

KALAM LAS ACADEMY

TRB (COMPUTER INSTRUCTOR) SYLLABUS

COMPUTER SYSTEMS ARCHITECTURE

Marks: 10

1. THE COMPUTER SYSTEM

System buses:

1. Computer Components
2. Computer function
3. Interconnection Structures.

Internal Memory:

1. Computer Memory System Overview
2. Cache Memory

Input/ Output:

1. External Devices
2. Direct Memory Access
3. The External Interface.
4. Operating System Overview

2. THE CENTRAL PROCESSING UNIT

Computer Arithmetic:

1. The Arithmetic and Logic Unit (ALU)
2. Floating-Point Arithmetic

Instruction Sets:

1. Types of Operands
2. Types of Operation
3. Register
4. Organization
5. The Instruction Cycle.

OPERATING SYSTEMS

Marks: 10

Introduction:

1. System software
2. OS strategies
3. Multi programming
4. batch

Operating System Organization:

1. basic OS function,
2. kernels
3. Device drivers.

Device Management:

1. Buffering.

Process Management:

1. resource abstraction,
2. Process hierarchy.

Scheduling:

1. Strategy selection.

Synchronization Principles:

1. deadlock,
2. semaphores,
3. multiprocessors.

Deadlocks:

1. hold and wait,
2. Banker's Algorithm,
3. consumable
4. resources.

Memory Management:

1. memory allocation strategies,
2. variable partition.

Protection and Security :

1. internal access authorization.

DIGITAL ELECTRONICS

Marks: 10

Fundamental Concepts:

NAND,

NOR and Exclusive-OR operation

Boolean Algebra.

Number system and Codes:

1. Primary
2. Octal
3. Hexadecimal
4. Signed Numbers Codes

Combinational Logic Design:

1. K-map representation of logical functions and simplification using K-map of 4 and 5 variables.
2. Multiplexers
3. Decoders

Flip-Flops:

1. Edge triggered flip flop.

DATA STRUCTURES

Marks: 15

1. Abstract data types and objects
2. graphical user interfaces

language support and OOP:

1. Inheritance,
2. classes and subclasses,
3. header files,
4. overloading

Programming with Data structures:

1. Stacks
2. queues
3. lists
4. trees and balanced binary trees,
5. algorithms for searching and sorting and open office.

PROGRAMMING IN C++

Marks: 20

1. Object Oriented Programming:

Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies.

2. Implementation of Object Oriented Programming concepts in C++:

Members of a class-Data Members AND Member Functions (methods), inside class definition and outside class definition using scope resolution operator (::) Objects as function arguments-pass by value and pass by reference;

Constructor and Destructor:

Constructor: Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors

Destructor: Declaration and definition of destructor;

Inheritance (Extending Class): Concept of Inheritance, Base Class, Derived Class, Defining derived classes, Multilevel inheritance and Multiple inheritance,

Data File Handling:

Reading and Manipulation of text from an already existing text File (accessing sequentially);

3. Pointers:

Declaration and Initialization of Pointers: Dynamic memory allocation/ deallocation operators: new, delete; Pointers and Arrays: Array of Pointers, Function returning a pointer.

Deference operator: *,->; self referential structures, Python, PHP;

RELATIONAL DATABASE MANAGEMENT SYSTEM Marks: 10

1. Database Management System

Introduction to database concepts: Relation/ Table, Data, Concept of String Candidate key, Alternate key, Primary Key, Foreign Keys; Data Normalization-first, second, third, BCNF normal form; Examples of Commercially available Database Management System's (Back-end) -MySQL, Examples of Front End Software's Visual C++

2. RDBMS Tools:

Oracle Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE), SQL SELECT Statement: SQL SELECT statement, Selecting All the Columns, Selecting Specific Column, Column Heading Default, SELECT Statement Continued: Limiting Rows during selection (using WHERE clause), Logical Operators, Use of Logical Operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/Descending Order, Functions: SQL Functions, Types of SQL Function (Single Row/ Multiple Row), Character Functions UPPER (), SUBSTR C), (ROUND (), TRUNC MOD()), Working with Dates ROUND(), Implicit and Explicit Conversion,

Grouping Records: Types of group functions [MAX (), MIN (), AVG (), SUM (), COUNT using AVG and SUM Functions, Group By Clause, Grouping By More than One Column, Having Clause.

Sub Queries: Guidelines for Using Sub Queries, Types of Sub-Queries (Single Row and Multiple Row)

Database Objects: DDL (Data Definition Language), Synonyms, Querying a View, Modifying a view.

Creating Including Constraints: UNIQUE KEY, PRIMARY KEY, FOREIGN KEY, FOREIGN KEY

Creation of a Table/ Relation: CREATE TABLE Statement, Creating a Table by Using a Sub-Query; Managing Existing Tables and other Database Objects: The ALTER TABLE Statement, Adding a New Column in a Table, Dropping Tables;

BUSINESS COMPUTING

Marks: 15

Integration of User Interface and Database;

More application areas of Databases: Inventory control, Financial Accounting, Fees Management System, Result Analysis System, Admission Management System, Income Tax Management System; Advance Program Development Methodology: System Development Life Cycle, Data Models (Entity Relationship Model), Attributes (Single, Composite and Multi- Valued), Relationship (One-to-One,

One-to-Many and Many-to-Many SQL Statements, Data Dictionary, Data Warehousing, Data Mining,

WEB DEVELOPMENT

Marks: 10

HTML/ DHTML

Introduction, Objectives, Introduction to Universal Resource Identifier (URI)

Basic Tags of HTML: HTML, HEAD, TITLE, BODY, Ordered List-OL (LI, Type-I, 1, A, a; START, VALUE), Unordered List-UL (Bullet Type- Disc, Circle, Square, DL, DT, DD), Web Page Authoring Using HTML

Tables: Creating Tables, Border, WIDTH, CAPTION, ALIGN,

Frames: Frameborder, height and width,

Forms: Definition, MS-Access or Oracle,

Form Tags: FORM, METHOD, Document Object Model

Active Server Pages (ASP)

Active Server Pages (ASP): Concept of ASP, features of ASP,

Variables: Explicit and Implicit Declaration;

Functions: String Manipulation Functions: Ucase (), Lcase (), Len (), Left (), Right (), Mid (), Ltrim (), InStr()

Time & Date Functions: Date (), Day(), Hour (), Left () , Len (), Minute (), Month (), Monthname (), Now ();

Arrays: Declaration and use of 1 dimensional and 2 dimensional arrays; nProcedures and Functions, Passing parameters/ arguments; Connecting with Databases: Creation of DSN, using OLEDB.

WEB SCRIPTING

Marks: 10

1. Java Script

Event handling, Adding Java Script in an HTML Page

MULTIMEDIA AND AUTHORING TOOLS

Image Formats

TIFF, BMP, JPG/ JPEG, GIF, IC, PDF, PSD:

Image Scanning with the help of scanner: Size, File formats of images; image preview Significance of PDF-creation, modification; Animation, Morphing and Applications Setting up Resolution,

Graphic Tools: Image Editing Software (Photoshop/ CorelDraw)

Image Handling: Cropping an image, adjusting image size, saving an image;

Layers: Adding layers, dragging and pasting selections on to layers, moving and copying layers, duplicating layers, deleting layers, merging layers. Opacity.

Concept of Multimedia: Picture/ Graphics, Audio, Video;

Sound: Recording Sound using Sound Recorder (Capture), Sound editing, Effect enhancement;

Voice Recognition Software Philips/ Dragon, MIDI Player, Sound Recorder.

Sound Quality: Radio Quality,

1. **Movie File Formats:** AVI, MPEG.

Movie Frames: Concept of Frame, Frame Buffer,;

2. Multimedia Authoring Using Macromedia Flash Making of Simple Flash Movie,

COMMUNICATION AND NETWORK CONCEPTS

Marks: 20

Evolution of Networking: Internet; Data Communication terminologies: Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, kbps, Mbps, Gbps, Tbps);

Network devices: Modem, Ethernet Card, Hub, Switch, Router, Different Topologies- Bus, Tree; Concepts of LAN, WAN, MAN;

Protocol: TCP/IP, Internet, Wireless/ Mobile Communication, GSM, Electronic Mail, Chat, Video Conferencing;

Network Security Concepts: Cyber Law, Hackers and Crackers; WebPages; Hyper TEXT markup Language (HTML), Hyper Text Transfer Protocol (HITP); Website, Web Browser, Web Servers.