06 | Project Management

OM 201
Principles of operations management

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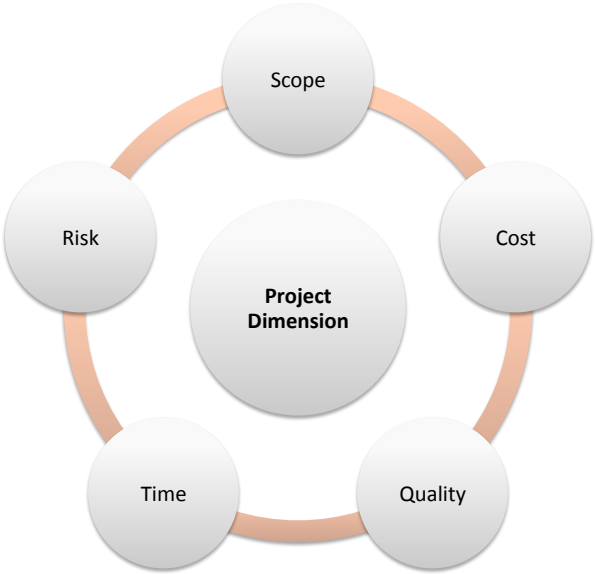
Project Dimension

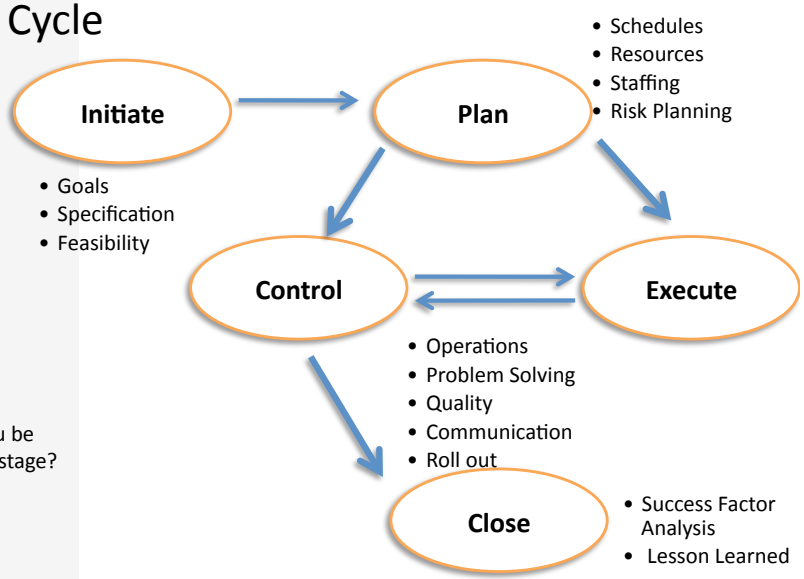


- Sponsor's or stakeholder's expectation
- We should be able to identify the **consequence** if any of these has changed.
  - Shorten project time frame
  - Budget cut
  - Larger scope and more details
  - Increases in quality and expectation

Project Characteristics

- Single unit
- Many related activities
- Difficult production planning and inventory control
- General purpose equipment
- High labor skills

Project Life Cycle



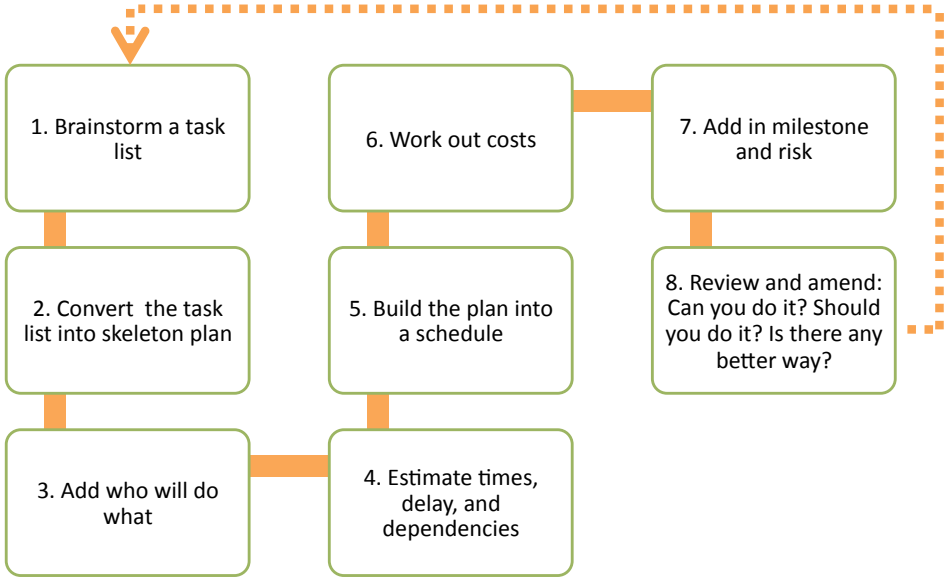
What questions will you be asking yourself in each stage?

Managing stakeholders – communications – planning and tracking - risks

Planning to Actions

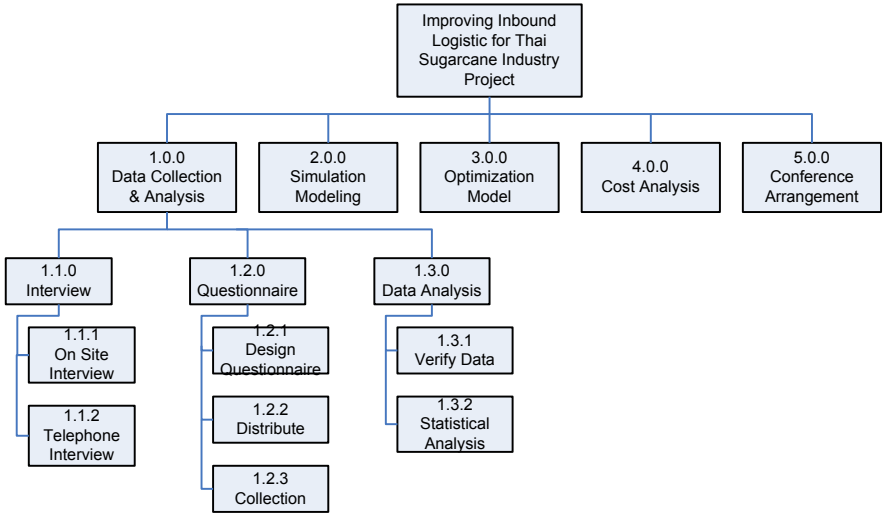
1. Work Breakdown Structure (WBS)	What activity?
2. Project Organization – Select team members	By whom?
3. Responsibility Chart	
4. Technical List	How?
5. Time planning	When

Step-by-Step Guide: Create your Project Plan



1. Work Breakdown Structure

Breakdown all the works and detailed activities



Work Breakdown Structure

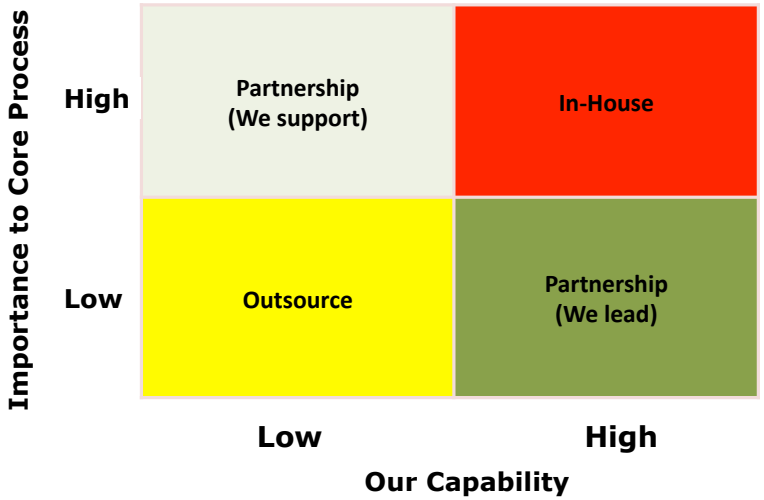
- 1. Project
- 2. Major tasks in the project
- 3. Subtasks in the major tasks
- 4. Activities (or work packages) to be completed

Work Breakdown Structure

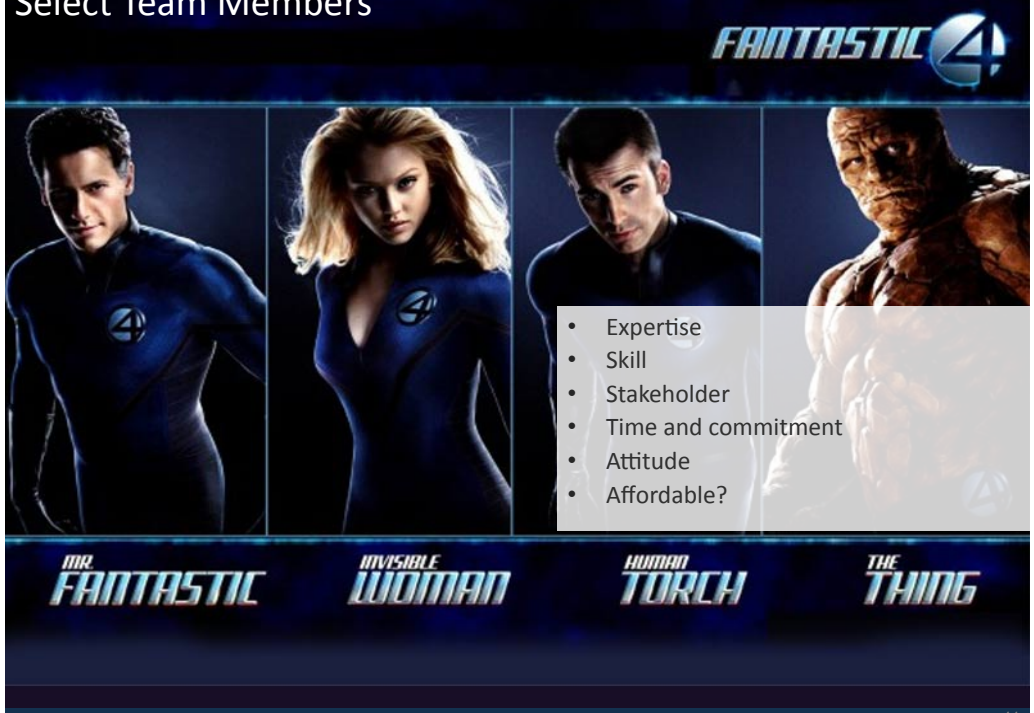
WORKSHOP

- You are about to launch an innovative project
- **"BKK – Phuket Trip via Tuk-Tuk"**

Decision Making in Project Process



Select Team Members



- Expertise
- Skill
- Stakeholder
- Time and commitment
- Attitude
- Affordable?

3. Responsibility Charts

- To identify key responsible person
- For communication and performance evaluation and control purpose

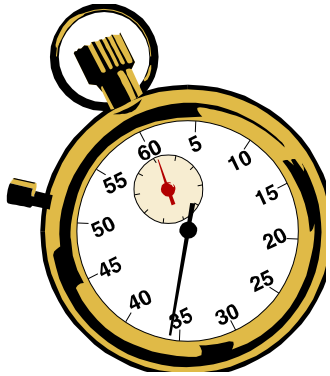
WBS	Duties	A	B	C	Secretary	Grad Students	Part Time Students
1.0.0	Data Collection and Analysis						
1.1.0	Interview						
1.1.1	On Site Interview	X				X	X
1.1.2	Telephone Interview				X	X	
1.2.0	Questionaire						
1.2.1	Design Questionaire	X				X	
1.2.2	Distribute					X	X
1.2.3	Collection					X	X
1.3.0	Data Analysis						
1.3.1	Verify Data	X	X			X	X
1.3.2	Statistical Analysis	X	X			X	
2.0.0	Simulation Modeling	X	X	X			
3.0.0	Optimization Model		X				
4.0.0	Cost Analysis			X			
5.0.0	Conference Arrangement				X		

4. Technical List

- List the details and requirement about
  - Material
  - Equipment
  - And others

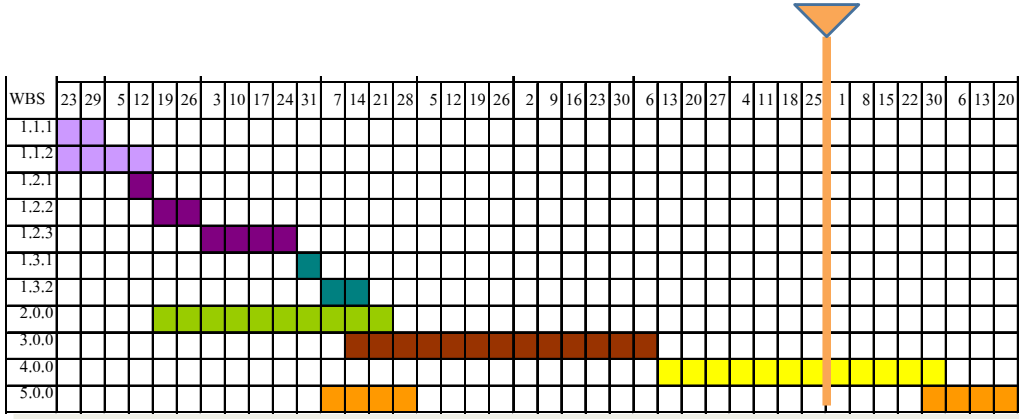
5. Time Planning

- Gantt Chart
- Critical Path Method (CPM)



Gantt Chart

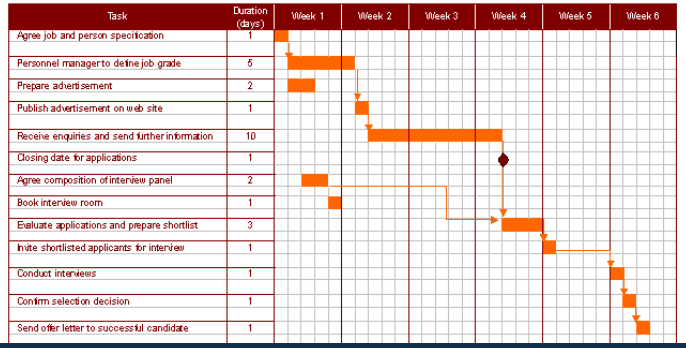
- Show the sequence of activities
- Starting dates and ending dates



Gantt Chart

Advantages	Disadvantages
• Easy to make and easy to understand • Suitable for simple plan and not much change along the project • Suitable for repeating project and flexible project	• Does not show the activity relationship • Not suitable for complex projects • Does not support the change in plan

Example Gantt Chart showing key dependencies in a recruitment process



A Comparison of AON and AOA Network Conventions

Activity on Node (AON)	Activity Meaning	Activity on Arrow (AOA)
(a) A → B → C	A comes before B, which comes before C	A → B → C
(b) A, B → C	A and B must both be completed before C can start	A, B → C
(c) A → B, C	B and C cannot begin until A is completed	A → B, C

A Comparison of AON and AOA Network Conventions

Activity on Node (AON)	Activity Meaning	Activity on Arrow (AOA)
(d) A, B → C, D	C and D cannot begin until A and B have both been completed	A, B → C, D
(e) A → C; B → C, D	C cannot begin until both A and B are completed; D cannot begin until B is completed. A dummy activity is introduced in AOA	A → C; B → C, D; Dummy activity

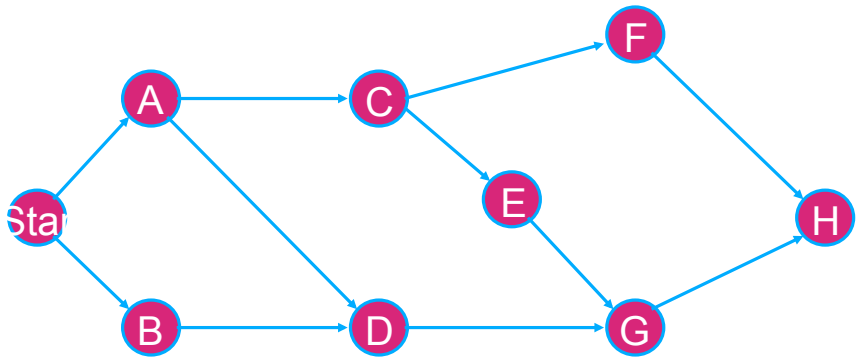
A Comparison of AON and AOA Network Conventions

Activity on Node (AON)	Activity Meaning	Activity on Arrow (AOA)
(f) A → B → D; A, B → C	B and C cannot begin until A is completed. D cannot begin until both B and C are completed. A dummy activity is again introduced in AOA.	A → B → D; A, B → C; Dummy activity

Milwaukee General Hospital's Activities and Predecessors

Activity	Description	Predecessor (s)
A	Build internal components	-
B	Modify roof and floor	-
C	Construct collection stack	A
D	Pour concrete and install frame	A, B
E	Build high-temperature burner	C
F	Install pollution control system	C
G	Install air pollution device	D, E
H	Inspect and test	F, G

AON Network for Milwaukee General Hospital



Time Estimates for Milwaukee General Hospital

Activity	Description	Time (weeks)
A	Build internal components	2
B	Modify roof and floor	3
C	Construct collection stack	2
D	Pour concrete and install frame	4
E	Build high-temperature burner	4
F	Install pollution control system	3
G	Install air pollution device	5
H	Inspect and test	2
	Total Time (weeks)	25

Some symbol and notations in CPM

- **T** Time
- **ES** Earliest start time
- **EF** Earliest finish time
- **LS** Latest start time
- **LF** Latest finish time

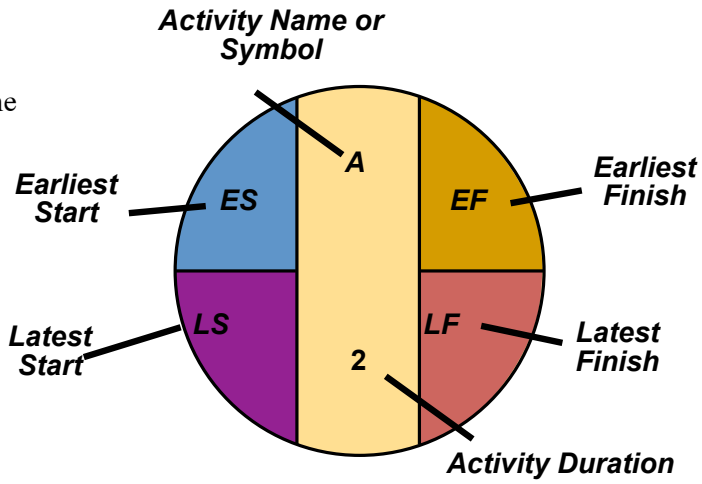


Figure 3.10

Earliest Start and Finish Steps

- Begin at starting event and work forward
- ES = 0 for starting activities
  - ES is earliest start
- EF = ES + Activity time
  - EF is earliest finish
- ES = Maximum EF of all predecessors for non-starting activities

Latest Start and Finish Steps

- Begin at ending event and work backward
- LF = Maximum EF for ending activities
  - LF is latest finish; EF is earliest finish
- LS = LF - Activity time
  - LS is latest start
- LF = Minimum LS of all successors for non-ending activities

Determining the Project Schedule

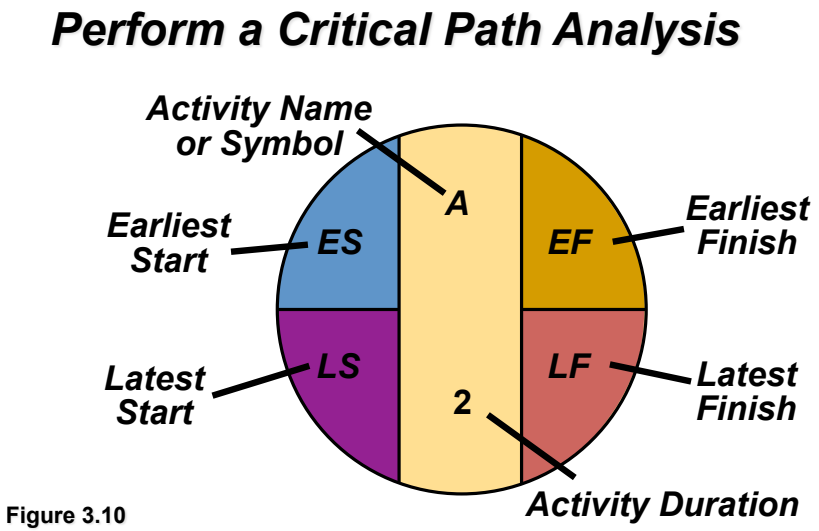
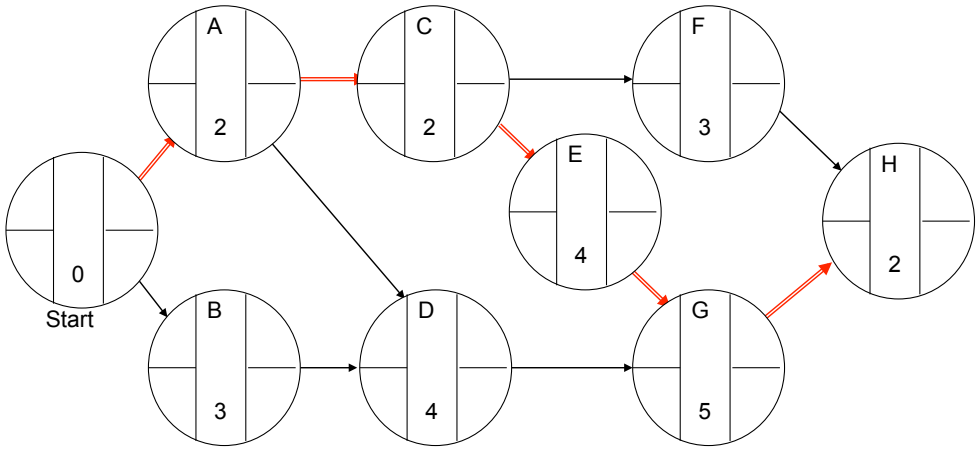
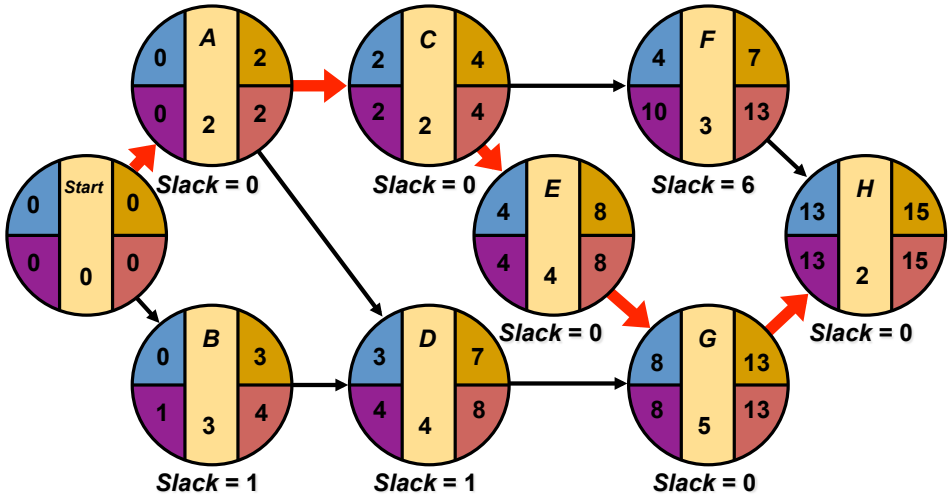


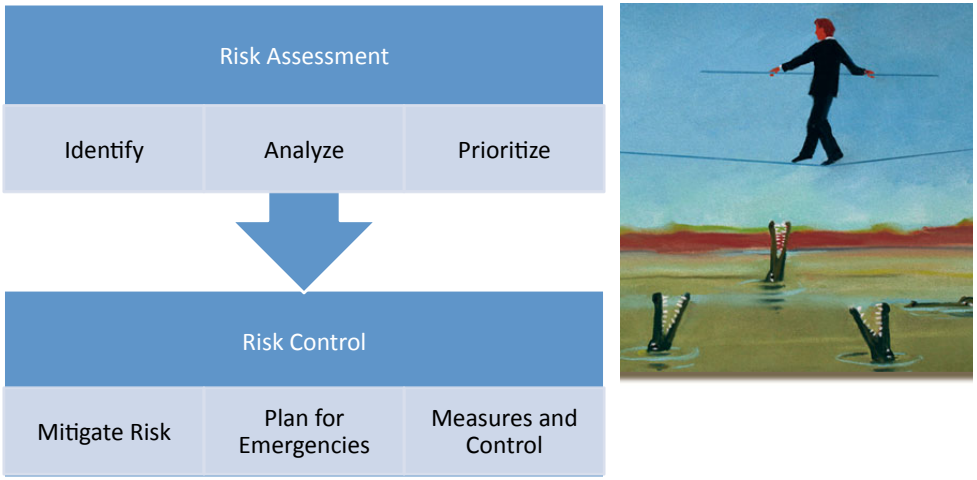
Figure 3.10

AON Network for Milwaukee General Hospital Includes Critical Path 0



Critical Path And Slack Times For Milwaukee





Risk Assessment

1. Identify Uncertainties

- Explore the entire project plans and look for areas of uncertainty.

2. Analyze Risks

- Specify how those areas of uncertainty can impact the performance of the project, either in duration, cost or meeting the users' requirements.

3. Prioritize Risks

- Establish which of those Risks should be eliminated completely, because of potential extreme impact, which should have regular management attention, and which are sufficiently minor to avoid detailed management attention.

Risk Assessment