Implementing the Solution
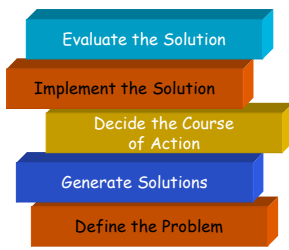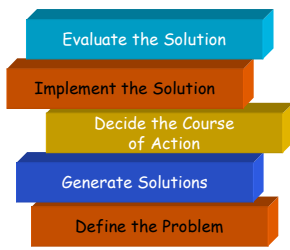
▪ Many people get stuck in the problem-solving process by analyzing things to death
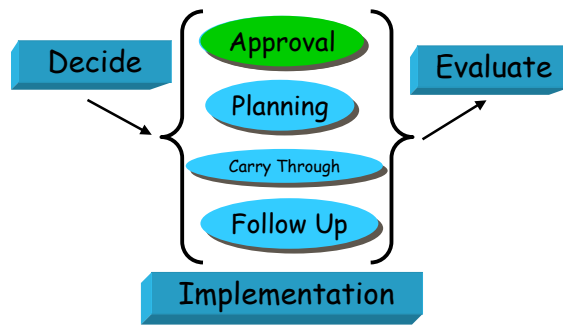
- Evaluate the Solution
- Implement the Solution
- Decide the Course of Action
- Generate Solutions
- Define the Problem

Implementing the Solution

▪ There are a number of techniques that will facilitate the implementation process

- Evaluate the Solution
- Implement the Solution
- Decide the Course of Action
- Generate Solutions
- Define the Problem

Implementing the Solution

Decide

Approval
Planning
Carry Through
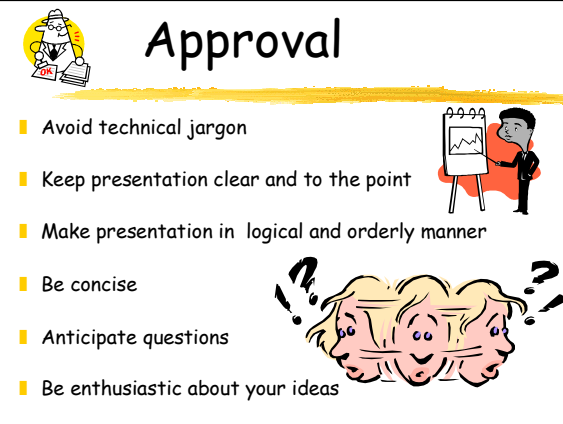Follow Up

Implementation

Evaluate

Approval

▪ The first step in the implementation process is to get approval from your organization

▪ Sell your ideas

▪ Prepare a document to sell your project

▪ Your report should describe:
  ▪ What you want to do
  ▪ Why you want to do it
  ▪ How you are going to do it
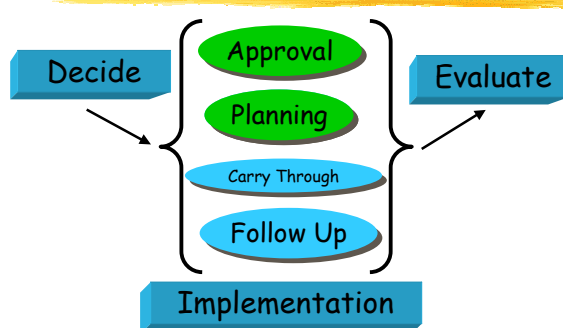 ▪ How your project will benefit the organization

Approval

▪ Avoid technical jargon

▪ Keep presentation clear and to the point

▪ Make presentation in logical and orderly manner

▪ Be concise

▪ Anticipate questions

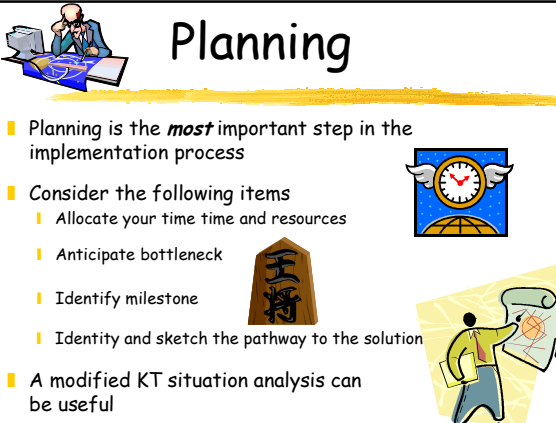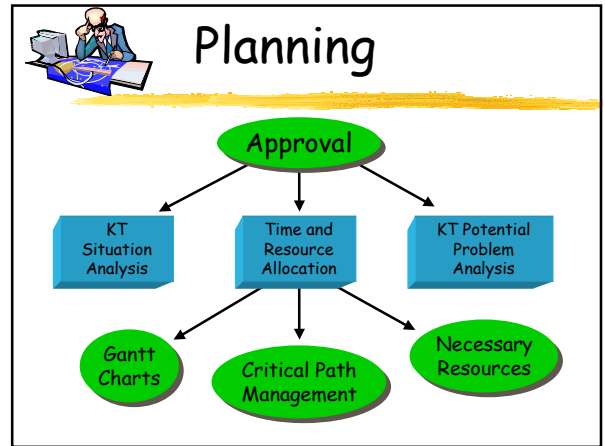▪ Be enthusiastic about your ideas

Implementing the Solution

Decide

Approval
Planning
Carry Through
Follow Up

Implementation

Evaluate

Planning

- Planning is the *most* important step in the implementation process

- Consider the following items
  - Allocate your time time and resources
  - Anticipate bottleneck
  - Identify milestone
  - Identity and sketch the pathway to the solution

- A modified KT situation analysis can be useful
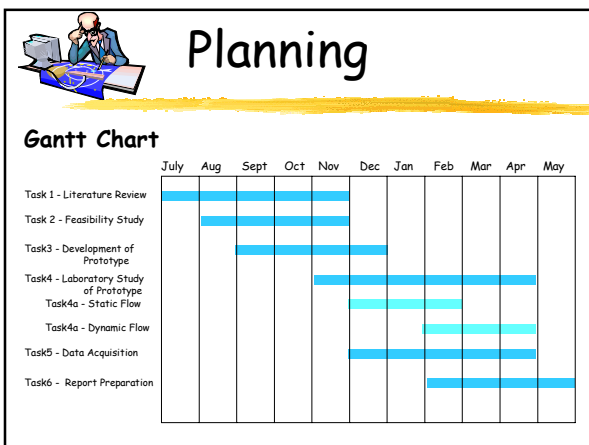
Planning

Planning

- Many people use a personal organizer to keep track of activities and commitments

- We will discuss four types of organization methods:
  - Gantt Chart
  - Coordination and development
  - Critical path
  - Necessary resources

Planning

- **Gantt Chart** - a common way to allocate time to specific tasks

- *"If you don't know where you're going you'll probably end up somewhere else"*

Planning

Gantt Chart

Planning

- **Coordinate and Development**

- **Coordination** among various team members is imperative to achieving an **efficient** solution in the **time allotted**

- The use of a **Development Chart** can help guide the team by assigning various responsibilities to different team members

Planning Example

- Thanksgiving Dinner - my extended family consists of 25 people

Main Course:	Roasted turkey with dressing	clean (0.5 hr), stuff (0.5 hr), cook (7 hr @ 350ºF), cool and slice (1 hr)
Vegetable:	Green beans with mushroom sauce	prep. time (30 min) microwave (30 min)
Potato:	Sweet potato casserole	prep. time (30 min), cook (3 hr @ 350ºF)
Sauce:	Jellied cranberry sauce	open can, slice, serve
Dessert:	Pumpkin pie	prep. time (45 min), cook (1 hr @ 425ºF)
Beverages:	Coffee, tea, milk, water, wine	

Planning Example

- Gantt Chart for Thanksgiving Dinner

Planning

- **Critical Path** - Organizing critical tasks along a time line

- Develop an understanding of how one task effects other tasks in the project

- Use extensively in the construction industry

- Constructing a critical path is a **dynamic** process

Critical Path Example

- Critical Path for Thanksgiving Dinner

Critical Path Example

- Critical Path for Thanksgiving Dinner

Group Problem

Critical Path Group Problem Page 148

Planning

Necessary Resources

- Typically resource are divided into five categories:

  - Personnel
  - Equipment
  - Travel
  - Supplies
  - Overhead

Planning

I. Salaries and Wages		
A. Principal Investigator, C.V. Camp		
Summer, 2 month @ 66.67%	$	14,925
Extra Compensation (1 month academic year @11.11%)	$	7,462
B. Shahram Pezeshk		
Summer, 2 month @ 66.67%	$	14,925
Extra Compensation (1 month academic year @11.11%)	$	7,462
C. Undergraduate Research Assistant		
2 @ $6/hr (1280 hours)	$	15,360
Subtotal I	$	60,134
II. Fringe Benefits		
@ 17.65% of IA+IB	$	7,903
III. Travel	$	2,000
IV. Operating Expenses	$	15,000
V. Subcontract - Dr. Russell Deaton - The Univeristy of Arkansas	$	37,597
Total Direct Costs	$	122,634
VI. Facilities & Administration Costs @ 15% MTDC	$	18,395
Total Project Costs	**$**	**141,029**

Planning

- **Carry Through** - all the planning in the world will not save a poor job of carrying through the chosen solution

- Carry Through Checklist:
  - Find the limits of your solution - overestimate or underestimate your assumptions
  - Anticipate your solution
  - Construction of a model our your solution to see if it will work under simple conditions
  - Continue to collect information and research your solution
  - Make sure no physical law are violated
  - Plan you simulations carefully

Planning

- Revealing the Solution - *"It's like peeling an onion"*

Planning

Revealing the Solution

- **Evaluation –** qualitative and quantitative judgements about how material and methods satisfy problem criteria

- **Synthesis –** formulation of problem statement and testing procedures from "fuzzy" situations

- **Analysis –** break the problem into parts, identify missing, redundant, and and contradictory information

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Planning

Revealing the Solution

- **Application –** organize which set of activities will be applied

- **Comprehension –** understanding, manipulation, and/or extrapolation of information generated or identified in the application step

- **Knowledge –** remembering previously learned material

Planning

Follow Up

- Flexibility in an essential trait of problem solvers

- Periodically check your progress

"Inspect what you expect"

Planning

Follow Up

👉 Follow the solution plan

👉 Proceed on schedule

👉 Stay within budget

Planning

Follow Up

👉 Acceptable quality

👉 Still relevant to the problem

Planning

Problems That Change With Time

- Where did the goals come from and why?

- Are the goals still appropriate to the problem?

- Are you trying to hit a moving target?

Planning

Experimental Projects

Examine the Need for the Experiment
Define Objectives for the Experiment
Choose Responses You Want to Measure
Identify the Important Variables
Design Experiment
Perform Experiment
Analysis Results

Planning

Experimental Projects

Examine the Need for the Experiment
Define Objectives for the Experiment
Choose Responses You Want to Measure
Identify the Important Variables
Design Experiment
Perform Experiment
Analysis Results
Act on Results → Report and Present

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- Do you really need the experiment?

  - Why perform the experiment?

  - Do you have enough time and money?

  - Is the information already available?

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- What are the objectives of the experiment?

  - Prepare a list of objectives you wish to accomplish

  - What question would you most like to answer?

  "Can't see the forest for the tress"

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- Choose the Response You Want to Measure

  - What are the dependent and independent variables?

  - Do you have the appropriate equipment?

  - Are your measures and accurate and precise

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- Identify Important Variables
  - What are the *really* important measurements?
  - What is the range of each variable?
  - Look for dimensionless ratios or groups of variables

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- Design the Experiment
  - What are the types of errors to avoid?
  - What is the minimum number of experiments that must be performed?
  - Should we repeat the experiment?

Planning

Experimental Projects

- Examine the Need for the Experiment
- Define Objectives for the Experiment
- Choose Responses You Want to Measure
- Identify the Important Variables
- Design Experiment
- Perform Experiment
- Analysis Results
- Act on Results → Report and Present

Planning

Experimental Projects

- Perform the Experiment
  - How many times?

    Is one enough?

    Is three too many?

Planning

Experimental Projects

Examine the Need for the Experiment
Define Objectives for the Experiment
Choose Responses You Want to Measure
Identify the Important Variables
Design Experiment
Perform Experiment
Analysis Results
Act on Results → Report and Present

Planning

Experimental Projects

▌ Analyze the Results

   ▌ Have all experimental objectives been satisfied?

Planning

Experimental Projects

Examine the Need for the Experiment
Define Objectives for the Experiment
Choose Responses You Want to Measure
Identify the Important Variables
Design Experiment
Perform Experiment
Analysis Results
Act on Results → Report and Present

Planning

Experimental Projects

▌ Report Format

   1. Abstract
   2. Introduction
   3. Material and Methods
   4. Results
   5. Discussion of Results
   6. Conclusions
   7. References

Planning

Top Ten List of Effective Reports
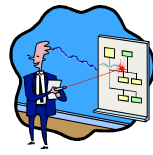
   1. Perfect grammar
   2. Logically organized
   3. Logical flow of ideas
   4. Concisely written
   5. Interestingly written
   6. Ideas supported by data
   7. Appropriate use of figures
   8. Passive voice
   9. Clear purpose
   10. Professionally bound document

Planning

Top Ten List of Effective Presentations

   1. Well organized
   2. Logical flow of ideas
   3. Ideas presented concisely
   4. Ideas supported by data
   5. Clear explanations
   6. Good visual aids
   7. Speak clearly
   8. Well prepare and practiced
   9. Dress appropriately
   10. Conclusions supported by evidence

End of Chapter 6