Information System Design

IT60105

Lecture 23

Project Scheduling

Lecture #22

- Scheduling Methodologies
  - Why scheduling?
  - Work breakdown structure
  - Activities network and Critical Path Method (CPM)
  - Gantt Chart
  - Pert Chart

Scheduling

- **Task of Project Manager as Scheduler:**

1. Identify all the tasks needed to complete the project
2. Break down large tasks into small activities
3. Determine the dependency among different activities
4. Establish the most likely estimates for the time durations necessary to complete the activities
5. Allocate resources to activities
6. Plan the starting and ending dates for various activities
7. Determine the critical path

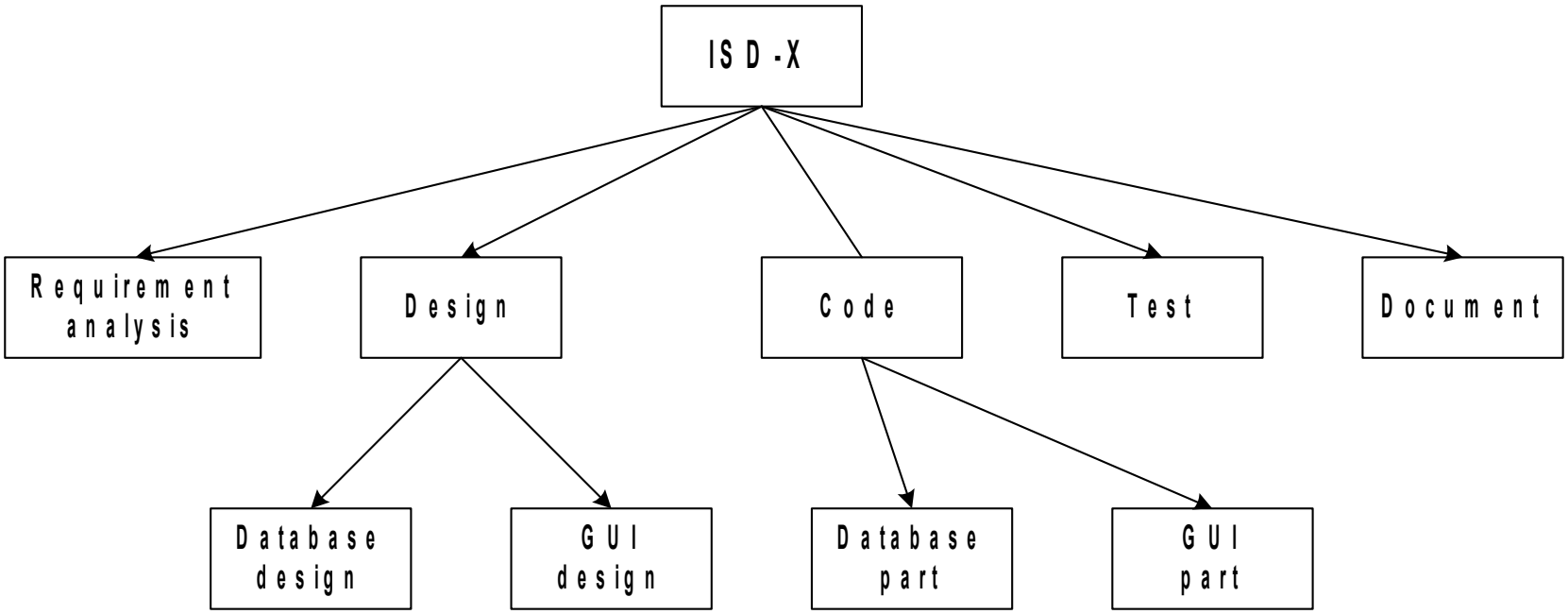
Methods of Scheduling

- Work Breakdown Structure (WBS)
- Activity Network and Critical Path Method (CPM)
- Gantt Charts
- Program Evaluation and Review Technique (PERT) charts

Work Breakdown Structure (WBS)

- WBS is used to decompose a given task set recursively into smaller tasks
- It provides a notation to represent major tasks needed to be carried out in order to develop a project
- The WBS is basically a tree structure (just like a directory in Unix OS)
- The depth of the tree is decided by the project size
- Any activity that is at the lowest level should not be less than two week effort

WBS: An Example



WBS: Another Example

a. Title of the project
b. Technical details
    i. Origin of the project
    ii. Problem definition
    iii. Aim and scope
    iv. Detailed description of the project
        1. Goals
        2. Feasibility study
        3. Architecture of the proposed system
        4. Flow of information
        5. Constraints and assumptions, if any
    v. Need and urgency with justification
    vi. Expected outcome of the project
c. Work plan (tentative)
    i. Methodology
    ii. Organization of work element
    iii. Time schedule of activities and milestones
d. Project estimation (tentative)
    i. Duration of the project
    ii. Cost of equipments and software
    iii. Salary and cost of training
e. Others, if any

Project Manger's Role in WBS

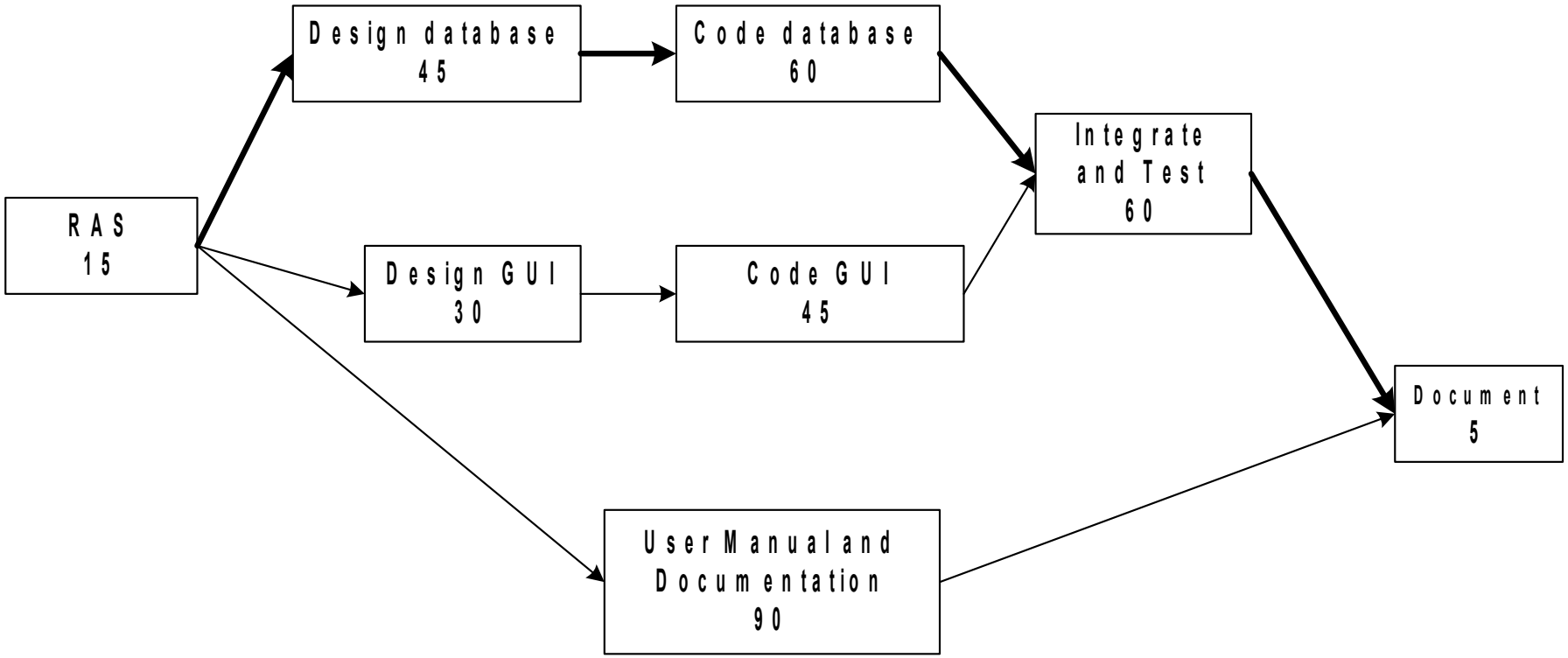
- Breaking the task is not so easy
- Broken down into very small activities means engagement of a large number of engineers
- Broken down into a larger activities means less scope of parallalelism
  - Engineer has to deal with complex task
  - Reliability/quality is under threat
- Rule of thumb
  - large activity means an activity not more than 6 months effort
  - Small activity means an activity of 1 month effort

Activity Network and Critical Path Method (AN/CPM)

- WBS does not show any interdependencies among the activity
- An AN incorporates the following
  - Different activities making up the project
  - Interdependencies among the activities
  - Estimated duration of each activity
  - Parallel activities

  etc.

Activity Network: An Example



Critical Path Method (CPM)

- CPM chart can answer the following:

  ? Minimum time (MT) to complete the project

  ? The earliest start (ES) time of a task

  ? The latest start (LS) time to start a task

  ? The earliest finish (EF) time of a task

  ? The latest finish (LF) time of a task

  ? Flexibility (slack time (ST)) of a task

  ? Critical tasks and Critical path

Critical Path Method (CPM)

- For the activity network, complete the following table

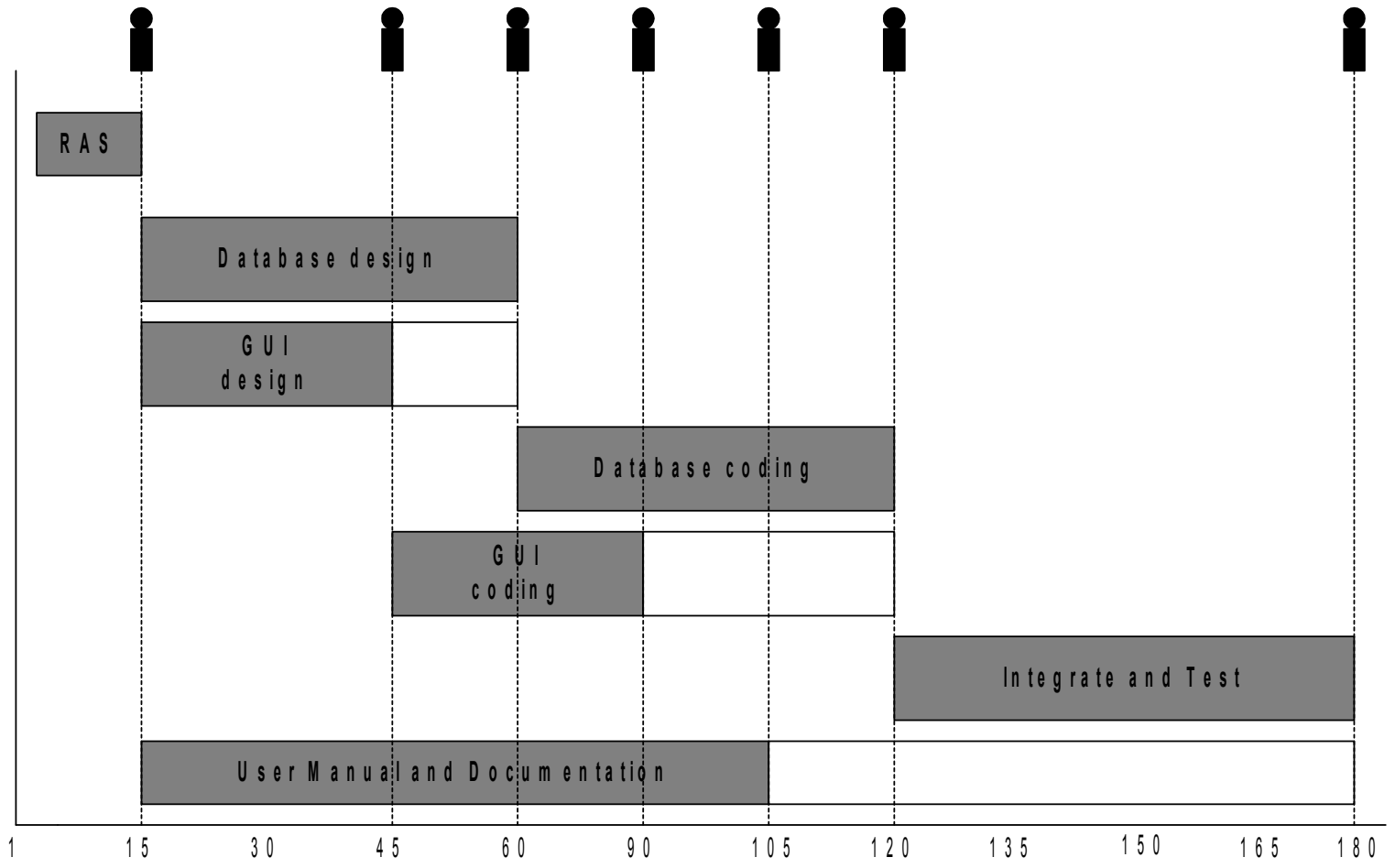
Task	MT	ES	LS	EF	LF	ST
RAS						
Design database						
Design GUI						
Code database						
Code GUI						
Integrate and test						
Documentation						

- Identify the **Critical tasks** and **Critical path**?

Gantt Charts

- Gantt chart (Henry Gantt) is a special bar chart to represent activities and resources (staff, hardware and software) allocation
- Duration is along the horizontal axis
- Activities (in the form of a bar) is along vertical axis

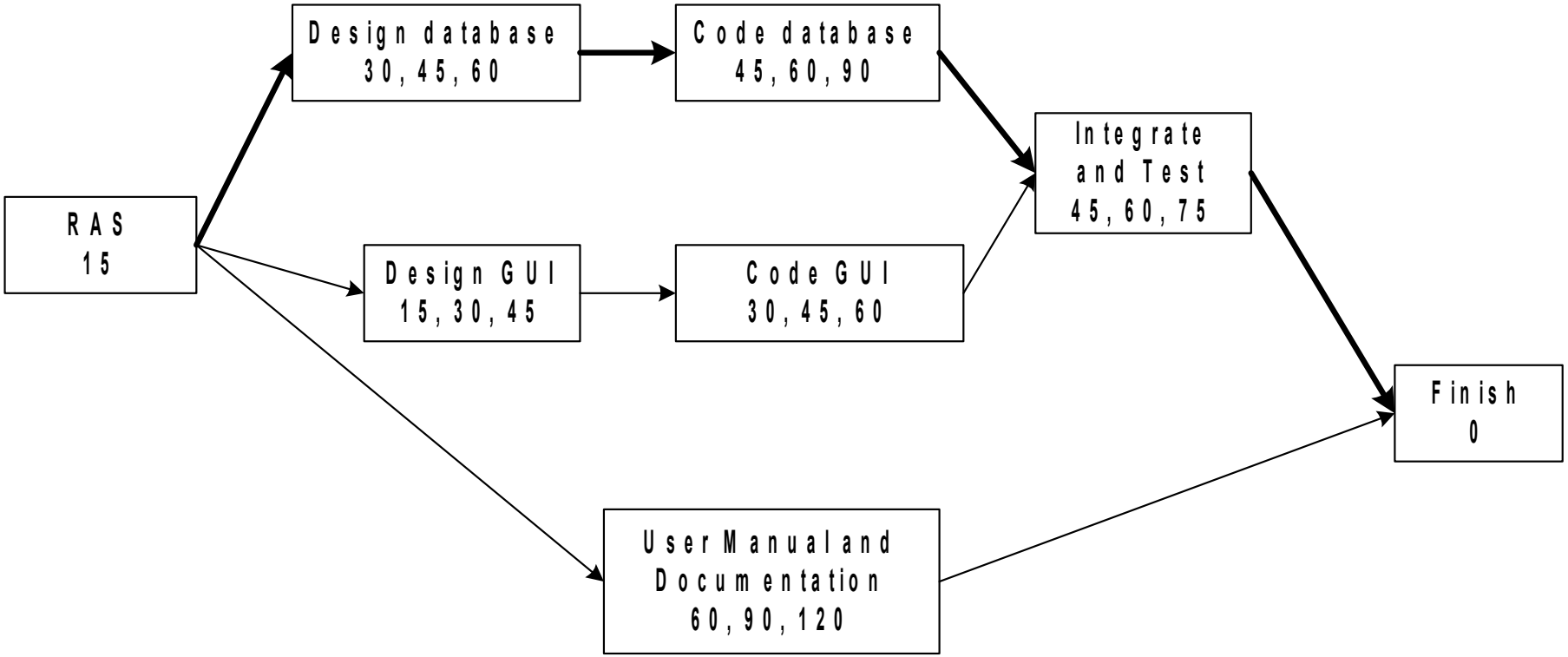
Gantt Chart: Example



PERT Charts

- Consists of network of tasks and their dependencies
- CPM is with normal distribution (single estimate)
- PERT is with statistical distribution (three estimates)
- Each task is annotated with *optimistic*, *likely* and *pessimistic* time of completion

PERT Charts


Design database
30, 45, 60
Code database
45, 60, 90
Integrate
and Test
45, 60, 75
RAS
15
Design GUI
15, 30, 45
Code GUI
30, 45, 60
Finish
0
User Manual and
Documentation
60, 90, 120

Problems to Ponder

- Who will be responsible for project scheduling?
- What are the basic utility of scheduling methods?
- How scheduling and resource distribution are related?
- In case of RAD process model, is the scheduling important? Justify your answer
- Compare the different scheduling techniques from the utility point of views