Chair of Mobile Business & Multilateral Security

Exercise 4
Business Informatics 2 (PWIN)

Management of IT Projects & Software Engineering

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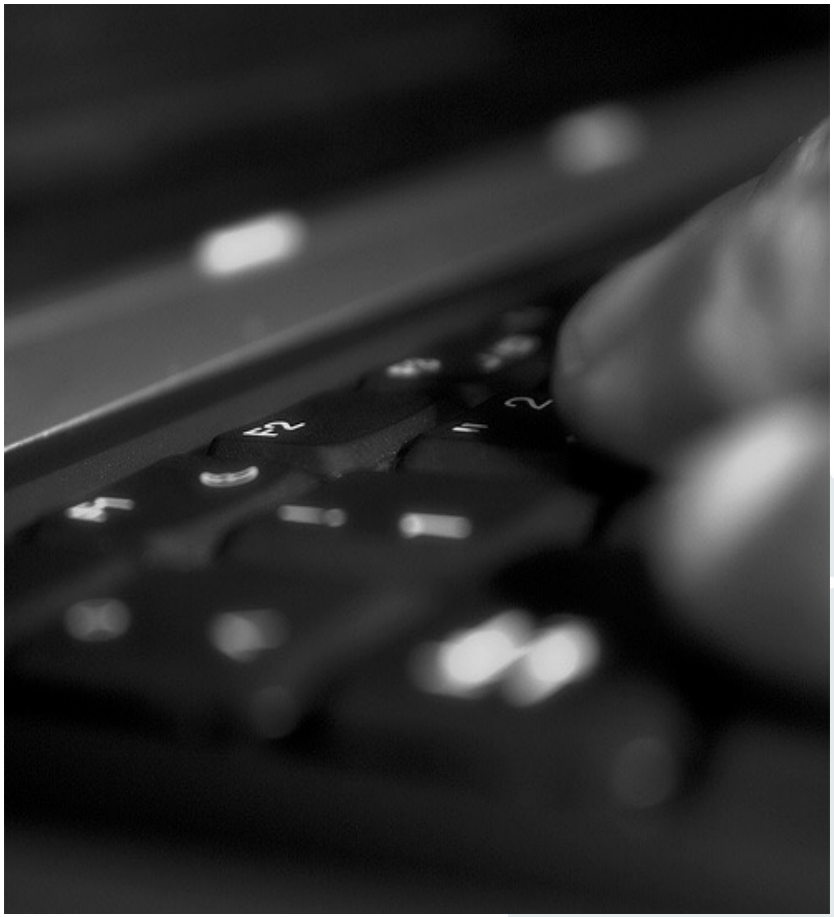


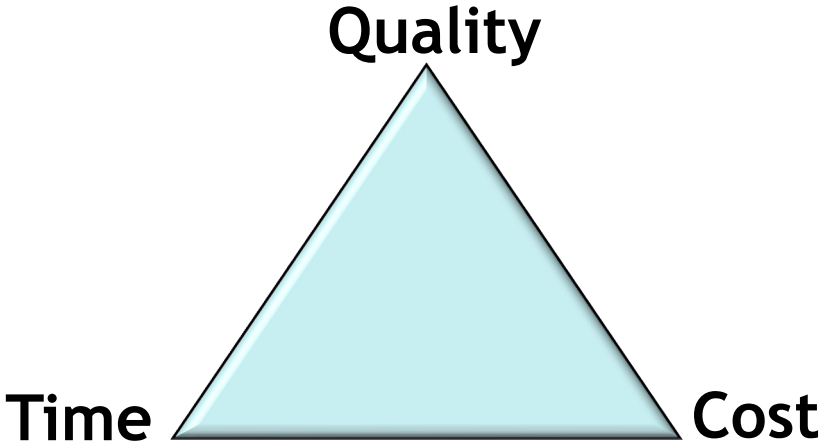
Jenser (Flickr.com)

Agenda

- Exercise 1: IT Project Management
- Exercise 2: IT Project Management
- Exercise 3: Network Plan and Gantt Chart
- Exercise 4: Software Development Process Models

Exercise 1: IT Project Management

Explain what is meant by “magic triangle of project management”.



Requirement Change	Consequences	
Shorter time	Higher costs	Reduced quality or scope
Reduced costs	More time	Reduced quality or scope
Higher quality	More time	Higher costs

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Exercise 2: IT Project Management

What are the "SMART" project objectives? Explain them at the example of the InstaMatch Service.

Exercise 2: IT Project Management

Specific:

- Desired objectives should specify what should be achieved and include some quantitative targeted values for the end product.

Measurable:

- You should be able to measure whether the objectives have been met or not.

Attainable:

- The desired objective must be one that is actually feasible to achieve within the given time and cost parameters.

Relevant:

- The desired objective should relate directly to the organisation's business needs and stated mission.

Time-bound:

- The boundaries for completion date of the desired objective should be either a specific date or time.

Exercise 2: IT Project Management

What are the “SMART” project objectives? **Explain them at the example of the InstaMatch Service.**

Exercise 2: IT Project Management

Specific:

- Improve quality of the personal profile matching
- Reduce calculation time for the personal profile matching

Measurable:

- Number of matching requests per performed date
- Reduce calculation time for the personal profile matching

Attainable:

- Five matching requests per performed date
- Reduce calculation time for the personal profile matching down to 3ms

Relevant:

- Personal profile matching constitutes the core functionality of the InstaMatch system

Time-bound:

- Objective completion until end of 2024

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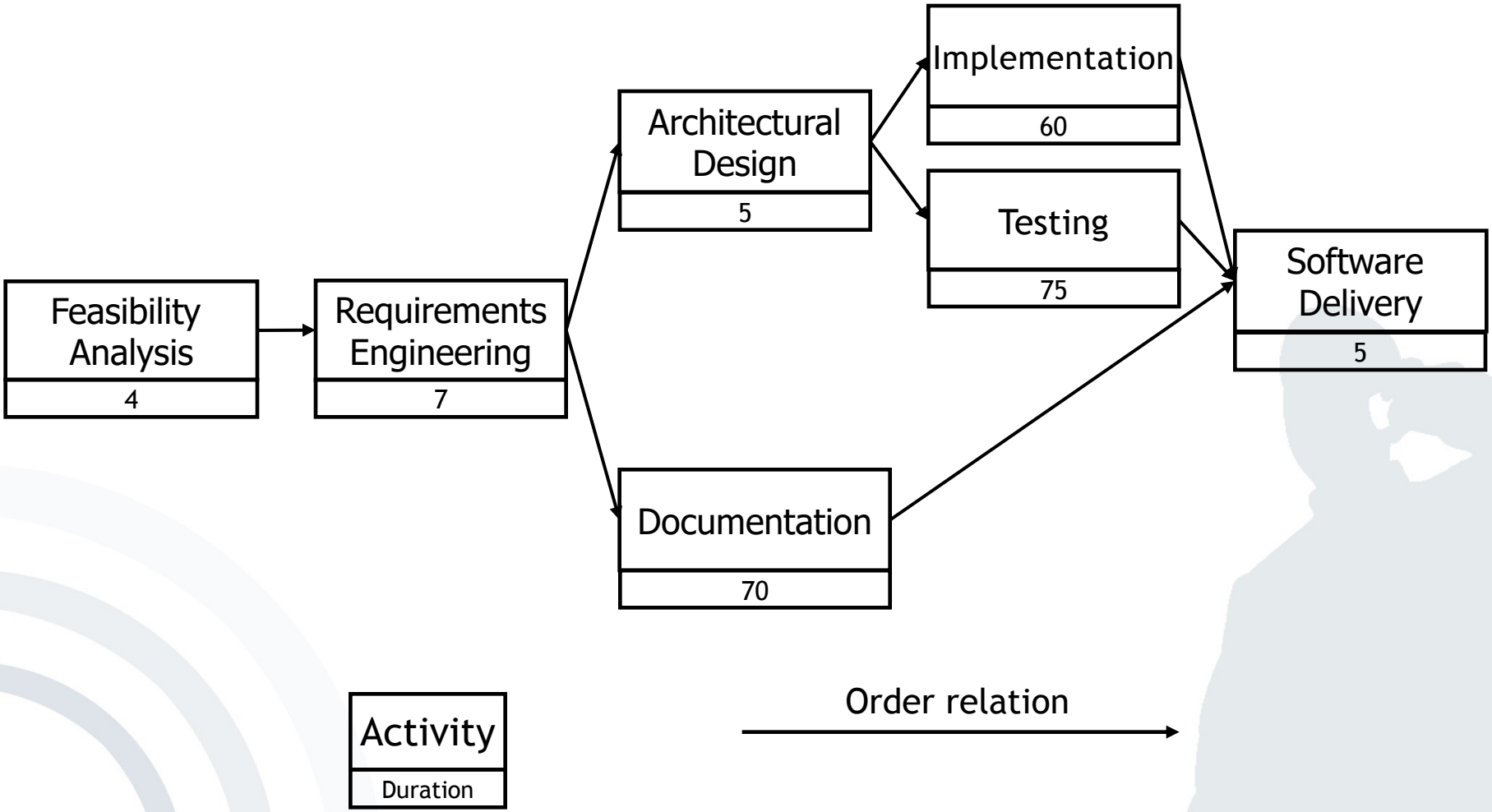
Excursion: Network Plan



Exercise 3: Network Plan and Gantt Chart

The project manager of a software company wants you to prepare a network plan for an upcoming software development project. His assistant has gathered the activity time estimates and their dependencies shown below.

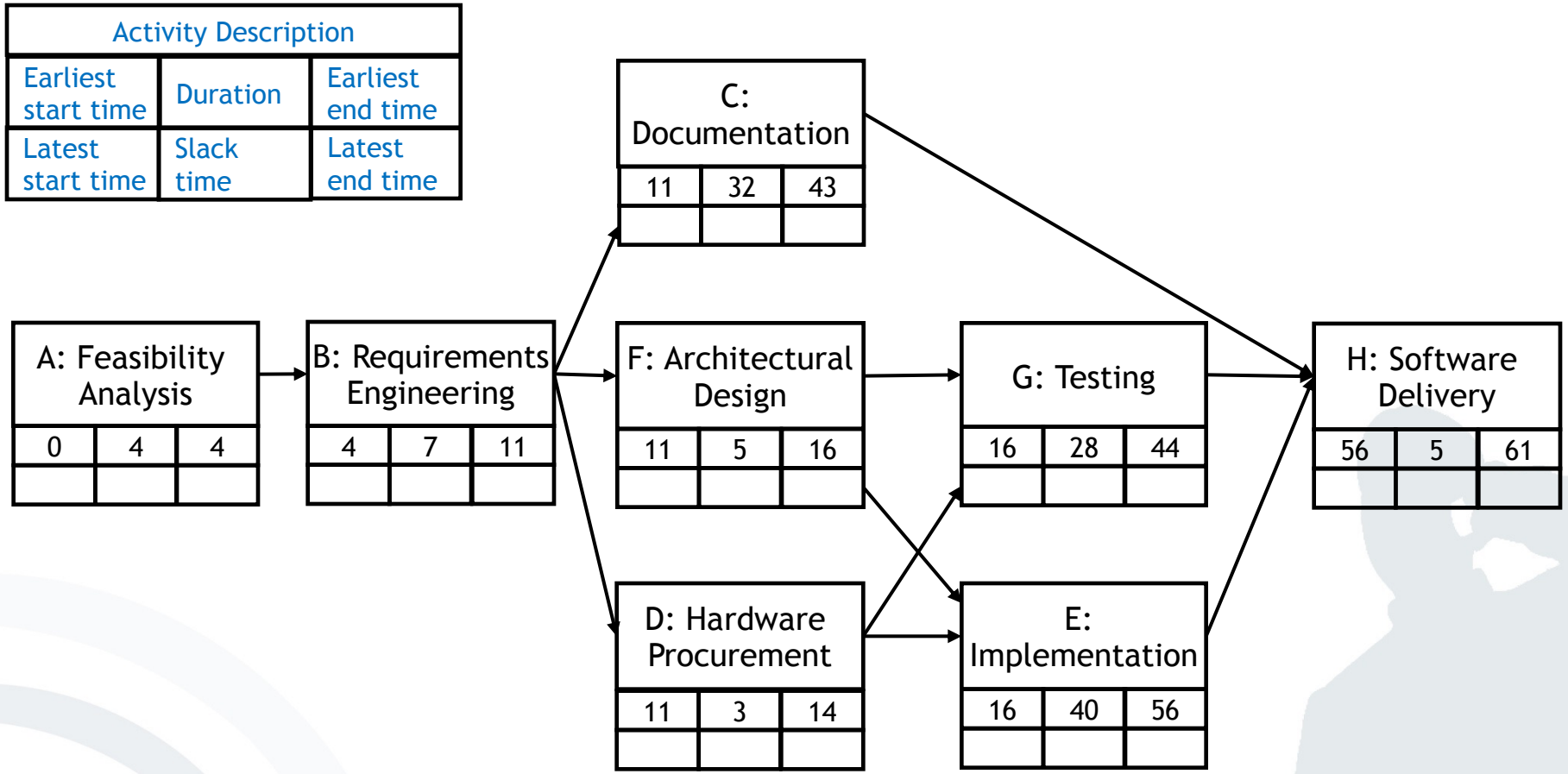
Activity ID	Activity Description	Duration (days)	Preceding Activities
A	**Feasibility Analysis**	4	-
B	**Requirements Engineering**	7	{A}
C	**Documentation**	32	{B}
D	**Hardware Procurement**	3	{B}
E	**Implementation**	40	{D, F}
F	**Architectural Design**	5	{B}
G	**Testing**	28	{D, F}
H	**Software Delivery**	5	{C, E, G}

Exercise 3a): Network Plan and Gantt Chart

a) Build a network plan according to the following schema and determine the critical path using activity slack calculations. Estimate how long the project will take.

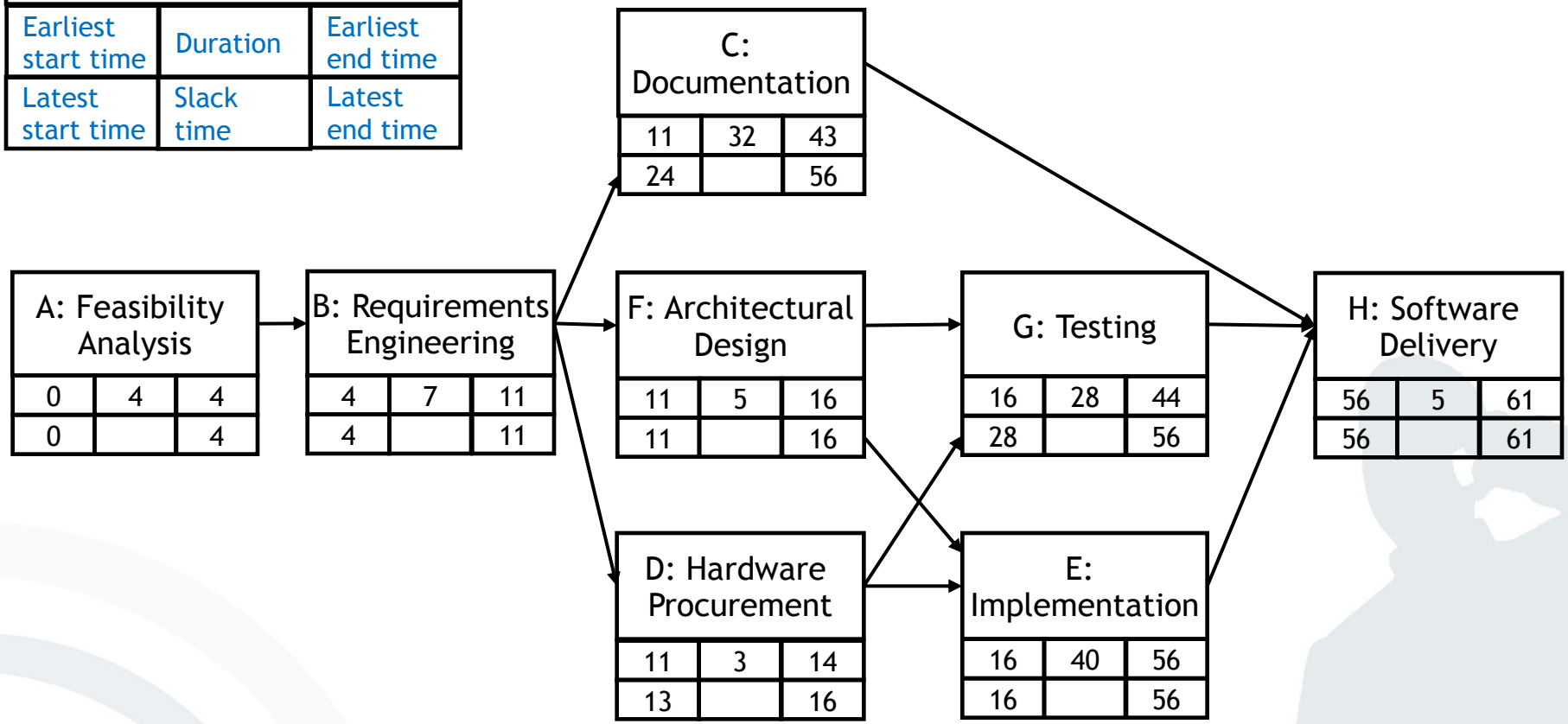
Activity Description		
Earliest start time	Duration	Earliest end time
Latest start time	Slack time	Latest end time

Exercise 3a): Network Plan and Gantt Chart

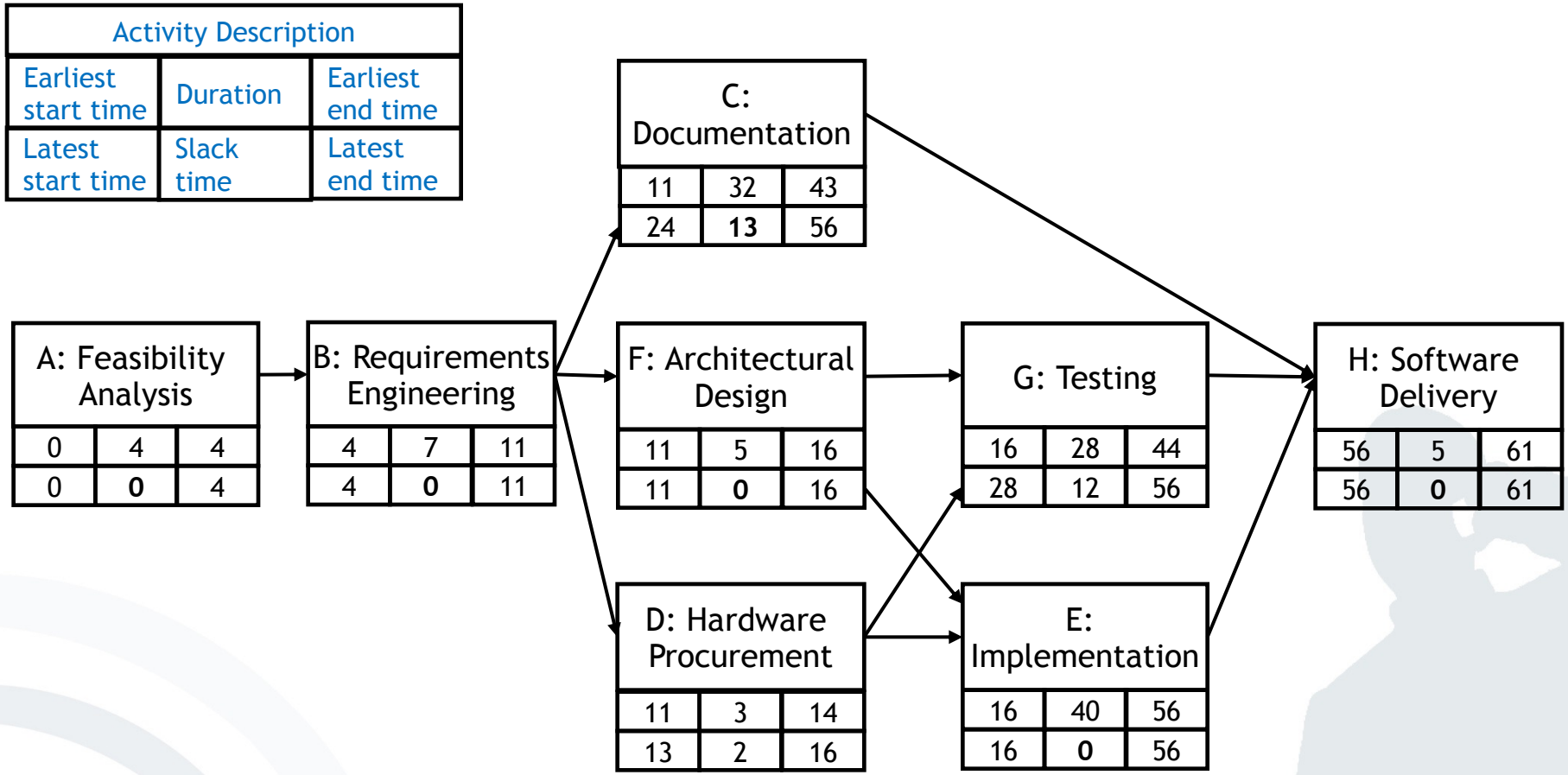


Exercise 3a): Network Plan and Gantt Chart

Activity Description		
Earliest start time	Duration	Earliest end time
Latest start time	Slack time	Latest end time

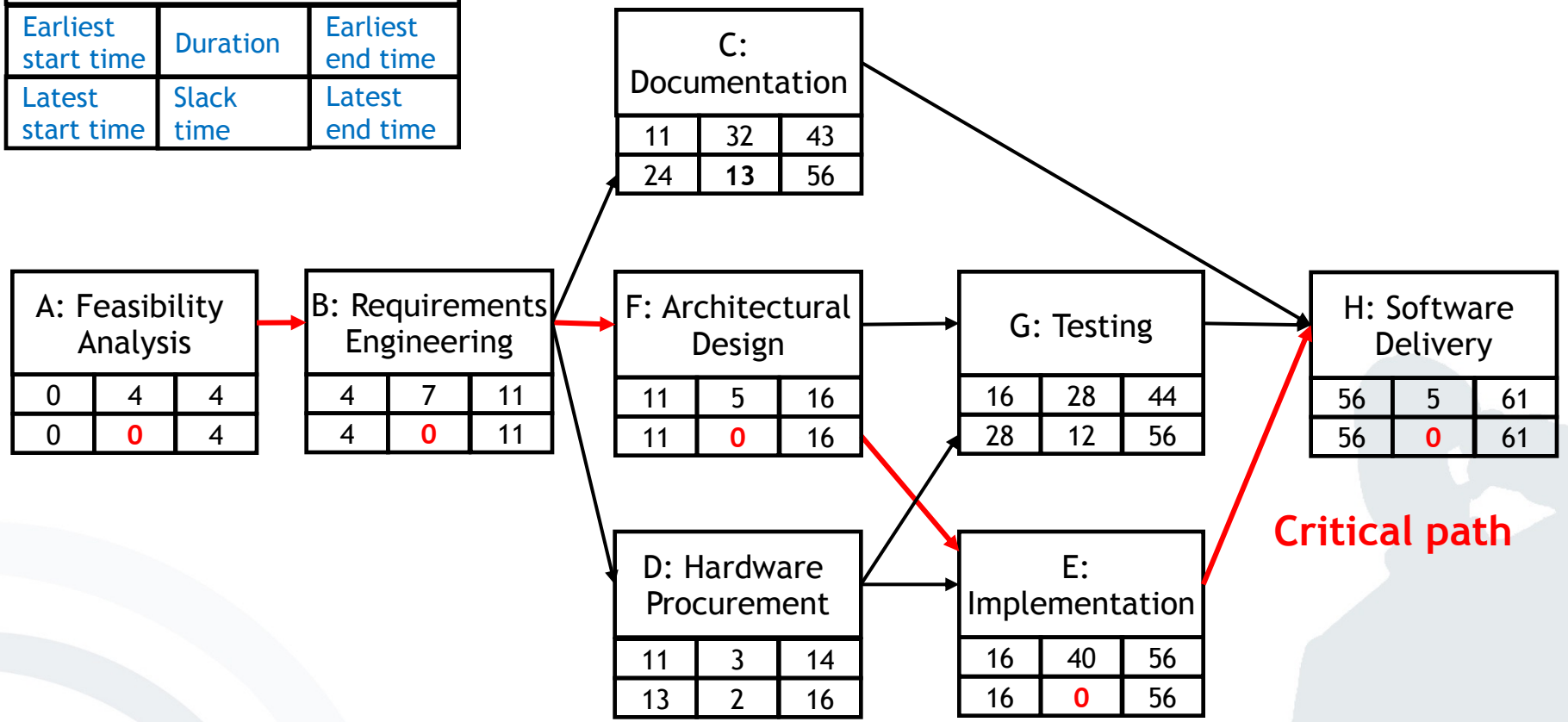


Exercise 3a): Network Plan and Gantt Chart



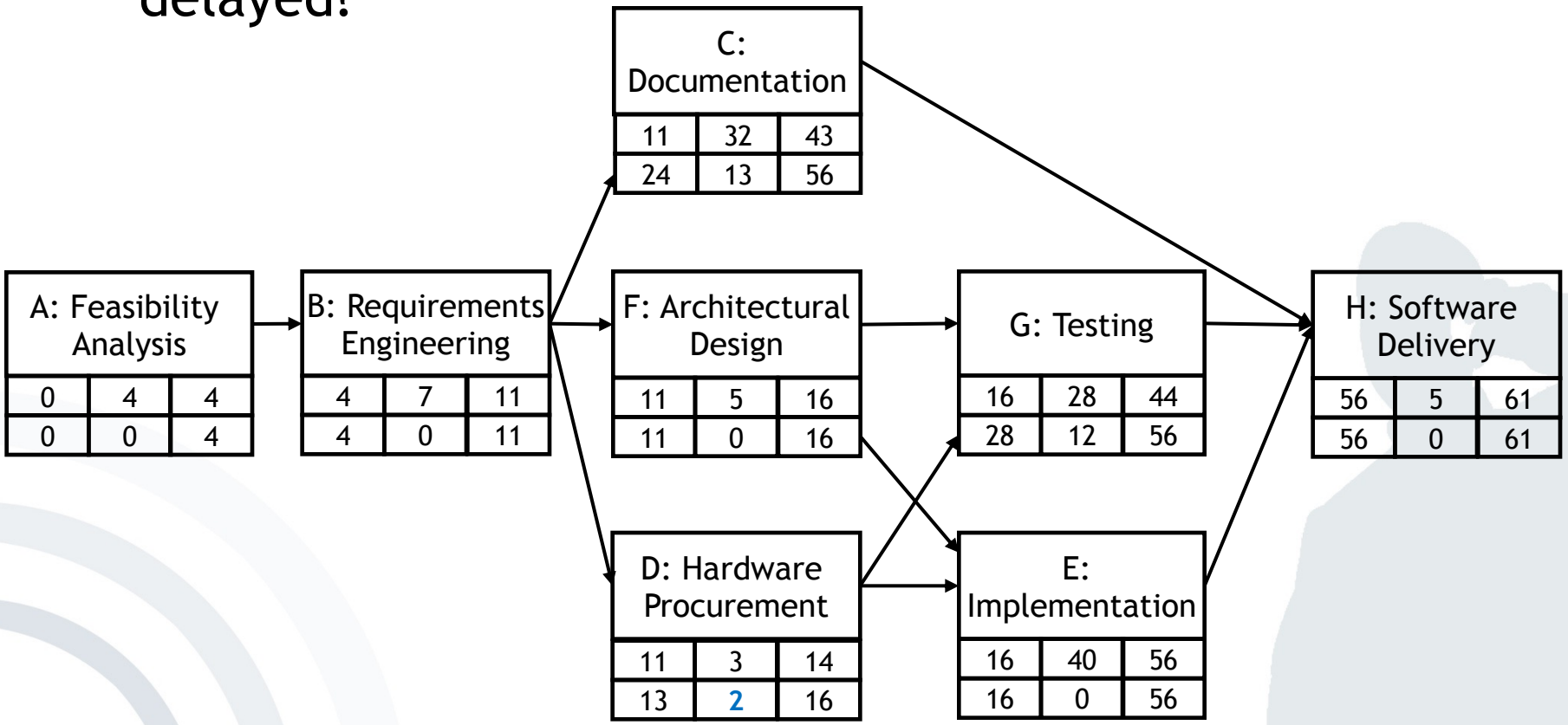
Exercise 3a): Network Plan and Gantt Chart

Activity Description		
Earliest start time	Duration	Earliest end time
Latest start time	Slack time	Latest end time



Exercise 3b): Network Plan and Gantt Chart

b) How long can activity “D: Hardware Procurement” be delayed?



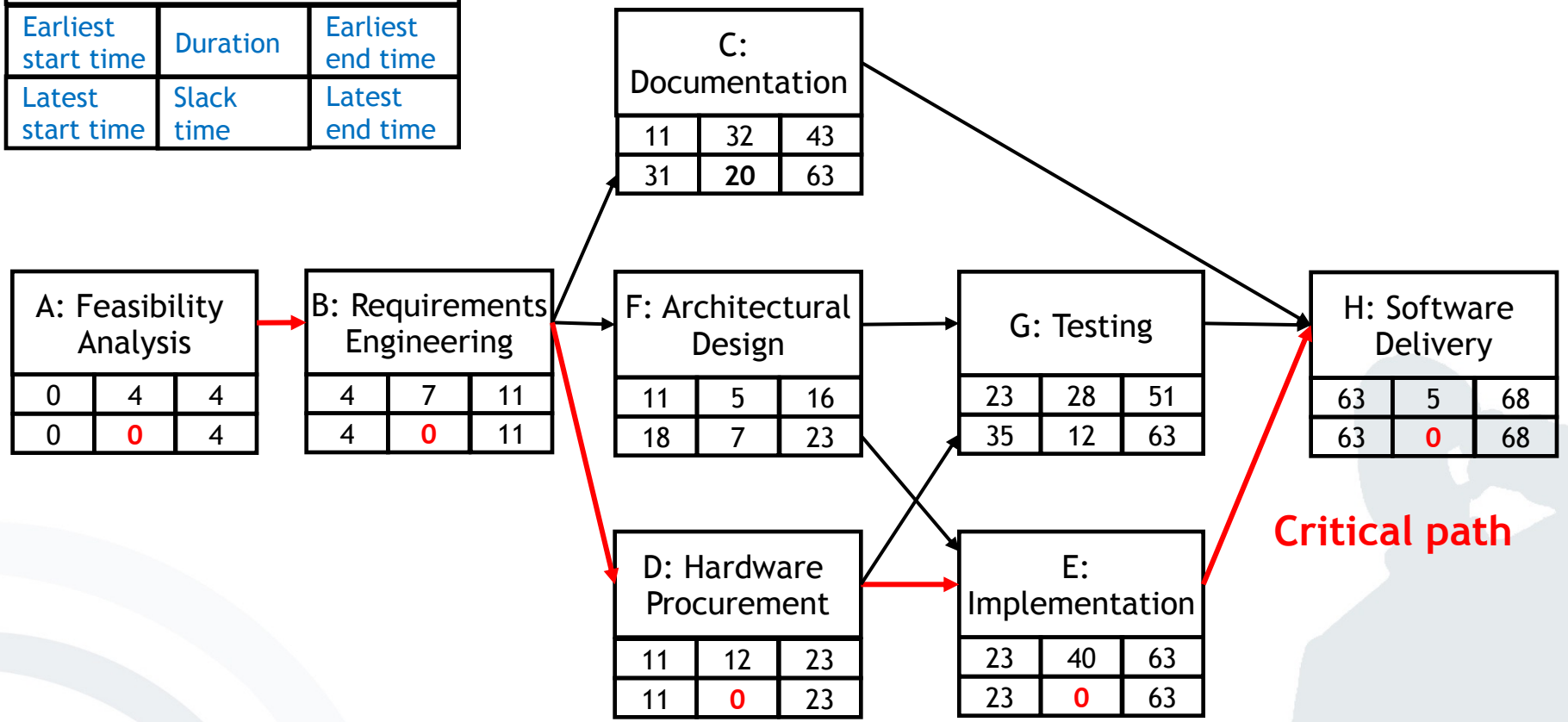
Exercise 3c): Network Plan and Gantt Chart

c) Because of some internal problems with the procurement process, the project manager now expects activity D to require 12 days. Rebuild the network plan, highlight the critical path and describe the impact on the project schedule.

Activity ID	Activity Description	Duration (days)	Preceding Activities
A	**Feasibility Analysis**	4	-
B	**Requirements Engineering**	7	{A}
C	**Documentation**	32	{B}
D	**Hardware Procurement**	12	{B}
E	**Implementation**	40	{D, F}
F	**Architectural Design**	5	{B}
G	**Testing**	28	{D, F}
H	**Software Delivery**	5	{C, E, G}

Exercise 3c): Network Plan and Gantt Chart

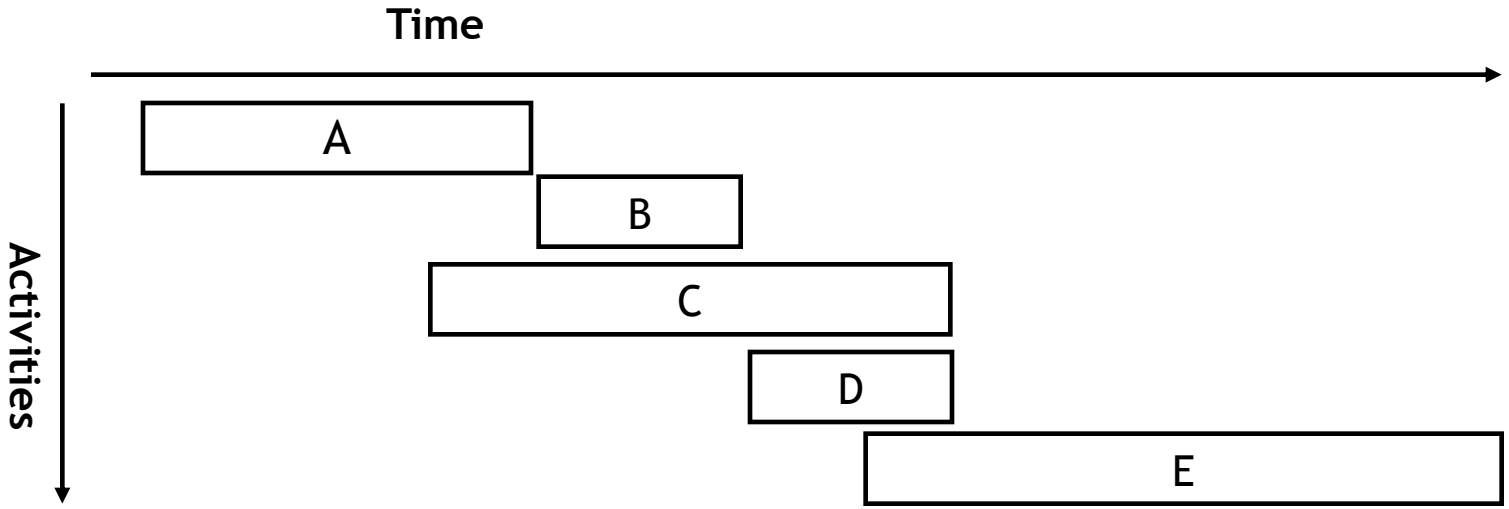
Activity Description		
Earliest start time	Duration	Earliest end time
Latest start time	Slack time	Latest end time



Exercise 3d): Network Plan and Gantt Chart

d) The project manager now asks you to develop a Gantt chart based on the updated network plan.

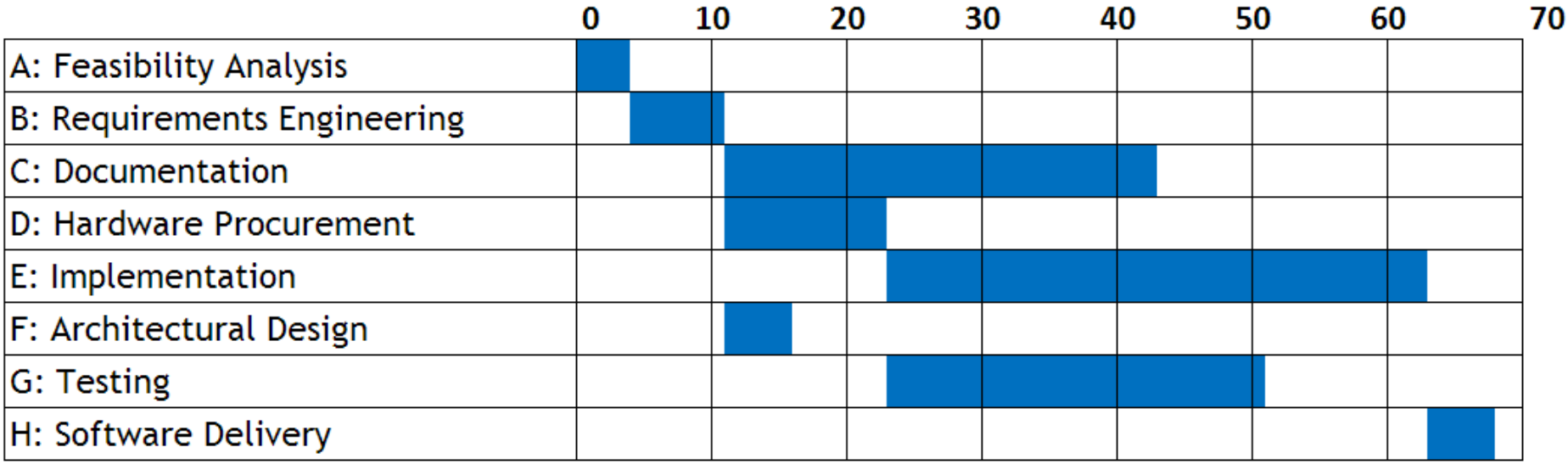
Excursion: Gantt Chart



ID	Task Name	Duration	Predecessors
1	**Software Project**	**172.5 days**	
2	Requirements	7 wks	
3	Design	5 wks	2
4	**Programming**	**60 days**	**3**
5	Unit Tests for Feature A	3 wks	3
6	Program Feature A	7 wks	5
7	Unit Tests for Feature B	4 wks	3
8	Program Feature B	8 wks	7
9	Feature-Complete Build	0 days	6,8
10	**Test Preparation**	**40 days**	
11	Build Test Plans	6 wks	2,3FF
12	Review, Correct Test Plans	2 wks	11
13	**Test Execution**	**52.5 days**	**12**
14	Execute Test Plan A	3 wks	9
15	Execute Test Plan B	1.5 wks	14SS
16	Fix Defects	1 wk	14,15
17	Regress Test Plan A	6.5 wks	16
18	Regress Test Plan B	3 wks	17SS
19	Deliver Beta Build	0 days	17,18

Exercise 3d): Network Plan and Gantt Chart

d) The project manager now asks you to develop a Gantt chart based on the updated network plan.



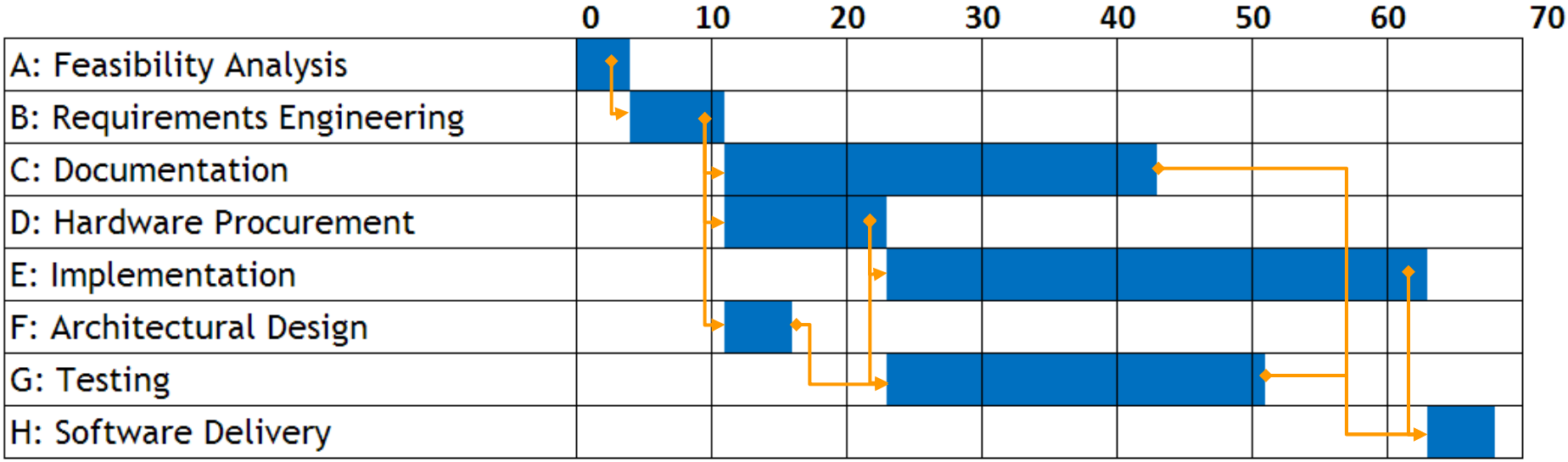
Exercise 3f): Network Plan and Gantt Chart

f) How could you improve the visualisation of Gantt charts?

Exercise 3f): Network Plan and Gantt Chart

f) How could you improve the visualisation of Gantt charts?

Networked Gantt charts visualize the dependencies between activities.



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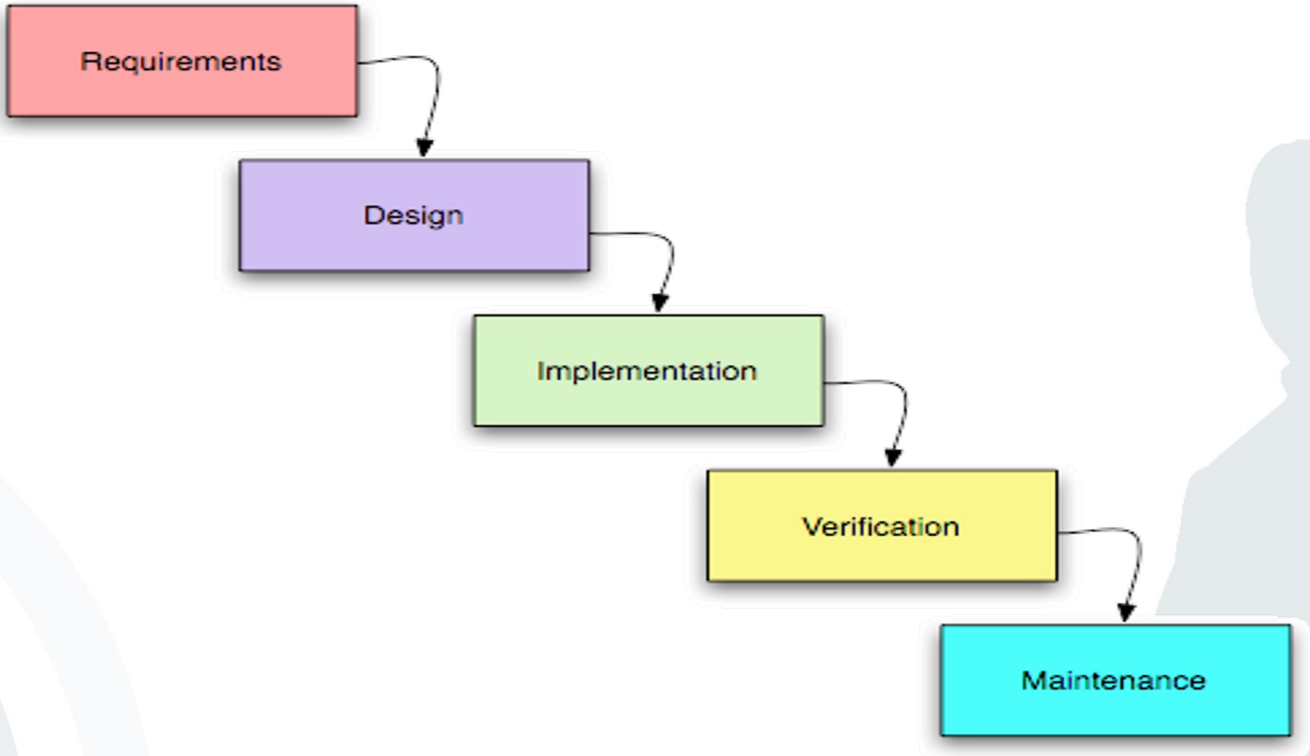
Exercise 4: Software Development Process Models

- Name and describe three software development process models and select one of them for the InstaMatch Service. Motivate your choice.

Exercise 4: Software Development Process Models

Waterfall model

- First described by Royce in 1970
- There seem to be at least as many versions as there are authorities - perhaps more



Exercise 4: Software Development Process Models

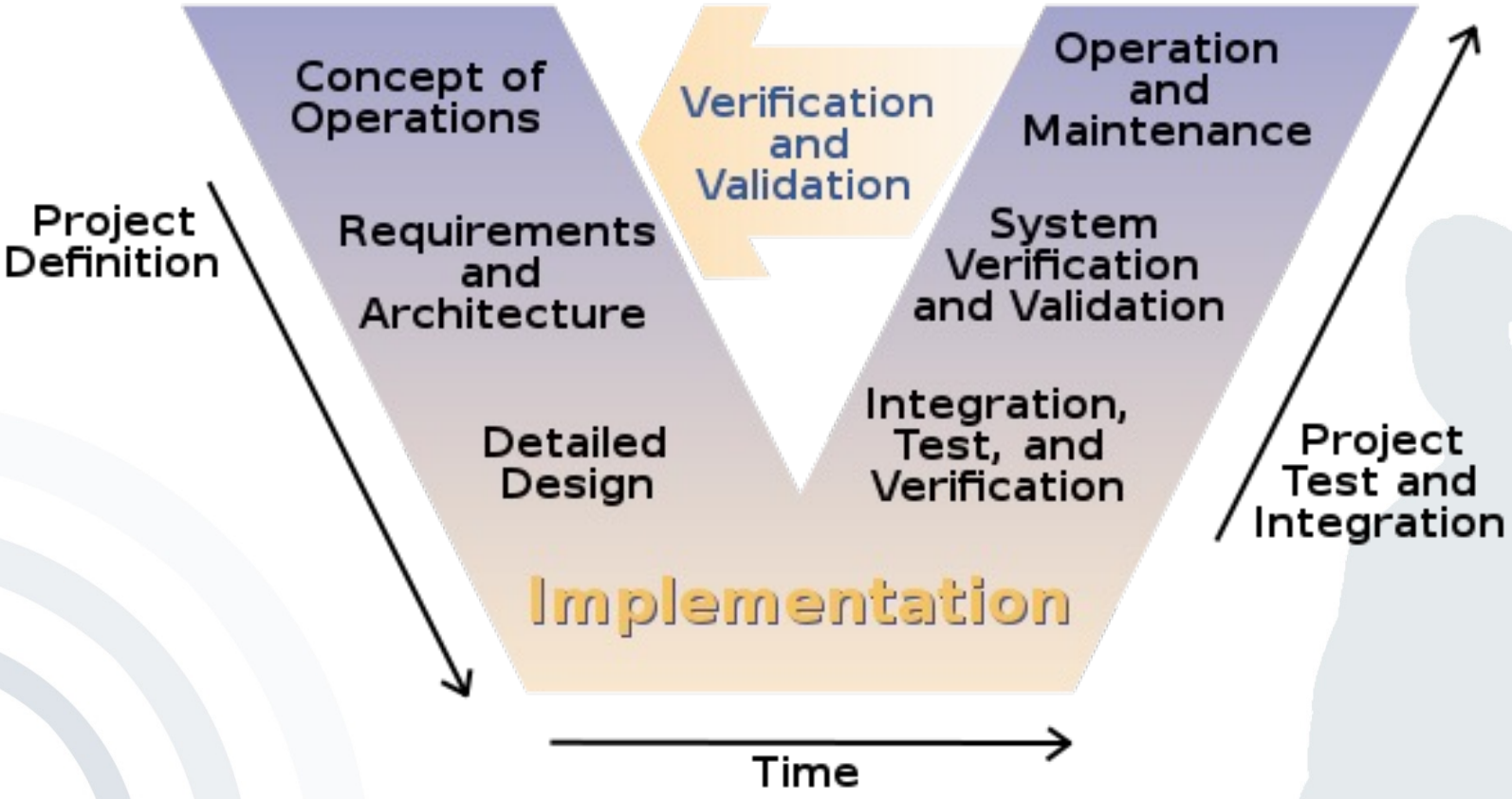
- One or more documents are produced after each phase and “signed off”.

- Points to note:
  - “Water does not flow up”.
    - it is difficult to change artifact produced in the previous phase.
  - This model should be used only when the requirements are well understood.
  - Reflects engineering practice.
  - Simple management model.

Exercise 4: Software Development Process Models

V-Model

- Horizontal lines denote the information flow between activities at the same abstraction level.

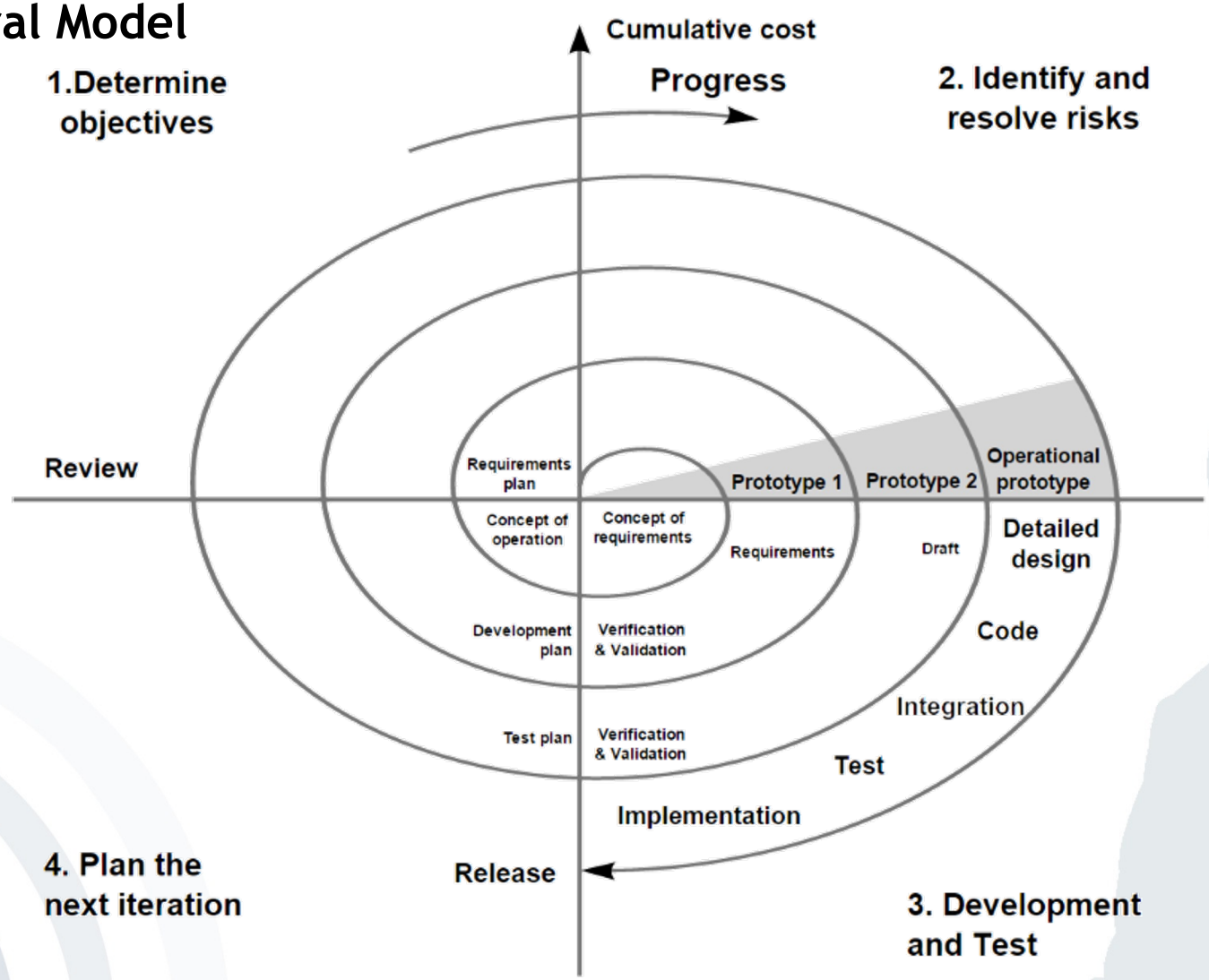


Exercise 4: Software Development Process Models

- Similar to pure waterfall model but makes explicit the dependency between development and verification activities.
- The left half of the V represents *development* and the right half system *validation*.
- Note the requirements specification includes requirements elicitation and analysis.

Exercise 4: Software Development Process Models

Spiral Model



Exercise 4: Software Development Process Models

- Basic Concept
  - Develop an initial implementation, demonstrate it to user, get feedback and refine it until an adequate system has been produced.
- Advantages
  - Estimates for budget, schedule, etc. become more realistic as work progresses
- Disadvantages
  - Requires expertise in risk evaluation and mitigation
  - Appropriate only for large systems

Exercise 4: Software Development Process Models

- Process model proposal for the InstaMatch® Service: V-Model

- Motivation
  - The InstaMatch® system is a complex system. The V-model was designed for complex systems.
  - The V-model makes explicit the dependency between development and validation and allows to jump back to earlier development phases.

Open Questions?