



# **CSSE 372 Software Project Management: Software Project Scheduling**

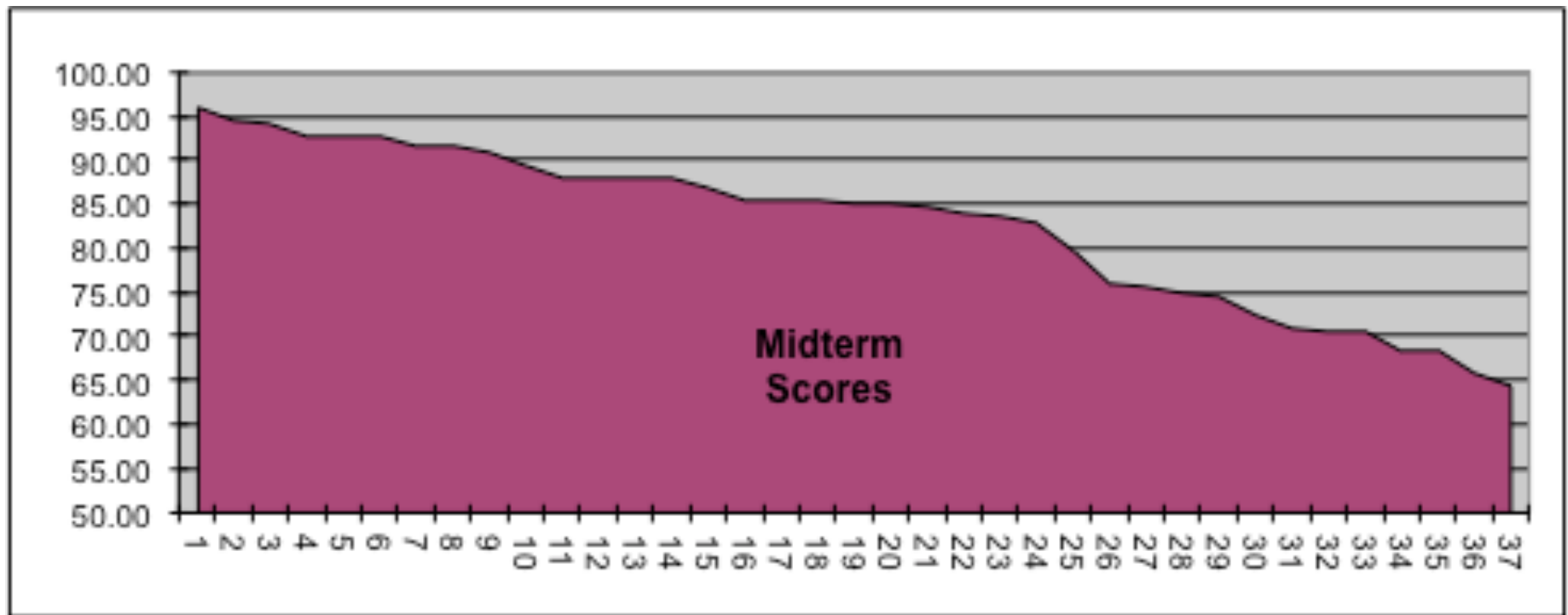
**Shawn Bohner**  
**Office: Moench Room F212**  
**Phone: (812) 877-8685**  
**Email: [bohner@rose-hulman.edu](mailto:bohner@rose-hulman.edu)**



**ROSE-HULMAN**  
INSTITUTE OF TECHNOLOGY



# Examination #1 Results



**Average Score 82.70%**

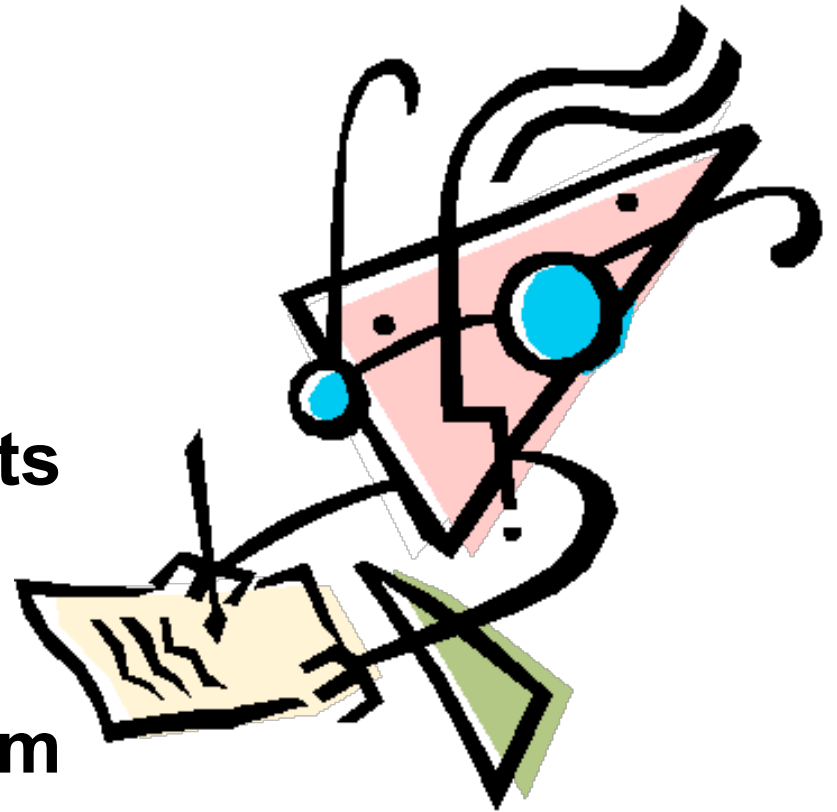
**Median Score 85.00%**

**Lowest Score 64.50%**

**Highest Score 96.00%**

# Exam Reflections

- Long exam – favored the swift and prepared
- Most folks did well on most parts – no throw-outs
- Estimation probably the weakest point, but this is normal at this point in term
- Function Point part I was most lenient on as several folks were partially finished





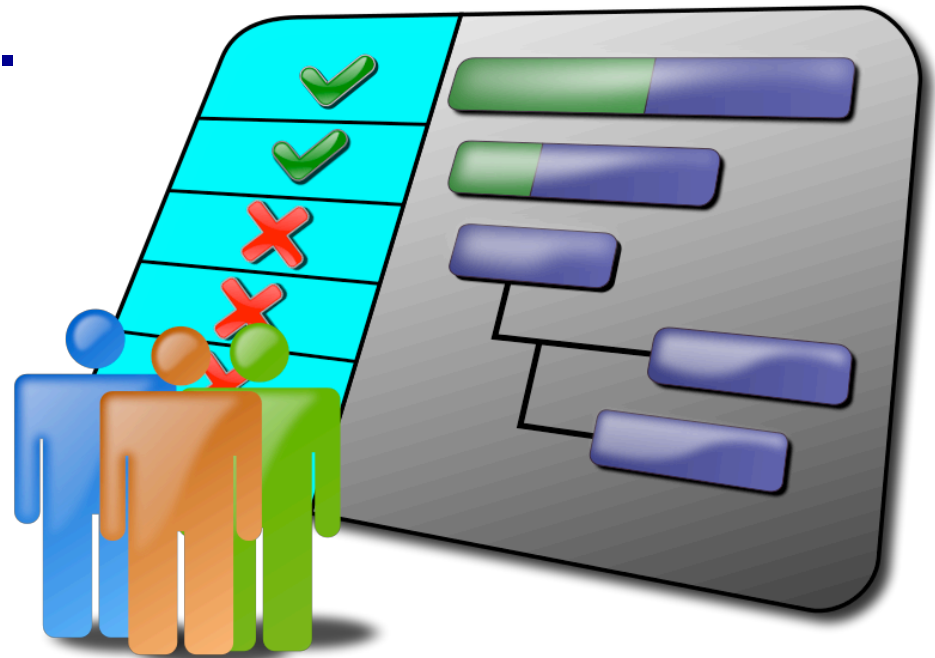
## **Exam 1 Stats (Comparative only – course grades will be determined later)**

<u>Cutoffs</u>	<u>Grade</u>	<u># of Grade</u>
90.0%	A	10
85.0%	B+	8
80.0%	B	7
74.0%	C+	4
70.0%	C	4
66.0%	D+	2
60.0%	D	2
0.0%	F	1

# Learning Outcomes: Schedule

Create and maintain a software project schedule.

- Recall Tasking from Work Breakdown Structure (WBS)
- Identify Scheduling in the SPM process
- Outline key elements of Scheduling activity



**Mind if I pick up the pace?**



**SQUIRRELS + COFFEE**

Dear god, help us.

JENNYMECHSTEINER.COM BY E

**Recall the schedule of tasks in the 1<sup>st</sup> homework. Now you have tasks that combine software components/capabilities and software process activities into a WBS.**

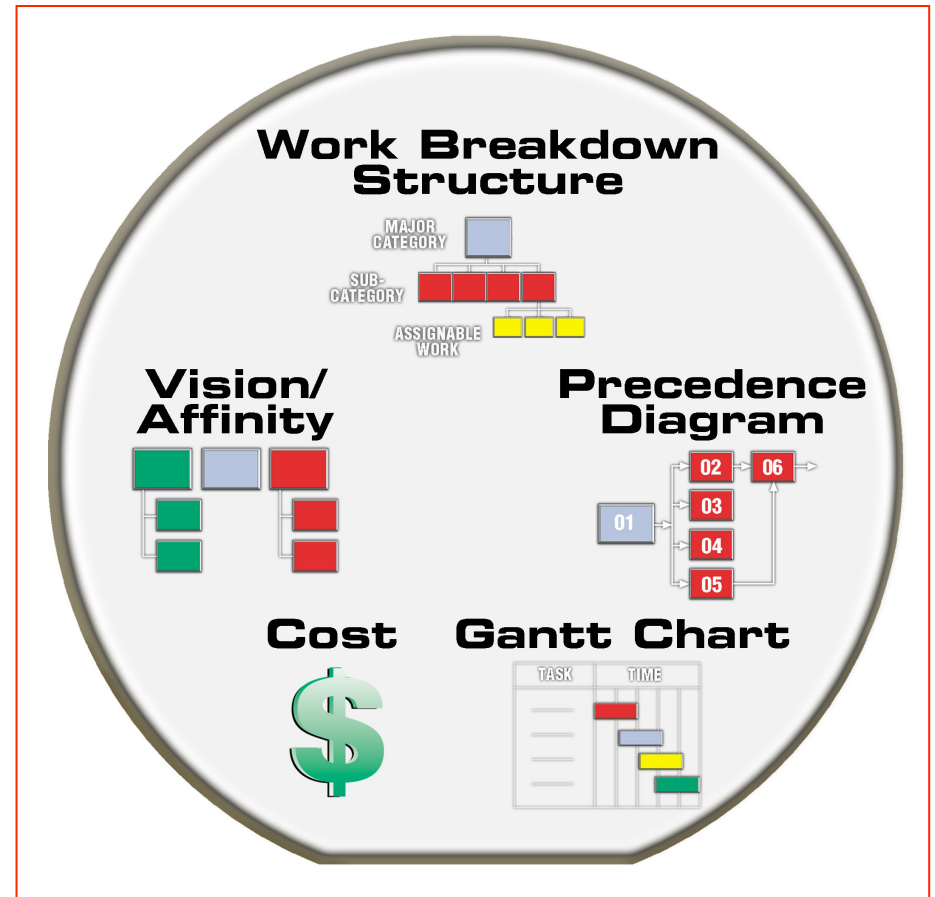
**What information do you need to do some ordering of the WBS tasks across a timeline?**

- Think for 13.13 seconds...
- Turn to a neighbor and discuss it for a 46.87 seconds



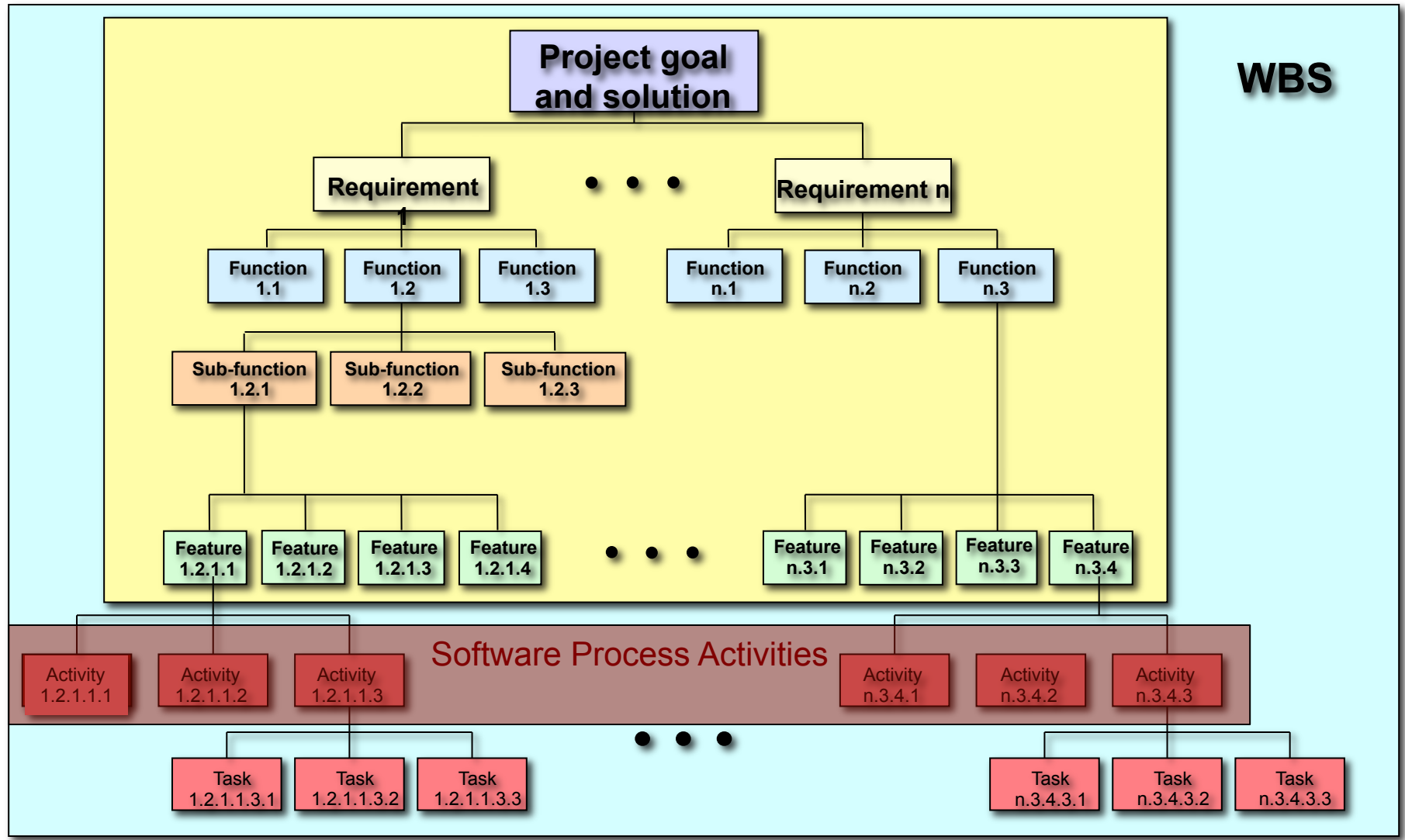
# Software Project Planning

- **Why** – Business Case/Scope
- **What** – Work Breakdown Structure
- **When** – Schedule
- **Who** – Staffing
- **Where** – Facilities
- **How Much** – Budget/Costs



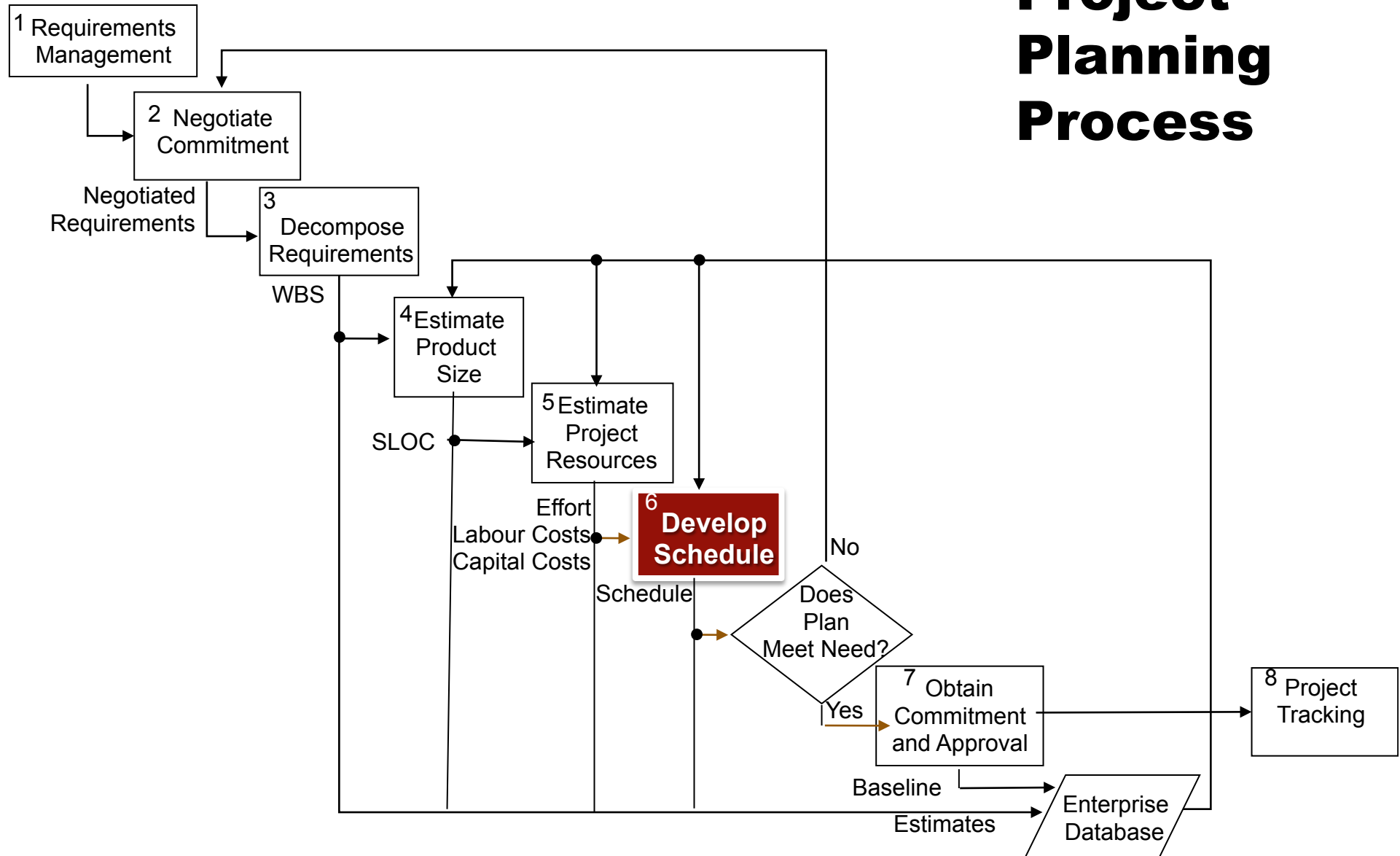


# Combining SW Activities with Artifacts → Schedule'able Tasks!





# Project Planning Process





# PMI PMBOK & ISO 10006 Standard

## PROJECT EVOLUTION

PMI (PMBOK)	PROPOSE	CHARTER	PLAN	COMMIT	EXECUTE	CLOSE
QUALITY	●	●	●	●	●	●
INTEGRATION	●	●	●	●	●	●
SCOPE	●	●	●		●	
TIME			●		●	
COST & RESOURCES			●		●	
PERSONNEL	●	●	●	●	●	●
COMMUNICATIONS	●	●	●	●	●	●
RISK	●	●	●	●	●	●
PROCUREMENT	●		●		●	●

*Know What*

*Know How*



# Recall: Software Project Planning

- Introduction: objectives of project and sets constraints
- Project Organization: way development team organized (roles, etc)
- Estimation: Effort, cost, schedule estimates & resource availability
- Risk Management: possible project risks, their likelihood of occurrence, and risk reduction strategies proposed
- Hardware/Software: support required for the development; if hardware to be bought, estimates of price and delivery schedule
- Work Breakdown: breakdown of project into activities / tasks, and identifies milestones / deliverables associated with each task
- Project Schedule: dependencies between activities, estimated time to reach each milestone, and allocation of resources to activities
- Monitoring, Control, and Reporting: management reports which should be produced, when, and the monitoring mechanism



# Scheduling Principles 1/2

## ■ Compartmentalization

- The product and process must be decomposed into a manageable number of activities and tasks

## ■ Interdependency

- Tasks that can be completed in parallel must be separated from those that must be completed serially

## ■ Time allocation

- Every task has start and completion dates that take the task interdependencies into account

## ■ Effort validation

- Project manager must ensure that on any given day there are enough staff members assigned to complete the tasks within the time estimated in the project plan



# Scheduling Principles 2/2

## ■ Defined Responsibilities

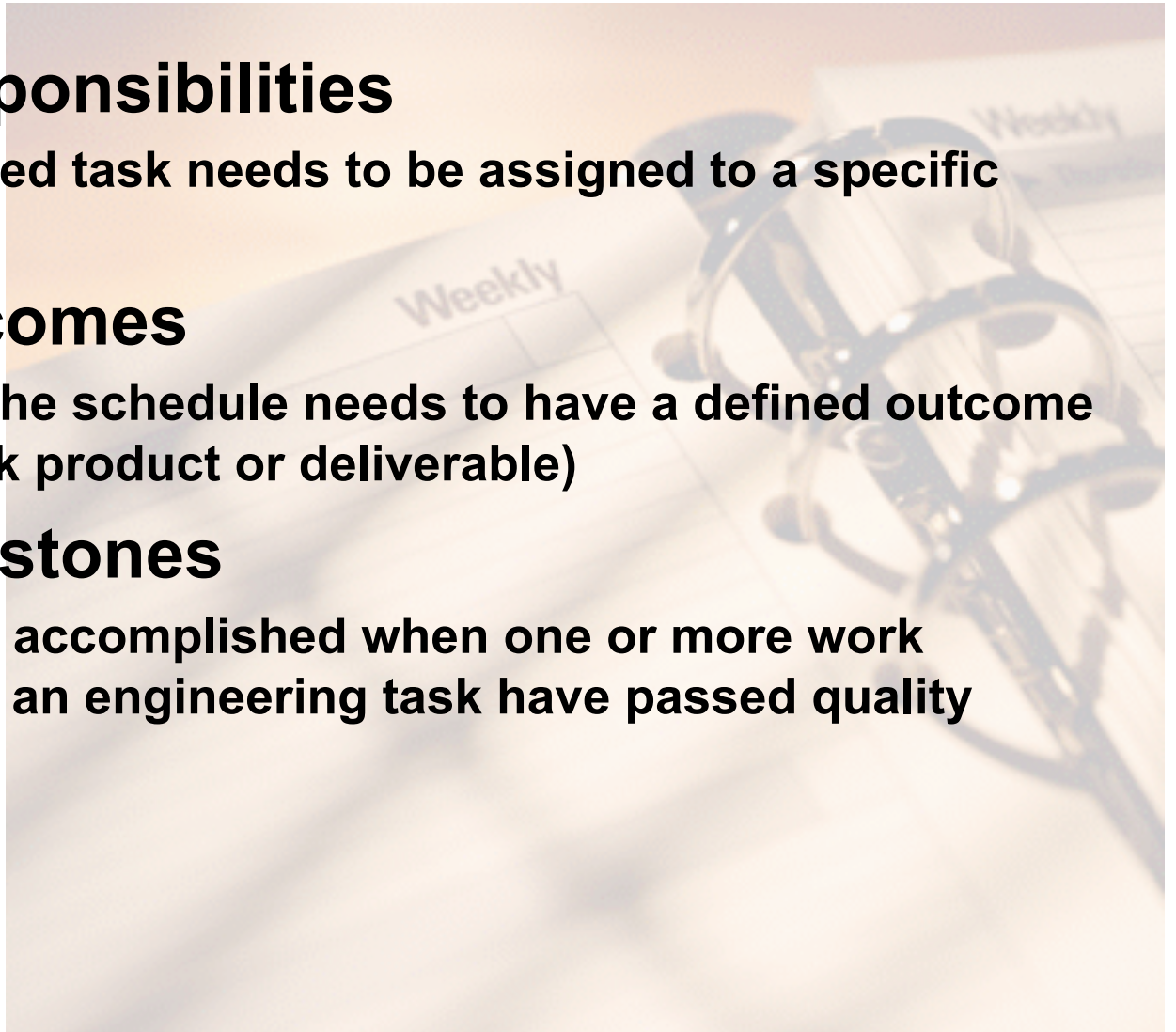
- Every scheduled task needs to be assigned to a specific team member

## ■ Defined outcomes

- Every task in the schedule needs to have a defined outcome (usually a work product or deliverable)

## ■ Defined milestones

- A milestone is accomplished when one or more work products from an engineering task have passed quality review





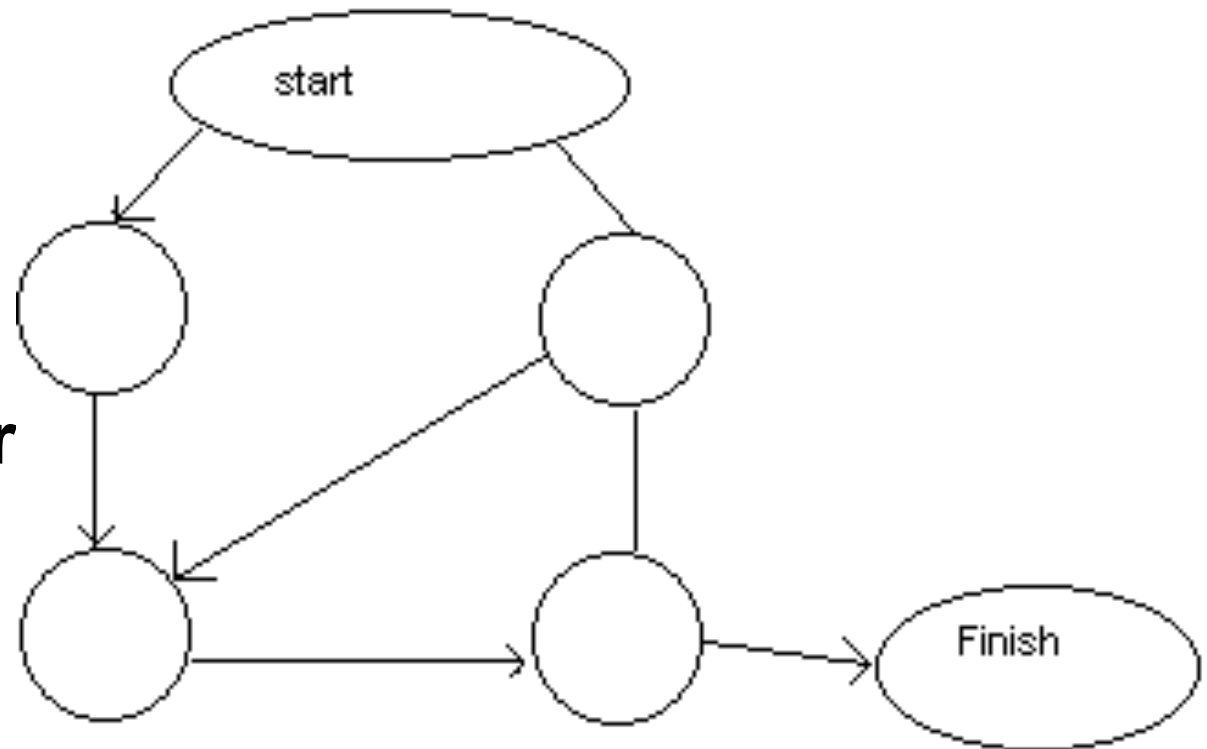
# Activity Graph

Each activity has:

1. Precursor
2. Duration
3. Due date
4. End point  
(milestone or deliverable)

Each task has:

1. Start time
2. End time
3. Duration





# How can you figure out the shortest time it would take to finish a project?

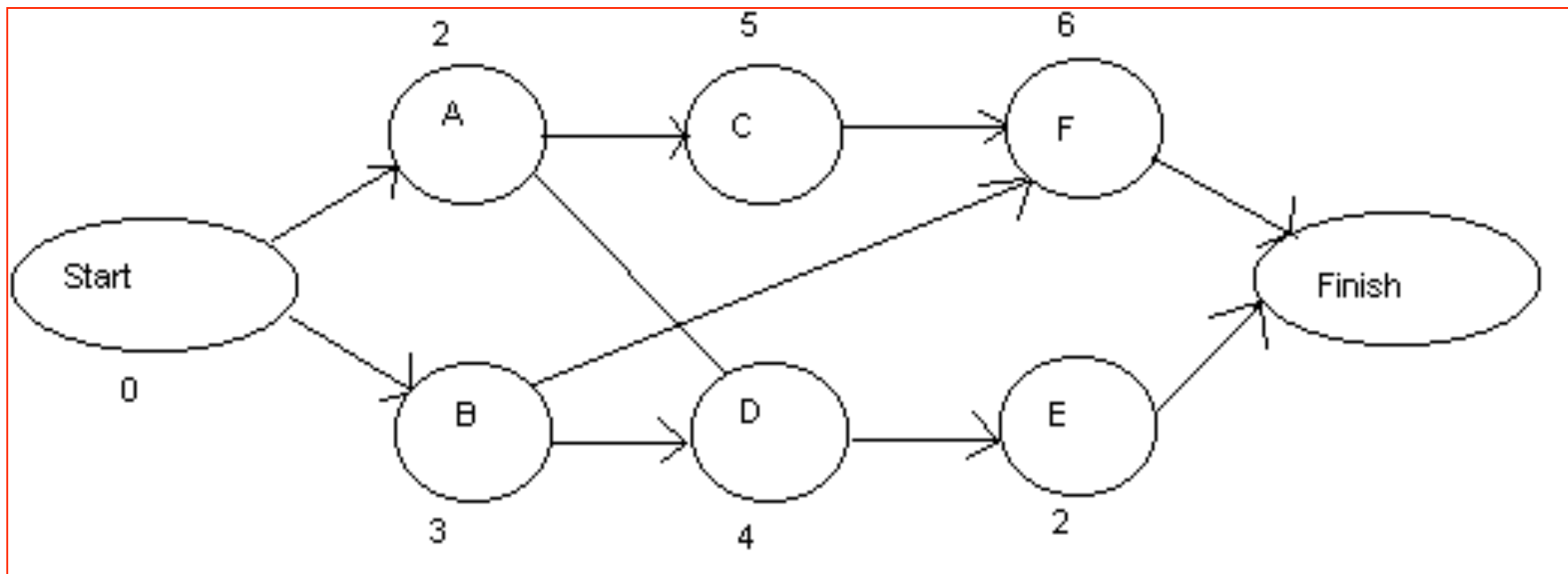
- Think for 11.6 seconds...
- Turn to a neighbor and discuss it for a 48.4 seconds







# Critical Path Method (CPM)





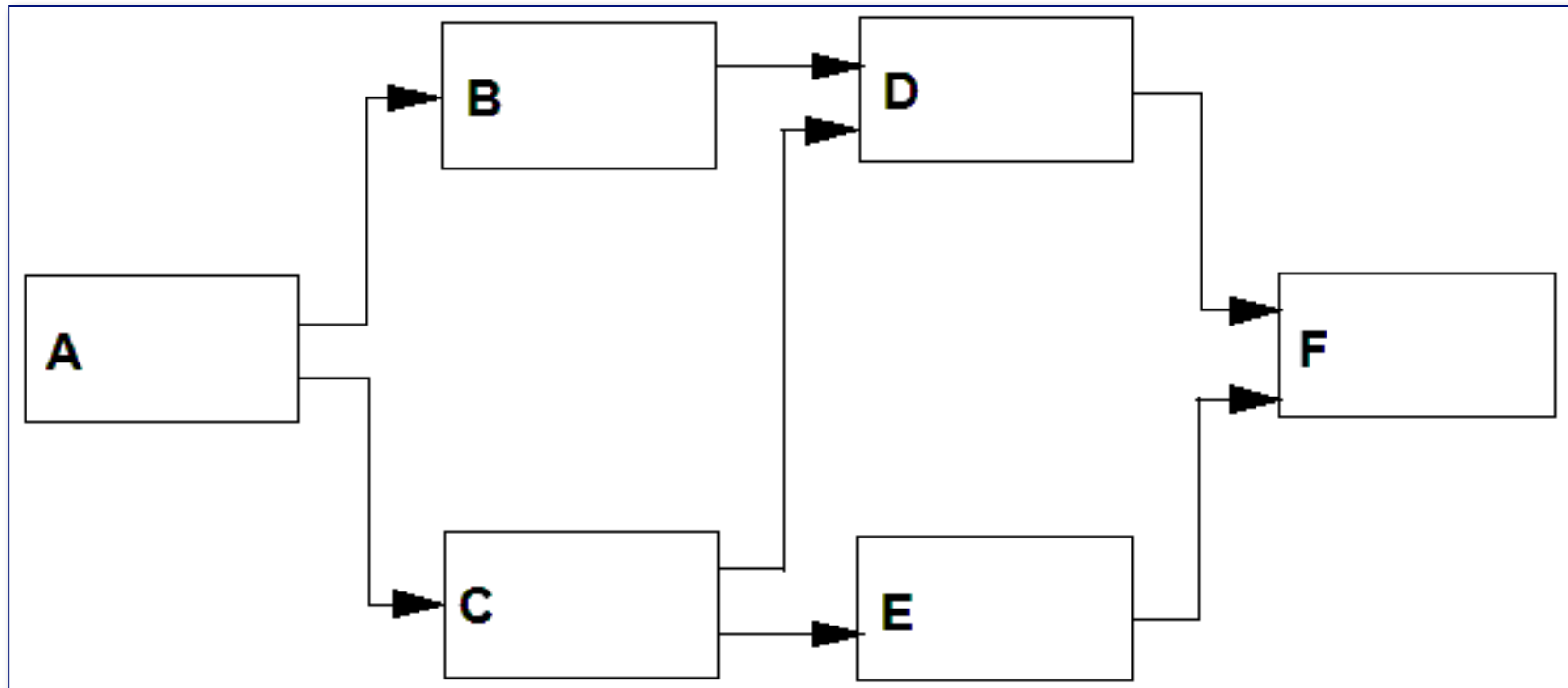
Activity	Pre-cursor	Duration	EST	EFT	LST	LFT	Slack
Start	-	0	0	0	0	0	0
A	Start	2	0	2	0	2	0
B	Start	3	0	3	4	7	4
C	A	5	2	7	2	7	0
D	A,B	4	3	7	7	11	4
E	D	2	7	9	11	13	4
F	B,C	6	7	13	7	13	0
FINISH	E,F	0	13	13	13	13	0

EST = earliest start time, EFT = earliest finish time

LST = latest start time, LFT = latest finish time

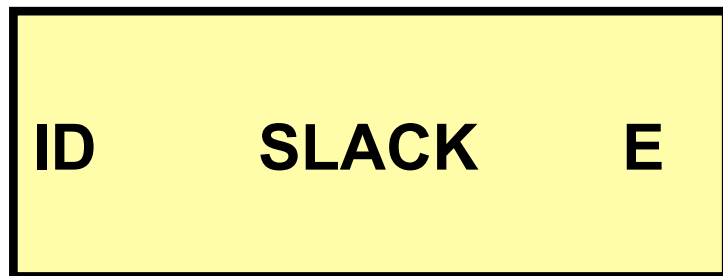
Slack = (LST - EST) or (LFT - EFT)

# Network-based Scheduling–Task on the Node



ES

EF



LS

LF

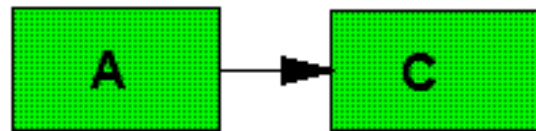
ES = earliest start, EF = earliest finish time

LS = latest start, LF = latest finish time

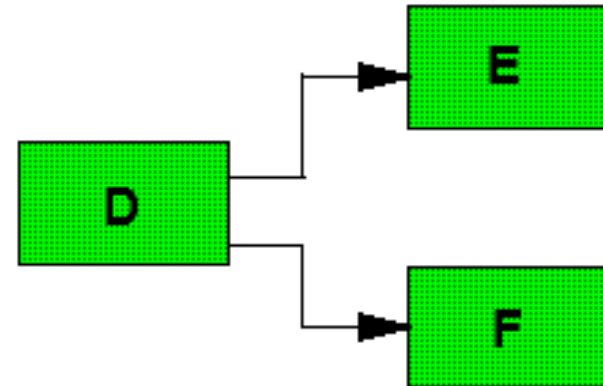
Slack = (LS - ES) or (LF - EF)

E = Effort (duration)

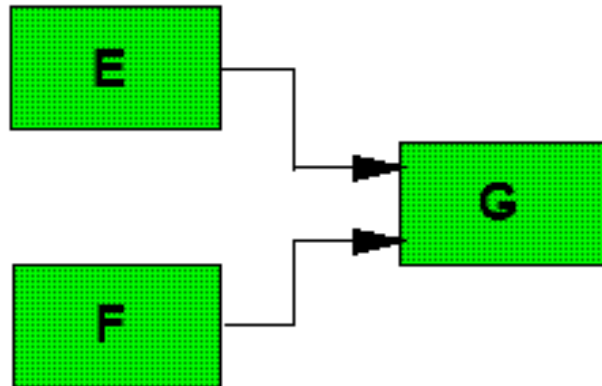
# Diagramming Conventions



(a)



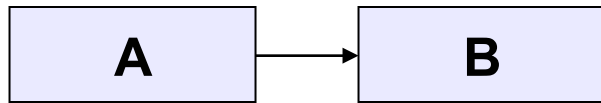
(c)



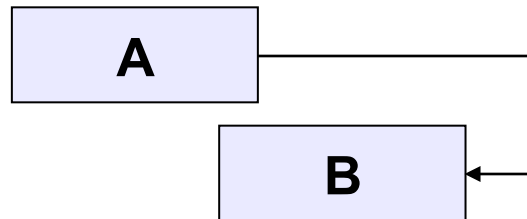
(b)



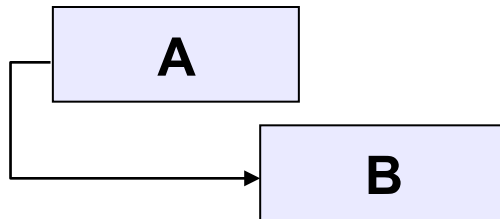
# Dependency Relationships



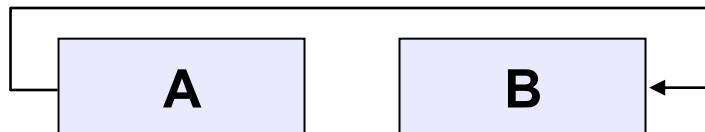
**FS:** When A finishes, B may start



**FF:** When A finishes, B may finish



**SS:** When A starts, B may start



**SF:** When A starts, B may finish

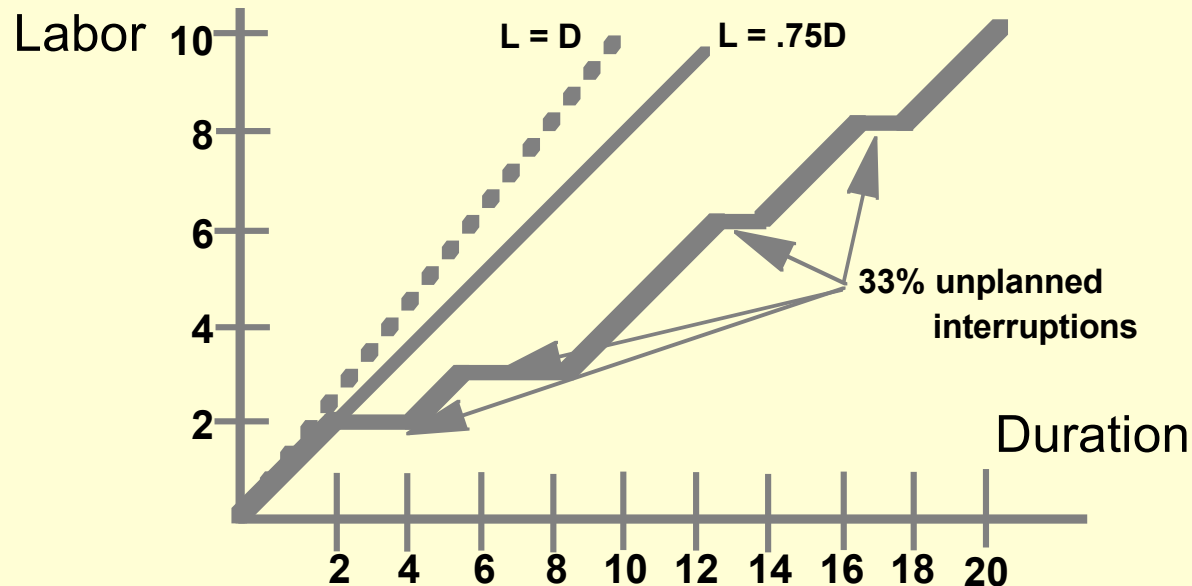
# Dependency Constraints

- **Technical constraints**
  - Discretionary constraints
  - Best practice constraints
  - Logical constraints
  - Unique requirements constraints
- **Management constraints**
- **Inter-project constraints**
- **Date constraints (sound like class!)**
  - No earlier than, No later than, On this date
- **Lag variables**





# Elapsed Time (duration) versus Work (effort)



## MODEL ASSUMPTIONS

- \* Individuals work at 75 percent efficiency rate.
- \* Unplanned interruptions account for 33 percent of clock time.



# **Homework and Reading Reminders**

- **Read Software Project Scheduling paper**
- **Complete Homework 4 – Software Risk Tables and Risk Sheets**
  - **Due by 11:5pm, Tuesday, October 2<sup>nd</sup>, 2012**