
Answers of Question Bank Class XI Computer Science (Book Reference : Sumita Arora)

Chapter – 1: GETTING STARTED WITH PYTHON

Very Short answer Type Questions

Q.1 When was Python released?

Ans- Python was released in February 1991.

Q.2 Who developed Python?

Ans- Python was developed by Guido Van Rossum.

Q.3 Which two languages contributed to Python as a Programming Language?

Ans- ABC language and Modula 3.

Q.4 Is Python an Object Oriented Language?

Ans- Yes, Python is an object oriented language.

Q.5 Python got its name from which show?

Ans- Python got its name from famous BBC comedy show “Monty Python’s Flying Circus”.

Short Answer Type Questions

Q.1 ‘Python is an interpreted language’. What does it mean to you?

Ans- It means that the Python installation interprets and executes the code line by line at a time.

Q.2 What does a cross platform language mean?

Ans- it means a language can run equally on variety of platforms-Windows, Linux/UNIX, Macintosh, Supercomputers, Smart phones etc.

Q.3 Python is a Free and Open Source language. What do you understand by this feature?

Ans- It means Python is freely available without any cost. Its source code is also available. One can modify, improve/extend an open source software.

Q.4 In how many ways, can you work in Python?

Ans-In two ways we can work in Python-

(i) Interactive mode

(ii) Script Mode

Q.5 What is the difference between Interactive mode and Script Mode in Python?

Ans- In interactive mode, one command can run at a time and commands are not saved. Whereas in Script mode, we can save all the commands in the form of a program file and can see output of all lines together.

Q.6 What are the advantages of Python?

Ans- Advantages-

- i. Easy to use OO Language.
- ii. Expressive Language.
- iii. Interpreted Language.
- iv. It is complete.
- v. Cross-Platform Language.
- vi. Free and Open Source.
- vii. Variety of Usage/ Applications

Q.7 What are the limitations of Python?

Ans- limitations-

- i. Not the fastest language.

- ii. Lesser Libraries than C, Java, Perl.
- iii. Not strong on Type Binding.
- iv. Not easily convertible.

Skill Based Questions

Q.1 Which of the following are not valid strings in Python?

(a) "Hello" (b) 'Hello' (c) "Hello" (d) 'Hello' (e) {Hello}

Ans- String (c) , (d) and (e) are not valid strings.

Q.2 Write Instructions in python to get the following result: (Do it in both interactive mode and script mode)

I am a student of KV Barabanki

I live in Barabanki

And I love Barabanki.

Barabanki is 20 KM away from Lucknow

This Place is famous for Dewa Sharif

Ans- In Interactive Mode-

```
>>> print("I am a student of KV Barabanki \nI live in Barabanki \nAnd I love Barabanki\n\n Barabanki is 20
KM away from Lucknow\n This Place is famous for Dewa Sharif")
```

In Script Mode-

```
print("I am a student of KV Barabanki \n I live in Barabanki \nAnd I love Barabanki\n\n Barabanki is 20 KM
away from Lucknow\n This Place is famous for Dewa Sharif")
```

(save this code to a file and then run the file)

Chapter – 2: PYTHON FUNDAMENTALS

Very Short answer Type Questions

Q.1 What is None literal in Python?

Ans: Python has one special literal, which is **None**. The None literal is used to indicate absence of value. It is also used to indicate the end of lists in Python. It means "There is nothing here".

Q.2 What is the error in following code: x, y = 7 ?

Ans: The following error comes - 'int' object is not iterable. Which means an integer object i.e. cannot be repeated for x and y. one more integer object is required after 7.

Q.3 what will the following code do: a=b=18 ?

Ans: This code will assign 18 to a and b both.

Q.4 Following code is creating problem X = 0281, find reason.

Ans: 0281 is an invalid token.

Q.5 Find the error in the following code:

(a) **temp=90**
Print temp

(b) **a=12**
b = a + b
print(a And b)

(c) **print("x="x)**

(d) **a, b, c=2, 8, 4**
print(a, b, c)
c, b, a = a, b, c
print(a; b; c)

(e) **x = 23**
4 = x

(f) **else = 21-4**

Ans: (a) Missing parentheses in call to 'print'.
(b) Name 'b' is not defined.
(c) Invalid Syntax.
(d) Invalid Syntax in second print statement.
(e) can't assign to literal in second line.
(f) Invalid Syntax.

Q.6 Find the error in the following code:

(a) `y = x + 5`
`print(x,y)`

(b) `a=input("Value: ")`
`b = a/2`
`print(a, b)`

(c) `print(x = y = 5)`

- Ans:** (a) Name 'x' is not defined.
(b) Unsupported operand type(s) for /: 'str' and 'int'.
(c) Invalid Syntax.

Short Answer Type Questions

Q.1 What is the difference between a keyword and an identifier?

Ans: Difference between Keyword and Identifier: Every language has keywords and identifiers, which are only understood by its compiler. Keywords are predefined reserved words, which possess special meaning. An identifier is a unique name given to a particular variable, function or label of class in the program.

Q.2 What are literals in Python? How many types of Literals allowed in Python?

Ans: Literals: Python comes with some built-in objects. Some are used so often that Python has a quick way to make these objects, called literals.

The literals include the string, Unicode string, integer, float, long, list, tuple and dictionary types.

Q.3 How many types of sequences are supported in Python?

Ans: Three Types of Sequences are supported in python:

- (i) String
- (ii) List
- (iii) Tuple

Q.4 What factors guide the choice of identifiers in program?

- Ans:** (i) An identifier must start with a letter or underscore followed by any number of digits and/or letters.
(ii) No reserved word or standard identifier should be used.
(iii) No special character (Other than underscore) should be included in the identifier.

Q.5 What is the difference between an expression and a statement in Python?

Ans: A statement is an instruction that the Python interpreter can execute. We have only seen the assignment statement so far. Some other kinds of statements that we'll see shortly are while statements, for statements, if statements, and import statements. (There are other kinds too!)

An expression is a combination of values, variables, operators, and calls to functions. Expressions need to be evaluated. If you ask Python to print an expression, the interpreter evaluates the expression and displays the result.

Q.6 What are tokens in Python? How many types of tokens allowed in Python?

Ans: Tokens are the smallest unit of the program. There are following tokens in Python:

- Reserved words or Keywords
- Identifiers
- Literals
- Operators
- Punctuators

Definition of all tokens may come. Which is not given in this question bank.

Q.7 What are operators? What is their function? Give examples of some unary and binary operators.

Ans: "Operators are those symbols used with operands, which tells compiler which operation is to be done on operands." in other words - "operators are tokens that trigger some computation/action when applied to variables and other objects in an expression."

Operators are of following types:

- **Unary operators** like (+) Unary Plus, (-) Unary Minus, not etc.
- **Binary Operators** like (+) addition, (*) multiplication, and etc.

Q.8 What is block/code block/suit in Python?

Ans: Sometimes a group of statements is part of another statement of function. Such a group of one or more statements is called **block** or **code-block** or **suit** in python. e.g.

```
if a>b:
    print("A is graeter")
    print("Value of A is : ",a)
else:
    print("B is graeter")
    print("Value of A is : ",b)
```

Here both the sections are separate code-blocks

Q.9 What is the role of indentation in Python?

Ans: Indentation plays a very important role in Python. Python uses indentation to create blocks of code. Statements at same indentation level are part of same block/suit. You cannot unnecessarily indent a statement; python will raise an error for that.

Q.10 How many types of strings are supported by Python?

Ans: Python supports two types of strings:

- Single-line string That terminates in single line.
- Multi-line String That stores multiple lines of text.

Skill Based Questions

Q.1 What will be the sizes of following constants?

(a) '\a' (b) "\a" (c) "Kumar\s" (d) '\'" (e) "it's"

Ans: (a) 50 (b) 50 (c) 56 (d) 50 (e) 53

This screenshot is the output of the above question.

```
>>> sys.getsizeof(a)
28
>>> sys.getsizeof('\a')
50
>>> sys.getsizeof("\a")
50
>>> sys.getsizeof("kumar\s")
56
>>> sys.getsizeof('\\"')
50
>>> sys.getsizeof("it's")
53
```

Q.2 How can you create multi-line strings in Python?

Ans: We can create multi-line string by putting a backslash (\) at the end of line which allows you to continue typing in next line in same string.

```
>>> Text1="Hello\
World"
>>> Text1
'HelloWorld'
```

Q.3 Which of the following are syntactically correct strings? State reason.

- "Python is nice Language"
- 'He called me "Friend!" when he came'
- "Very Good'
- 'This is a good book'
- "Namaste
- "I liked 'Harry Potter' very much"

Ans: (a) Correct (b) Correct (c) Incorrect (d) Correct (e) Incorrect (f) Correct

Q.4 What is the error in following Python program with one statement?

```
print("My name is : ", name)
```

suggest a solution

Ans: Error is : "name 'name' is not defined". And the solution is to declare the variable-name before this statement.

```
>>> name="aa"
>>> print("My name is : ", name)
My name is : aa
```

Q.5 Predict the output of the following:

```
x,y=7,2
x,y,x=x+1,y+3,x+10
print(x,y)
```

Ans: Output: 17 5

Q.6 What will be the output of the following code:

```
name='Hari'
age=18
print(name," , you are ",age," now but ",end="")
print("You will be ",age+1," next Year")
```

Ans: Output: Hari , you are 18 now but You will be 19 next year

Q.7 Write a Program to obtain temperature in Celsius and convert it into Fahrenheit using formula -

C X 9/5 + 32 = F

```
c=int(input("Enter the value in Celsius"))
f=(c * 9/5) + 32
```

Ans: print("Temperature in fahrenheit is : ",f)

Q.8 Predict output:

```
a,b,c=2,3,4
a,b,c=a*a,a*b,a*c
print(a,b,c)
```

Ans: Output: 4 6 8

Q.9 WAP to read today's date (only date Part) from user. Then display how many days are left in the current month.

Ans:

```
import datetime
td=0
now=datetime.datetime.now()
print(now.day)
if now.month==2:
    td=28
elif now.month in(1,3,5,7,8,10,12):
    td=31
else:
    td=30
print("Total remaining days in the current month are : ", td-now.day)
```

Q.10 WAP to print the area of circle when radius of the circle is given by user.

Ans:

```
r=int(input("Enter the radius : "))
area= 3.14*r*r
print("Area of circle is : ",area)
```

Q.11 WAP to print the volume of a cylinder when radius and height of the cylinder is given by user.

Ans:

```
r=int(input("Enter the radius : "))
h=int(input("Enter the height : "))
vol=3.14*r*r*h
print("Volume of Cylinder is : ",vol)
```

Q.12 WAP that asks your height in centimeters and converts it into foot and inches.

```
Ans: cm=int(input("Enter height in Centimeters : "))
foot=cm//30
rcm=cm%30
inches=rcm*0.393701
print("Height is : ",foot," Foot ",inches," Inches ")
```

Q.13 WAP to find area of a triangle.

```
Ans: import math
a=int(input("Enter side 1 on triangle : "))
b=int(input("Enter side 2 on triangle : "))
c=int(input("Enter side 3 on triangle : "))
s=(a+b+c)/2
area=s*math.sqrt((s-a)*(s-b)*(s-c))
print("Area of Triangle is : ",area)
```

Q.14 WAP to calculate simple interest.

```
Ans: p=int(input("Enter Principal : "))
r=int(input("Enter Rates : "))
t=int(input("Enter Time :"))
si=(p*r*t)/100
print("Simple Interest is :",si)
```

Q.15 WAP to read a number in n and prints n^2 , n^3 , n^4

```
Ans: n=int(input("Enter value of n : "))
print("n^2 : ",n*n)
print("n^3 : ",n*n*n)
print("n^4 : ",n*n*n*n)
```

Chapter – 3: DATA HANDLING

Very Short answer Type Questions

Q.1 Identify the data types of the following values given bellow –

3, 3j, 13.0, '12', "14", 2+0j, 19, [1,2,3], (3,4,5)

Ans: 3 – int 3j – complex 13.0 – float '12' – string "14" – string
2+0j – complex 19 – int [1,2,3] – list (3,4,5) – tuple

Q.2 What will be the output of the following

(a)12/4 (b)14//14 (c)14%4 (d) 14.0/4 (e) 14.0//4 (f)14.0%4

Ans: (a) 3.0 (b) 1 (c) 2 (d) 3.5 (e) 3.0 (f) 2.0

Q.3 What will be the output of the following ?

```
print(17//4)
print(17/4)
print(len(str(17//4)))
print(len(str(17/4)))
```

Ans: 4
4.25
1
4

Q.4 What will be the output of the following ?

(a) bool(0) (b) bool('0') (c) bool(int('0'))
(d) bool(str(0.0)) (e) bool(0j) (f) bool(0.0)

Ans: (a) False (b) True (c) False
(d) True (e) False (f) False

Q.5 What will be the output of the following ?

(a) 87//5 (b) (87//5.0) == (87//5) (c) 87//5.0 (d) 17%5.0

Ans: (a) 17 (b) True (c) 17.0 (d) 2.0

Q.6 int('a') produces error. Why?

Ans: This is because 'a' is an invalid literal for int() with base 10.

Q.7 Write following expressions in Python.

(a) $\frac{1}{3}b^2h$ (b) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (c) $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (d) $a^n \times a^m = a^{n+m}$

Ans: (a) (b*b*h)/3

(b) d=math.sqrt(pow(x2-x1,2)+pow(y2-y1,2))

(c) x1=(-b) + math.sqrt((b*b)-(4*a*c))/(2*a)

x2=(-b) - math.sqrt((b*b)-(4*a*c))/(2*a)

(d) pow(a,n) * pow(a,m) = pow(a,m+n)

Short Answer Type Questions

Q.1 What are data types? What are Python's built-in core data types?

Ans: Every value in Python has a datatype. Since everything is an object in Python programming, data types are actually classes and variables are instance (object) of these classes.

There are various data types in Python. Some of the important types are listed below.

(i) Numbers (ii) String (iii) List (iv) Tuple (v) Dictionary

Q.2 Which data types of Python handle Numbers?

Ans: It is cleared by name that Number data types are used to store numeric value in Python. The Numbers in Python have following core data types:

(i) Integers

a. Integers (signed)

b. Booleans

(ii) Floating-Point Numbers

(iii) Complex Numbers

Q.3 Why is Boolean considered a subtype of Integers?

Ans: Because Boolean Values *False* and *True* behave like the values 0 and 1, respectively. So Boolean type is a subtype of plain integers.

Q.4 What do you understand by term 'immutable'?

Ans: Immutable types are those data types that can never change their value in place. In Python the following types are immutable:

(i) integers

(ii) floating-point numbers

(iii) Booleans

(iv) Strings

(v) Tuples

Q.5 What will be the output of the following code? Why?

(a) 13 or len(13)

(b) len(13) or 13

Ans: (a) 13 (b) TypeError: object of type 'int' has no len().

Q.6 What are mutable and immutable types in Python? List both of them.

Ans: **Mutable types** means those data types whose values can be changed at the time of execution.

They are as follows:

- Lists
- Dictionaries
- Sets

Immutable types are those data types that can never change their value in place. In Python the following types are immutable:

- integers
- floating-point numbers
- Booleans
- Strings
- Tuples

Q.7 What are augmented assignment operators? How are they useful?

Ans: An augmented assignment is generally used to replace a statement where an operator takes a variable as one of its arguments and then assigns the result back to the same variable. A simple example is `x += 1` which is expanded to `x = x + (1)`. Similar constructions are often available for various binary operators. They are helpful in making the source code small.

Skill Based Questions

Q.1 WAP to calculate compound simple interest after taking the principle, rate and time.

Ans:

```
#Compound Interest
p=int(input("Enter the Principal"))
r=int(input("Enter the Interest Rate"))
t=int(input("Enter the Tenure"))
temp=1+r/100
f=1
for i in range(1,t+1):
    f=f*temp
Amount=p*f
interest=Amount-p
print("The interest on ",p," with rate ",r," is ",interest)
```

Q.2 WAP to check the given year is leap year or not.

Ans:

```
year = int(input("Enter year"))
if (year % 4) == 0:
    if (year % 100) == 0:
        if (year % 400) == 0:
            print("{0} is a leap year".format(year))
        else:
            print("{0} is not a leap year".format(year))
    else:
        print("{0} is a leap year".format(year))
else:
    print("{0} is not a leap year".format(year))
```


Q.3 WAP to take two numbers and check that the first number is fully divisible by second number or not.

Ans:

```
a=int(input("Enter First Number : "))
b=int(input("Enter Second Number : "))
if a%b==0:
    print(a, " is fully divisible by ",b)
else:
    print(a, " is not fully divisible by ",b)
```

Q.4 What will be the output of the following?

```
a=5-4-3
b=3**2**3
print(a)
print(b)
```

Ans: -2
6561

Q.5 What will be the output of the following?

```
x,y=4,8
z=x/y*y
print(z)
```

Ans: 4.0

Q.6 WAP to take value of x,y,z from the user and calculate the equation $4x^4 + 3y^3 + 9z^2 + 6\pi$

Ans:

```
x=int(input("Enter x : "))
y=int(input("Enter y : "))
z=int(input("Enter z : "))
f=4*pow(x,4)+3*pow(y,3)+9*pow(z,2)+6*3.14
print("The Answer is : ",f)
```

Q.7 WAP to take the temperatures of all 7 days of the week and displays the average temperature of that week.

Ans:

```
d1=int(input("Temperature of day 1 : "))
d2=int(input("Temperature of day 2 : "))
d3=int(input("Temperature of day 3 : "))
d4=int(input("Temperature of day 4 : "))
d5=int(input("Temperature of day 5 : "))
d6=int(input("Temperature of day 6 : "))
d7=int(input("Temperature of day 7 : "))
avg=(d1+d2+d3+d4+d5+d6+d7)/7
print("The average temp is : ",avg)
```

Chapter – 4: CONDITIONAL AND ITERATIVE STATEMENTS

Short Answer Type Questions

Q.1 What a range() function does? Give an example.

Ans: The range() function returns a sequence of numbers, starting from 0 by default, and increments by 1 (by default), and ends at a specified number. its syntax is **range(start, stop, step)** e.g.

```
x = range(3, 6)
```

```
for n in x:
    print(n)
```

#This code will print 3 4 5

```
x = range(1, 10,2)
```

```
for n in x:
    print(n)
```

#This code will print 1 3 5 7 9

Q.2 What are loops in Python? How many types of loop are there in Python?

Ans: Loops are iteration constructs in Python. Iteration means repetition of a set of statements depending upon a condition test. Loops has three basic elements within it to repeat the statements –

- Initialization (Start)
- Check Condition (Stop)
- Updation (Step)

Python provide two types of loop

- (i) Conditional Loop **while**((Condition based loop)
- (ii) Counting loop **for** (loop for a given number of times).

Q.3 What is the syntax of if-elif statement in Python?

Ans: The syntax of if-elif statement in python is as follows:

```
If condition1:
    #code-block of statements when condition1 is true
elif condion2:
    #code-block of statements when condition2 is true
elif condition3:
    #code-block of statements when condition3 is true
.
.
.
else:
    #code-block of statements when all above conditions are false.
```

Q.4 What are jump statements in Python? Name jump statements with example.

Ans: Python offers two jump statements to be used with in loops to jump out of loop-iterations.

These are **break** and **continue** statements.

```
#program to stop loop when 5 encounters
n=int(input("Enter limit : "))
i=0
while i<=n:
    i+=1
    if i==5:
        break
    print(i)
```

```
#program to print upto n excluding 5
n=int(input("Enter limit : "))
i=0
while i<=n:
    i+=1
    if i==5:
        continue
    print(i)
```

Q.5 Rewrite the following code fragment using for loop.

```
i=100
while(i>0):
    print(i)
    i-=3
```

Ans:

```
for i in range(100,0,-3):
    print(i)
```

Q.6 What is the error in following code. Rewrite the correct code.

```
weather='raining'
if weather='sunny':
    print('wear sunblock')
elif weather='snow':
    print('Going skiing')
else:
    print("None of the above")
```

Correct Code:

```
weather='raining'
if weather=='sunny':
    print('wear sunblock')
elif weather=='snow':
    print('Going skiing')
else:
    print("None of the above")
```

Q.7 Rewrite the following code fragment using while loop.

```
for i in range(1,10):
    if i%3==0:
        print(i)
```

Ans:

```
i=1
while i<10:
    if i%3 ==0:
        print(i)
    i+=1
```

Skill Based Questions

Q.1 WAP that searches for prime numbers from 15 through 25.

Ans:

```
for a in range(15,25):
    k=0
    for i in range(2,a//2+1):
        if(a%i==0):
            k=k+1
    if(k==0):
        print(a)
```

Q.2 WAP to test if given number is prime or not.

Ans:

```
a=int(input("Enter number: "))
k=0
for i in range(2,a//2+1):
    if(a%i==0):
        k=k+1
if(k==0):
    print("Number is prime")
else:
    print("Number isn't prime")
```

Q.3 WAP to compute the result when two numbers and one operator is given by user.

Ans:

```
a=int(input("Enter 1st number: "))
b=int(input("Enter 2nd number: "))
c=input("Enter the Operation +,-,/,*:")
print("The result is : ", end='')
if c=='+':
    print(a+b)
elif c=='-':
    print(a-b)
elif c=='/':
    print(a/b)
elif c=='*':
    print(a*b)
else:
    print("Error : Wrong operator entered")
```

Q.4 WAP to calculate the roots of a given quadratic equation.

Ans:

```
import math
a=int(input("Enter a "))
b=int(input("Enter b "))
c=int(input("Enter c "))
d=(b*b)-(4*a*c)
if d>=0:
    print("roots are : ")
    x1=-b+math.sqrt(d)/(2*a)
    x2=-b-math.sqrt(d)/(2*a)
    print(" x1 = =",x1)
    print(" x2 = =",x2)
else:
    print("roots are imaginary.")
```

Q.5 WAP to input a digit and print it in words.

Ans:

```
n=int(input("Enter the Digit from 0 to 9: "))
print("Entered Digit is : ",end='')
if n==0:
    print("Zero")
elif n==1:
    print("One")
elif n==2:
    print("Two")
elif n==3:
    print("Three")
elif n==4:
    print("Four")
elif n==5:
    print("Five")
elif n==6:
    print("Six")
elif n==7:
    print("Seven")
elif n==8:
    print("Eight")
elif n==9:
    print("Nine")
else:
    print("Not a digit")
```

Q.6 WAP to check whether square root of a given number is prime or not.

Ans:

```
import math
n=int(input("Enter a number"))
m=int(math.sqrt(n))
k=0
for i in range(2,m//2+1):
    if(m%i==0):
        k=k+1
if(k==0):
    print(m," which is sqare root of ",n," is Prime number.")
else:
    print(m," which is sqare root of ",n," is not Prime number.")
```

Q.7 WAP to print first n odd numbers in descending order.

Ans:

```
n=int(input("Enter the Limit "))
if n%2==0:
    for i in range(n-1,0,-2):
        print(i)
else:
    for i in range(n,0,-2):
        print(i)
```

Q.8 WAP to print the following series -

(i) 1 4 7 1040

(ii) 1 -4 7 -10 -40

Ans: (i)

```
n=int(input("Enter the Limit "))
for i in range(1,n+1,3):
    print(i, end=' ')
```

(ii)

```
n=int(input("Enter the Limit "))
j=0
for i in range(1,n+1,3):
    print(pow(-1,j)*i, end=' ')
    j+=1
```

Q.9 WAP to find the average of the list of the numbers entered through keyboard.

```
Ans: n=int(input("Enter the Limit "))
s=0
for i in range(1,n+1):
    print("Enter ",i,end='')
    a=int(input("th number : "))
    s=s+a
avg=s/n
print("The sum of entered numbers : ",s)
print("The Average of entered numbers : ",avg)
```

Q.10 WAP to find the largest number from the list of the numbers entered through keyboard.

```
Ans: n=int(input("Enter the Limit less than 99999999999 "))
small=99999999999
for i in range(1,n+1):
    print("Enter ",i,end='')
    a=int(input("th number : "))
    if a<small:
        small=a
    print("Smallest no. is : ",small)
```

Q.11 WAP to find the 2nd largest number from the list of the numbers entered through keyboard. (This program is from List Chapter)

```
Ans: a=[]
n=int(input("Enter number of elements:"))
for i in range(1,n+1):
    b=int(input("Enter element:"))
    a.append(b)
a.sort()
print("Second largest element is:",a[n-2])
```

Q.12 WAP to find the sum of n natural numbers.

```
Ans: n=int(input("Enter the Limit : "))
s=0
for i in range(1,n+1):
    s=s+i
print("The sum is : ",s)
```

Q.13 WAP to find the sum of first n even numbers.

```
Ans: n=int(input("Enter the Limit : "))
s=0
for i in range(0,n+1,2):
    s=s+i
print("The sum is : ",s)
```

Q.14 WAP to find the sum of first n odd numbers.

```
Ans: n=int(input("Enter the Limit : "))
s=0
for i in range(1,n+1,2):
    s=s+i
print("The sum is : ",s)
```

Q.15 WAP to print the following pattern

(a)	*	(b)	*	(c)	A	(d)	0
	**		**		AB		2 2
	***		***		ABC		4 4 4
	****		****		ABCD		8 8 8 8
	*****		*****		ABCDE		

Ans: (a)

```
n=int(input("Enter the Limit : "))
for i in range(1,n+1):
    for j in range(1,i+1):
        print("*",end='')
    print("")
```

(b)

```
n=int(input("Enter the Limit : "))
for i in range(1,n+1):
    for k in range(n-i,0,-1):
        print(' ',end='')
    for j in range(1,i+1):
        print("*",end='')
    print("")
```

(c)

```
s=input("Enter the String : ")
n=len(s)
for i in range(0,n):
    for j in range(0,i):
        print(s[j],end='')
    print("")
```

(d)

```
n=int(input("Enter the Limit : "))
for i in range(0,n+1,2):
    for j in range(0,i+1,2):
        print(i,end='')
    print("")
```

Chapter – 5: STRING MANIPULATION

Very Short answer Type Questions

Q.1 which of the following is not a Python legal string operation?

(a) 'abc'+ 'abc' (b) 'abc'*3 (c) 'abc' + 3 (d) 'abc'.lower()

Ans: (c) 'abc' + 3

Q.2 Out of the following operators, which ones can be used with strings?

=, -, *, /, //, %, >, <>, in, not in, <=

Ans: /, // and %

Q.3 From the string S = "CARPE DIEM". Which ranges return "DIE" and "CAR"?

Ans: S[6:9] for "DIE" and S[0:3] for "CAR"

Q.4 Given a string S = "CARPE DIEM". If n is length/2 then what would following return?

- (a) S[:n] (b) S[n:] (c) S[n:n] (d) S[1:n] (e) S[n:length-1]

Ans: (a) "CARPE" (b) "DIEM" (c) '' (d) "ARPE" (e) "DIE"

Q.5 What would following expression return?

- (a) "Hello World".upper().lower() (b) "Hello World".lower().upper()
(c) "Hello World".find("Wor",1,6) (d) "Hello World".find("Wor")
(e) "Hello World".find("wor") (f) "Hello World".isalpha()
(g) "Hello World".isalnum() (h) "Hello World".isdigit()
(i) "123FGH".isdigit()

Ans: (a) 'hello world'

(c) -1

(e) -1

(g) False

(i) False

(b) 'HELLO WORLD'

(d) 6

(f) False

(h) False

Short Answer Type Questions

Q.1 What is a string slice? How is it useful?

Ans: String Slice is a part of a string containing some contiguous characters from the string. It is accessed from the string by providing a range in "[]" brackets i.e. S [n:m]. Python returns all the characters at indices n, n+1, n+2 . . . m-1 e.g. 'Barabanki'. [4:7] will return 'ban'.

Q.2 Write a python script that traverses through an input string and prints its characters in different lines – two characters per line.

Ans:

```
s=input("Enter a string")
l=len(s)
j=0
for i in range(0,l):
    print(s[i],end='')
    j+=1
    if j%2==0:
        print('\n')
```

Q.3 Which functions would you chose to use to remove leading and trailing white spaces from a given string?

Ans: Python String strip() function will remove leading and trailing whitespaces. If you want to remove only leading or trailing spaces, use lstrip() or rstrip() function instead.

Q.4 Suggest appropriate functions for the following tasks –

(a) To check whether the string contains digits.

(b) To find the occurrence a string within another string.

(c) To convert the first letter of a string to upper case.

(d) To convert all the letters of a string to upper case.

(f) To check whether all the letters of the string are in capital letters.

(g) to remove all the white spaces from the beginning of a string.

Ans: (a) isalnum()

(b) find()

(c) capitalize()

(d) upper()

(f) isupper()

(g) lstrip()

Q.5 Find the errors -
s="PURA VIDA"
Print(s[9] + s[9:15])

Ans: Here the error is : Sting index out of range.

Q.6 Find the output – if we give input as "Hello"

```
S=input("Enter String")
RS=""
for ch in S:
    RS=ch+RS
print(S+RS)
```

```
S=input("Enter String")
RS=""
for ch in S:
    RS=ch*2+RS
print(RS+S)
```

Ans: output 1 Enter a stringHello **output2**

```
HelloH
HelloeH
HelloleH
HellolleH
HelloolleH
```

```
Enter a stringHello
HelloHH
HelloeeHH
HellolleeHH
HellollleeHH
HellooollleeHH
```

Skill Based Questions

Q.1 WAP to print following pattern without using any nested loop.

```
#
# #
# # #
# # # #
# # # # #
```

Ans:

```
n=int(input("Enter Limit"))
for i in range(1,n+1):
    print("#"*i)
```

Q.2 WAP to print the number of occurrences of a substring into a line.

Ans:

```
s=input("Enter a String : ")
substr=input("Enter a Sub String : ")
l=len(s)
lsub=len(substr)
start=count=0
end=1
while True:
    position=s.find(substr,start,end)
    if position!=-1:
        count+=1
        start=position+lsub
    else:
        break
    if start>=l:
        break
print("No. of occurances of ",substr, " : ",count)
```


Q.3 WAP to check the given string is palindrome or not.

```
Ans: s=input("Enter a string : ")
mid=len(s)//2
rev=-1
for a in range(mid):
    if s[a]==s[rev]:
        rev-=1
    else:
        print(s," is not Palindrome")
        break
else:
    print(s, " is palindrome")
```

Q.4 WAP that:

- **Prompt the user for a string**
- **Extract all the digits from the string.**
- **If there are digits**
 - **Sum the collected digits together.**
 - **Printout:**
 - **The original string**
 - **The digits**
 - **The sum of the digits**
- **If there are no digits**
 - **Print the original string**
 - **A message "Has no Digits"**

```
Ans: s=input("Enter a String : ")
sum=0
num=0
if s.isalpha()==False:
    for i in s:
        if i.isdigit()==True:
            num=num*10+int(i)
            sum+=int(i)
    print("Original String : ",s)
    print("Digits : ",num)
    print("Sum of digits is : ",sum)
else:
    print("Original String ",s," has no digit")
```

Chapter – 6: DEBUGGING PROGRAMS

Short answer Type Questions

Q.1 What do you understand by Syntax errors and Semantics errors?

Ans: Syntax Errors: syntax error occur when rules of a programming language are misused i.e. grammatical rule of Python is violated. e.g.

X<-x*y

if x=(x*y) etc.

Semantics Errors: Semantics error occur when statements are not meaningful. e.g.

$x * y = z$

this will result in a semantical error as an expression cannot come on the left side of an assignment operator.

Q.2 Why are logical errors harder to locate?

Ans: in spite of logical errors presence, program executes without any problems but the output produced is not correct. Therefore, each and every statement of the program needs to be scanned and interpreted. Thus the logical errors are harder to locate.

Q.3 What is an Exception?

Ans: Exception in general refers to some contradictory or unusual situation which can be encountered unexpectedly while executing the program. Unhandled exceptions will cause Python to halt execution.

Q.4 Why is Exception Handling is required?

Ans: Unhandled exceptions will cause Python to halt execution. The exception handling is ideal for processing exceptional situations in a controlled way so that program ends gracefully rather than abrupt crashing of the program.

Q.5 What is the need for debugger tool?

Ans: Debugger tools are very useful especially if the code is big or the error is not very clear, it becomes very difficult to manually figure out the origin and cause of the problem. Debugger tools here prove very handy and useful. They show us the line by line execution and its result on variables interactively and help a programmer get to the root of the problem.

Q.6 What are main error types? Which types are most dangerous and why?

Ans: Main error types are -

- (i) Compile-time errors
- (ii) Run-time errors
- (iii) Logical errors

Logical errors are most dangerous errors because these are most difficult to fix. The error is caused by a mistake in the program's logic. You won't get an error message, because no syntax or runtime error has occurred. You will have to find the problem on your own by reviewing all the relevant parts of your code – although some tools can flag suspicious code which looks like it could cause unexpected behaviour.

Q.7 What is a difference between an error and exception?

Ans: Exception and Error: Exceptions are those which can be handled at the run time whereas errors cannot be handled. An exception is an Object of a type deriving from the System.Exception class. System.Exception is thrown by the CLR (Common Language Runtime) when errors occur that are nonfatal and recoverable by user.

Q.8 Name some common built-in exceptions in Python.

Ans: Some Common built-in Exceptions in Python are:

- (i) EOFError
- (ii) IOError
- (iii) NameError
- (iv) IndexError
- (v) ImportError
- (vi) TypeError
- (vii) ValueError
- (viii) ZeroDivisionError
- (ix) KeyError

Q.9 when does these exception occur?

- (a) Type Error**
- (b) Index Error**
- (c) Name Error**

Ans: (a) Type Error: Raised when an operation or function is applied to an object of inappropriate type. e.g. if you try to compute square-root of a string.

(b) Index Error: Raised when a sequence subscript or index is out of range e.g. from a string of length 4 if you try to read a value of index 4 or more.

(c) Name Error: Raised when an identifier name is not found.

Q.10 What is debugging and code tracing?

Ans: Debugging involves correction of code so that the cause of errors is removed. In other words we can say that debugging means figure out the origin of error in code, fix the error code and review and rerun your code to ensure that the error is fixed.

Chapter – 7: LIST MANIPULATION

Very Short answer Type Questions

Q.1 What do you understand by mutability?

Ans: Mutable means changeable. In Python, mutable types are those whose values can be changed in place. Only three types are mutable in python – Lists, Dictionaries and Sets.

Q.2 Start with the list[8,9,10]. Do the following using list functions

(a) Set the second entry (index 1) to 17

(b) Add 4, 5 and 6 to the end of the list.

(c) Remove the first entry from the list.

(d) Sort the list.

(e) Double the list.

(f) Insert 25 at index 3

Ans: (a) `list[1]=17`

(b) `list.append(4)`

`list.append(5)`

`list.append(6)`

(c) `list.pop(0)`

(d) `list.sort()`

(e) `list=list*2`

(f) `list.insert(3,25)`

Q.3 If a is [1, 2, 3], what is the difference (if any) between a*3 and [a, a, a]?

Ans: `a*3` will produce `[1,2,3,1,2,3,1,2,3]`, means a list of integers and `[a, a, a]` will produce `[[1,2,3],[1,2,3],[1,2,3]]`, means list of lists

Q.4 If a is [1, 2, 3], is a *3 equivalent to a + a + a?

Ans: Yes, Both `a*3` and `a+a+a` will produce same result.

```
>>> a=[1,2,3]
>>> a*3
[1, 2, 3, 1, 2, 3, 1, 2, 3]
>>> a+a+a
[1, 2, 3, 1, 2, 3, 1, 2, 3]
```

Q.5 If a is [1, 2, 3], what is the meaning of a [1:1] = 9?

Ans: This will generate an error "TypeError: can only assign an iterable".

Q.6 If a is [1, 2, 3], what is the meaning of a [1:2] = 4 and a [1:1] = 4?

Ans: These will generate an error "TypeError: can only assign an iterable".

Q.7 What are list slices?

Ans: List slices are the sub-part of a list extracted out. You can use indexes of the list elements to create *list slices* as per following format. Syntax is as follows –

Seq=ListName[start:stop]

Q.8 Does a slice operator always produce a new list?

Ans: Yes, this will create a new list.

Short Answer Type Questions

Q.1 How are lists different from strings when both are sequences?

Ans: Lists are similar to strings in many ways like indexing, slicing, and accessing individual elements but they are different in the sense that

- (i) *Lists are mutable while strings are immutable.*
- (ii) *In consecutive locations, strings store the individual characters while list stores the references of its elements.*
- (iii) *Strings store single type of elements-all characters while lists can store elements belonging to different types.*

Q.2 What are nested Lists?

Ans: A list can have an element in it, which itself is a list. Such a list is called nested list. e.g.
L = [1,2,3,4,[5,6,7],8]

Q.3 Discuss the utility and significance of Lists.

Ans: The list is a most versatile datatype available in Python which can be written as a list of comma-separated values (items) between square brackets. Important thing about a list is that items in a list need not be of the same type. List is majorly used with dictionaries when there is large number of data.

Q.4 What is the purpose of the del operator and pop method? Try deleting a slice.

Ans: **del operator** is used to remove an individual item, or to remove all items identified by a slice.

It is to be used as per syntax given below –

```
>>>del List[index]
```

```
>>>del List[start:stop]
```

pop method is used to remove single element, not list slices. The pop() method removes an individual item and returns it. Its syntax is –

```
>>>a=List.pop() #this will remove last item and deleted item will be assigned to a.
```

```
>>>a=List[10] # this will remove the ite at index 10 and deleted item will be assigned to a.
```

Q.5 What are list slices?

Ans: List slices, like string slices are the sub part of a list extracted out. Indexes can be used to create list slices as per following format:

```
seq = L[start:stop]
```

Q.6 What do you understand by true copy of a list? How is it different from shallow copy?

Ans: A **shallow copy** means constructing a new collection object and then populating it with references to the child objects found in the original. In essence, a shallow copy is only *one level deep*. The copying process does not recurse and therefore won't create copies of the child objects themselves.

True Copy means you can create a copy of a list using `New_list=My_list`. The assignment just copies the reference to the list, not the actual list, so both `new_list` and `my_list` refer to the same list after the assignment.

Q.7 Predict the output –

```
L1=[1,3,5,7,9]
print(L1==L1.reverse())
print(L1)
```

Ans: False
[9, 7, 5, 3, 1]

Q.8 Predict the output –

```
List1=[13,18,11,16,13,18,13]
print(List1.index(18))
print(List1.count(18))
List1.append(List1.count(13))
print(List1)
```

Ans: 1
2
[13, 18, 11, 16, 13, 18, 13, 3]

Skill Based Questions

Q.1 WAP to find minimum element from a list of elements along with its index in the list.

Ans:

```
L=[2,58,95,999,65,32,15,1,7,45]
print(L)
m=min(L)
print("The Minimum elements is : ",m)
print("Index of minimum element is : ",L.index(m))
```

This program is for 1 or 2 marks

Or

```
lst=eval(input("Enter List : "))
length=len(lst)
min_ele=lst[0]
min_index=0
for i in range(1,length-1):
    if lst[i]<min_ele:
        min_ele=lst[i]
        min_index=i
print("Given list is : ",lst)
print("The Minimum element of the list is : ")
print(min_ele," at index ",min_index)
```

This program is for 3 or 4 marks

output

```
Enter List : [67,87,56,6,4,89,99,3,2,56]
Given list is : [67, 87, 56, 6, 4, 89, 99, 3, 2, 56]
The Minimum element of the list is :
2 at index 8
```

Q.2 WAP to calculate mean of a given list of numbers.

Ans:

```
from statistics import mean
L=[2,58,95,999,65,32,15,1,7,45]
m=mean(L)
print("Mean of list is : ",m)
```

This program is for 1 or 2 marks

OR

```
lst=eval(input("Enter List : "))
length=len(lst)
mean=sum=0
for i in range(0,length-1):
    sum+=lst[i]
mean=sum/length
print("Given List is : ",lst)
print("The Mean of given list is : ",mean)
```

This program is for 3 or 4 marks

output

```
Enter List : [1,2,3,4,5,6,7,8,9]
Given List is : [1, 2, 3, 4, 5, 6, 7, 8, 9]
The Mean of given list is : 4.0
```

Q.3 WAP to search for an element in a given list of numbers.

Ans:

```
L=[2,58,95,999,65,32,15,1,7,45]
n=int(input("Enter the number to be searched : "))
found=0
for x in L:
    if x==n:
        print("Item found at position : ",L.index(n)+1)
        found=1
if found==0:
    print("Item not found")
```

Q.4 WAP to count frequency of a given element in a list of numbers.

Ans: `L=[2,58,95,999,95,32,15,95,7,45]` This program is for 1 or 2 marks
`n=int(input("Enter the number : "))`
`print("The frequency of number ",n," is ",L.count(n))`

Or

```
lst=eval(input("Enter List : "))
length=len(lst)
element=int(input("Enter the element: "))
count=0
for i in range(0,length-1):
    if element==lst[i]:
        count+=1
if count==0:
    print(element," Not Found")
else:
    print(element," has frequency as ",count," in given list")
```

This program is for 3 or 4 marks

output

```
Enter List : [34,45,56,45,34,88,45,99,45,90,45]
Enter the element: 45
45 has frequency as 4 in given list
```

Q.5 WAP to calculate the sum of integers of the list.

Ans: `L=[1,2,"Two",3,4,"four",5]`
`s=0`
`for x in L:`
 `if type(x)==int:`
 `s=s+x`
`print("The sum of integers is : ",s)`

Q.6 WAP that reverses an array of integers (in place)

Ans: `alist=[1,2,3,4,5,6]`
`end = len(alist)-1`
`limit = int(end/2) + 1`
`for i in range(limit):`
 `alist[i],alist[end] = alist[end],alist[i]`
 `end = end - 1`
`print (alist)`

Q.7 WAP that creates a third list after adding two lists.

Ans: `lst1=eval(input("Enter List1 : "))`
`lst2=eval(input("Enter List2 : "))`
`lst3=lst1+lst2`
`print("Given List are : ", lst1," and ",lst2)`
`print("The sum of list are : ",lst3)`

Q.8 WAP a program to generate a list of elements of Fibonacci Series.

Ans: `n=int(input("Enter the limit :"))`
`a=-1`
`b=1`
`for i in range(1,n+1):`
 `c=a+b`
 `print(c,end=' ')`
 `a=b`
 `b=c`

```
Enter the limit :10
0 1 1 2 3 5 8 13 21 34
```

Chapter – 8: TUPLES

Very Short answer Type Questions

Q.1 What do you understand by immutability?

Ans: Immutability means not changeable. The immutable types are those that can never change their value in place. In python following types are immutable –

- I. Integers

- II. Floating point numbers
- III. Booleans
- IV. Strings
- V. Tuples

Q.2 What is the length of the tuple shown below?

T = (((('a', 1), 'b', 'c'), 'd', 2), 'e', 3)

Ans: 3, because tuple contains only 3 elements.

Q.3 If a is (1, 2, 3), what is the difference (if any) between a*3 and [a, a, a]?

Ans: a*3 is different from [a,a,a] because, a*3 will produce a tuple (1,2,3,1,2,3,1,2,3) and [a, a, a] will produce a list of tuples [(1,2,3),(1,2,3),(1,2,3)].

Q.4 If a is (1, 2, 3), is a *3 equivalent to a + a + a?

Ans: Yes

Q.5 If a is (1, 2, 3), what is the meaning of a [1:1] = 9?

Ans: This will produce an error: TypeError: 'tuple' object does not support item assignment

Q.6 If a is (1, 2, 3), what is the meaning of a [1:2] = 4 and a [1:1] = 4?

Ans: This will produce an error: TypeError: 'tuple' object does not support item assignment

Q.7 Does a slice operator always produce a new Tuple?

Ans: Yes

Q.8 How is an empty Tuple created?

Ans: To create an empty tuple we have to write –
>>>T=() or >>>T=tuple()

Q.9 How is a tuple containing just one element created?

Ans: Following methods may be used to create single valued tuple –
>>>T=3, or >>>T=(4,)

Q.10 What is the difference between (30) and (30,)?

Ans: (30) is an integer while (30,) is a tuple.

Short Answer Type Questions

Q.1 How are Tuples different from Lists when both are sequences?

Ans: Tuples are similar to lists in many ways like indexing, slicing, and accessing individual values but they are different in the sense that –

Tuples are immutable while lists are mutable.

List can grow or shrink while tuples cannot.

Q.2 Can tuples be nested?

Ans: Yes, tuples can be nested. e.g (1,2,3,(4,5,6))

Q.3 Discuss the utility and significance of Tuples.

Ans: Tuples are great for holding static data that you don't plan on modifying and changing a lot. Tuples are four to seven times faster than lists. This means for every list item manipulated, four to seven tuples could be manipulated within that time frame. This has huge advantages for scientific work, as this allows for speedy data reading.

Q.4 How can you say that a tuple is an ordered list of objects?

Ans: A tuple is an ordered list of objects. This is evidenced by the fact that the objects can be accessed through the use of an ordinal index and for a given index, same element is returned everytime.

Q.5 How can you add an extra element to a tuple?

Ans: We can add an extra element to the tuple as follows – `>>>T = T +(9,)` e.g.

```
>>> T=(1, 2, 3, 4)
>>> T
(1, 2, 3, 4)
>>> T=T+(9,)
>>> T
(1, 2, 3, 4, 9)
```

Q.6 Find out the output generated by following code fragments:

(a) `plane = ("Passengers", "Luggage")`

`plane [1] = "Snakes"`

(b) `(a, b, c) = (1,2,3)`

(c) `(a, b, c, d) = (1,2,3)`

(d) `a, b, c, d = (1,2,3)`

(e) `a, b, c, d, e = (p, q, r, s, t) = t1`

Ans: (a) `TypeError: 'tuple' object does not support item assignment`

(b) This will assign 1 to a, 2 to b and 3 to c.

```
>>> (a,b,c)=(1,2,3)
>>> a
1
>>> b
2
>>> c
3
```

(c) `ValueError: not enough values to unpack (expected 4, got 3)`

(d) `ValueError: not enough values to unpack (expected 4, got 3)`

(e) If tuple t1 has 5 values then this will assign first value of t1 in to a and p , next value to b and q and so on.

Q.7 Predict the output –

```
a='a', 'b'
b=('a', 'b')
print(a==b)
```

Ans: True

Q.8 Predict the output –

```
t=(1,)*3
t[0]=2
print(t)
```

Ans: `TypeError: 'tuple' object does not support item assignment`

Skill Based Questions

Q.1 WAP that creates a tuple storing first 9 items of Fibonacci Series.

Ans:

```
a=-1
b=1
L=[]
for i in range(1,10):
    c=a+b
    L.append(c)
    a=b
    b=c
T=tuple(L)
print(T)
```

Q.2 WAP that creates a third tuple after adding two tuples. Add second after first tuple.

Ans:

```
a=(1, 2, 3)
b=(4, 5, 6)
c=a+b
print(c)
```


Q.3 WAP to calculate the mean of the numbers of the tuple.

Ans:

```
tpl=eval(input("Enter Tuple : "))
length=len(tpl)
mean=sum=0
for i in range(0,length):
    sum+=tpl[i]
mean=sum/length
print("Given tuple is : ",tpl)
print("The Mean of given tuple is : ",mean)
```

Enter Tuple : (1,2,3,4,5)
Given tuple is : (1, 2, 3, 4, 5)
The Mean of given tuple is : 3.0

Q.4 WAP to calculate the average of the numbers of the tuple.

Ans:

```
tpl=eval(input("Enter Tuple : "))
length=len(tpl)
avg=sum=0
for i in range(0,length):
    sum+=tpl[i]
avg=sum/length
print("Given tuple is : ",tpl)
print("The average of given tuple is : ",avg)
```

Enter Tuple : (1,2,3,4,5)
Given tuple is : (1, 2, 3, 4, 5)
The average of given tuple is : 3.0

Chapter – 9: DICTIONARIES

Very Short answer Type Questions

Q.1 Why can't List can be used as keys?

Ans: List is mutable datatype. And Keys of dictionary must be immutable type. This is the region that list cannot be used as keys.

Q.2 What type of objects can be used as keys in dictionary?

Ans: Any immutable objects can be used as keys in dictionary.

Q.3 Can you change the order of the dictionaries contents?

Ans: Yes, the order of dictionary contents may be changed.

Q.4 Can you modify the keys in a dictionary?

Ans: Keys cannot be modified in dictionary while values are mutable in dictionary.

Q.5 Can you modify the value in a dictionary?

Ans: Yes, Values can be modified in dictionaries.

Q.6 Is dictionary Mutable? Why?

Ans: Dictionary is mutable type because we can change its values.

Short Answer Type Questions

Q.1 How are dictionaries different from Lists?

Ans: The dictionary is similar to lists in the sense that it is also a collection of data-items but it is different from lists in the sense that lists are sequential collections(ordered) and dictionaries are non-sequential collections(unordered).

Elements in lists or tuples can be accessed by using indexes. But in dictionaries the values can be obtained using keys. By changing the sequence of key we can shuffle the order of elements of dictionary while this thing is not possible in list.

Q.2 When are dictionaries more useful than lists?

Ans: Dictionaries can be much more useful than lists when we wanted to store all our friends cell-phone numbers. We could create a list of pairs,(name of friend, phone number), but once this list becomes long enough searching this list for a specific phone number will get-time consuming. Better would be if we could index the list by our friend's name. This is precisely what a dictionary does.

Q.3 Discuss the utility and significance of Dictionaries.

Ans: Dictionaries can be much more useful than lists when we wanted to store all our friends cell-phone numbers. We could create a list of pairs,(name of friend, phone number), but once this list becomes long enough searching this list for a specific phone number will get-time consuming. Better would be if we could index the list by our friend's name. This is precisely what a dictionary does.

Q.4 Why is a dictionary termed as an unordered collection of objects?

Ans: But in dictionaries the values can be obtained using keys. By changing the sequence of key we can shuffle the order of elements of dictionary while this thing is not possible in list. In dictionaries there is no index. It uses its keys as index which can be rearranged. That's why a dictionary termed as an unordered collection of objects

Q.5 How is clear() function different from del <dict> Statement?

Ans: clear() removes all the elements of a dictionary and makes it empty dictionary while del statement removes the complete dictionary as an object. After del statement with a dictionary name, that dictionary object no longer exists, not even empty dictionary.

Q.6 What is the output produced by the following code -

```
d1={5:[6,7,8], "a":(1,2,3)}      Ans: dict_keys([5, 'a'])
print(d1.keys())                 dict_values([[6, 7, 8], (1, 2, 3)])
print(d1.values())
```

Skill Based Questions

Q.1 WAP that repeatedly asks the user to enter product names and prices. Store all of them in a dictionary whose keys are product names and values are prices. And also write a code to search an item from the dictionary.

Ans:

```
dict={}
ch='y'
while ch=='y' or ch=='Y':
    name=input("Enter name of product :")
    price=eval(input("Enter Price of product :"))
    dict[name]=price
    ch=input("Want to add more items (Y/N) : ")
print(dict)
nm=input("Enter the product you want to search :")
for x in dict:
    if x==nm:
        print("Product found and the price of product "\
              ,x," is ",dict[x])
```

```
Enter name of product :Pen
Enter Price of product :10
Want to add more items (Y/N) : y
Enter name of product :Pencil
Enter Price of product :5
Want to add more items (Y/N) : y
Enter name of product :Rubber
Enter Price of product :4
Want to add more items (Y/N) : y
Enter name of product :Cutter
Enter Price of product :4
Want to add more items (Y/N) : n
{'Pen': 10, 'Pencil': 5, 'Rubber': 4, 'Cutter': 4}
Enter the product you want to search :Rubber
Product found and the price of product Rubber is 4
```

Q.2 WAP to create a dictionary named year whose keys are month names and values are their corresponding number of days.

Ans:

```
dict={}
ch='y'
while ch=='y' or ch=='Y':
    month=input("Enter name of month :")
    days=eval(input("Enter no. of days of month :"))
    dict[month]=days
    ch=input("Want to add more months (Y/N) : ")
print(dict)
```

Chapter – 10: UNDERSTANDING SORTING

Short Answer Type Questions

Q.1 What is sorting? Name some sorting Techniques.

Ans: In computer terms sorting refers to arranging elements in a specific order – ascending or descending. Some sorting techniques are –

- (i) Selection Sort
- (ii) Bubble Sort
- (iii) Insertion Sort
- (iv) Heap Sort
- (v) Quick Sort

Q.2 What is the basic principal of sorting in bubble sort?

Ans: The basic principal of bubble sort is to compare two adjoining values and exchange them if they are not in proper order.

Q.3 Why do number-of-comparisons reduce in every successive iteration in bubble sort?

Ans: For the first iteration of the outer loop, when we are trying to place the largest element in its correct position, $N-1$ comparisons takes place. For the second iteration of the outer loop, there is no need to compare against the last element of the list, because it was put at its correct position on the previous pass. Therefore, the second iteration requires only $N-2$ comparisons. And so on.

Q.4 On which basis can you determine if an algorithm is efficient or not?

Ans: Efficiency of the algorithm is determined by its number of operations. More number of operations means more CPU time. So the algorithm with less number of operations will be more efficient.

Q.5 What is the basic principal of sorting in Insertion sort?

Ans: Insertion sort is a sorting algorithm that builds a sorted list by taking one element at a time from the unsorted list and by inserting the element at its correct position in sorted list.

Q.6 Number of operations wise, compare bubble sort and insertion sort techniques.

Ans: In bubble sort in i th iteration you have $n-i-1$ inner iterations $(n^2)/2$ total, but in insertion sort you have maximum i iterations on i 'th step, but $i/2$ on average, as you can stop inner loop earlier, after you found correct position for the current element. So you have (sum from 0 to n) / 2 which is $(n^2) / 4$ total.

That's why insertion sort is faster than bubble sort.

Q.7 Why insertion sort is considered a better algorithm than bubble sort?

Ans: Insertion sort is slightly better than bubble sorting algorithm. Though the worst case time complexity are same for both algorithms, time complexity of insertion sort will depend on the data given. For a array which is already sorted, insertion sort takes linear time, but for the bubble sort algorithms it will take quadratic time complexity irrespective of arrangement of data.

Q.8 In which situations, insertion sort also becomes inefficient?

Ans: For large datasets, insertion sort becomes inefficient.

Q.9 What is the main difference between insertion sort and bubble sort techniques?

Ans: Bubble Sort - It is a sorting algorithm in which two adjacent elements of an array are checked and swapped if they are in wrong order and this process is repeated until we get a sorted array.

In this first two elements of the array are checked and swapped if they are in wrong order. Then first and third elements are checked and swapped if they are in wrong order. This continues till the last element is checked and swapped if necessary.

Insertion Sort - In this, the second element is compared with the first element and is swapped if it is not in order. Similarly, we take the third element in the next iteration and place it at the right place in the sub-array of the first and second elements (as the subarray containing the first and second elements is already sorted). We repeat this step with the fourth element of the array in the next iteration and place it at the right position in the subarray containing the first, second and the third elements. We repeat this process until our array gets sorted.

Q.10 When and why would you choose insertion sort over bubble sort?

Ans: When databases are smaller, insertion sort will be beneficial. And where there are large databases than bubble sort will perform better.

Skill Based Questions

Q.1 WAP to perform insertion sort in a list.

Ans:

```
alist = [54,26,93,17,77,31,44,55,20]
print(alist)
print("List after sorting :")
for index in range(1,len(alist)):
    currentvalue = alist[index]
    position = index
    while position>0 and alist[position-1]>currentvalue:
        alist[position]=alist[position-1]
        position = position-1
    alist[position]=currentvalue
print(alist)
```

```
[54, 26, 93, 17, 77, 31, 44, 55, 20]
List after sorting :
[17, 20, 26, 31, 44, 54, 55, 77, 93]
```

Q.2 WAP to sort a list using bubble sort technique.

Ans:

```
arr = [64, 34, 25, 12, 22, 11, 90]
n = len(arr)
print("The List is : ",arr)
for i in range(n):
    for j in range(0, n-i-1):
        if arr[j] > arr[j+1] :
            arr[j], arr[j+1] = arr[j+1], arr[j]
print ("Sorted List is:")
print(arr)
```

```
The List is : [64, 34, 25, 12, 22, 11, 90]
Sorted List is:
[11, 12, 22, 25, 34, 64, 90]
```

Chapter – 11: STATES AND TRANSITIONS

Short Answer Type Questions

Q.1 What are state transition diagrams?

Ans: A State-Transition diagram describes all the **states** that a computation system can undergo along with the *events(such as external input other stimuli)* under which the computation systems behaves in a certain way and changes state. The change of state is marked as a **transition**.

Q.2 What is the utility of state transition diagrams?

Ans: The State-Transition diagrams are very much used in Automata Theory of computing. The finite Automata Theory, a branch of Automata Theory, is used to represent a machine/hardware or software in terms of its behaviours in response to some external input or internal actions.

Q.3 What does a state signify?

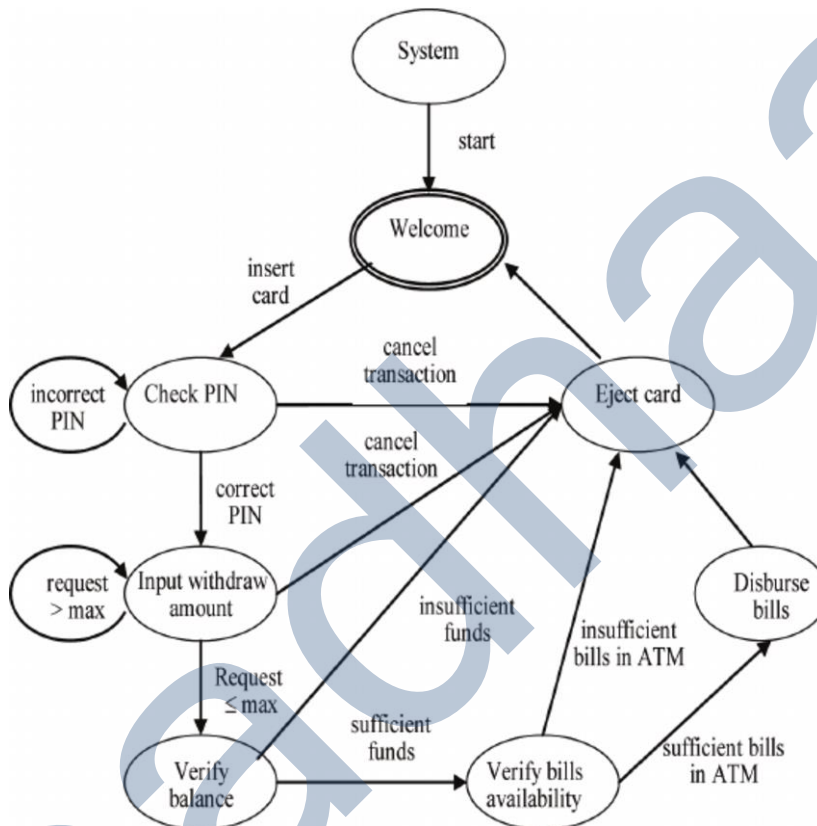
Ans: A State is one of the possible internal configurations (a state of computation) of a hardware/software (as in recorded information), which is caused by some external input or some internal actions.

Q.4 how is a transition linked to states?

Ans: A transition can be termed as a marked change from one state to another state in response to some external input or internal actions.

Q.5 Draw a state transition diagram for operation of an ATM machine.

Ans:



Chapter – 12: COMPUTER SYSTEM OVERVIEW

Very Short answer Type Questions

Q.1 What is volatile memory?

Ans: RAM is known as Volatile Memory because when we switch off the computer its data is vanished.

Q.2 Define each of the following:

- (a) byte
- (b) kilobyte
- (c) megabyte
- (d) gigabyte
- (e) terabyte

Ans: (a) byte: This is the unit of memory in computer. 1 byte = 8 bits
(b) kilobyte: This is the unit of memory in computer. 1 kilobyte = 1024 bytes
(c) megabyte: This is the unit of memory in computer. 1 megabyte = 1024 kilobytes
(d) gigabyte: This is the unit of memory in computer. 1 gigabyte = 1024 megabytes
(e) terabyte: This is the unit of memory in computer. 1 terabyte = 1024 gigabytes.

Short Answer Type Questions

Q.1 State the basic units of computer. Name the subunits that make up the CPU, and give the function of each of the unit.

Ans: Basic units of computer are Input Unit, Central Processing Unit and Output Unit. Sub units of CPU are Arithmetical Logical Unit(ALU), Control Unit (CU) and Memory Unit(MU).

Q.2 What is the function of memory? What are its measuring units?

Ans: The computer memory is a temporary storage area. It holds the data and instructions that the Central Processing Unit (CPU) needs. Before a program can run, the program is loaded from some storage medium into the memory. This allows the CPU direct access to the program. Its measuring units are byte, kilobyte, megabyte, gigabyte, terabyte etc.

Q.3 Why is primary memory termed as 'destructive write' memory but 'non-destructive read' memory?

Ans: The primary memory is called destructive write because the data enter here are temporary. That's why your RAM gets cleared after every restart.

Q.4 What is the role of CPU of a mobile system?

Ans: A mobile processor is found in mobile computers and cellphones. A CPU chip is designed for portable computers, it is typically housed in a smaller chip package, but more importantly, in order to run cooler, it uses lower voltages than its desktop counterpart and has more sleep mode capability. A mobile processor can be throttled down to different power levels or sections of the chip can be turned off entirely when not in use. Further, the clock frequency may be stepped down under low processor loads. This stepping down conserves power and prolongs battery life.

Q.5 What is SoC? how it is different from CPU? Why is it considered a better development?

Ans: A system on a chip (SoC) combines the required electronic circuits of various computer components onto a single, integrated chip (IC). SoC is a complete electronic substrate system that may contain analog, digital, mixed-signal or radio frequency functions. Its components usually include a graphical processing unit (GPU), a central processing unit (CPU) that may be multi-core, and system memory (RAM).

Because SOC includes both the hardware and software, it uses less power, has better performance, requires less space and is more reliable than multi-chip systems. Most system-on-chips today come inside mobile devices like smartphones and tablets. These are considered a better development because of their small size and speed capability.

Q.6 What are various categories of software?

Ans: Software are classified into following categories –

- (i) System Software
 - a. Operating System
 - b. Language Processor
- (ii) Application Software
 - a. Packages
 - b. Utilities
 - c. Customized software
 - d. Developer Tools

Q.7 What is the difference between an interpreter and a compiler?

Ans: Interpreter: Interpreter is a type of system software that translates and executes instructions written in a computer program line-by-line, unit by unit etc. It is slower in execution because each time when you run the program translation is required.

Compiler: Compiler is another type of system software that translates and executes instructions written in a computer program in one go. Once compiled program need not to translate again so it works faster.

Q.8 What is application software? Why it is required?

Ans: Application software is the set of programs necessary to carry out operations for a specific task. Such as for word processing there are many application software like MS-Word, Wordpad etc. These software are required to perform special task using the computer like painting, recording, typing, data handling etc.

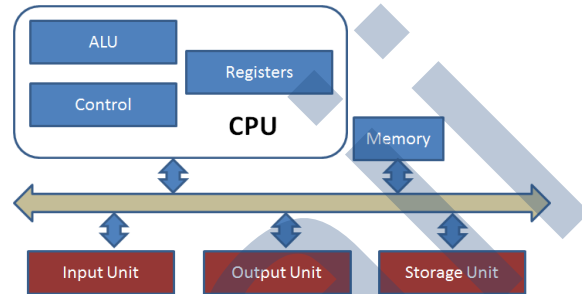
Q.9 Briefly explain the basic architecture of a computer.

Ans: Computer organization refers to logical structure of a computer describing how its components are connected to one another, how they affect one another's functioning and contributes to overall performance of computer.

Computers follow the 'IPO' principal i.e.

Input → Process → Output

(That means a certain input is processed to Generate specific output)



Q.10 What do you understand by input unit? What is its significance? What does computer system consist of?

Ans: Input unit is formed by the input devices (Keyboard, mouse, MICR, OBCR etc.) attached to the computer. Input unit is responsible for taking input and converting it into computer understandable form (the binary code). Some common input devices are:

- (i) Keyboard
- (ii) Mouse
- (iii) Microphone
- (iv) Scanner
- (v) Webcam
- (vi) Optical Bar Code Reader
- (vii) Optical Mark Reader
- (viii) Magnetic Ink Character Reader
- (ix) Touch Pad
- (x) Track Ball
- (xi) Joy stick
- (xii) Touch Screen
- (xiii) Biometric Sensors. Etc.

Q.11 What is the function of CPU in a computer system? What are its sub units?

Ans: The central processing unit (CPU) of a computer is a piece of hardware that carries out the instructions of a computer program. It performs the basic arithmetical, logical, and input/output operations of a computer system. The CPU is like the brains of the computer - every instruction, no matter how simple, has to go through the CPU. So let's say you press the letter 'k' on your keyboard and it appears on the screen - the CPU of your computer is what makes this possible. The CPU is sometimes also referred to as the central processor unit, or processor for short. So when you are looking at the specifications of a computer at your local electronics store, it typically refers to the CPU as the processor. Its sub units are:

- (i) Control Unit
- (ii) Arithmetical and Logical Unit (ALU)
- (iii) Memory Unit

Q.12 What functions are performed by the control unit?

Ans: The CU controls and guides the interpretation, flow and manipulation of all data and information. CU sends control signals until the required operations are done properly by ALU and memory. Another function of CU is the program execution. It means carrying out all the instructions stored in the program. CU gets program instruction from the memory and executes them one after the other. CU acts as a supervisor by controlling and guiding the operation taking place.

Q.13 Distinguish between CPU and ALU?

Ans: Difference Between **ALU and CPU** is that arithmetic logic unit (ALU), another component of the processor, performs arithmetic, comparison, and other operations. While Processor also central processing unit (CPU), interprets and carries out the basic instructions that operate a computer.

The main difference between CPU and ALU is that the CPU is an electronic circuit that handles instructions to operate the computer while the ALU is a subsystem of the CPU that performs arithmetic and logical operations.

Q.14 What is the function of output unit in a computer system?

Ans: Input devices are the hardware that give computers instructions. Output devices relay the response from the computer in the form of a visual response (monitor), sound (speakers) or media devices (CD or DVD drives). The purpose of these devices is to translate the machine's response to a usable form for the computer user.

Q.15 Distinguish between internal and external memory.

Ans: Internal memory is usually chips or modules that you attach directly to the motherboard. Internal Memory is a circular disc that continuously rotates as the computer accesses its data. External memory often comes in the form of USB flash drives; CD, DVD, and other optical discs; and portable hard drives.

Q.16 What are RAM and ROM? How are they alike? How are they different? What are PROM, EPROM, EEPROM?

Ans: A ROM chip is a non-volatile storage medium, which means it does not require a constant source of power to retain the information stored on it.

A RAM chip is volatile, which means it loses any information it is holding when the power is turned off.

Both of them are known as primary memory as they can directly work with CPU.

Read Only Memory (ROM)

Programmable Read Only Memory (PROM)

Erasable Programmable Read Only Memory (EPROM)

Electrically Erasable Programmable Read Only Memory (EEPROM)

Q.17 What are major functional components of a mobile system?

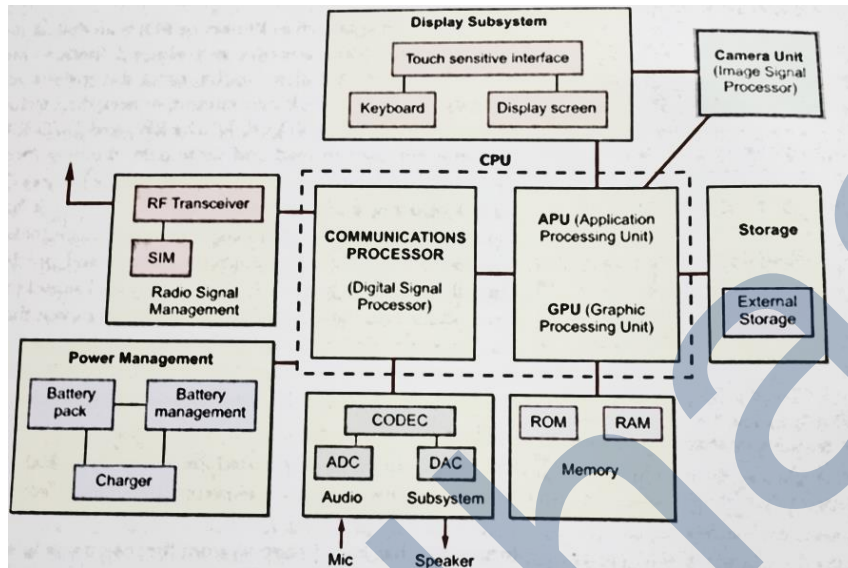
Ans: Major functional components of a mobile system are-

- (i) Mobile Processor
 - a. Communications Processing Unit
 - b. Application Processing Unit
 - c. GPU (Graphics Processing Unit)
- (ii) SoC (System on a chip)
- (iii) Display Subsystem

- a. Display Screen
- b. Touch Sensitive Interface
- c. Touch Sensitive Keyboards
- (iv) Camera Subsystem
- (v) Mobile System Memory
 - a. RAM
 - b. ROM
- (vi) Storage
- (vii) Power Management Subsystem

Q.18 Draw a block diagram depicting organization of a mobile system.

Ans:



Q.19 What is the role of Power Management Unit in a mobile system?

Ans:

This subsystem is responsible for providing power to a mobile system. The mobile systems work on limited power provided through an attached battery unit. This system has a battery management system that works with a battery charger and a battery unit and provides power to the mobile system in required form.

It also contains a collection of different functions like battery charging, monitoring and supplying many different voltages these systems require. It also contains software controlled turn-on and turn-off feature to optimize the power consumption and battery life.

Q.20 What does the communication processor do?

Ans:

this subsystem is responsible for making and receiving phone calls on a mobile handset. It has a digital signal processor that helps it work with RF Transceiver and the Audio subsystem.

Q.21 What is GPU? How is it useful?

Ans:

Graphics Processing Unit assists the CPU by handling the visuals, other graphically-rich applications. In short, GPU handles all graphics-related chores of a mobile CPU.

Q.22 What is system software?

Ans:

The software that controls internal computer operations is called system software. It manages all the resources of a system. Its example is Operating System.

Q.23 Discuss the role of utility software in the context of computer performance?

Ans: Utilities are those application programs that assist the computer by performing housekeeping functions like backing up disk or scanning/cleaning viruses or arranging information etc. its example is Antivirus software.

Q.24 What is the importance of an OS?

Ans: An operating system is a program which acts as an interface between a user and the hardware. It manages all the resources of the computer system. It provides an environment to the user to work with. All the application are installed after the operating system is installed. It manages memory, processing, storage, memory etc.

Q.25 How are software libraries useful? Name some software libraries of Python.

Ans: A software library is a predefined and available to use, suit of data and programming code in the form of prewritten code/ functions/scripts/classes etc. that can be used in the development of the new software programs and applications.

Some software library in python are:

- (i) NumPy (numerical Python)
- (ii) SciPy (Scientific Python)
- (iii) Pandas Library

Q.26 What is the utility of these software?

(a) disk fragmentor **(b) backup software**

Ans: **(a) disk fragmentor:** A file is fragmented when it becomes too large for your computer to store in a single location on a disk. When this happens, your computer splits the file up and stores in pieces. You can use fragmented files, but it takes your computer longer to access them.

(b) Backup software: This utility program facilitates the backing-up of disk. Back-up means duplicating the disk information so that in case of any damage or data-loss, this backed-up data may be used.

Chapter – 13: DATA REPRESENTATION

Very Short answer Type Questions

Q.1 Add the binary numbers (a) 110101 and 101111 (b) 10110 and 1101

Ans: (a) 1100100 (b) 100011

Q.2 Convert 11111011110101₂ to octal.

Ans: 37365

Q.3 Convert the following binary numbers to decimal -

(a)1010 (b) 111000 (c) 10101111 (d) 10110

Ans: (a) 10 (b) 56 (c) 175 (d) 22

Q.4 Convert the following Decimal numbers to binary -

(a) 23 (b) 100 (c) 161 (d) 145

Ans: (a) 10111 (b) 1100100 (c) 10100001 (d) 10010001

Q.5 Convert the following Hexadecimal numbers to Binary -

(a) BE (b) BC9 (c) A07 (d) 7AB4

Ans: (a)10111110 (b) 101111001001 (c) 101000000111 (d) 0111101010110100

Q.6 Convert the following binary numbers to Hexadecimal -

(a)101000001 (b) 11100011 (c) 10101111 (d) 101101111

Ans: (a) 141 (b) E3 (c) AF (d)16F

Q.7 Covert the following Octal numbers to Binary -

(a) 456 (b) 26 (c) 751 (d) 777

Ans: (a) 100101110 (b) 010110 (c) 111101001 (d)111111111

Q.8 Convert the following:

(a) 446_8 to ()₁₆ (b) 47.5_8 to ()₁₀ (c) 45.9_{10} to ()₂

Ans: (a) 126 (b) 39.625 (c) 101101.1110

Short Answer Type Questions

Q.1 What is the use of encoding schemes?

Ans: A character encoding provides a key to unlock (ie. crack) the code. It is a set of mappings between the bytes in the computer and the characters in the character set. Without the key, the data looks like garbage.

So, when you input text using a keyboard or in some other way, the character encoding maps characters you choose to specific bytes in computer memory, and then to display the text it reads the bytes back into characters. Unfortunately, there are many different character sets and character encodings, ie. many different ways of mapping between bytes, code points and characters. The section Additional information provides a little more detail for those who are interested.

Q.2 Discuss UTF-8 encoding Scheme.

Ans: UTF-8 is a compromise character encoding that can be as compact as ASCII (if the file is just plain English text) but can also contain any unicode characters (with some increase in file size). UTF stands for Unicode Transformation Format. The '8' means it uses 8-bit blocks to represent a character.

Q.3 How UTF-8 encoding scheme different from UTF-32 encoding scheme?

Ans: UTF-8: Variable-width encoding, backwards compatible with ASCII. ASCII characters (U+0000 to U+007F) take 1 byte, code points U+0080 to U+07FF take 2 bytes, code points U+0800 to U+FFFF take 3 bytes, code points U+10000 to U+10FFFF take 4 bytes. Good for English text, not so good for Asian text.

UTF-32 uses 32-bit values for each character. That allows them to use a fixed-width code for every character. UTF-32 is opposite, it uses the most memory (each character is a fixed 4 bytes wide), but on the other hand, you *know* that every character has this precise length, so string manipulation becomes far simpler. You can compute the number of characters in a string simply from the length in bytes of the string. You can't do that with UTF-8.

Q.4 What are ASCII and extended ASCII schemes?

Ans: The standard ASCII character set uses just 7 bits for each character. There are several larger character sets that use 8 bits, which gives them 128 additional characters. The extra characters are used to represent non-English characters, graphics symbols, and mathematical symbols.

The extended ASCII character set uses 8 bits, which gives it an additional 128 characters. The extra characters represent characters from foreign languages and special symbols for drawing pictures.

Q.5 What is the utility of ISCII encoding schemes?

Ans: ISCII is a bilingual character encoding (not glyphs) scheme. Roman characters and punctuation marks as defined in the standard lower-ASCII take up the first half the character set (first 128 slots). Characters for indie languages are allocated to the upper slots (128-255). T

Q.6 What is Unicode? What is its significance?

Ans: Unicode is a character encoding standard that has widespread acceptance. Microsoft software uses Unicode at its core. Whether you realize it or not, you are using Unicode already! Basically, "computers just deal with numbers. They store letters and other characters by assigning a number for each one. Before Unicode was invented, there were hundreds of different encoding systems for assigning these numbers. No single encoding could contain enough characters.1" This has been the problem we, in SIL, have often run into. If you are using a legacy encoding your font conflicts with the font someone in another area of the world uses. You might have an in your font while someplace else someone used a at the same codepoint. Your files are incompatible. Unicode provides a unique number for every character and so you do not have this problem if you use Unicode. If your document calls for U+0289 it will be clear to any computer program what the character should be

Q.7 What are ASCII and ISCII? Why are these used?

Ans: ASCII uses a 7-bit encoding and ISCII uses an 8-bit which is an extension of ASCII. These are encoding schemes to represent character set in s computer system.

Q.8 Compare UTF-8 and UTF-32 encoding schemes. Which one is most popular scheme?

Ans: UTF-8: Variable-width encoding, backwards compatible with ASCII. ASCII characters (U+0000 to U+007F) take 1 byte, code points U+0080 to U+07FF take 2 bytes, code points U+0800 to U+FFFF take 3 bytes, code points U+10000 to U+10FFFF take 4 bytes. Good for English text, not so good for Asian text.

UTF-32 uses 32-bit values for each character. That allows them to use a fixed-width code for every character. UTF-32 is opposite, it uses the most memory (each character is a fixed 4 bytes wide), but on the other hand, you *know* that every character has this precise length, so string manipulation becomes far simpler. You can compute the number of characters in a string simply from the length in bytes of the string. You can't do that with UTF-8.

Q.9 What do you understand by code point and code unit?

Ans: A code point is the atomic unit of information. ... Each code point is a number which is given meaning by the Unicode standard. A code unit is the unit of storage of a part of an encoded code point. In UTF-8 this means 8-bits, in UTF-16 this means 16-bits.

Q.10 What is code space? How is it related to code point?

Ans: In computing, Code space may refer to: In memory address space: code space, where machine code is stored. For a character encoding: code space (or code space), the range of code points.

Chapter – 14: BOOLEAN LOGIC

Very Short answer Type Questions

Q.1 Prove $X.(X+Y) = X$ using truth table.

Ans: Proof:

X	Y	X+Y	X.(X+Y)
0	0	0	0
0	1	1	1
1	0	1	1
1	1	1	1

Q.2 Give duals for the following –

(a) $X+X'Y$ (b) $XY+XY'+X'Y$ (c) $AB+A'B$ (d) $ABC+AB'C+A'BC'$

Ans: (a) $X.X' + Y$ (b) $(X+Y).(X+Y').(X'+Y)$
 (c) $(A+B).(A'+B)$ (d) $(A+B+C).(A+B'+C).(A'+B+C')$

Q.3 What is tautology?

Ans: If the result of any logical statement or expression is always TRUE or 1 for all input combinations, it is called tautology.

Q.4 What is Fallacy?

Ans: If the result of any logical statement or expression is always FALSE or 0 for all input combinations, it is called fallacy.

Q.5 What is a truth table? What is its significance?

Ans: A truth table is a table which represents all the possible values of logical variables/statements along with all the possible results of the given combinations of values.

Short Answer Type Questions

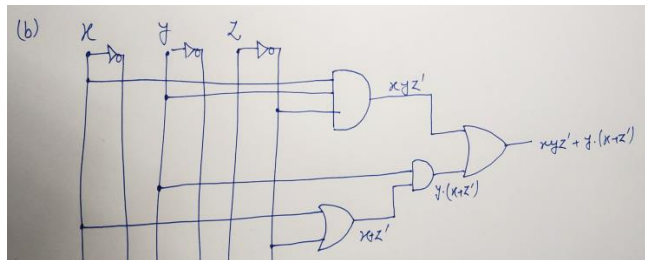
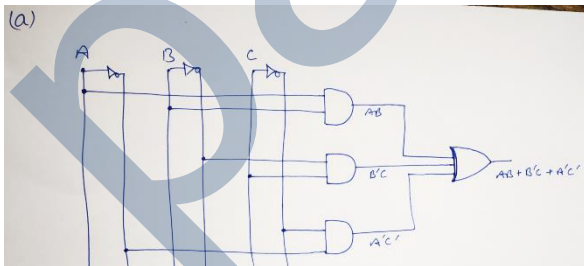
Q.1 Prove $X.(X+Y)=X$ by algebraic method.

Ans: L.H.S. $X.(X+Y) = X.X + X.Y$
 $= X+X.Y$ since $X.X = X$
 $= X.(1+Y)$
 $= X$ (R.H.S.) since $1+Y = 1$

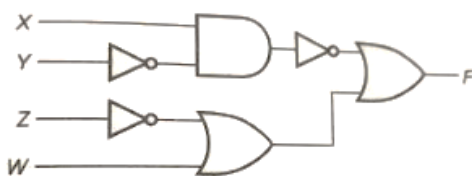
Q.2 Draw logic circuit diagram for the following expression –

(a) $Y=AB+B'C+A'C'$ (b) $R=XYZ' + Y.(X+Z')$

Ans:



Q.3 Obtain the Boolean Expression for the logic circuit shown bellow –



Ans: $(X.Y')+(Z'+W)$

Q.4 Find the complement of the following Boolean function : $F1=AB' + C'D'$

Ans: Complement of F1 will be $(A'+B).(C+D)$

Q.5 State and verify Involution law.

Ans: Involution law says that $(X')' = X$.

X	X'	(X')'
0	1	0
1	0	1

Q.6 Prove algebraically $X.Y + X'.Z + Y.Z = X.Y + X'.Z$

Ans: L.H.S. $X.Y + X'.Z + Y.Z = X.Y + X'.Z + 1.Y.Z$
 $= X.Y + X'.Z + (X+X').Y.Z$
 $= X.Y + X'.Z + X.Y.Z + X'.Y.Z$
 $= X.Y + X.Y.Z + X'.Z + X'.Y.Z$
 $= X.Y.(1+Z) + X'.Z.(1+Y)$
 $= X.Y + X'.Z$ Since $1+Z=1$ and $1+Y=1$

Q.7 State and verify Absorption law in Boolean Algebra.

Ans: (a) $X+XY = X$

LHS = $X+XY = X(1+Y) = X$

(b) $X(X+Y) = X$

LHS = $X(X+Y) = X.X + X.Y$
 $= X + XY = X(1+Y) = X$

Q.8 State DeMorgan's law of Boolean Algebra and verify them using truth table.

Ans: (a) $(X + Y)' = X'.Y'$

X	Y	X+Y	(X+Y)'	X'	Y'	X'.Y'
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

(b) $(X.Y)' = X' + Y'$

X	Y	X.Y	(X.Y)'	X'	Y'	X'+Y'
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

Q.9 What do you understand by "logical function"? Give examples for logical functions.

Ans: Boolean algebra is the algebra of logic that deals with the study of binary variables and logical operations. It was founded by the mathematician George Boole. Boolean variables are the variables which have only two states i.e. true/ false or right/ wrong or on/off or 0/1. Boolean function or more commonly known as a logic function is an expression expressed algebraically. There are 3 logical operators: AND, OR and NOT.

Q.10 What are basic postulates of Boolean Algebra?

Ans: Postulates

(1)	$A + 0 = A$	$A \cdot 1 = A$	identity
(2)	$A + \text{NOT}[A] = 1$	$A \cdot \text{NOT}[A] = 0$	complement
(3)	$A + B = B + A$	$A \cdot B = B \cdot A$	commutative law
(4)	$A + (B + C) = (A + B) + C$	$A \cdot (B \cdot C) = (A \cdot B) \cdot C$	associative law
(5)	$A + (B \cdot C) = (A + B) \cdot (A + C)$	$A \cdot (B + C) = (A \cdot B) + (A \cdot C)$	distributive law

Q.11 What does duality principle state? What is its usage in Boolean algebra?

Ans: The duality principle ensures that "if we exchange every symbol by its dual in a formula, we get the dual result".

- Everywhere we see 1, change to 0.
- Everywhere we see 0, change to 1.
- Similarly, (+) to (.) , and (.) to (+).

For example if $A+B=1$ then its dual will be $A.B=0$

Q.12 Prove the complementarity law of Boolean algebra using truth table?

Ans: (a) $X+X'=1$

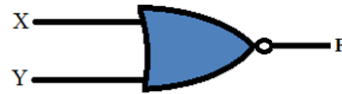
X	X'	X+X'
0	1	1
1	0	1

(b) $X.X'=0$

X	X'	X.X'
0	1	0
1	0	0

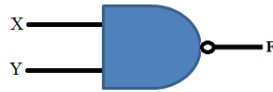
Q.13 Why are NAND and NOR Gates more popular?

Ans: The NOR Gate has two or more input signals but only one output signal. If all the inputs are 0 (i.e. low) then output signal is 1(high).



X	Y	F
0	0	1
0	1	0
1	0	0
1	1	0

The NAND Gate has two or more input signals but only one output signal. If all the inputs are 1 (i.e. High) then output signal is 0(low).



X	Y	F
0	0	1
0	1	1
1	0	1
1	1	0

NAND and NOR Gates are known as universal gates because fundamental gates can be made using them. And By using NAND and NOR Gates the cost and size of circuit gets reduced.

Q.14 Prove algebraically that $(X+Y).(X+Z)=X+Y.Z$

Ans: L.H.S. $(X+Y).(X+Z) = X.X + X.Z + X.Y + Y.Z$

$$= X + X.Z + X.Y + Y.Z$$

$$= X + X.Y + Y.Z$$

$$= X + Y.Z \quad \text{R.H.S.}$$

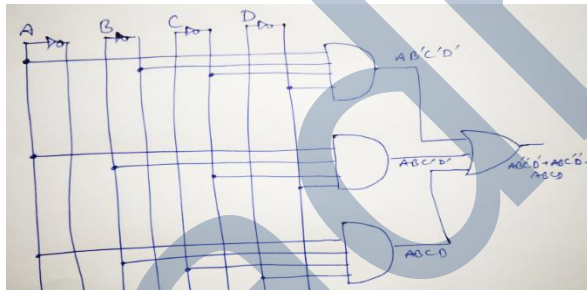
Since $X.X=X$

Since $X+XZ=X$

Since $X+X.Y=X$

Q.15 Draw the AND OR Circuit for : $y=AB'C'D' + ABC'D' + ABCD$

Ans:



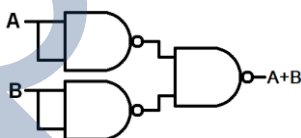
Q.16 Make AND Gate using NAND Gate.

Ans:



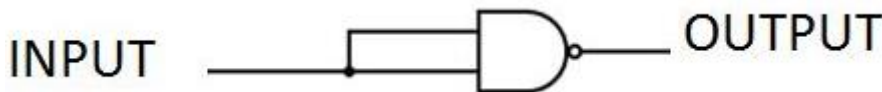
Q.17 Make OR Gate using NAND Gate.

Ans:



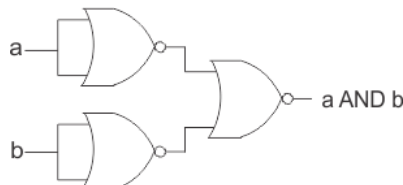
Q.18 Make NOT Gate using NAND Gate.

Ans:



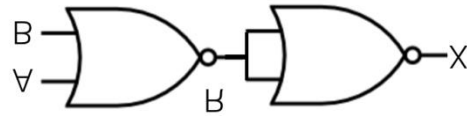
Q.19 Make AND Gate using NOR Gate.

Ans:



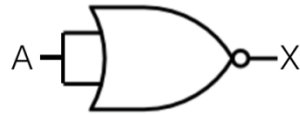
Q.17 Make OR Gate using NOR Gate.

Ans:

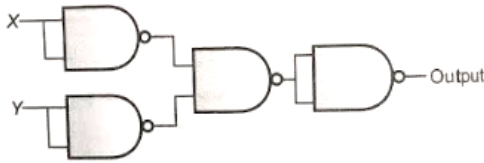


Q.18 Make NOT Gate using NOR Gate.

Ans:



Q.19 Which gate is the following circuit equivalent to ?



- (a) AND (b) OR (c) NAND (d) NOR (e) None of these

Ans: (b) OR

Chapter – 15: INSIGHT INTO PROGRAM EXECUTION

Short Answer Type Questions

Q.1 What are the front end and back end phases of compiler?

Ans: The front end phase of compiler is **Analysis Phase**. This phase of compilation identifies all the tokens in the source code and creates a symbol table with it.

The back end phase of compiler is **Synthesis Phase**. This phase of compiler parses the code and generates syntax tree, analyzing the syntax of the source code.

Q.2 Differentiate between compiler and interpreter.

Ans:

Aspects	Compiler	Interpreter
Input	A Compiler takes an entire program as its input.	It takes a single line of code or single instruction (such as loop) as its input.
Output	It generates intermediate object code from the whole program.	It does not create any intermediate object code.
Memory	Requires more memory during compilation.	Requires less memory during interpretation as it interprets single instruction/unit-of-code at a time.
Errors	Displays lists of errors of entire program with line numbers and the error(s) in that line.	Displays the error of single line it is interpreting. Thus errors also appear one line at a time.
Always Required	No. once the role of compiler is over, a compiler is no longer required to run the executable file.	Always required. Interpreter translates and runs one instruction every time. So it is always required in memory to run the code.
Workload	Compilation once done, stays always. Recompile not required if the code (without any change) needs to run again. The same executable file can be rerun without the compiler.	Interpretation is required each time you have to run the code. The interpreter does not create an executable and hence it is required every time, the code is to run.

Q.3 What are the characteristics of compiler?

Ans:

Aspects	Compiler
Input	A Compiler takes an entire program as its input.
Output	It generates intermediate object code from the whole program.
Memory	Requires more memory during compilation.
Errors	Displays lists of errors of entire program with line numbers and the error(s) in that line.
Always Required	No. once the role of compiler is over, a compiler is no longer required to run the executable file.
Workload	Compilation once done, stays always. Recompilation not required if the code (without any change) needs to run again. The same executable file can be rerun without the compiler.

Q.4 What are the characteristics of Interpreter?

Ans:

Aspects	Interpreter
Input	It takes a single line of code or single instruction (such as loop) as its input.
Output	It does not create any intermediate object code.
Memory	Requires less memory during interpretation as interprets single instruction/unit-of-code at a time.
Errors	Displays the error of single line it is interpreting. Thus errors also appear one line at a time.
Always Required	Always required. Interpreter translates and runs one instruction every time. So it is always required in memory to run the code.
Workload	Interpretation is required each time you have to run the code. The interpreter does not create an executable and hence it is required every time, the code is to run.

Q.5 Describe the role of Operating System as a resource Manager.

Ans: A computer system has many resources (hardware and software), which may be required to complete a task. The commonly required resources are input/output devices, memory, file storage space, CPU etc. The operating system acts as a manager of the above resources and allocates them to specific programs and users, whenever necessary to perform a particular task. Therefore operating system is the resource manager i.e. it can manage the resource of a computer system internally. The resources are processor, memory, files, and I/O devices. In simple terms, an operating system is the interface between the user and the machine.

Operating System Management Tasks

1. **Processor management** which involves putting the tasks into order and pairing them into manageable size before they go to the CPU.
2. **Memory management** which coordinates data to and from RAM (random-access memory) and determines the necessity for virtual memory.
3. **Device management** which provides interface between connected devices.
4. **Storage management** which directs permanent data storage.
5. **Application** which allows standard communication between software and your computer.
6. **User interface** which allows you to communicate with your computer.

Q.6 What is cloud computing?

Ans: cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics, intelligence and more—over the Internet (“the cloud”) to offer faster innovation, flexible resources and economies of scale. You typically pay only for cloud services you use, helping lower your operating costs, run your infrastructure more efficiently and scale as your business needs change.

Cloud computing is a big shift from the traditional way businesses think about IT resources. Here are seven common reasons organizations are turning to cloud computing services.

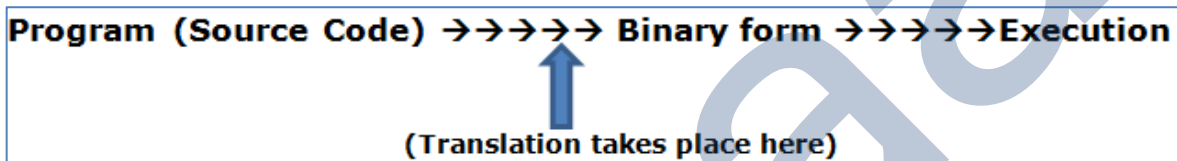
Q.7 What are the advantages of parallel computing?

Ans: **Parallel computing** is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time. It refers to the simultaneous working of multiple processors to solve a computational problem. Its advantages are –

- (i) It saves time and the cost too.
- (ii) It makes easier to solve larger or complex problems.
- (iii) It provides efficient use of underlying hardware.
- (iv) It can utilize the resources available remotely.

Q.8 What is the basic flow of program execution?

Ans: the basic flow of program execution can be defined when a programmer create a program(the source code), which needs to be converted into binary form so that computer can execute it. This conversion is done by a software which is known as translator(compiler or interpreter).



Q.9 What is the difference between source code and object code?

Ans: **Source Code** refers to the original code written in a programming language by a programmer. **Object Code** refers to the code converted into computer understandable form that a computer can understand and can directly execute.

Q.10 What are the steps of compilation?

Ans: The compilation mainly undergoes these steps:

- (i) Preprocessing
- (ii) Compilation
 - a. Analysis
 - b. Synthesis
- (iii) Assembly
- (iv) Linking

Q.11 What is the role of linker in a compiler?

Ans: The part of the compiler which performs the linking of libraries is called linker. In this phase, with the help of OS, all memory references are resolved and code is converted to a form which requires nothing else to run.that is, the code has become executable (.exe. file) now.

Q.12 How is interpretation done?

Ans: Unlike compiler, an interpreter doesn't translate the complete code in one go and hand over a full executable file to execute. Instead, an interpreter translates a single line/section of code at a time, makes its executable version and runs it immediately.

Q.13 How is a process different from a program?

Ans: A running program or the executing entity is called a process. So a program is a passive entity when it is stored in storage. When it is copied to memory to get executed and starts its execution then the program is known as process.

Q.14 What is process scheduling?

Ans: The process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy.

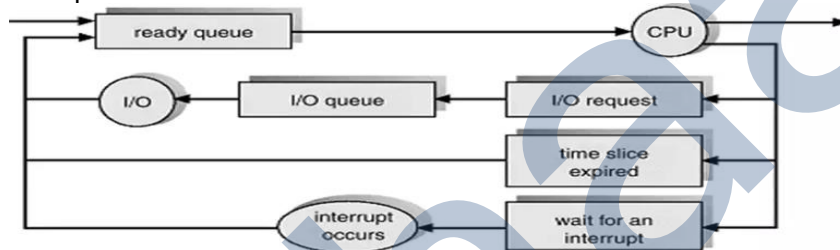
Process scheduling is an essential part of a Multiprogramming operating systems. Such operating systems allow more than one process to be loaded into the executable memory at a time and the loaded process shares the CPU using time multiplexing.

Q.15 What are process scheduling queues?

Ans: The OS maintains all PCBs in Process Scheduling Queues. The OS maintains a separate queue for each of the process states and PCBs of all processes in the same execution state are placed in the same queue. When the state of a process is changed, its PCB is unlinked from its current queue and moved to its new state queue.

The Operating System maintains the following important process scheduling queues –

- **Job queue** – This queue keeps all the processes in the system.
- **Ready queue** – This queue keeps a set of all processes residing in main memory, ready and waiting to execute. A new process is always put in this queue.
- **Device queues** – The processes which are blocked due to unavailability of an I/O device constitute this queue.



Q.16 How does OS manage all the running processes?

Ans: Process managements involve the execution of various tasks such as creation of processes, scheduling of processes, management of deadlock, and termination of processes. It is responsibility of operating system to manage all the running processes of the system. Operating system manages processes by performing tasks such as resource allocation and process scheduling. When a process runs on computer device memory and CPU of computer are utilized. The operating system also has to synchronize the different processes of computer system.

A process consists of set of instruction to be executed called process code. A process is also associated with some data that is to be processed. The resources that a process required for its execution is called process components. There is also a state that is associated with a process at a particular instant of time called process state. Similar to these concepts, there are number of concepts associated with the process management function of an operating system. Some of those concepts are given as following.

- Process State
- Process Control Block (PCB)
- Process Operations
- Process Scheduling
- Process Synchronization
- Interprocess Communication
- Deadlock

Q.17 What is the role of memory manager and I/O manager of OS?

Ans: Memory management is a form of resource management applied to computer memory. The essential requirement of memory management is to provide ways to dynamically allocate portions of memory to programs at their request, and free it for reuse when no longer needed. This is critical to any advanced computer system where more than a single process might be underway at any time.

I/O Manager:One of the important jobs of an Operating System is to manage various I/O devices including mouse, keyboards, touch pad, disk drives, display adapters, USB devices, Bit-

mapped screen, LED, Analog-to-digital converter, On/off switch, network connections, audio I/O, printers etc.

An I/O system is required to take an application I/O request and send it to the physical device, then take whatever response comes back from the device and send it to the application. I/O devices can be divided into two categories –

- **Block devices** – A block device is one with which the driver communicates by sending entire blocks of data. For example, Hard disks, USB cameras, Disk-On-Key etc.
- **Character devices** – A character device is one with which the driver communicates by sending and receiving single characters (bytes, octets). For example, serial ports, parallel ports, sound cards etc

Q.18 How is private cloud different from public cloud?

Ans: Public cloud: Public clouds are owned and operated by a third-party cloud service providers, which deliver their computing resources like servers and storage over the Internet. Microsoft Azure is an example of a public cloud. With a public cloud, all hardware, software and other supporting infrastructure is owned and managed by the cloud provider. You access these services and manage your account using a web browser.

Private cloud: A private cloud refers to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located on the company's on-site datacenter. Some companies also pay third-party service providers to host their private cloud. A private cloud is one in which the services and infrastructure are maintained on a private network.

Q.19 What is parallel computing?

Ans: Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time. It refers to the simultaneous working of multiple processors to solve a computational problem.

Q.20 How is parallel computing different from serial computing?

Ans: Serial Computing: A processing in which one task is completed at a time and all the tasks are run by the processor in a sequence. In real time example, people standing in a queue and waiting for a railway ticket. In this case, one person can get a ticket at a time. Suppose there are two queues of people and one cashier is handling both the queues then one person can get a ticket at a time from both queues. Similarly, processor get lists of tasks and each task is completed at a time and all other tasks wait till the first one completes. This type of processing is also known as **sequential processing**.

Parallel Computing: A type of processing in which multiple tasks are completed at a time by different processors. Note that in parallel processing there is more than one processor involved. In real time example, there are multiple queues of people standing to get railway tickets. In this case, each queue is handled by multiple people, so multiple people will get tickets at a time. Similarly, in the operating system, there are multiple queues of tasks and multiple tasks are completed by different processors at a time.

Q.21 What are the advantages of parallel computing?

Ans: Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time. It refers to the simultaneous working of multiple processors to solve a computational problem. Its advantages are –

- (i) It saves time and the cost too.
- (ii) It makes easier to solve larger or complex problems.

- (iii) It provides efficient use of underlying hardware.
- (iv) It can utilize the resources available remotely.

Q.22 What is PCB? What is its role?

Ans: While creating a process the operating system performs several operations. To identify these process, it must identify each process, hence it assigns a process identification number (PID) to each process. As the operating system supports multi-programming, it needs to keep track of all the processes. For this task, the process control block (PCB) is used to track the process's execution status. Each block of memory contains information about the process state, program counter, stack pointer, status of opened files, scheduling algorithms, etc. All these information is required and must be saved when the process is switched from one state to another. When the process made transitions from one state to another, the operating system must update information in the process's PCB.

A process control block (PCB) contains information about the process, i.e. registers, quantum, priority, etc.



Process Control Block

Pointer – It is a stack pointer which is required to be saved when the process is switched from one state to another to retain the current position of the process.

Process state – It stores the respective state of the process.

Process number – Every process is assigned with a unique id known as process ID or PID which stores the process identifier.

Program counter – It stores the counter which contains the address of the next instruction that is to be executed for the process.

Register – These are the CPU registers which includes: accumulator, base, registers and general purpose registers.

Memory limits – This field contains the information about memory management system used by operating system. This may include the page tables, segment tables etc.

Open files list – This information includes the list of files opened for a process.

Chapter – 16: RELATIONAL DATABASES

Short Answer Type Questions

Q.1 What is a database system? What is its need?

Ans: A database is a collection of information that is organized so that it can be easily accessed, managed and updated. Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it. The software which facilitates the

collection of database and its retrieval is known as DBMS. A database along with a DBMS is referred to as a database system.

DBMS is needed to overcome the following problems in traditional file system –

- (i) Data redundancy
- (ii) Data inconsistency
- (iii) Unstandardized data
- (iv) Insecure data
- (v) Incorrect data etc.

In DBMS these limitations has been almost reduced.

Q.2 What are the disadvantages of database systems?

Ans: When we work with complex task then there may be some disadvantages of using databases these are –

- (i) Security may be compromised without good controls.
- (ii) Integrity may be compromised without good controls.
- (iii) Extra hardware may be required.
- (iv) Performance overhead may be significant.
- (v) System is likely to be complex.

Q.3 What are views? How they are useful?

Ans: A view is a virtual table that does not really exist in its own right but is instead derived from one or more underlying base tables(s). the view is a kind of table whose contents are taken upon other tables depending upon a given query condition. No stored file is created to store the contents of a view rather its definition is stored only.

The usefulness of views lies in the fact that they provide an excellent way to give people access to some but not all of the information in a table.

Q.4 What is the purpose of using MySQL?

Ans: MySQL is a free, open source *Relational Database Management System* (RDBMS) that uses Structured Query Language (SQL). In MySQL database, information is stored in *Tables*. A single MySQL database can contain many tables at once and store thousands of individual records.

Q.5 What do you understand by MySQL server instance?

Ans: MySQL server instance is created from background processes and applications.it stays in memory and listens for client requests coming in over the network amd accesses database contents according to those requests and provides that to the clients.

Q.6 What do you understand by MySQL client?

Ans: MySQL clients are programs that connect to the MySQL server and issue queries in a pre-specified format. MySQL is compatible with the standards based SQL. The client program may contact the server programmatically or manually.

Q.7 What is SQL? What are different categories of commands available in SQL?

Ans: In order to access the data within Oracle databases, all programs and users must use, Structured Query Language (SQL). SQL is the set of commands that is recognized by nearly all RDBMSs. SQL commands can be divided into following categories –

- (i) Data Definition Language (DDL) Commands.
- (ii) Data Manipulation Language (DML) Commands.
- (iii) Transaction Control Language (TCL) Commands.

- (iv) Session Control Commands.
- (v) System Control Commands.

Q.8 Differentiate between DDL and DML commands.

Ans: *The DDL commands*, as the name suggests, allow you to perform tasks related to data definition i.e. through these commands you can perform tasks like create, alter and drop schema objects, grant and revoke privileges etc.

The DML commands, as the name suggests, are used to manipulate data i.e. DML commands query and manipulate data in existing schema objects like, Select query, insert into command etc.

Q.9 What is MySQL? What are its functions and features?

Ans: MySQL is a free, open source *Relational Database Management System* (RDBMS) that uses Structured Query Language (SQL). In MySQL database, information is stored in *Tables*. A single MySQL database can contain many tables at once and store thousands of individual records.

Its functions and features are –

- (i) Speed
- (ii) Ease of use
- (iii) Cost
- (iv) Query Language support
- (v) Portability
- (vi) Data Types
- (vii) Security
- (viii) Scalability and Limits
- (ix) Connectivity
- (x) Localization
- (xi) Clients and Tools

Q.10 Name some commands used to assign/revoke privileges from database users.

Ans: Grant Privilege Command and Revoke Privilege commands.

Q.11 Name some Table maintenance commands?

Ans: ANALYZE TABLE , CHECK TABLE , CHECKSUM TABLE , OPTIMIZE TABLE , REPAIR TABLE

Chapter – 17: SIMPLE QUERIES IN SQL

Very Short Answer Type Questions

Q.1 Name some basic MySQL SQL elements.

Ans: Some basic MySQL SQL elements are : (i) Literals (ii) Datatypes (iii) Nulls (iv) Comments.

Q.2 Differentiate between CHAR and VARCHAR Datatypes.

Ans: The difference between CHAR and VARCHAR is that of *fixed length* and *variable length* respectively.

Q.3 Write two usage of DESC in SQL.

Ans: DESC is used with Order by Clause in select statement which displays the data in descending order. And another user of DESC is that it is used to display the structure of table.

Q.4 Consider the following Table named 'empl' and Write SQL commands from (a) to (n)

empno	ename	job	mgr	hiredate	sal	comm	deptno
8369	SMITH	CLERK	8902	1990-12-18	800.00	NULL	20
8499	ANYA	SALESMAN	8698	1991-02-20	1600.00	300.00	30
8521	SETH	SALESMAN	8698	1991-02-22	1250.00	500.00	30
8566	MAHADEVAN	MANAGER	8839	1991-04-02	2985.00	NULL	20
8654	MOMIN	SALESMAN	8698	1991-09-28	1250.00	1400.00	30
8698	BINA	MANAGER	8839	1991-05-01	2850.00	NULL	30
8882	SHIAVNSH	MANAGER	8839	1991-06-09	2450.00	NULL	10
8888	SCOTT	ANALYST	8566	1992-12-09	3000.00	NULL	20
8839	AMIR	PRESIDENT	NULL	1991-11-18	5000.00	NULL	10
8844	KULDEEP	SALESMAN	8698	1991-09-08	1500.00	0.00	30
8886	ANOOP	CLERK	8888	1993-01-12	1100.00	NULL	20
8900	JATIN	CLERK	8698	1991-12-03	950.00	NULL	30
8902	FAKIR	ANALYST	8566	1991-12-03	3000.00	NULL	20
8934	MITA	CLERK	8882	1992-01-23	1300.00	NULL	10

(a) Display all the records from table empl.

Ans: select * from empl;

(b) Display EmpNo and EName of all employees from the table empl.

Ans: select EmpNo, EName from empl;

(c) Display employee name, salary, and department number who are not getting commission from table empl.

Ans: select EName, sal, deptno from empl where comm = NULL;

(d) Display employee number, name, sal*12 as Annual salary whose commission is not NULL from table empl.

Ans: select EmpNo, EName, sal*12 'Annual Salary' from empl where sal<>NULL;

(e) List all department numbers from table empl.

Ans: select deptno from empl;

(f) List all unique department numbers from table empl.

Ans: select distinct(deptno) from empl;

(g) List the details of all clerks who have not been assigned department as yet.

Ans: select * from empl where job='CLERK' and deptno=NULL;

(h) Display the details of employees whose name have only four letters.

Ans: select * from empl where EName like '____';

(i) Display the details of all employee whose annual salary is between 25000 to 40000.

Ans: select * from empl where sal between 25000 and 40000;

(j) How many job types are offered to employees?

Ans: select count(distinct(job)) from empl;

(k) List the employees who earn more commission than their salaries.

Ans: select * from empl where sal<comm;

(l) Display name, job title and salary of employee who do not have manager.

Ans: select EName, job, sal from empl where mgr = NULL;

(m) Display the name of employee whose name contains 'A' as third letter.

Ans: select EName from empl where EName like `__ A%`

(n) Display the name of employee whose name contains 'L' as any letter.

Ans: select EName from empl where EName like `%L%`

Consider the above table 'empl' and give answer-

Q.5 Write a query to display EName and Sal of employee whose salary is greater than or equal to 2200 from table empl.

Ans: select EName, sal from empl where sal >= 2200;

Q.7 Write SQL commands for the following on the basis of given table STUDENT :

Table : STUDENT1

No.	Name	Stipend	Stream	AvgMark	Grade	Class
1	Karan	400.00	Medical	78.5	B	12B
2	Divakar	450.00	Commerce	89.2	A	11C
3	Divya	300.00	Commerce	68.6	C	12C
4	Arun	350.00	Humanities	73.1	B	12C
5	Sabina	500.00	Nonmedical	90.6	A	11A
6	John	400.00	Medical	75.4	B	12B
7	Robert	250.00	Humanities	64.4	C	11A
8	Rubina	450.00	Nonmedical	88.5	A	12A
9	Vikas	500.00	Nonmedical	92.0	A	12A
10	Mohan	300.00	Commerce	67.5	C	12C

- (a) Select all the Nonmedical stream students from STUDENT1.
- (b) List the names of those students who are in class 12 sorted by Stipend.
- (c) List all students sorted by AvgMark in descending order
- (d) Display a report, listing Name, Stipend, Stream and amount of stipend received in a year assuming that the Stipend is paid every month.

Ans: (a) Select * from CLUB;

(b) Select COACHNAME, DATEOFAPP from CLUB order by DATEOFAPP desc;

(c) Select COACHNAME, PAY, AGE, PAY*15/100 'BONUS' from CLUB;

Q.6 Write SQL commands for the following on the basis of given table CLUB :

Table : CLUB

COACH ID	COACHNAME	AGE	SPORTS	DATOFAPP	PAY	SEX
1.	KUKREJA	35	KARATE	27/03/1996	1000	M
2.	RAVINA	34	KARATE	20/01/1998	1200	F
3.	KARAN	34	SQUASH	19/02/1998	2000	M
4.	TARUN	33	BASKETBALL	01/01/1998	1500	M
5.	ZUBIN	36	SWIMMING	12/01/1998	750	M
6.	KETAKI	36	SWIMMING	24/02/1998	800	F
7.	ANKITA	39	SQUASH	20/02/1998	2200	F
8.	ZAREEN	37	KARATE	22/02/1998	1100	F
9.	KUSH	41	SWIMMING	13/01/1998	900	M
10.	SHAILYA	37	BASKETBALL	19/02/1998	1700	M

- (a) To show all information about the swimming coaches in the club.
 (b) To list names of all coaches with their date of appointment (DATOFAPP) in descending order.
 (c) To display a report, showing coachname, pay, age and bonus (15% of pay) for all the coaches.

Ans: (a) select * from STUDENT1 where Stream = 'NONMEDICAL';
 (b) select Name from STUDENT1 where CLASS like '12_' order by Stipend;
 (c) select * from STUDENT1 order by AvgMark desc;
 (d) select Name, Stipend, Stream, Stipend*12 'Stipend in a Year' from STUDENT1;

Chapter – 18: TABLE CREATION AND DATA MANIPULATION COMMANDS

Short Answer Type Questions

Q.1 Using SQL statements in MySQL, create the tables identified bellow in the following order.

Database Name: Univ.

Create database if needed. (Underlined Columns depict primary key)

Campus (CampusID, CampusName, Street, City, State, Pin, Phone, CampusDiscount)

Position (PositionID, Position, YearlyMembershipFee)

Members (MemberID, Lastname, FirstName, CampusAddress, CampusPhone, CampusID, PositionID, ContractDuration)

Foreign Keys CampusID → Campus(CampusID)

PositionID → Position(PositionID)

Ans: mysql>CREATE DATABASE Univ;
 mysql>USE Univ;
 mysql>CREATE TABLE Campus(CampusID VARCHAR(5) PRIMARY KEY,
 CampusName VARCHAR(20),
 Street VARCHAR(20),
 City VARCHAR(20),
 State VARCHAR(15),
 Pin INT(6),
 Phone VARCHAR(13),
 CampusDiscount INT(2));
 mysql>CREATE TABLE Position (PositionID VARCHAR(4) PRIMARY KEY,

```

Position VARCHAR(10),
YearlyMemberShipFee INT(4));
mysql>CREATE TABLE Members (MemberID VARCHAR(5) PRIMARY KEY,
LastName VARCHAR(15),
FirstName VARCHAR(15),
CampuAddress VARCHAR(30),
CampusPhone VARCHAR(13),
CAMPUSID VARCHAR(5) REFERENCES Campus(CampusID),
PositionID VARCHAR(4) REFERENCES Position(PositionID),
ContractDuration INT(2));

```

Q.2 Write SQL commands to perform the following tasks -

(a) Create table Employee with the following structure:

Name of Column	ID	First_Name	Last_Name	User_ID	Salary
Type	Number(4)	Varchar(30)	Varchar(30)	Varchar(10)	Number(9,2)

Ensure the following specification in created table:

- ✚ ID should be declared as Primary Key
- ✚ User_ID should be unique
- ✚ Salary Must be greater than 5000
- ✚ First_Name and Lst_Name must not remain Blank

Ans: mysql>CREATE TABLE Employee (ID NUMBER(4) PRIMARY KEY,
First_Name VARCHAR(30) NOT NULL,
Last_Name VARCHAR(30) NOT NULL,
User_ID VARCHAR(10) UNIQUE,
Salary NUMBER(9,2));

(b) Create another table Job with following specification:

Name of Column	Type
Job_ID	Number(4)
Job_des	Varchar(30)
Alloc_on	Date
Due_on	Date
Emp_id	Number(4)

Ensure the following specification in created table:

- ✚ Job_ID should be declared as Primary Key
- ✚ Job_des, Alloc_on, Due_on cannot be left blank
- ✚ Emp_id is foreign key here that us related to ID column of earlier created table Employee.

Ans: mysql>CREATE TABLE Job (Job_ID NUMBER(4) PRIMARY KEY,
Job_des VARCHAR(30) NOT NULL,
Alloc_on DATE NOT NULL,
Due_on DATE NOT NULL,
Emp_id NUMBER(4) REFERENCES Employee(ID));

(a) Show the structure of the table employee.

Ans: mysql>DESC Employee;

(b) Show the structure of the table job.

Ans: mysql>DESC Job;

(c) Insert 10 records into the table employee as well as Job.

Ans: mysql> INSERT INTO Employee VALUES(1, 'Amit', 'Kumar', 'E1001',20000);

Same remaining 9 values can be inserted into Employee Table.

mysql> INSERT INTO Job VALUES(1001, 'Manager', '12-25-2016', '12-28-2017', 1);

Same remaining 9 values can be inserted into Job Table.

(d) For record with ID 4 update record with Last_Name, User_ID and Salary.

Ans: mysql>UPDATE Employee SET Last_Name='Singh' WHERE ID=4;

mysql>UPDATE Employee SET Salary=25000 WHERE ID=4;

mysql>UPDATE Employee SET User_ID='E1004' WHERE ID=4;

(e) Make the changes permanent.

Ans: mysql>COMMIT

(f) Modify the salary and increase it by 1000, for all who get salary less than 6000.

Ans: mysql>UPDATE Employee SET Salary = Salary+1000 WHERE Salary<6000;

(g)Add one new column in table Employee named 'Phone'.

Ans: mysql>ALTER TABLE Employee ADD(Phone VARCHAR(13));

(h)Provide the phone numbers to all the employees.

Ans: mysql>INSERT INTO Employee (Phone) VALUES('+918888888888');

Same remaining 9 values can be inserted into Employee Table.

(i) Delete the Employee record having First_Name as Manish.

Ans: mysql>DELETE FROM Employee WHERE First_Name='Manish';

(j) Remove employee table permanently.

Ans: mysql>DROP TABLE Employee;

(k)Count the total records in the table employee.

Ans: mysql>SELECT Count(*) FROM Employee;

Q.3 What are the different divisions of SQL and commands? Give examples.

Ans: SQL commands can be divided into following categories –

- (i) Data Definition Language (DDL) Commands. e.g. CREATE TABLE, ALTER TABLE, DROP TABLE etc.
- (ii) Data Manipulation Language (DML) Commands. e.g. INSERT INTO, DELETE FROM, UPDATE, SELECT etc.
- (iii) Transaction Control Language (TCL) Commands.e.g. ROLLBACK, COMMIT, SAVEPOINT etc.

Q.4 What is foreign key? How do you define a foreign key in your table?

Ans: A foreign key is a column or group of columns in a relational database table that provides a link between data in two tables. It acts as a cross-reference between tables because it references the primary key of another table, thereby establishing a link between them.

To define a foreign key in a table we have to use REFERENCES keyword as follows -

```
mysql>CREATE TABLE Job (Job_ID NUMBER(4) PRIMARY KEY,  
Job_des VARCHAR(30) NOT NULL,  
Alloc_on DATE NOT NULL,  
Due_on DATE NOT NULL,
```

```
Emp_id NUMBER(4) REFERENCES Employee(ID));
```

In the above example Emp_id is a foreign key which references the ID field of table Employee.

Q.5 How foreign key command is different from Primary Key command?

Ans: A primary key is a special key in a relational database that acts as a unique identifier for each record meaning it uniquely identifies each row/record in a table and its value should be unique for each row of the table. A foreign key, on the other hand, is a field in one table that link two tables together. It refers to a column or a group of columns that uniquely identifies a row of another table or same table.

A primary key is a combination of UNIQUE and Not Null constraints so no duplicate values can be allowed to have in a primary key field in a relational database table. No two rows are allowed to carry duplicate values for a primary key attribute. Unlike a primary key, foreign key can contain duplicate values and a table in a relational database can contain more than foreign key.

Q.6 How is Foreign Key commands related to Primary Key?

Ans: A foreign key refers to a field or a collection of fields in a database record that uniquely identifies a key field of another database record in some other table. In simple terms, it establishes a link between records in two different tables in a database. It can be a column in a table that points to the primary key columns meaning a foreign key defined in a table refers to the primary key of some other table. References are crucial in relational databases to establish links between records which is essential for sorting databases. Foreign keys play an important role in relational database normalization especially when tables need to access other tables.

Q.7 How do you enforce business rules on a database?

Ans: We can enforce Business Rules in Relational Databases Using Constraints. Constraints are restrictions over a column. Or we can say that constraint is a check or condition applicable on a field or set of fields. These are of following types –

- (i) Unique
- (ii) Primary Key
- (iii) Default
- (iv) Check
- (v) Foreign Key

Q.8 What are table constraints? What are column constraints? How these two are different?

Ans: Table constraints apply to groups of one or more columns whereas column constraints apply only to Individual column.

Q.9 What is default value? How do you define it? What is the default value of column for which no default value is defined?

Ans: A default value can be specified for a column using DEFAULT clause. When a user does not enter a value for the column (having default value), automatically the defined default value is inserted in the field. e.g.

```
mysql>CREATE TABLE Employee (ID NUMBER(4) PRIMARY KEY,  
                                First_Name VARCHAR(30) NOT NULL,  
                                Last_Name VARCHAR(30) NOT NULL,  
                                User_ID VARCHAR(10) UNIQUE,  
                                Salary NUMBER(9,2) DEFAULT 15000);
```

Q.10 Differentiate between -

- (i) DROP TABLE, DROP DATABASE

(ii) DROP TABLE, DROP clause of ALTER TABLE.

Ans: (i) DROP TABLE will delete a table whereas DROP DATABASE will delete a complete database which will contain different tables. These are DDL commands.

Q.11 How will you enlist the name of tables in a database?

Ans: By using SHOW TABLES command. e.g.
mysql>SHOW TABLES;

Q.12 How to view the structures of the table made by you?

Ans: By using DESC <TableName> command. e.g.
mysql>DESC Employee;

Q.13 How to Drop Table and Databases?

Ans: By using DROP TABLE command. e.g.
mysql>DROP TABLE Employee;

Chapter – 19: TABLE JOINS AND INDEXES IN SQL

Short Answer Type Questions

Consider the following tables and give the commands based on the asked queries from Q1. To Q.4.

TABLE : CUSTOMERS

Name	Address	State	Zip	Phone	Remarks
True wheel	550 Husker	NE	58702	555-4545	None
Bike Spec	CPT Shrive	LA	45678	555-1234	None
Le Shoppe	Hometown	KS	54678	555-1278	None
AAA Bike	10 Oldtown	NE	56784	555-3421	John-Mgr
Jacks Bike	24 Eglin	FL	34567	555-2314	None

TABLE : PARTS

Partnum	Description	Price
54	Pedals	54.25
42	Seats	24.50
46	Tires	15.25
23	Mountain Bike	350.45
76	Road Bike	530.00
10	Tandem	1200.00

TABLE : ORDERS

Orderedon	Name	Partnum	Quantity	Remarks
15-MAY-1996	True wheel	23	6	Paid
19-MAY-1996	True wheel	76	3	Paid
2-SEP-1996	True wheel	10	1	Paid
30-JUNE-1996	True wheel	42	8	Paid
30-JUNE-1996	Bike Spec	54	10	Paid
30-MAY-1996	Bike Spec	10	2	Paid
30-MAY-1996	Bike Spec	23	8	Paid
17-JAN-1996	Bike Spec	76	11	Paid
17-JAN-1996	Le Shoppe	76	5	Paid
1-JUNE-1996	Le Shoppe	10	3	Paid
1-JUNE-1996	AAA Bike	10	1	Paid
1-JUL-1996	AAA Bike	76	4	Paid
1-JUL-1996	AAA Bike	46	14	Paid
11-JUL-1996	Jacks Bike	76	14	Paid

Q.1 Find out the Cartesian product of the table Orders and Parts.

Ans: SELECT * FROM Orders, Parts;

Q.2 What will be the equijoin of the Orders and Parts?

Ans: SELECT ord.orderdon,ord.name,ord.partnum,pr.partnum,description FROM orders ord, parts pr WHERE ord.partnum=pr.partnum;

Q.3 Determine the total order amount for part1 'Road Bike'.

Ans: SELECT SUM(ord.quantity*pr.price) 'Total Amount' FROM orders ord, parts pr WHERE ord.partnum=pr.partnum AND pr.description='Road Bike';

Q.4 Find out the order details of parts having description like 'Road.'

Ans: SELECT * FROM orders WHERE prtnum = (SELECT partnum FROM parts WHERE description LIKE 'Road%');

Q.5 Given two tables -

Employee	PayTable
employee_id	employee_id
last_name	salary
first_name	department
middle_name	supervisor
marital_status	

Find out the salary taken by all KUMAR, i.e. all those who have their last_name as 'KUMAR'

Ans: SELECT e.employee_id, e.last_name, ep.salary FROM employee e, PayTable ep WHERE e.employee_id=ep.employee_id AND e.last_name='KUMAR';

Q.6 A table FLIGHT has 4 rows and 2 columns and another table AIR HOSTESS has 3 rows and 4 columns. How many rows and columns will be there if we obtain the Cartesian product of these two tables?

Ans: 12 rows and 6 rows

Q.7 Table Employee has 4 records ad Table Dept has 3 records in it. Mr. Jain wants to display all information stored in both of these related tables. He forgot to specify equi-join condition in the query. How many rows will get displayed on execution of this query?

Ans: 12 Rows (4 X 3)

Q.8 What are table joins?

Ans: An SQL join clause - corresponding to a join operation in relational algebra - combines columns from one or more tables in a relational database. It creates a set that can be saved as a table or used as it is. A JOIN is a means for combining columns from one (self-join) or more tables by using values common to each. ANSI-standard SQL specifies five types of JOIN: INNER, LEFT OUTER, RIGHT OUTER, FULL OUTER and CROSS. As a special case, a table (base table, view, or joined table) can JOIN to itself in a self-join.

Q.9 Name some types of joins that you can create on tables.

Ans: (i) Equi Join
(iii) Non-Equi-Join
(iii) Natural Join
(iv) Cross Join
(v) Left, Right Joins

Q.10 What are table Indexes? How are they useful?

Ans: Table index is a kind of data structure which is used to fetch the data from database very fast. An index keeps the location in index field in actual table, in ordered form. This is also a table which stores the location of records within it.

Indexes are used to make the search fast. Queries work with indexes very efficiently. Indexes are very much helpful in sorting. Index guarantees in uniquely identifying the records in the databases.

Q.11 What are the advantages and disadvantages of table-indexes?

Ans: Advantages:

- (i) Indexes are used to make the search fast.
- (ii) Queries work with indexes very efficiently
- (iii) Indexes are very much helpful in sorting
- (iv) Index guarantees in uniquely identifying the records in the databases.

Disadvantages:

- (i) The capability of insert, update and delete command reduces. As the index table's updating is an overburden.
- (ii) It consumes more memory.

Q.12 What is database index? Is it a table?

Ans: Table index is a kind of data structure which is used to fetch the data from database very fast. An index keeps the location in index field in actual table, in ordered form. This is also a table which stores the location of records within it.

Q.13 How many ways can you create index in?

Ans: There are two ways to create index -

- (i) At the time of table creation.
- (ii) Creating an index on already existing table.

Q.14 Why is it said that indexes should be created when needed?

Ans: (i) The capability of insert, update and delete command reduces. As the index table's updating is an overburden.

(ii) It consumes more memory. That's why it is said that when there is a need then create the index.

Q.15 How is a left join different from natural join? Give example.

Ans: A NATURAL JOIN is a JOIN operation that creates an implicit join clause for you based on the common columns in the two tables being joined. Common columns are columns that have the same name in both tables. A NATURAL JOIN can be an INNER join, a LEFT OUTER join, or a RIGHT OUTER join. The default is INNER join. And the LEFT JOIN keyword returns all records from the left table (table1), and the matched records from the right table (table2). The result is NULL from the right side, if there is no match.

Q.16 How is a cross join different from natural join? Give example.

Ans: A NATURAL JOIN is a JOIN operation that creates an implicit join clause for you based on the common columns in the two tables being joined. Common columns are columns that have the same name in both tables. A NATURAL JOIN can be an INNER join, a LEFT OUTER join, or a RIGHT OUTER join. The default is INNER join.

The SQL CROSS JOIN produces a result set which is the number of rows in the first table multiplied by the number of rows in the second table if no WHERE clause is used along

with CROSS JOIN. This kind of result is called as Cartesian Product. If WHERE clause is used with CROSS JOIN, it functions like an INNER JOIN

Q.17 In a database there are two tables "Product" and "Client" as shown below :

[CBSE D 11]

Table : Product

P_ID	ProductName	Manufacture	Price
P001	Moisturiser	XYZ	40
P002	Sanitizer	LAC	35
P003	Bath Soap	COP	25
P004	Shampoo	TAP	95
P005	Lens Solution	COP	350

Table : Client

C_ID	ClientName	City	P_ID
01	Dreamz Disney	New Delhi	P002
05	Life Line Inc	Mumbai	P005
12	98.4	New Delhi	P001
15	Appolo	Banglore	P003

Write the commands in SQL queries for the following :

- To display the details of Product whose Price is in the range of 40 and 120 (Both values included).
- To display the ClientName, City from table Client and ProductName and Price from table Product, with their corresponding matching P_ID.
- To increase the Price of all the Products by 20.

Ans: (i) `mysql>SELECT * FROM Product WHERE Price between 40 and 120;`

(ii) `mysql> SELECT c.ClientName, c.City, p.ProductName, p.Price FROM Product p, Client c
WHERE p.P_ID=c.P_ID;`

(iii) `mysql> UPDATE Product set Price=Price+20;`

Chapter – 20: BASICS OF NoSQL DATABASE - MongoDB

Short Answer Type Questions

Q.1 What do you understand by NoSQL databases? How are these different from relational databases?

Ans: It is possible to have database without any structure or record. NoSQL or Not Only SQL Databases are such databases. These are non-relational databases which does not have any strict or rigid structure. These do not store records on the basis of conventional tables. These run in clusters and store data on the basis of web. These are high in scalability. These are also known as big data.

- These provide fast response time.
- These can handle data of any kind without any restriction.
- These adopt new features and fast update.
- These do not show down time.

Q.2 Discuss different types of NoSQL databases.

Ans: 1. Key-value Databases

- Just like python dictionary.
- Very simple and flexible.
- Examples-Cassandra, Amazon DyanmoDB, ATS (Azure Table Storage, Riak, BerkeleyDB)

2. Document Databases

- These are advanced form of key-value databases.
- Here, key-value pair stores in document in structured or semi-structured form.
- Keys are always of string type, values can be of any type.
- It can be in the form of MS office document, PDFs, XML, JSON, BSON.
- JSON (JavaScript Object Notation) and BSON (Binary JSON)

- JSON is an open, human & machine understandable standard. Its main format to interchange data on modern web is XML.
- We have learnt use of JSON in Python dictionaries.
- Its examples are - MongoDB, Couch DB DocumentDB etc.

3. Column family stores Databases

- These are known as column store or column family databases and these are column oriented models.
- Column family is a storage mechanism which can –
 - ❖ Have multiple rows.
 - ❖ Each row can have multiple columns.
 - ❖ In this, there is a row key under which there can be multiple columns as shown in the figure.
 - ❖ Its examples are- Hbase, Cassandra, HyperTable etc

4. Graph Databases

- It uses graphical model to store data.
- Here, nodes are used to show object whereas edges are used to show relation between those nodes.
- Its examples are- Neo4j, Blazegraph, Titan etc.

Q.3 What are the advantages and disadvantages of NoSQL databases?

Ans: •Advantages:

–Flexible Data Model

These are very flexible database which can store any kind of data.

–Evolving Data Model

You can change its schema without downing the system.

–Elastic Scalability

Huge database can be stored on a very less cost.

–High Performance

Time of throughput and latency is very less.

–Open Source

It is available free of cost and you can change it as per your requirement.

•Disadvantages:

–Lack of Standardization

No standard rules are there for NoSQL database.

–Backup of Database

Main problem with NoSQL databases is of backup. MongoDB provides tool for backup but it is also not up to the mark.

–Consistency

NoSQL database does not think about consistency. Means here, you can have duplicate data very easily.

Q.4 What is MongoDB? Which category of NoSQL does it belong to?

Ans: MongoDB is a document-oriented NoSQL database. It supports dynamic schemas which shows data in JSON format. It is a free open source software which gives scalability and high performance. It is Document Database Type of NoSQL database.

Q.5 Explain following terms of MongoDB :

(a) Field (b) Document (c) Collection (d) Database

Ans:	MongoDB Term	Description	SQL Term
	Field	a name-value pair which stores information.	Column

Q.6 What are the main categories of NoSQL databases?

- Ans:
1. Key-value Databases
 2. Document Databases
 3. Column family stores Databases
 4. Graph Databases

Q.7 What is JSON Format?

Ans: JSON (JavaScript Object Notation) is an open, human & machine understandable standard. Its main format to interchange data on modern web is XML. We have learnt use of JSON in Python dictionaries

Application Based Questions

1. Create a new Database by the name **newdb**. Create a collection with name **people** and insert following data in it :

```
"name": "Faqir",    "age": 21, salary :17000
"name": "Farhat",  "age": 20, salary :27000
"name": "Rajat",   "age": 45, salary :37000
"name": "Sia",     "age": 33, salary :25000
"name": "Albert",  "age": 53, salary :47000
"name": "Gurjyot", "age": 24, salary :31000
"name": "Mohan",   "age": 47, salary :50000
```

2. Write query to list all documents in a collection.
3. Write query to find document of a person with name "Mohan".
4. Write query to return all people documents with an age greater than 20.
5. Write a query to retrieve people that are less than or equal to age 24.
6. Frame a query that returns documents where field name has double datatype.
7. Write query to set age of Mohan as 79.
8. Write query to update all the people records where age is in range 20 to 25 and set their salary to 27000.
9. Write query to remove one document with salary less than 30000.
10. Write query to remove all documents where salary is less than 30000.

Ans: The Asked commands will be

1. `>use newdb`
`>newdb.people.save({name:'Faqir',age:21,salary:17000})`

Note: all the records will be added in the same manner.

2. `>newdb.people.find()`
3. `>newdb.people.find({name:'Mohan'})`
4. `>newdb.people.find({age:{$gt:20}})`
5. `>newdb.people.find({age:{$lte:24}})`
6. `>newdb.people.find({"name":{$type:"double"}})`
7. `>newdb.people.update({name:'Mohan'},{$set:{age=79}})`

8. >newdb.people.updatemany({\$and:[{age:{\$gte:20}},{age:{\$lte25}}]},{\$set:{salary=27000}})
9. >newdb.people.deleteone({salary:{\$lt:30000}})
10. >newdb.people.deletemany({salary:{\$lt:30000}})

Chapter – 21: CYBER SAFETY

Short Answer Type Questions

Q.1 What is cyber safety?

Ans: Using internet with care and responsibility is called Cyber Safety so that we can keep our personal information safe.

Q.2 What should you do to protect your identity on Internet?

Ans: The things we can do to protect our identity on Internet.

- Most common solution to this is Private browsing or Anonymous browsing.
- Confidentiality of information.
- Appropriate usage of social networking sites.

Q.3 How do websites track you online?

Ans: Whenever you visit a website, your web browser may reveal your location via your device's IP address.

- It can also provide your search and browsing history etc. which may be used by third parties, like advertisers or criminals.
- This way website track you. Tracking is generally used by advertising networks to build up details profiles for pinpoint adtargeting.
- This information is compiled through your web usage patterns, and which websites generally use for tracking you. This generally includes-
 - IP Address
 - Cookies and tracking scripts etc.
 - HTTP Referrer
 - Super Cookies
 - User Agent

Q.4 What are cookies? How are they used by websites to track you?

Ans: cookies are small pieces of information websites can store in your browser. Cookies can be –

1. **First Party Cookies-** These are the cookies that store your own log in id, password, and auto fill information etc.
2. **Third Party Cookies:** These are the cookies that websites store to know about your search history and web browsing history so as to place advertisements as per your interests.

Q.5 What is private browsing? Why is it considered a better way of browsing the Internet?

Ans: →Anonymous browsers allow users to view websites without revealing personal information of user.

→It can be sued as a tool for governments, journalists and every security conscious surfers.

→A popular solution to this is- Private Browsing.

→Incognito browsing open up a version of the browser that will not track your activity.it is particularly useful if you are entering sensitive data like bank details into your browser.

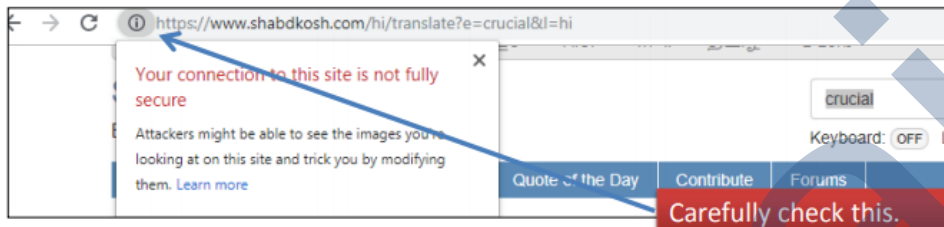
→Proxy works as a middleman between your computer and the website you want to access. Now the tracking website will get the IP address of proxy site.

→Virtual Private Network (VPN) this is a method to add security and privacy to private and public networks, like WiFi hotspots and Internet. It is originally meant for business employees working offsite to gain access to shared drives or networks.

Q.6 What is confidentiality of information? How do you ensure it?

Ans: • Confidentiality of Information ensures that only authorized users get access to sensitive and protected data. Best practices used to ensure confidentiality are-

1. Use of Firewall.
2. Control browser settings to block Tracking.
3. Browse Privately.
4. Be careful while posting on Internet.
5. Ensure safe sites while entering crucial information.



Q.7 What is cyber-crime? How can you report it?

Ans: • Any criminal offense that is facilitated by, or involves the use of, electronic communication or information systems, including any electronic device, computer, or the internet is referred to as **Cybercrime**.

• Some common Cybercrimes are-

1. Cyber Trolls and Bullying:
2. Cyber Bullying
3. Cyber Stalking (Online Harassment)
4. Spreading Rumours Online
5. Unethical hacking
6. Stealing information etc.

• **Reporting Cybercrime** : One must report it firstly to parents, school authorities and then to police.

• The procedure for reporting cybercrime is more or less the same as for reporting any other kind of offence.

• The local police stations can be approached for filling complaints.

• Most of the states have facility of E-FIR.

• Ministry of Home Affairs is also launching a website for registering crime against women and children online including Cybercrime.

Q.8 What is cyber bullying and cyber stalking?

Ans: **Cyber stalking** is the use of the Internet or other electronic means to stalk or harass an individual, group, or organization. It may include false accusations, defamation, slander and libel. It may also include monitoring, identity theft, threats, vandalism, solicitation for sex, or gathering information that may be used to threaten, embarrass or harass.

Cyber bullying or **cyber harassment** is a form of bullying or harassment using electronic means. Cyber bullying and cyber harassment are also known as online bullying. It has become increasingly common, especially among teenagers. Cyber bullying is when someone, typically teens, bully or harass others on social media sites. Harmful bullying behavior can include posting rumors, threats, sexual remarks, a victims' personal information, or pejorative labels (i.e., hate speech). Bullying or harassment can be identified by repeated behavior and an intent

to harm. Victims may have lower self-esteem, increased suicidal ideation, and a variety of emotional responses, including being scared, frustrated, angry, and depressed.

Q.9 What is identity fraud?

Ans: Identity fraud is the use by one person of another person's personal information, without authorization, to commit a crime or to deceive or defraud that other person or a third person.

Q.10 What is digital footprint? Why is it so important?

Ans: A *digital footprint* is a trail of data you create while using the Internet. It includes the websites you visit, emails you send, and information you submit to online services. A "passive digital footprint" is a data trail you unintentionally leave online.

It is not a matter of gathering one person's online activity. The main concern is what the person is doing. If he or she is going to a dark path then the online activity is the first thing that will provide a glimpse of it. The matter is serious and digital footprint is going to provide the fullest information on it. Apart from gathering information the digital footprint provides knowledge on what the person likes and how well the orientation of his mind is. If you find that your friend and beloved family member is posting something obnoxious and disgraceful in a continuous manner then you can stop him from going to the dark path. In this technical society a digital footprint can give you full information of what the person is thinking. Regardless of all thoughts of getting diverted from the prime goal, one person should keep a track of all the information of his online activity. Nowadays, when technology has become too much available and influencing all the activities in a regular manner, keeping it at a side and thinking without the influence of it has become impossible that is why analysis of your digital footprint is highly necessary. This will provide you valuable information on what you are doing and what should be avoided by you.

Q.11 Why are privacy settings of a social networking site so important?

Ans: Privacy settings, present in most of the major social networking sites can be used by the user to adjust the visibility of their profile or of certain information on the profile. As a result, this could eliminate a certain amount of unwanted disclosures and upgrade the level of privacy of the profile.

Q.12 What are the usage rules for effective use of social networking sites?

- Social media is everywhere these days, from personal to professional front. Social media has made it too difficult to remain entirely anonymous these days.
- Whatever you do online, leaves a permanent foot print, called digital foot print.
- Once posted these becomes part of public domain and hence are visible to anyone who looks for it.
- Thus appropriate usage of Social media is very important and you must be aware that it may pose problems later if not used appropriately.
- You should conduct yourself in a responsible way so that you can enjoy using it.
- Be Authentic.
- Use a Disclaimer.
- Don't pick fights Online.
- Don't use fake names or pseudonyms.
- Protect your identity.
- Always take publicity test when post something.

- Respect your audience.
- Respect other's sentiments.
- Monitor comments.

Q.13 Raman wanted to gift his brother a football or a wrist watch. So he searched for many sports items and wrist watches online. But after that every time he goes online, his web-browser shows him advertisements about sports items and wrist watches.

(a) Why is this happening?

(b) How could have Raman avoided them?

(c) How can Raman get rid of this now?

Ans: (a) This is happening because third party cookies saved his search preferences and now websites are posting advertisements based on his preferences.

(b) Robin could have avoided this by privately browsing i.e. opening the web browser in incognito mode before searching for such things.

(c) Now Robin can delete all the previous history and cookies stored on his computer. This would stop websites posting advertisements.

Chapter – 22: ONLINE ACCESS AND COMPUTER SECURITY

Short Answer Type Questions

Q.1 What is a virus? What is anti-virus software?

Ans: A **computer virus** is a malicious program that self-replicates by copying itself to another program. In other words, the computer virus spreads by itself into other executable code or documents. The purpose of creating a computer virus is to infect vulnerable systems, gain admin control and steal user sensitive data. Hackers design computer viruses with malicious intent and prey on online users by tricking them.

Antivirus software is a program or set of programs that are designed to prevent, search for, detect, and remove software viruses, and other malicious software like worms, trojans, adware, and more

Q.2 How is backup utility useful? Is it necessary to take backup of data?

Ans: Backup is a very helpful utility. You can backup your data with that and whenever your data is corrupted by any virus or Trojans your data will remain safe.

It is not necessary to backup your until or unless you have something really important stuff in your machine. The backup depends on your wish if you want to make backup, go on for it and if you don't leave it. But if you have something very useful for you in future then its better to take backup.

Q.3 What is Computer virus? How can it affect your computer?

Ans: A **computer virus** is a malicious program that self-replicates by copying itself to another program. In other words, the computer virus spreads by itself into other executable code or documents. The purpose of creating a computer virus is to infect vulnerable systems, gain admin control and steal user sensitive data. Hackers design computer viruses with malicious intent and prey on online users by tricking them.

Q.4 What are different types of threats to computer security?

Ans: A Threat is a potential violation of security. When a threat is actually executed, it becomes attack. Those who execute such actions, or cause them to be executed are called attackers.

Some common threats the average computer user faces everyday are

1. Viruses
2. Worms
3. Trojans
4. Spyware
5. Adware
6. Spamming
7. PC Intrusion:
8. Denial of Service
9. Sweeping
10. Password Guessing
11. Phishing

Q.5 What type damages can be caused by viruses to your computer?

Ans: Damages caused by Viruses:

- Damage or Delete files.
- Slow down your computer.
- Invade your email programs.

Q.6 What are malware? What type damages can they cause to your computer?

Ans: "**Malware**" is short for malicious software and used as a single term to refer to virus, spy ware, worm etc. Malware is designed to cause damage to a stand-alone computer or a networked pc. So wherever a malware term is used it means a program which is designed to damage your computer it may be a virus, worm or Trojan.

Q.7 What is a spam? Why has it become a big Internet issue?

Ans: Spam email is a form of commercial advertising which is economically viable because email is a very cost-effective medium for the sender. If just a fraction of the recipients of a spam message purchase the advertised product, the spammers are making money and the spam problem is perpetuated.

Q.8 What do you understand by PC intrusion?

Ans: **Intrusion** - Computer Definition. To compromise a computer system by breaking the security of such a system or causing it to enter into an insecure state. The act of intruding—or gaining unauthorized access to a system—typically leaves traces that can be discovered by intrusion detection systems.

Q.9 What measures would you take to avoid -

- (a) Virus attack (b) Spyware (c) Adware (d) Spam (e) PC Intrusion**

Ans: **(a), (b)& (c)**

Solutions to Virus, Adware and Spyware

• Active Protection :

1. Use Anti-Virus and Anti-Spyware.
2. Download updates regularly.
3. Run frequent full-system scans.

• Preventive Measure :

1. Keep your system up-to-date.
2. Use caution when downloading files on the Internet.
3. Be careful with email.
4. Disable cookies, if possible.

(d)

Solutions to Spam and Eavesdropping

• Active Protection :

1. Use Anti-Virus.
2. Update your Anti-Virus regularly.

• Preventive Measure :

1. Keep your email address private.
2. Use encryption in emails.
3. Be careful with E-mails.
4. Install Internet security services.

(e) Solution to PC intrusion

• **Active Protection :**

1. Authorization
2. Authentication
3. Firewall

• **Preventive Measure :**

1. Use Proper File Access Permission.
2. Disconnect from internet when away.

Q.10 What are denial-of-service or Sweeper attack?

Ans: A **denial-of-service attack** is a security event that occurs when an attacker prevents legitimate users from accessing specific computer systems, devices, services or other IT resources.

Q.11 What is Phishing?

Ans: **Phishing and Pharming**

- In **Phishing**, an imposter uses an authentic looking e-mail or website to trick recipients into giving out sensitive personal information which may later used for cyber crimes and frauds.
- **Pharming** is an attack in which a hacker attempts to redirect a website's traffic to another, bogus website. Even if the URL is correct, it can still be redirect to a fake website.

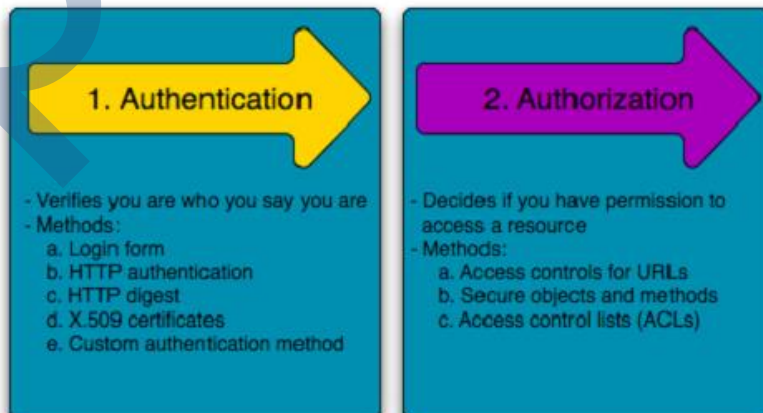
Q.12 How is pharming similar to and different from phishing?

Ans: **Phishing and Pharming**

- In **Phishing**, an imposter uses an authentic looking e-mail or website to trick recipients into giving out sensitive personal information which may later used for cyber crimes and frauds.
- **Pharming** is an attack in which a hacker attempts to redirect a website's traffic to another, bogus website. Even if the URL is correct, it can still be redirect to a fake website.

Q.13 What is Authentication and Authorization? Why are these two used together?

Ans: Difference between Authentication and Authorization. Both the terms are often used in conjunction with each other in terms of security, especially when it comes to gaining access to the system. Authentication means confirming your own identity, while authorization means granting access to the system.



Q.14 What is the significance of Firewall in a computer's security scheme?

- Ans:**
- An Internet Firewall is a device or a software that is designed to protect your computer from data and viruses that you do not want. A firewall is so called because of the real firewalls used to secure buildings.
 - **Software Firewall:** A software firewall is a special type of software running on a computer. It protects your computer from outside attempts to control or gain access.
 - **Hardware Firewall:** It is a physical piece of equipment designed to perform firewall duties. A hardware firewall may actually be another computer or dedicated piece of equipment which serves as a firewall.

Q.15 What is Eavesdropping? What security measures can you take up to prevent it?

- Ans:**
- Unauthorized monitoring of other people's communications is called Eavesdropping.
 - Eavesdropping can be carried out through all communication devices and media of today-telephone, emails, messaging, other internet services.
 - To prevent this, email messages have to be encrypted and digital signature are also effective.

Q.16 What is the need for secure passwords?

Ans: A password that is difficult to detect by both humans and computer programs, effectively protecting data from unauthorized access. A strong password consists of at least six characters (and the more characters, the stronger the password) that are a combination of letters, numbers and symbols (@, #, \$, %, etc.) if allowed. Passwords are typically case-sensitive, so a strong password contains letters in both uppercase and lowercase. Strong passwords also do not contain words that can be found in a dictionary