



Param Puja Dr. Babasaheb Ambedkar Smarak Samiti's

**Dr. Ambedkar Institute of Management Studies & Research**

Deeksha Bhoomi, Nagpur - 440010 (Maharashtra State) INDIA

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Tel: +91 712 6521204, 6521203, 6501379

Email: [info@daimsr.in](mailto:info@daimsr.in)

# Unit III

## Gantt Charts

# Programme Educational Objectives

*Our program will create graduates who:*

- 1. Will be recognized as a creative and an enterprising team leader.*
- 2. Will be a flexible, adaptable and an ethical individual.*
- 3. Will have a holistic approach to problem solving in the dynamic business environment.*

# Project Management Course Outcomes

- CO1-Given a project example (construction, organizing event), student manager will be able to construct and explain project life cycle of the project.
- CO2-Given a construction project example, the student manager will be able to identify the probable risks in the project and explain the steps of risk response planning process of the project.
- CO3-Given the time duration and cost estimates for various activities in a project, the student manager will be able to construct a Gantt chart of the project.

CO4- Given a condition (Early project delivery, project delay, shifting to new project, cost escalation), the student manager will be able to identify the reason for fast tracking the project and explain the process of fast tracking that project.

CO5- Given an organizational project example, the Student manager will be able to select and explain the type of project organization structure of a given project.

# What is a 'Gantt Chart?'

- A Gantt chart is a graphical depiction of a project schedule.
- A Gantt chart is a type of bar chart that shows the start and finish dates of several elements of a project that include resources, milestones, tasks and dependencies.
- Henry Gantt, an American mechanical engineer, designed the Gantt chart.

# Origins of the Tool

- In around 1910, Henry Gantt, a management consultant and engineer, took concept to the next stage.
- His chart was designed to help manufacturing supervisors see whether their work was on, ahead of, or behind schedule, and it formed the foundation of the tool we use today.

# Why Use Gantt Charts?

- When you set up a Gantt chart, you need to think through all of the tasks involved in your project. **As part of this process,**
- you'll work out who will be responsible for each task,
- how long each task will take, and
- what problems your team may encounter.

# Contd....

- **They also help you work out practical aspects of a project,**
- such as the minimum time it will take to deliver,
- and which tasks need to be completed before others can start.
- **Plus, you can use them to identify the critical path –**
- **the sequence of tasks that must individually be completed on time if the whole project is to deliver on time.**

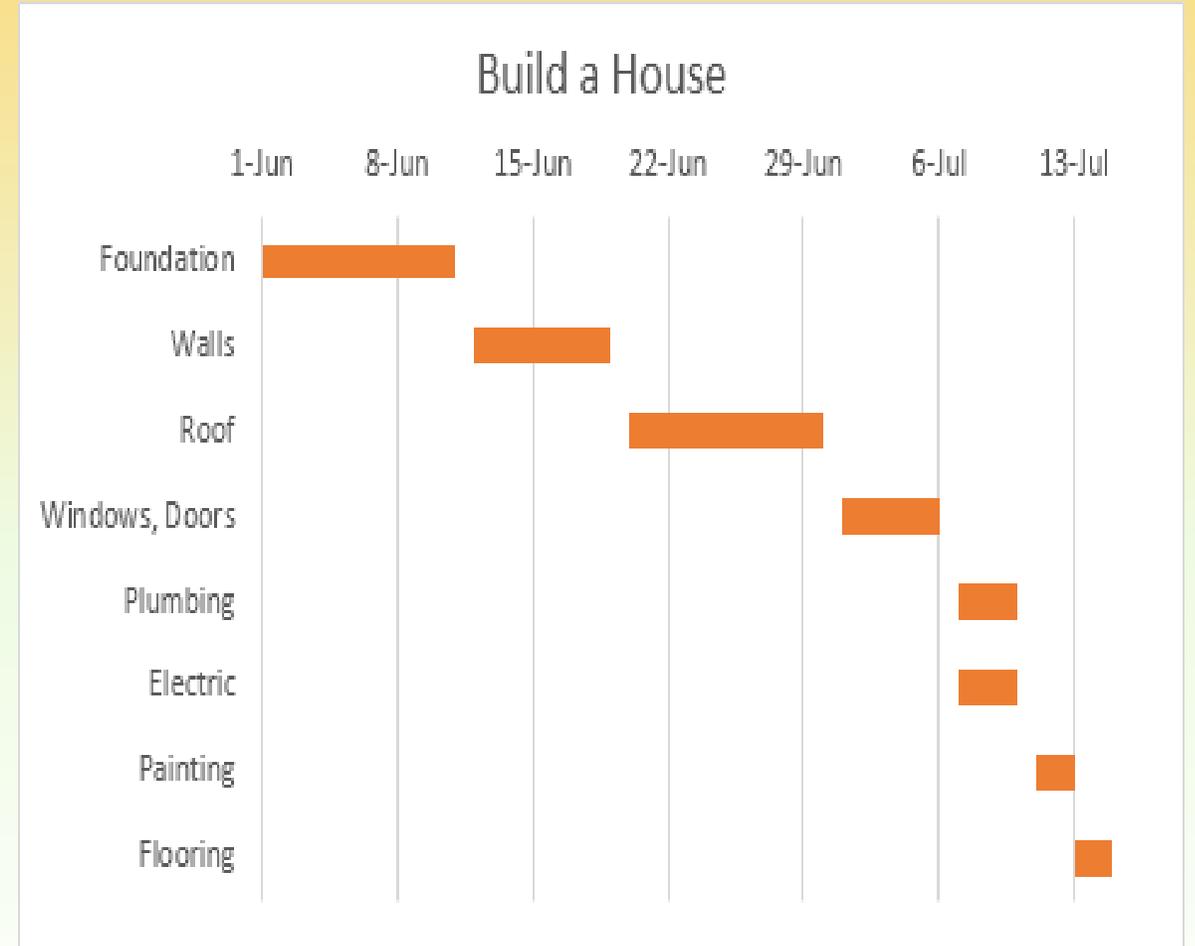
## Contd....

- Finally, you can use them to keep your team and your sponsors informed of progress.
- Simply update the chart to show schedule changes and their implications, or
- use it to communicate that key tasks have been completed.



# Gantt chart preparation

	A	B	C
1	<b>Build a House</b>		
2			
3		<b>Start Date</b>	<b>Duration</b>
4	Foundation	1-Jun	10
5	Walls	12-Jun	7
6	Roof	20-Jun	10
7	Windows, Doors	1-Jul	5
8	Plumbing	7-Jul	3
9	Electric	7-Jul	3
10	Painting	11-Jul	2
11	Flooring	13-Jul	2
12			



# How to Build a Gantt Chart

- The basic procedure must be followed to build a Gantt chart.
- **Identify the steps** or activities needed to complete the project.
- **Identify milestones** within the project.
- Identify the expected time required to complete each task.
- Identify the sequence of tasks and the order of precedence of tasks.

# Applications

## Bookstore Weekly Schedule

Week of : May 1-7

	Sun 5/1	Mon 5/2	Tue 5/3	Wed 5/4	Thu 5/5	Fri 5/6	Sat 5/7
Bourne, M.	9am-6pm	9am-6pm	9am-1pm				
Brown, M.	11am-8pm	11am-8pm	7am-11am		9am-6pm	9am-6pm	
Gatsby, A.		11am-8pm	11am-8pm	7am-11am			
Gordon, A.				11am-8pm	11am-8pm	7am-11am	
Hender, V.							
Lawson, N.		11am-8pm	11am-8pm	7am-11am			
Shiro, I.					9am-6pm	9am-6pm	9am-1pm
Smith, T.	9am-6pm	9am-6pm				9am-6pm	9am-6pm
Talbot, P.						9am-6pm	9am-6pm
Tate, L.				9am-6pm	9am-6pm		
Vasquez, A.	11am-8pm	11am-8pm	7am-11am				

# Advantages of Gantt Charts

- It creates a picture of complexity.
- It organizes your thoughts.
- It demonstrates that you know what you're doing.
- It can be highly visible.

# Disadvantages Of Gantt Charts

- They can become extraordinarily complex.
- The size of the bar does not indicate the amount of work.
- They need to be constantly updated.



## **Unit III**

# **Critical Path analysis**

# What is a 'Critical Path Analysis'

- Critical path analysis is a technique that identifies the activities necessary to complete a task, .....
- including identifying the time necessary to complete each activity and
- the relationships between the activities.
- Also known as the critical path method, critical path analysis helps to predict if a project will finish on time.

## Contd....

- CPA aids in keeping the project's completion on track and
- makes certain that deliverables finish on time.
- CPM aids in planning project activities and
- helps project managers handle complex and urgent tasks and projects with a large number of activities.

## Contd....

- CPA detects and defines the critical and noncritical tasks in relation to a business process or work plan and the amount of float associated with each activity to prevent schedule delays and process bottlenecks.
- CPA is a key component in reducing project timelines and
- controlling costs to prevent exceeding the project budget.

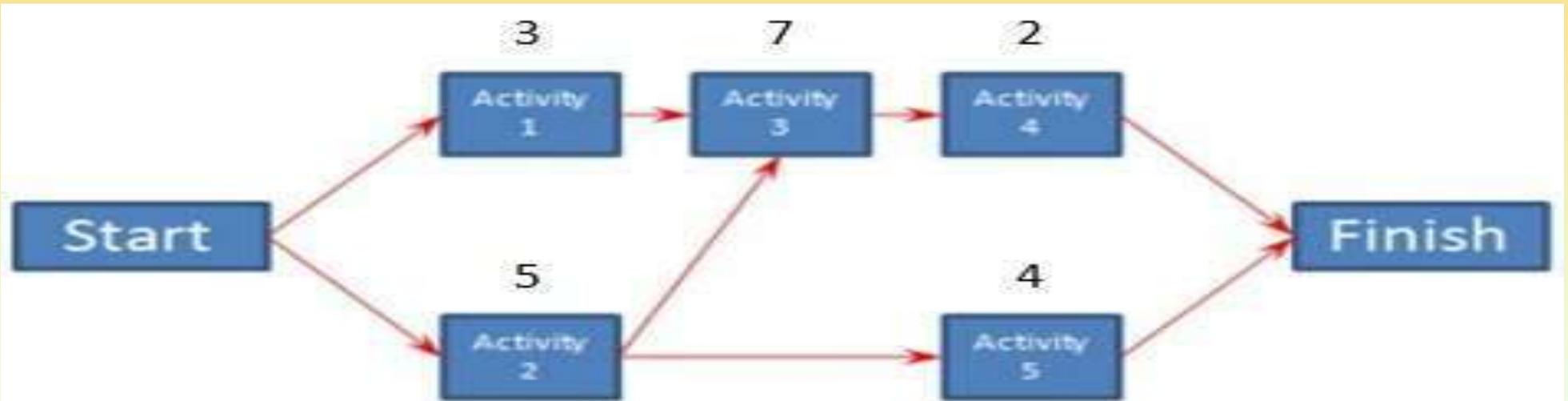
## contd.....

- Critical path analysis results **define the critical path**, a sequential set of related and important steps that comprise a work plan, usually with zero slack.
- **CPA examines all options for decreasing the time** necessary to complete the critical steps in a work plan.

# Components of CPA

1. A list of all activities required to complete the project (typically categorized within a **work breakdown structure**),
2. The time (**duration**) that each activity will take to complete,
3. The **dependencies** between the activities and,
4. Logical end points such as milestones or **deliverable** items.

# Critical Path Analysis



Start → Activity 1 → Activity 3 → Activity 4 → Finish      $3 + 7 + 2 = 12$   
Start → Activity 2 → Activity 3 → Activity 4 → Finish      $5 + 7 + 2 = 14$   
Start → Activity 2 → Activity 5 → Finish      $5 + 4 = 9$

*Critical Path*



**contd....**

**The critical path can be defined in many ways including:**

- The longest path in the network diagram, or
- The shortest duration in which the project can be completed.

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**CPA is a project analysis  
and planning method  
that allows a project to  
completed in the shortest  
possible time**

- 
- A decorative vertical sidebar on the left side of the slide. It features a light yellow background with a faint grid pattern. At the top, there is a small line graph with a red line showing an upward trend. Below the graph, several yellow pencils are arranged vertically, pointing upwards.
- Many larger businesses get involved in projects that are complex and involve significant **investment** and **risk**
  - As the complexity and risk increases it becomes even more necessary to identify the **relationships between the activities** involved and to work out the most efficient way of completing the project

- 
- A decorative vertical strip on the left side of the slide. It features a background of graph paper. At the bottom, there are several yellow pencils with sharpened tips. Above the pencils, a red line graph is plotted, showing a series of peaks and valleys.
- A list of all activities required to complete the project
  - The time (duration) that each activity will take to completion
  - The dependencies between the activities (e.g. activity D cannot be completed until activity B&C done)

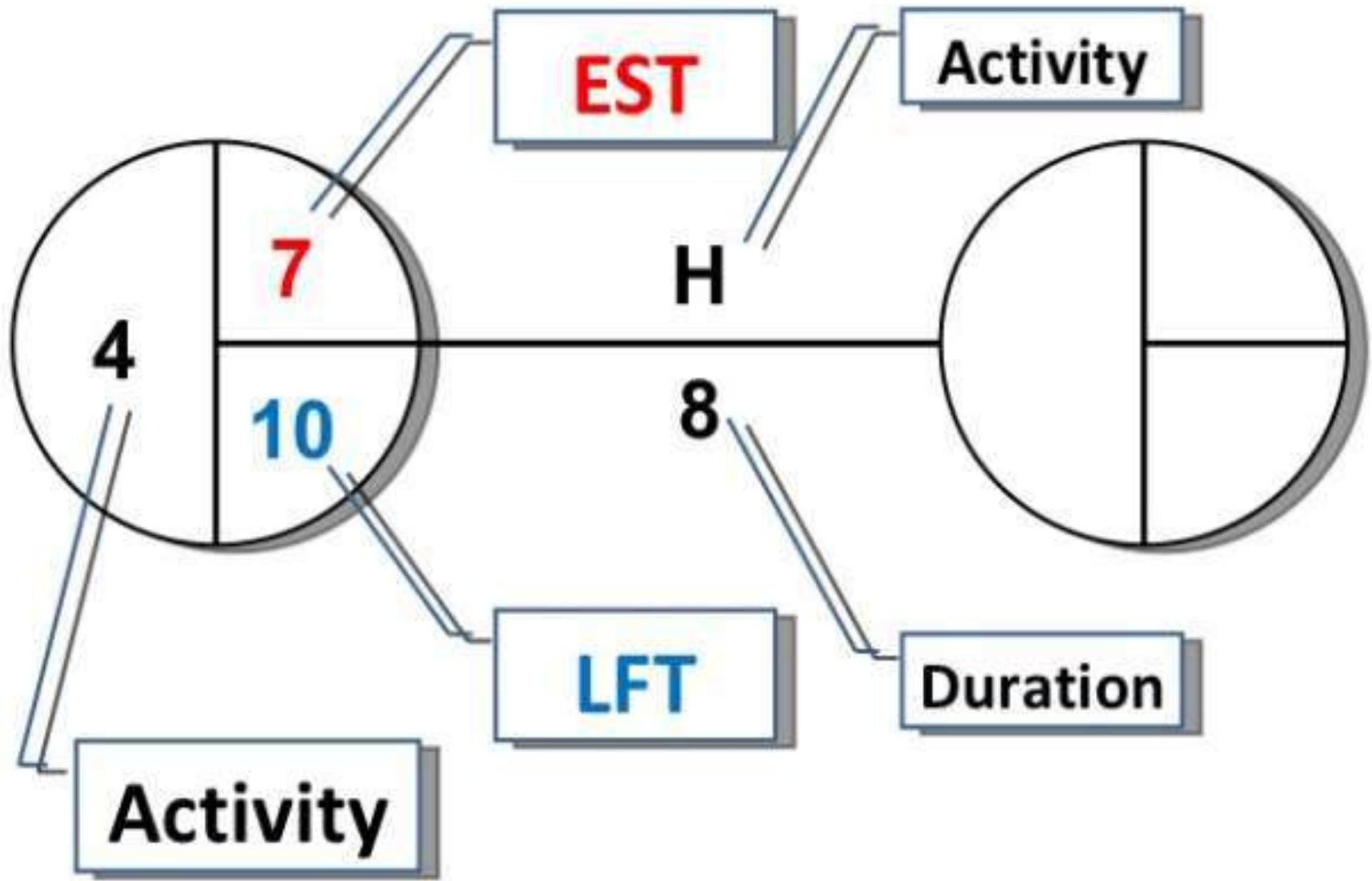


**The sequence of project activities which add up to the **longest overall duration****

**The critical path determines the shortest time possible to complete the project**

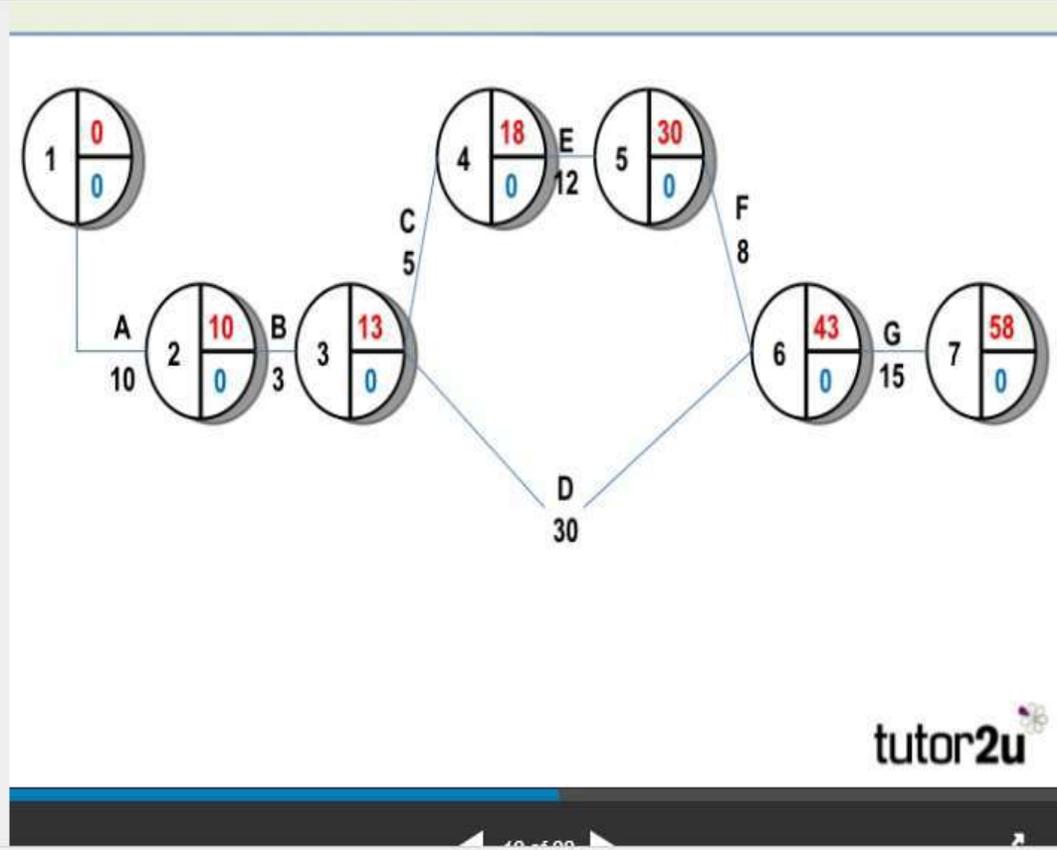
A decorative vertical strip on the left side of the slide. It features a background of graph paper with a red line graph showing an upward trend. In the foreground, several yellow pencils are arranged vertically, pointing upwards.

**Any delay of an activity on the critical path directly impacts the planned project completion date (i.e. there is no float on the critical path)**





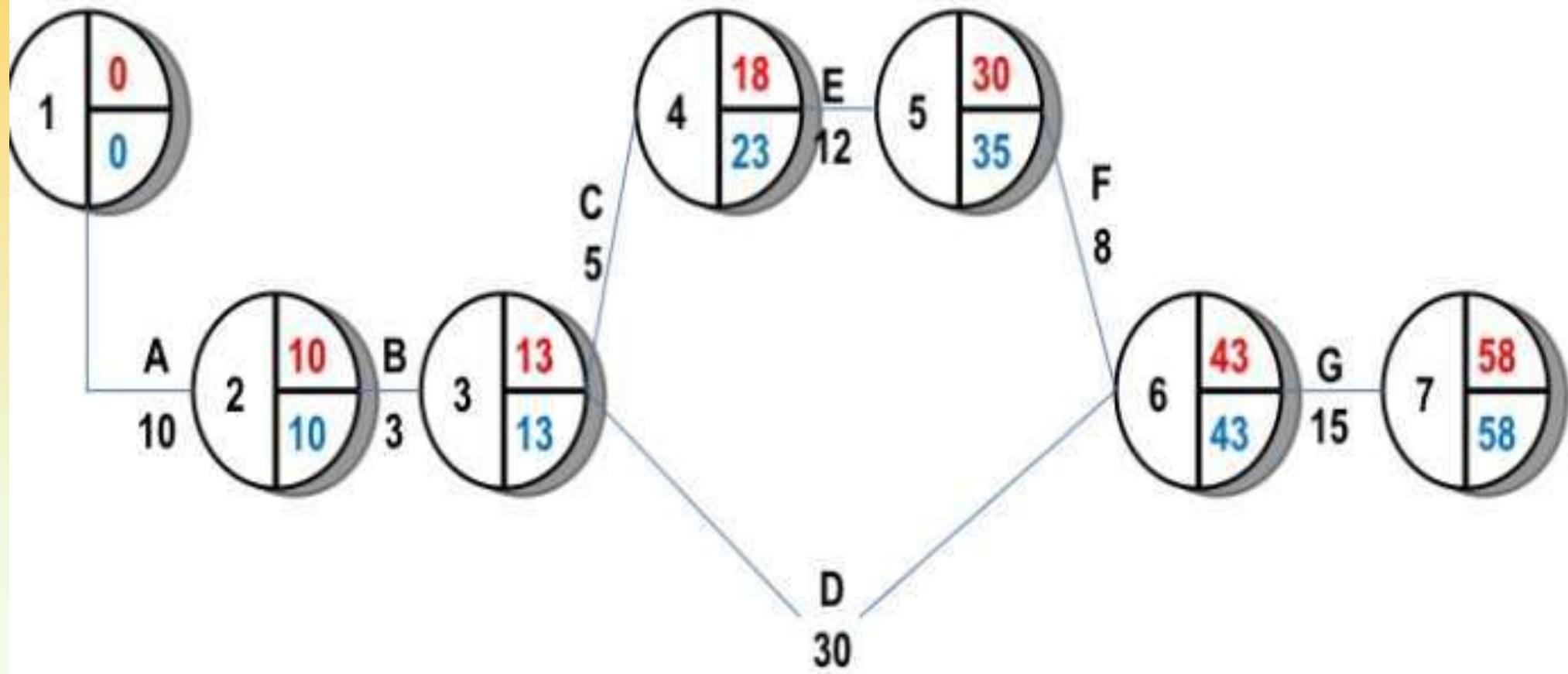
<b>Task</b>	<b>Activity</b>	<b>Dependent on</b>	<b>Duration (hours)</b>
<b>A</b>	Gather lesson notes and read through	Starting activity	10
<b>B</b>	Identify gaps in knowledge	Completion of task A	3
<b>C</b>	Research online sources	Completion of task B	5
<b>D</b>	Procrastinate and browse Facebook	Completion of task B	30
<b>E</b>	Write revision plan & revision notes	Completion of task B & C	12
<b>F</b>	Practice past exam papers	Begin when E complete	8
<b>G</b>	Complete last minute cramming		15



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Critical Path Ppt Jeff Hilton



## Advantages

Most importantly – helps reduce the risk and costs of complex projects

Encourages careful assessment of the requirements of each activity in a project

Help spot which activities have some slack (“float”) and could therefore transfer some resources = better allocation of resources

A decision-making tool and a planning tool – all in one!

Provides managers with a useful overview of a complex project

Links well with other aspects of business planning, including cash flow forecasting and budgeting

## Disadvantages

Reliability of CPA largely based on accurate estimates and assumptions made

CPA does not guarantee the success of a project

Resources may not actually be as flexible as management hope when they come to address the network float

Too many activities may the network diagram too complicated. Activities might themselves have to be broken down into mini-projects

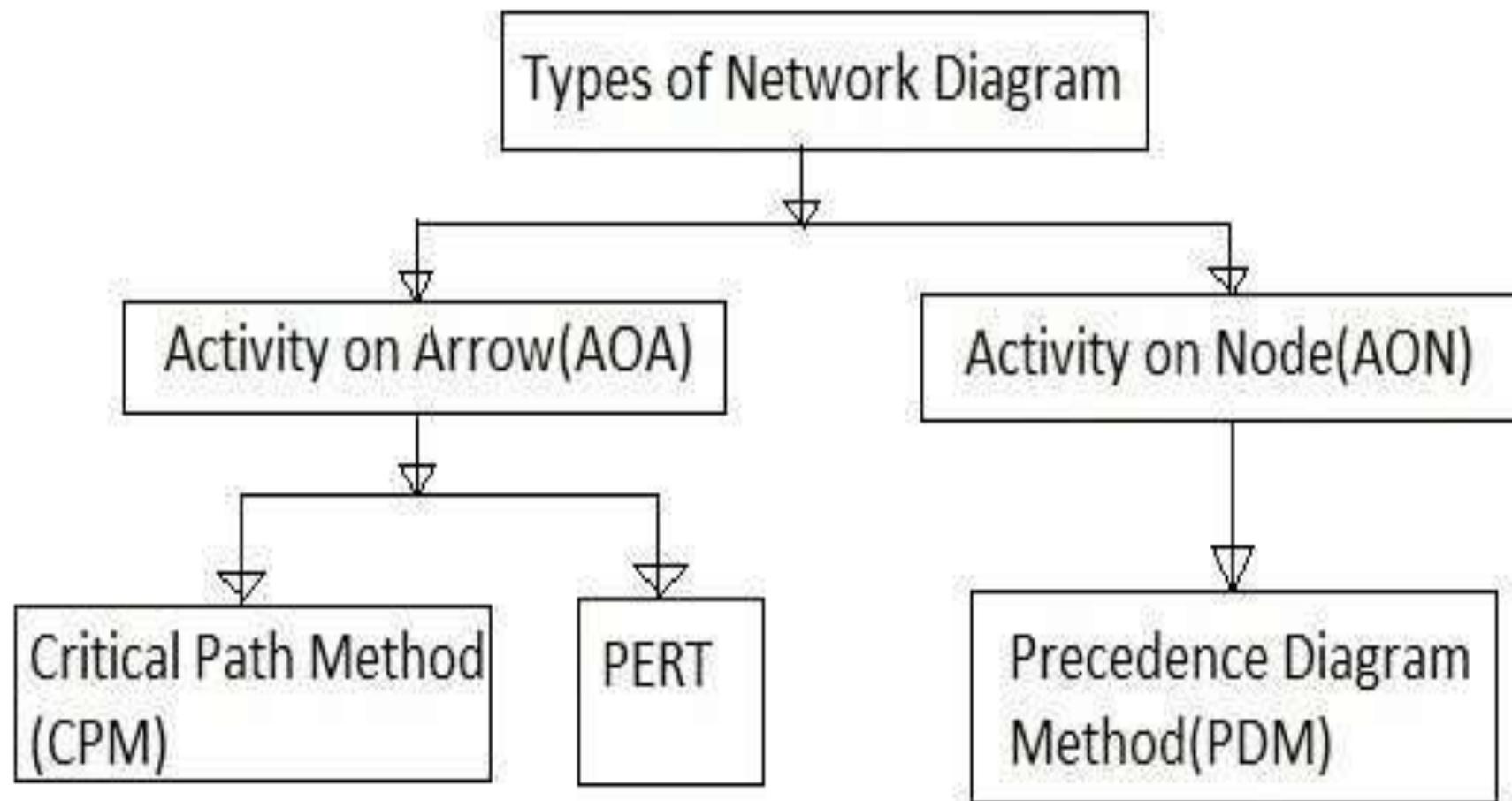


Fig-1

# Activity on arrow

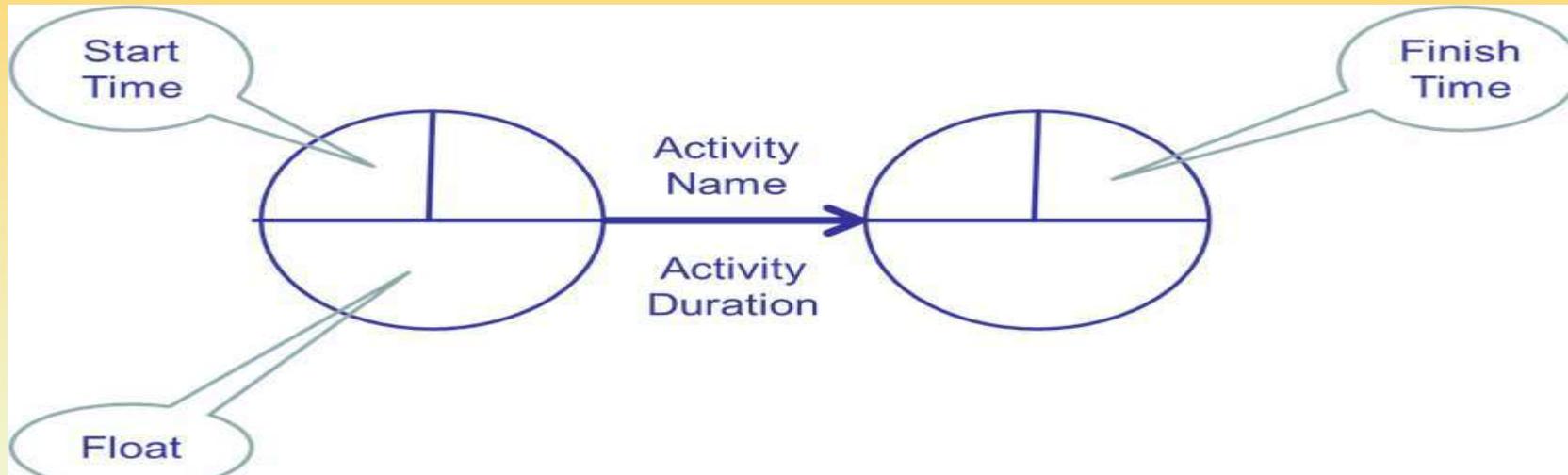
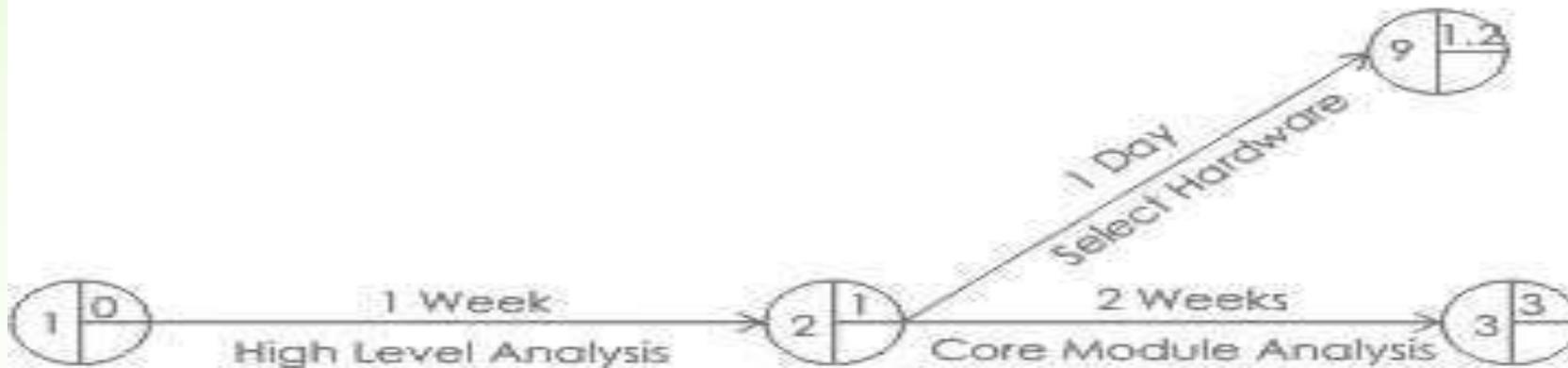


Figure 3: Circle and Arrow Diagram showing two activities that cannot be started until the first activity has been completed.



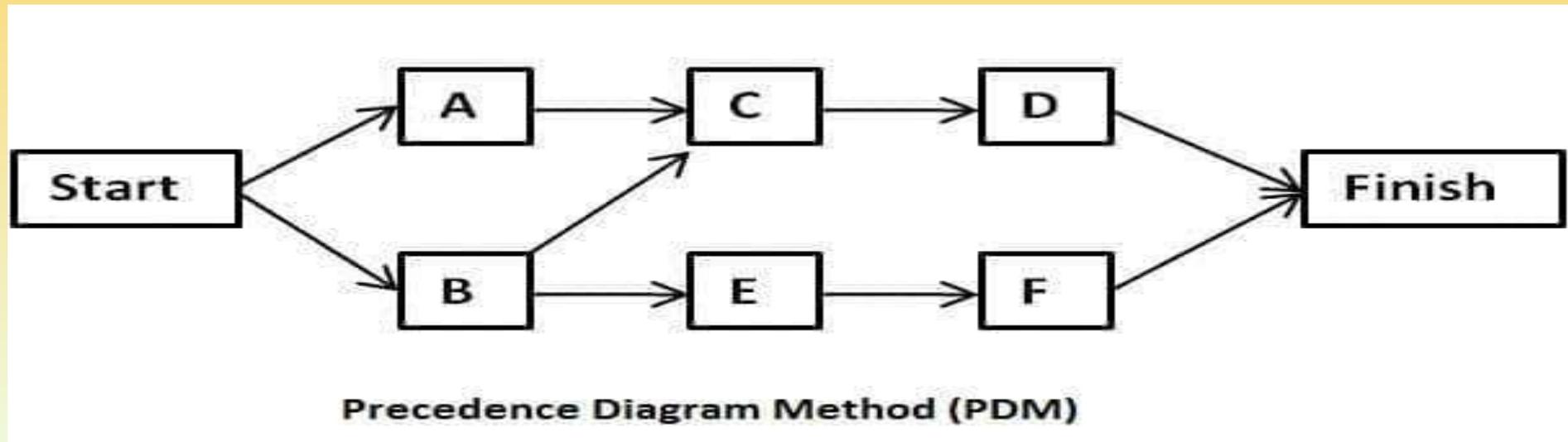
# AOA

- In AoA diagrams, the Activity Name and the Activity Duration are specified on the arrow between two nodes.
- Then each node contains three numerical values – the Start Time, the Finish Time and the Float.
- This layout has consequences for the forward and the backward passes.
- In the forward pass, we calculate the Start Times of all the nodes.

## **contd....**

- With the backward pass, the end node's Start Time becomes its Finish Time and the backward pass proceeds by subtracting the durations of the activities leading to the end node from the end node's Finish Time to arrive at the Finish Times for the preceding nodes.

# Activity on node



- The Precedence Diagramming Method (PDM) consists of rectangles, known as nodes, and the **project activities are shown in these boxes**.
- These **rectangular boxes are connected to each other** with **arrows** to show the dependencies; therefore, these diagrams are also known as the Activity on Node (AON) diagrams.

## Contd....

There are four types of dependencies between the activities.

- ➔ **Finish to Start:** An activity must finish before the successor activity can start.
- ➔ **Start to Start:** An activity must start before the successor activity can start.
- ➔ **Finish to Finish:** An activity must finish before the successor activity can finish.
- ➔ **Start to Finish:** An activity must start before the successor activity can finish.



# **Unit III**

## **Fast Track Project**

# Schedule Compression

- Because a particular event is running behind schedule, or
- In other cases because a succeeding event's timing has to be changed one way or another.

# What is Schedule compression

- Schedule compression specifically speaking is a technique that is employed **that involves taking the previously determined schedule and shortening the project schedule duration,**
- but doing so in a manner which does not reduce and or minimize the project scope in any way.

# Why Schedule Compression

- A competitor is preparing to release a similar product or concept and your company wants to be first on the market.
- Anticipated changes in economic landscape, political climate or environmental conditions are likely to derail the project unless it is completed.

## Contd....

- A client is offering additional monetary incentive for a rush job.
- There are several subsequent, related projects planned which are dependent on the timely completion of the current project.
- Resources can move on to other projects

## Contd....

- Your organization is aware of the opportunity to bid on a new, highly lucrative project in the near future **but doesn't have enough resources to handle two projects simultaneously.**
- **Penalties, that late execution of project will attract, are high.** Not only penalties, the loss in goodwill also needs to be taken into account.

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# **Schedule Compression Methodology**

# What is fast tracking

- **Fast tracking is a** technique that is often implemented in crisis and/or crunch times.
- Fast tracking is referred to as a project schedule compression technique of sorts in that its intent is to take an entire schedule of a project and attempting to compress it into a smaller period of time

## Contd...

- Involves completing multiple phases of a project simultaneously instead of in sequence.
- Working on various work packages at the same time can cut schedule times significantly.

# Risks Associated With Fast Tracking.....

- There is a greater chance of errors.
- Mistakes that require work to be redone can end up increasing the time to completion and may negate the whole purpose of the schedule compression effort.
- The **risk management plan** should be fully reviewed before fast tracking is attempted.

# When to use Crashing????

- Crashing is the technique to use when fast tracking has not saved enough time on the project schedule.

# Crashing

- The goal of crashing is to determine the perfect balance between shortening the schedule and keeping costs low.
- **Some of the common methods used are...**
- **Adding additional resources to the critical path tasks**
- This option has various constraints such as the securing of the budget to add the resources, and the availability of the resources.
- **Reduce the project requirements or scope**  
This can be done only if the sponsor and major stakeholders agree to reduce the scope

# LIMITATIONS

- Crashing is expensive because more resources are added to the project.
- Including adding more resources to the project, allowing additional overtime, and
- Paying extra to receive delivery of critical components more quickly, among others.

# Dangers of Fast Track project

- Adds much more risk to the project
- Have to pay for resources
- Have to bring new team members
- Need to do a lot of work to fast track your project but you don't see any difference to the end date.

## Contd....

- Fast-track projects are more apt to lack a fixed final budget when the project commences and then have unexpected modifications and expensive change orders the client does not anticipate.
- Processes that are normally carried out in sequence must be performed concurrently, increasing the chances of miscommunication and errors.



# **Unit III**

## **Project Evaluation And Termination**

# What is Evaluation

- *Evaluation* involves the systematic collection of information about the activities, characteristics and outcomes of an activity or action, **in order to determine its worth or merit.**
- It is a major part of learning, and can **provide a wealth of useful information on the outcomes of a project or action,** and the dynamics of those who undertook the work.

# Purpose of Evaluation

- Evaluation draws conclusions which can inform future decision making, and assist to define future projects and policies.
- To assess performance.
- Reveal areas where project deviates from goals.
- Uncover extant or potential problems so they can be corrected.
- Summarizing project status.

## **Evaluation of coastal management projects and actions are undertaken for a number of reasons:**

to be ***accountable*** to those who are funding the project.

as a ***debrief*** to the group on the completion of a project.

to ***reflect*** on how you're developing as a group or organisation, and whether you need to improve the way things are being done.

to provide information for planning ***future projects***.

## Contd....

to determine the **worth** of a coastal management project.

to **review management methods and techniques**, and how effective they were.

to see if the work is **contributing to the management objectives** for an area

# TIMING

Evaluation can take place at any time in a project.

**You may decide that you will:**

carry out an initial baseline exercise against which to **compare progress at the end of the project**

**refine the project on an ongoing basis**; therefore, evaluation will be part of your regular project activities

**OR**

**evaluate the project at agreed milestones**, for example on a tri-monthly basis.

# Steps Involved With Any Evaluation Should Include The Following:

## **1. Design and plan the evaluation**

Clarify the specific purpose or intended outcomes of the evaluation. Why are you doing it?

## **2. Gather information**

This may be an ongoing requirement or staged at key points during the project.

## **3. Analyse the information**

This may involve preparing a report. Check that your conclusions respond to the outcomes which the evaluation was originally seeking.

## **4. Use the conclusions**

Once you have evaluated the worth or merit of your project tell others about what you have learned and achieved so they too can benefit from your experience.

# EVALUATION METHODS

## Asking people

- **Structured interviews**
  - closed and open
- **Semi-structured interviews**

## Questionnaires

- **In person**
- **Telephone**
- **E-mail**

## Evaluation stories

## Photographic history

# **Physical methods**

## **Photographic records**

Photographic records capture the appearance of a coastal site, and allow comparisons of before and after management actions and are useful for on-ground projects.

## **Aerial photographs**

## **Direct measurements**

## **Participant observation**

# Project Termination

**Project termination** is sometimes also called **project close-out** or **final shutdown**.

During this phase the people involved are acknowledged for their achieved goals and the work is considered complete.

```
graph TD; A([Termination Under two conditions]) --> B([Success]); A --> C([Fail]);
```

**Termination  
Under two  
conditions**

**Success**

**Fail**

## "A Project Is Successful When:

- The objectives of the project have been achieved to the full satisfaction of the users,
- All closeout activities have been completed, and
- All designated interests, including the project's sponsor and/or initiator officially accept the project results or products and close the project."

# Reasons Why Project Termination Becomes Necessary

- Technical reasons
- Requirements or specifications of the project result are not clear or unrealistic
- The intended result or product of the project becomes obsolete, is not any longer needed
- Adequate human resources, tools, or material are not available
- The parent organization does not longer exist

# Steps To Take In Termination

- **Finalize all outstanding contracts** to vendors, suppliers or customers **including final payments** (in some cases, according to federal regulations, project-related revenue that is earned on or before project termination is considered program income. If it is earned after project termination, it is an external sale.)
- **Transfer any responsibilities** necessary
- **Reassign the project team** members to other duties

# Contd.....

- **Release** all remaining **resources** such as materials
- **Complete the final accounting on the project** such as totally final costs, paying bills, etc. so you can "close the book"
- **Document the results** of the project and make recommendations for future projects (opportunity for learning and anticipating new risks)

## Contd....

- **Presentation** of the system **and approval (or rejection)** of the system by the client according to acceptance criteria set forth in the Project Agreement
- **Installation** and field testing as applicable

**Thank you**

