Chapter 5

Software Scheduling:

- **Project planning Steps:**

1) **Establish project scope:**
   Understand the problem and the work that must be done.
2) **Determine feasibility:**
   To determine whether it would be financially and technically feasible to develop the product.
3) **Analyze risks:**
   What can go wrong? How can we avoid it? What can we do about it?
4) **Define required resources**
   a) Determine human resources required
   b) Define reusable software resources
   c) Identify environmental resources
5) **Estimate cost and effort**
   a) Decompose the problem
   b) Develop two or more estimates using different approaches
6) **Develop a project schedule**
   a) Establish a meaningful task set
   b) Define a task network
   c) Use scheduling tools to develop a timeline chart
   d) Define schedule tracking mechanism

Risk Analysis and Management:

Software risks:

- What can go wrong?
- What is the likelihood?
- What will be the damage?
- What can be done about it?

Risk analysis and management are a set of activities that help a software team to understand and manage uncertainty about a project.

Risk Management

The process by which a course of action is selected that balances the potential impact of a risk weighted by its probability of occurrence and the benefits of avoiding (or controlling) the risk

Risk management life cycle:

a. Identify(risk identification)
b. Analyze(risk analysis)
c. Plan(contingency planning)
d. Track(risk monitoring)
e. Control(recovery management)

- **Software Project Scheduling:**
  Software project scheduling distributes estimated effort across the planned project duration by allocating the effort to specific tasks.

Basic principles of project scheduling:

- **Compartmentalization**
  - The project must be compartmentalized into a number of manageable activities, actions, and tasks.
- **Interdependency**
  - The interdependency of each compartmentalized activity, action, or task must be determined
  - Some tasks must occur in sequence while others can occur in parallel
  - Some actions or activitiescannot commence until the work product produced by another is available
- **Time allocation**
  - Each task to be scheduled must be allocated some number of work units
  - In addition, each task must be assigned a start date and a completion date that are a function of the interdependencies.

- **Effort validation**
  - Every project has a defined number of people on the team

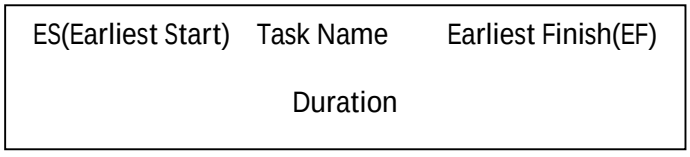
- **Defined responsibilities**
  - Every task that is scheduled should be assigned to a specific team member

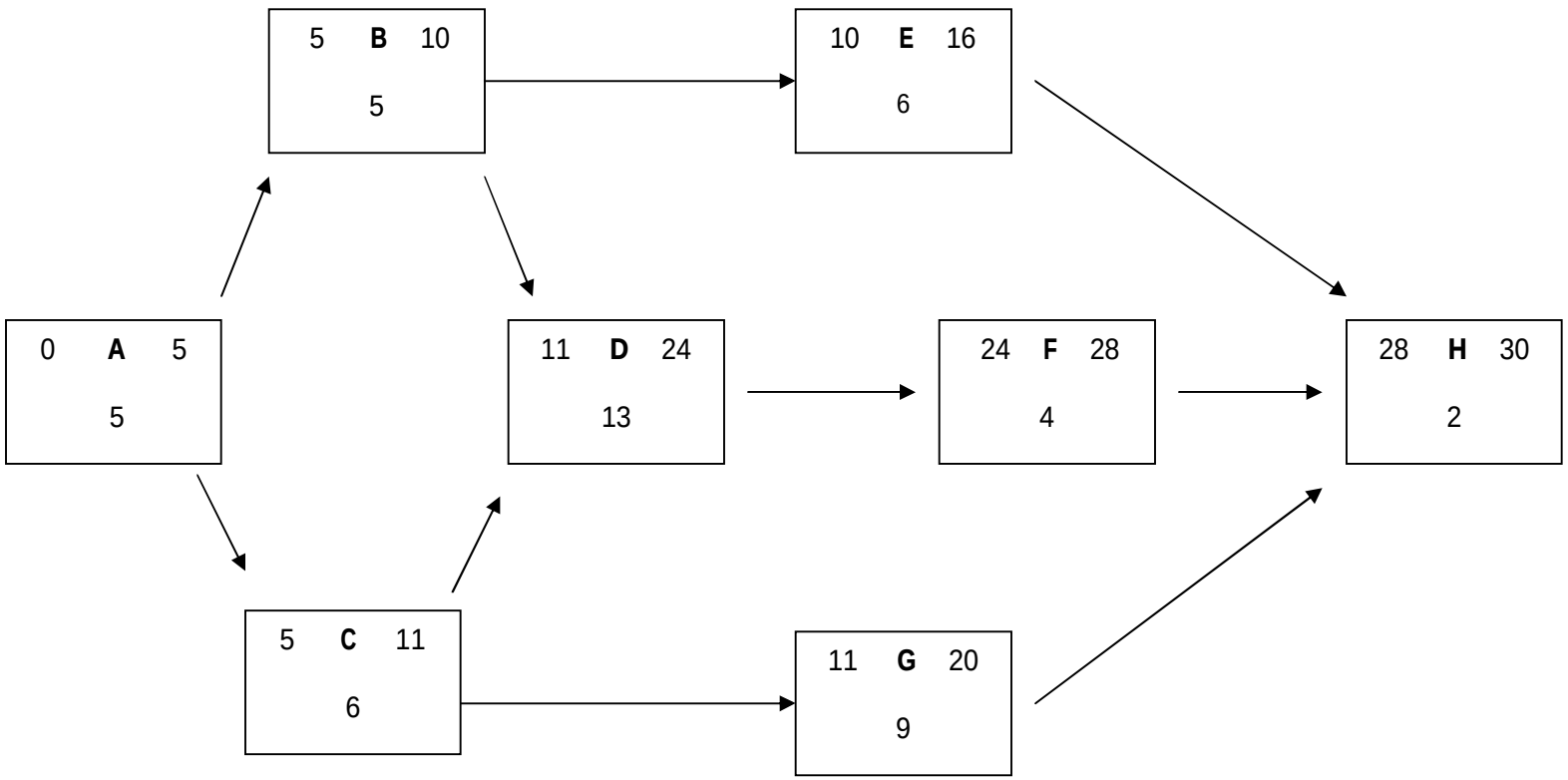
- **Defined outcomes**
  - Every taskthat is scheduled should have a defined outcome for software projects such as a work product or part of a work product

- **Defined milestones**
  - A milestone is accomplished when one or more work products has been reviewed for quality and has been approved

Activity	Predecessors	Estimated Duration
A	None	5
B	A	5
C	A	6
D	B, C	13
E	B	6
F	D	4
G	C	9
H	E, F, G	2

1. Subtract activity times along each path as you move through the network (LF – Dur = LS),
2. Carry back the LS time to the activity nodes immediately preceding the successor node. That LS becomes the LF of the next node, unless the preceding node is a burst point.
3. In the case of a burst point, the smallest succeeding LS become the LF for that node.





Critical path analysis:

A project-management technique that lays out all the activities needed to complete a task, the time it will take to complete each activity and the relationships between the activities. A task on the Critical Path has no (zero) slack.

Possible paths: A-B-E-H=5+5+6+2=18

A-B-D-F-H = 5+5+13+4+2=29

A-C-D-F-H = 5+6+13+4+2=30 /critical path

A-C-G-H = 5+6+9+2=22

2. How is slack determined?

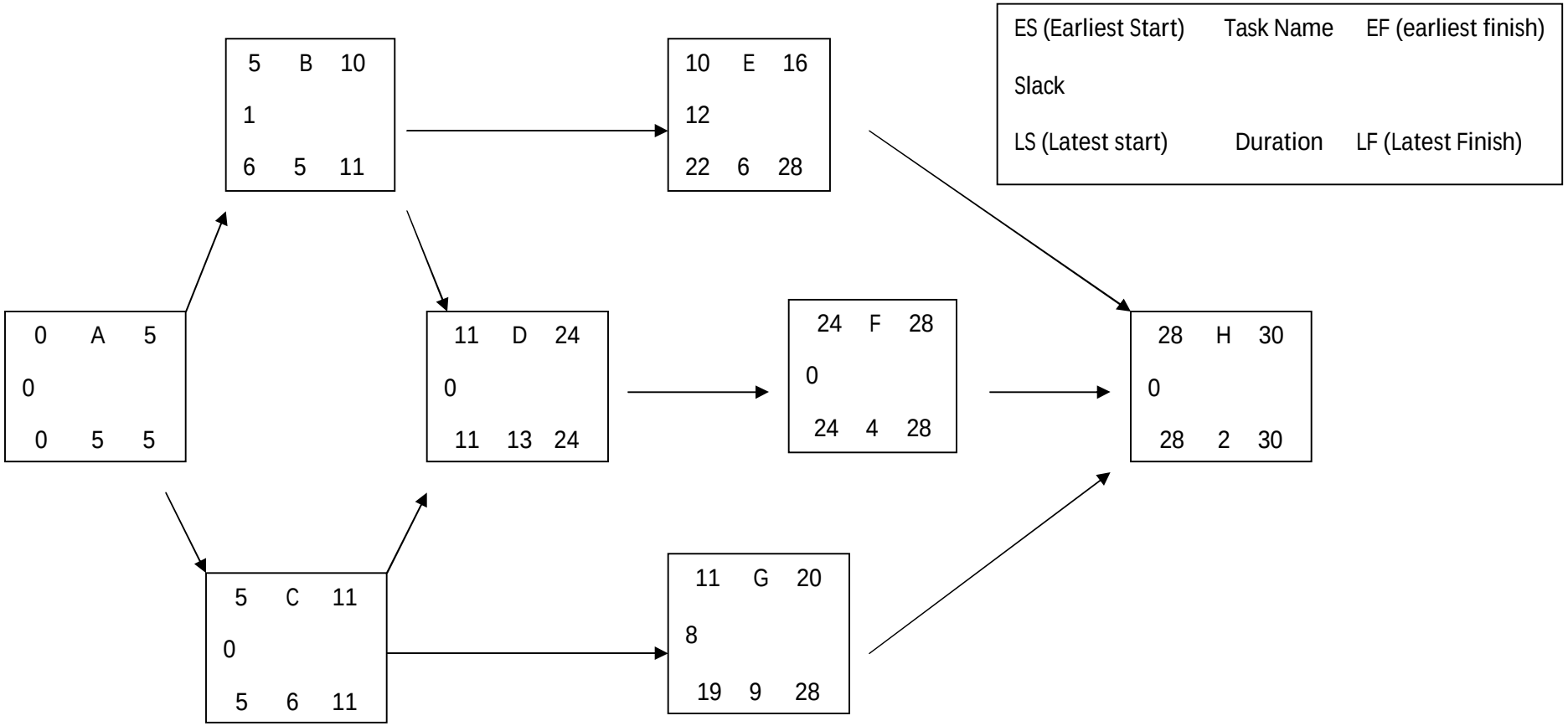
Slack for a particular task is calculated by:

- Subtracting the earliest time the task can start from the latest time the task can start (LS - ES).

3. How do you determine the ES for an activity with two predecessors? How do you determine the LF for an activity with two successors?

- The **ES** for an activity with two predecessors is equal to the ***later*** **EF** of the two predecessors since both predecessors must be completed for the task to begin.

- The LF for an activity with two successors is equal to the ***smaller*** LS of the two successors.


ES (Earliest Start) Task Name EF (earliest finish)
Slack
LS (Latest start) Duration LF (Latest Finish)
5 B 10
1
6 5 11
10 E 16
12
22 6 28
0 A 5
0
0 5 5
11 D 24
0
11 13 24
24 F 28
0
24 4 28
28 H 30
0
28 2 30
5 C 11
0
5 6 11
11 G 20
8
19 9 28