FE 322 FOOD PRODUCTION MANAGEMENT

2. PROJECT MANAGEMENT AND PRODUCT DEVELOPMENT

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What is Project Management?

- a method for organizing tasks
- a structured framework to help a group work productively
- tools to aid in task sequencing, dependency analysis, resource allocation, scheduling, etc.
- tools to track progress relative to plan

Why Need Project Management?

- Complex project needs coordination of:
  - Multiple people
  - Multiple resources (labs, equipment, etc.)
  - Multiple tasks – some must precede others
  - Multiple decision points – approvals
  - Phased expenditure of funds
  - Matching of people/resources to tasks

Task Dependencies and the Critical Path

- Sometimes task B cannot be started before task A is completed
- Other types of constraints – calendar, lags, etc.
- Critical path – any slippage slips whole project
- Helpful to know what tasks are on the critical path
- Useful to try to shorten the critical path

Suggested Steps in Project Management

1. Generate a formal definition of the project, with goals, constraints, assumptions
2. Identify project start/end dates, any mandatory milestones, including reports, signoffs, deliverables, etc.
3. List constraints – money, equipment availability, holidays, etc.
4. Identify tasks to be accomplished – high level (i.e., by categories), then details within each, using brainstorming method – green light
5. Refine detailed task list, dropping/ combining, adding things omitted

Then, for each task in list:

A. Estimate time (person hours, calendar period)

B. Identify dependencies among tasks

Identify resources (people, money, parts, etc.)

6. Organize task groups roughly by starting date
7. List dependencies that should or MUST hold
8. Make a GANTT chart
9. First capture tasks and task groups, milestones
10. Identify critical path, see if it can be shortened (get more “slack”)
11. Assign person-hours and specific team member(s) to each task – identify “task leads”

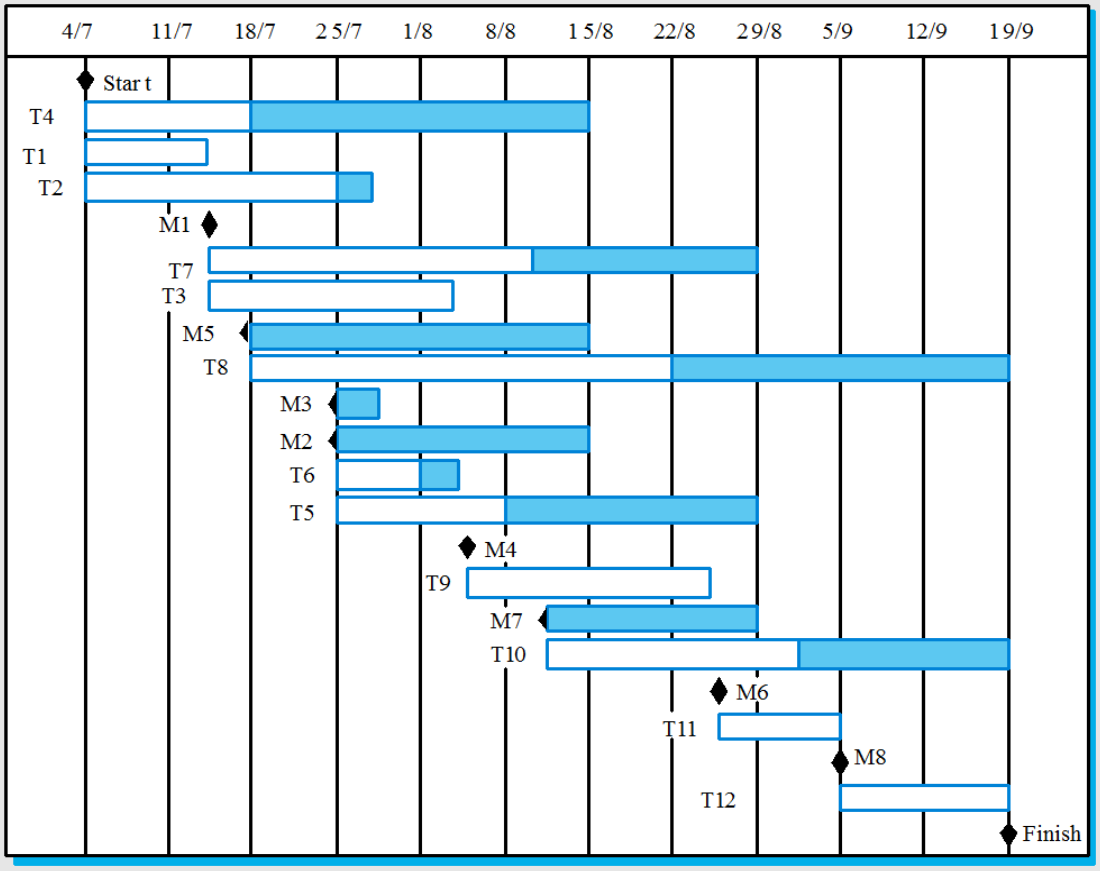
As project progresses:

A. Monitor, record progress on all tasks, at least weekly – use “Tracking Gantt Chart”

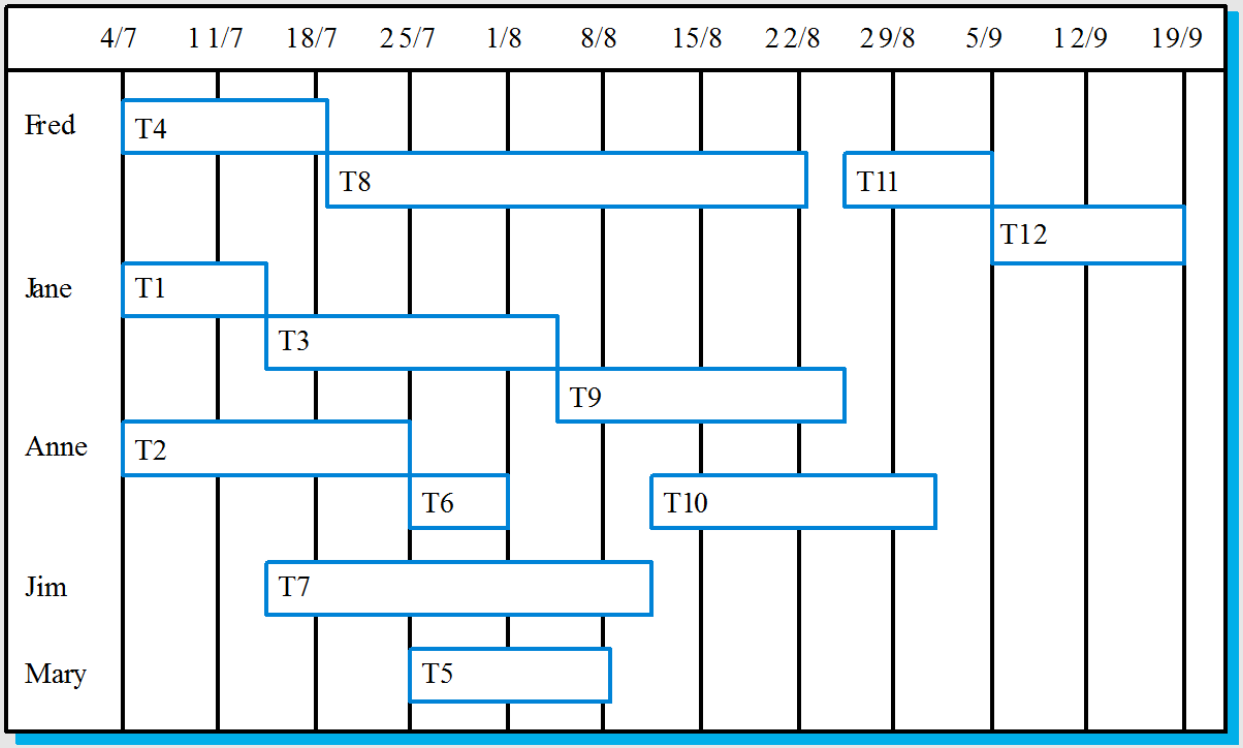
B. Pay particular attention to those on critical path

C. Revise plan as needed to take into account changes, adapt to meet milestones

GANTT Chart


4/7
11/7
18/7
25/7
1/8
8/8
15/8
22/8
29/8
5/9
12/9
19/9
Start
T4
T1
T2
M1
T7
T3
M5
T8
M3
M2
T6
T5
M4
T9
M7
T10
M6
T11
M8
T12
Finish

Staff allocation



Network Diagrams and Critical Path Analysis

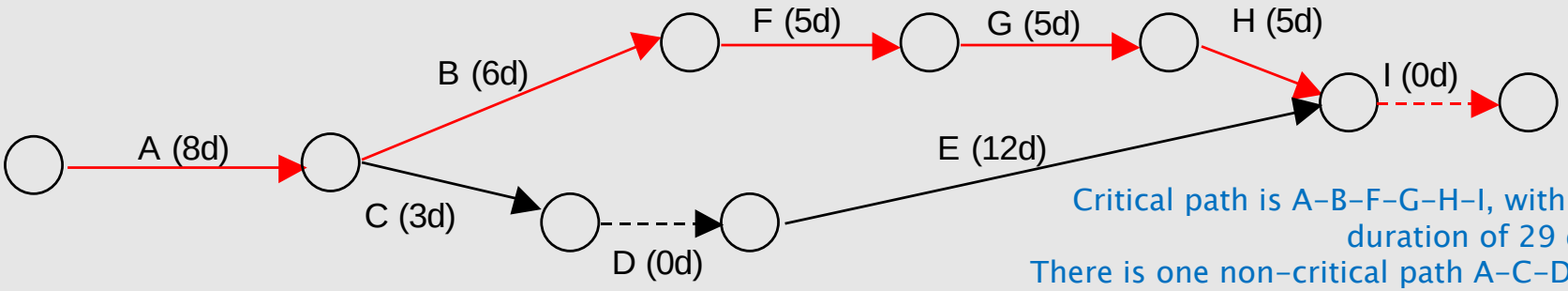
Once you've determined the activities for the project and estimated their durations, network diagrams are the next step for creating the project schedule.

Two Types:

- Activity on Arrow (AOA)—nodes on the diagram connect arrows and represent activities
- Activity on Node (AON)—nodes represent activities that are connected by arrows showing the precedence of activities

Network Diagram Example Activity on Arrow (AOA)

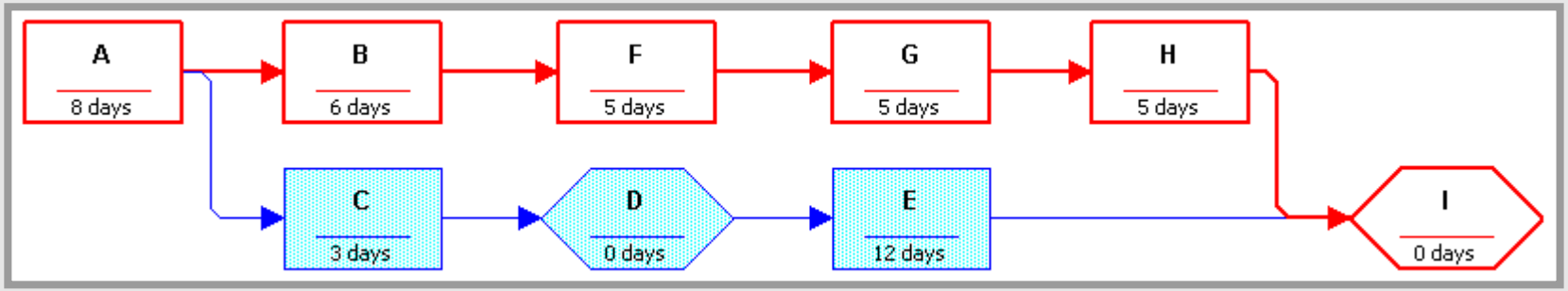
Task	Duration	Predecessor(s)
A	8 days	-
B	6 days	1
C	3 days	1
D	0 days	3
E	12 days	4
F	5 days	2
G	5 days	6
H	5 days	7
I	0 days	5,8



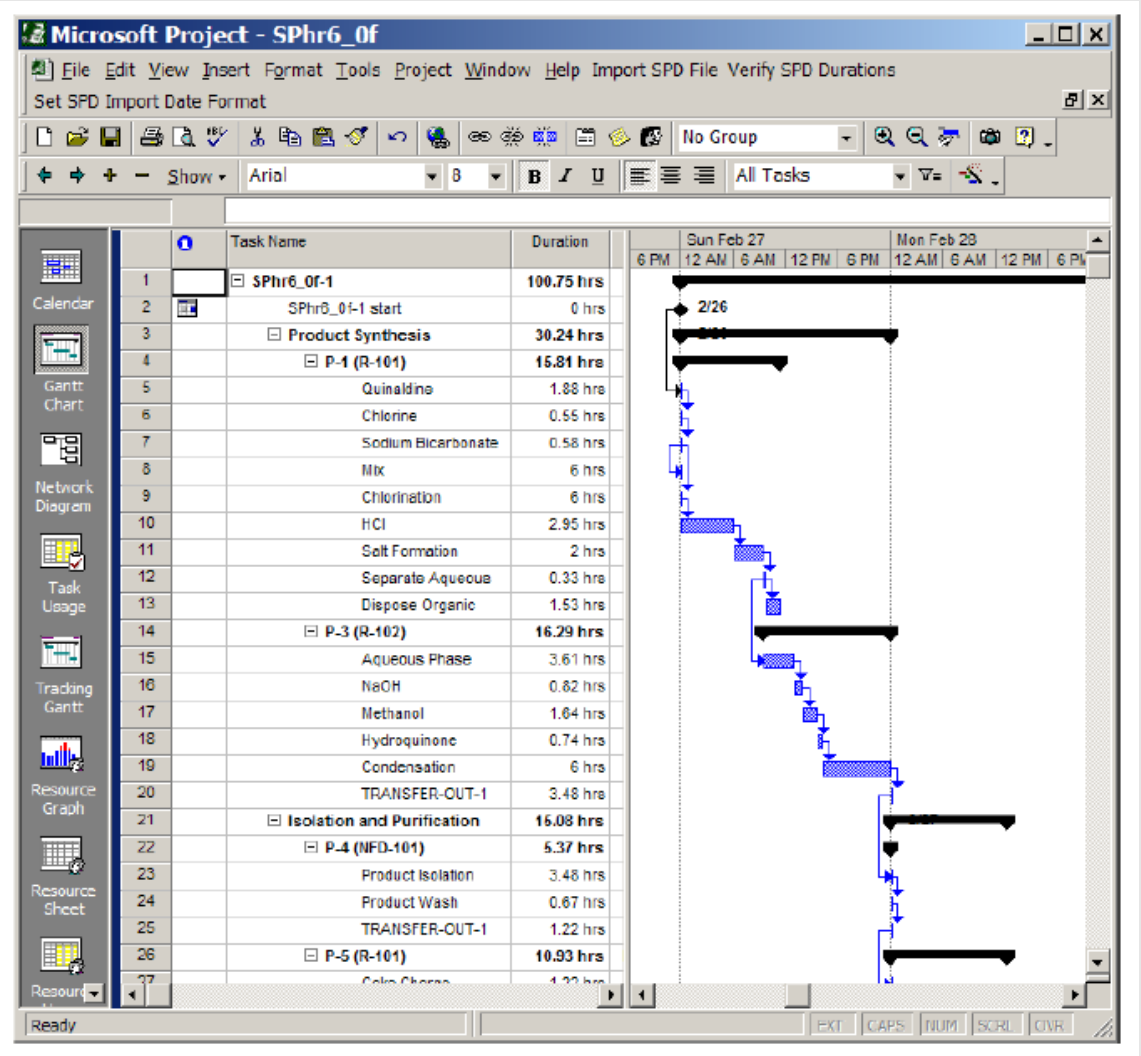
Critical path is A-B-F-G-H-I, with total duration of 29 days.
There is one non-critical path A-C-D-E-I, with total duration of 23 days.
NOTE: Task A has no slack because it is on the critical path.

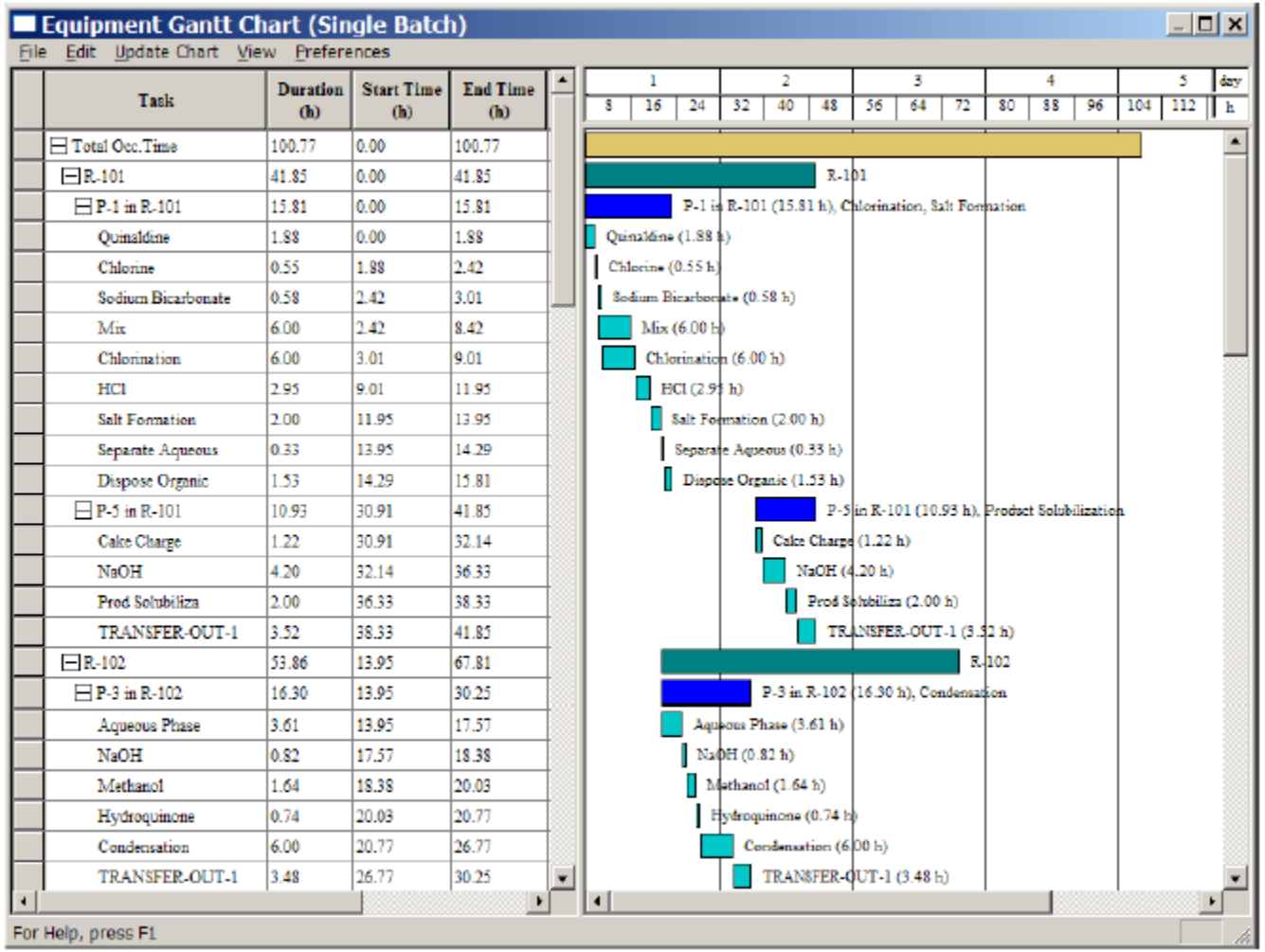
Network Diagram Example Activity on Node (AON)

Task	Duration	Predecessor(s)
A	8 days	-
B	6 days	1
C	3 days	1
D	0 days	3
E	12 days	4
F	5 days	2
G	5 days	6
H	5 days	7
I	0 days	5,8



Once again, the critical path is A-B-F-G-H-I, with total duration of 29 days.
There is one non-critical path A-C-D-E-I, with total duration of 23 days.
NOTE: Task A has no slack because it is on the critical path.


Microsoft Project - SPhr6_0f
File Edit View Insert Format Tools Project Window Help Import SPD File Verify SPD Durations
Set SPD Import Date Format
No Group
Show
Arial
8
All Tasks
Calendar
Gantt Chart
Network Diagram
Task Usage
Tracking Gantt
Resource Graph
Resource Sheet
Task Name
Duration
Sun Feb 27
Mon Feb 28
6 PM 12 AM 6 AM 12 PM 6 PM 12 AM 6 AM 12 PM
2/26
1 SPhr6_0f-1 100.75 hrs
2 SPhr6_0f-1 start 0 hrs
3 Product Synthesis 30.24 hrs
4 P-1 (R-101) 15.81 hrs
5 Quinaldine 1.88 hrs
6 Chlorine 0.55 hrs
7 Sodium Bicarbonate 0.58 hrs
8 Mix 6 hrs
9 Chlorination 6 hrs
10 HCl 2.95 hrs
11 Salt Formation 2 hrs
12 Separate Aqueous 0.33 hrs
13 Dispose Organic 1.53 hrs
14 P-3 (R-102) 16.29 hrs
15 Aqueous Phase 3.61 hrs
16 NaOH 0.82 hrs
17 Methanol 1.64 hrs
18 Hydroquinone 0.74 hrs
19 Condensation 6 hrs
20 TRANSFER-OUT-1 3.48 hrs
21 Isolation and Purification 15.08 hrs
22 P-4 (NFD-101) 5.37 hrs
23 Product Isolation 3.48 hrs
24 Product Wash 0.67 hrs
25 TRANSFER-OUT-1 1.22 hrs
26 P-5 (R-101) 10.93 hrs
Ready
EXT CAPS NUM SCRL OVR


Equipment Gantt Chart (Single Batch)
File Edit Update Chart View Preferences
Task
Duration (h)
Start Time (h)
End Time (h)
Total Occ.Time 100.77 0.00 100.77
R-101 41.85 0.00 41.85
P-1 in R-101 15.81 0.00 15.81
Quinaldine 1.88 0.00 1.88
Chlorine 0.55 1.88 2.42
Sodium Bicarbonate 0.58 2.42 3.01
Mix 6.00 2.42 8.42
Chlorination 6.00 3.01 9.01
HCl 2.95 9.01 11.95
Salt Formation 2.00 11.95 13.95
Separate Aqueous 0.33 13.95 14.29
Dispose Organic 1.53 14.29 15.81
P-5 in R-101 10.93 30.91 41.85
Cake Charge 1.22 30.91 32.14
NaOH 4.20 32.14 36.33
Prod Solubiliza 2.00 36.33 38.33
TRANSFER-OUT-1 3.52 38.33 41.85
R-102 53.86 13.95 67.81
P-3 in R-102 16.30 13.95 30.25
Aqueous Phase 3.61 13.95 17.57
NaOH 0.82 17.57 18.38
Methanol 1.64 18.38 20.03
Hydroquinone 0.74 20.03 20.77
Condensation 6.00 20.77 26.77
TRANSFER-OUT-1 3.48 26.77 30.25
1 2 3 4 5 day
8 16 24 32 40 48 56 64 72 80 88 96 104 112 h
R-101
P-1 in R-101 (15.81 h), Chlorination, Salt Formation
Quinaldine (1.88 h)
Chlorine (0.55 h)
Sodium Bicarbonate (0.58 h)
Mix (6.00 h)
Chlorination (6.00 h)
HCl (2.95 h)
Salt Formation (2.00 h)
Separate Aqueous (0.33 h)
Dispose Organic (1.53 h)
P-5 in R-101 (10.93 h), Product Solubilization
Cake Charge (1.22 h)
NaOH (4.20 h)
Prod Solubiliza (2.00 h)
TRANSFER-OUT-1 (3.52 h)
R-102
P-3 in R-102 (16.30 h), Condensation
Aqueous Phase (3.61 h)
NaOH (0.82 h)
Methanol (1.64 h)
Hydroquinone (0.74 h)
Condensation (6.00 h)
TRANSFER-OUT-1 (3.48 h)
For Help, press F1

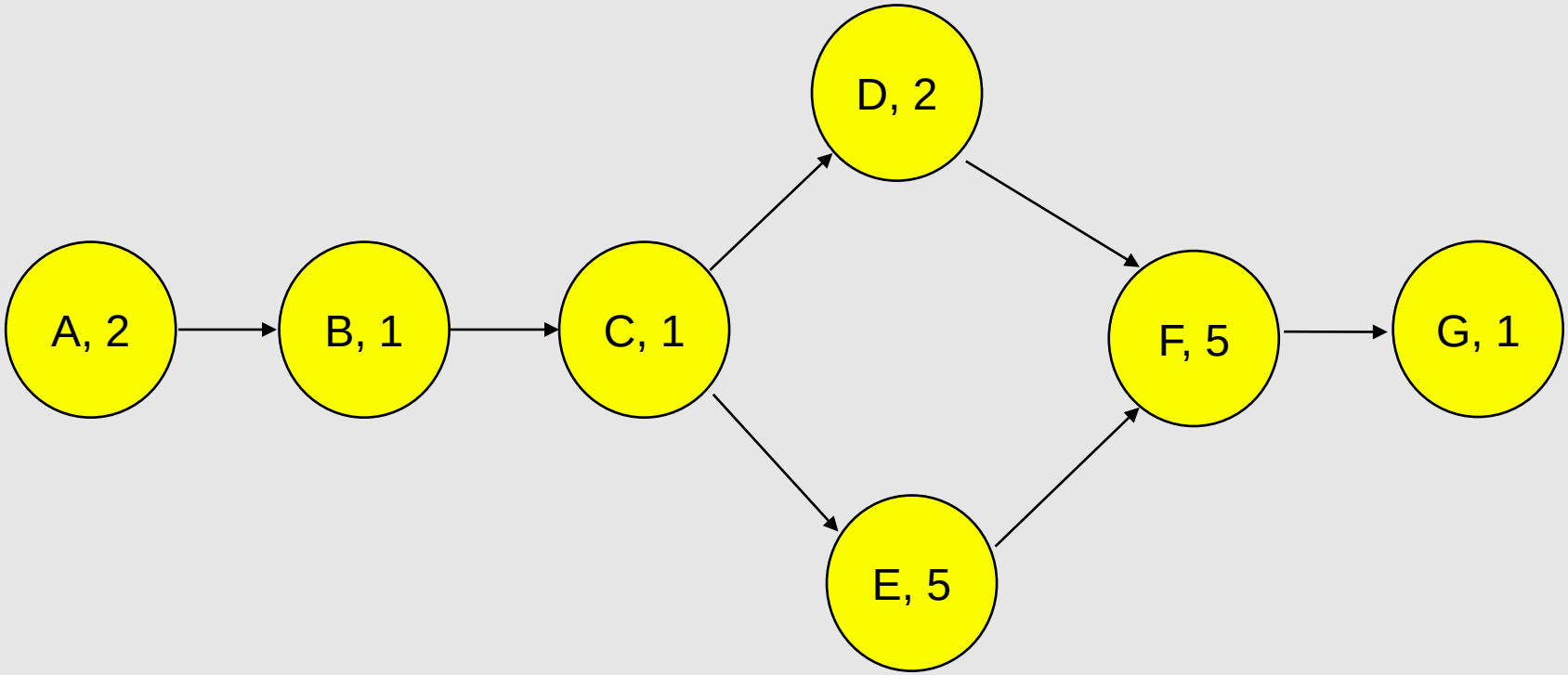
CPM with Single Time Estimate

Consider the following consulting project:

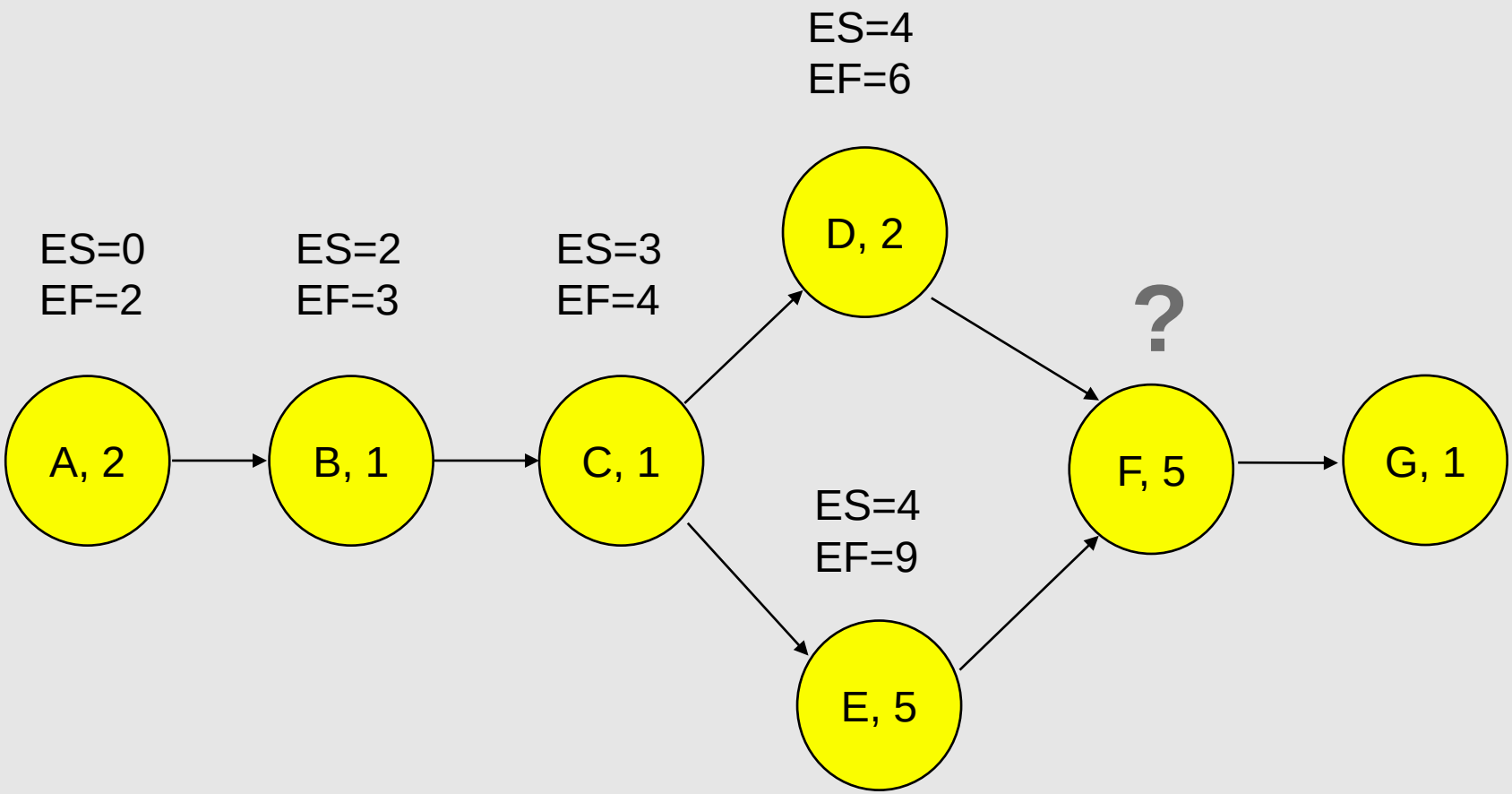
Activity	Designation	Immed. Pred.	Time (Weeks)
Assess customer's needs	A	None	2
Write and submit proposal	B	A	1
Obtain approval	C	B	1
Develop service vision and goals	D	C	2
Train employees	E	C	5
Quality improvement pilot groups	F	D, E	5
Write assessment report	G	F	1

Develop a critical path diagram and determine the duration of the critical path and slack times for all activities

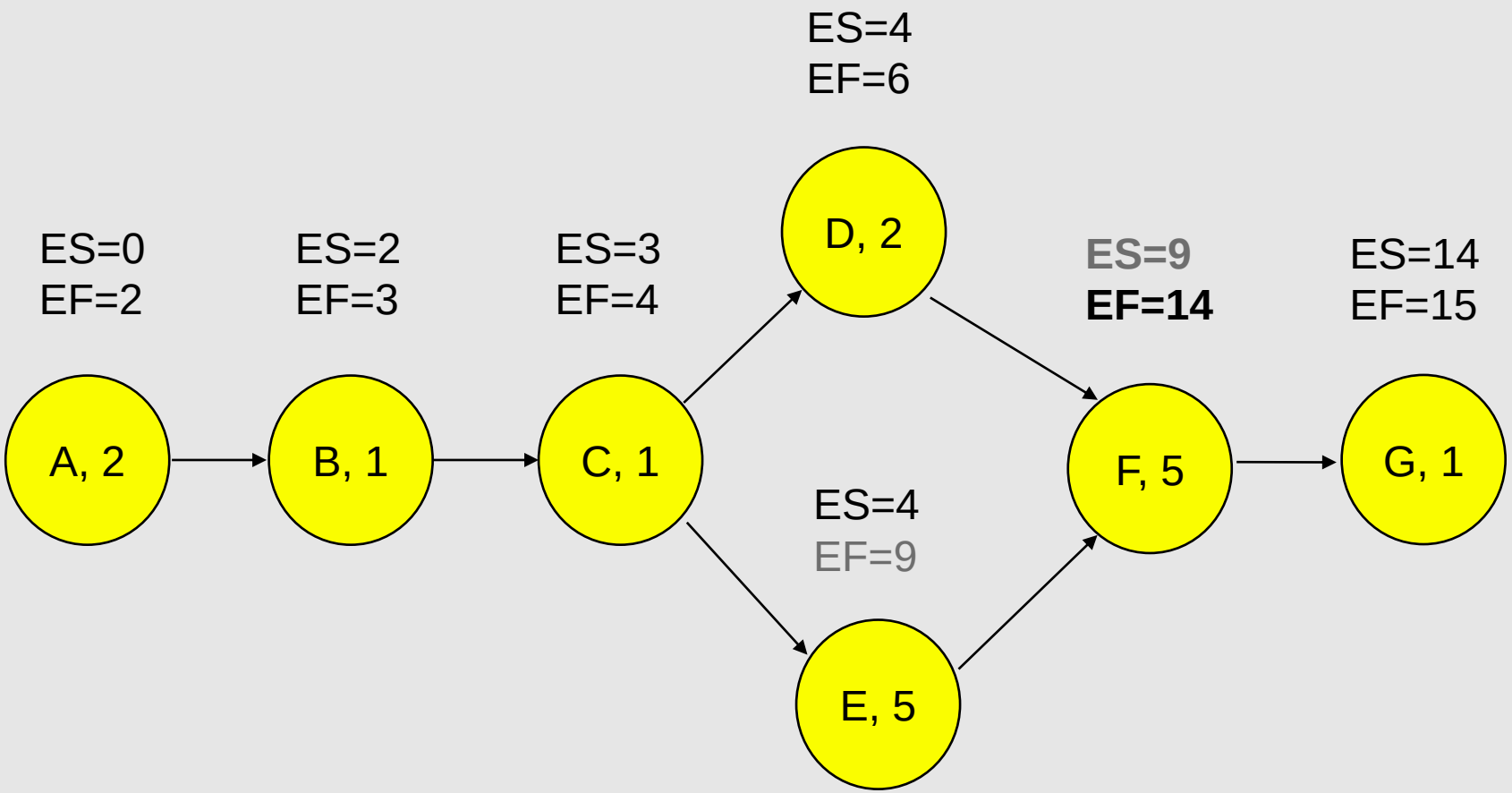
First draw the network



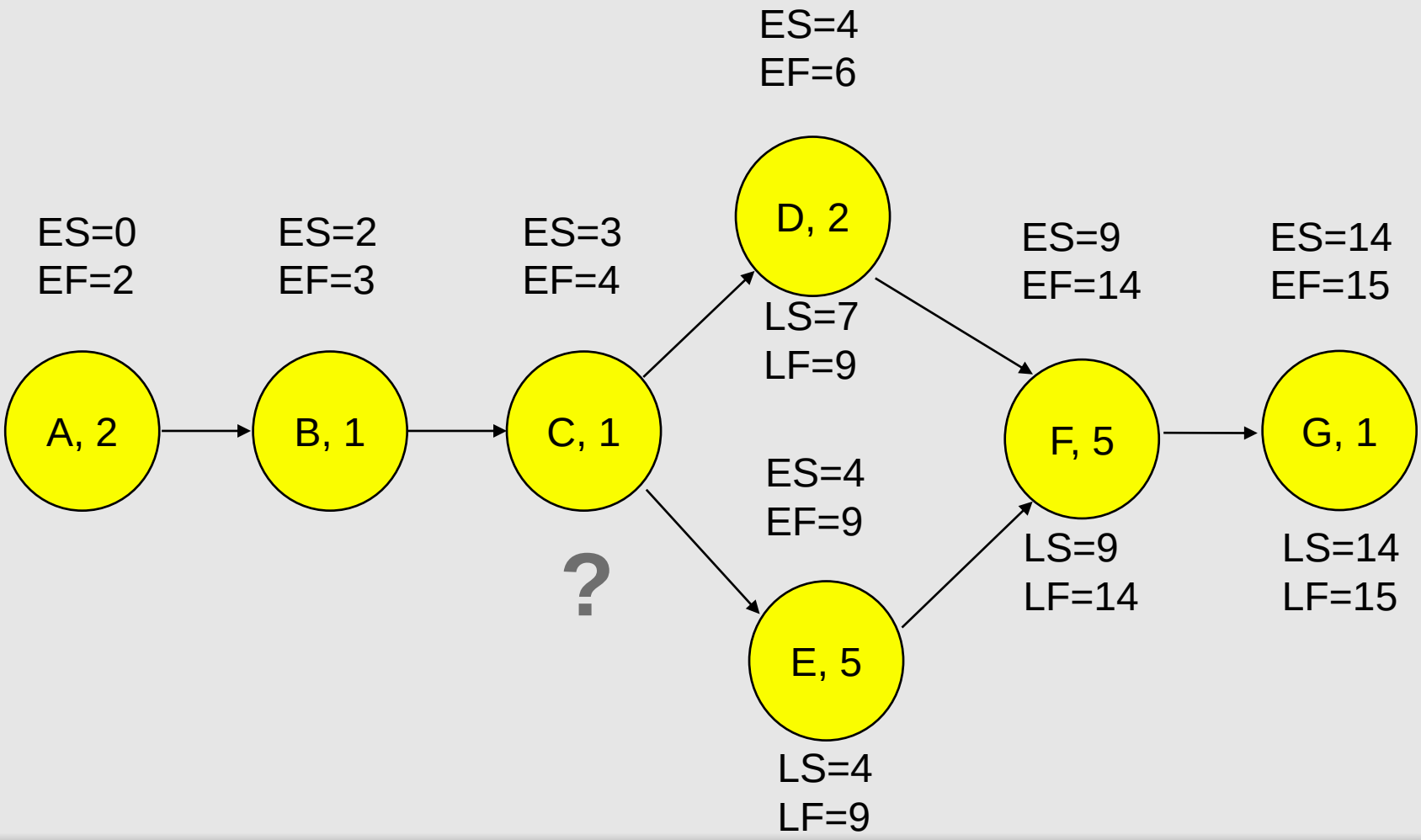
Determine early start and early finish times



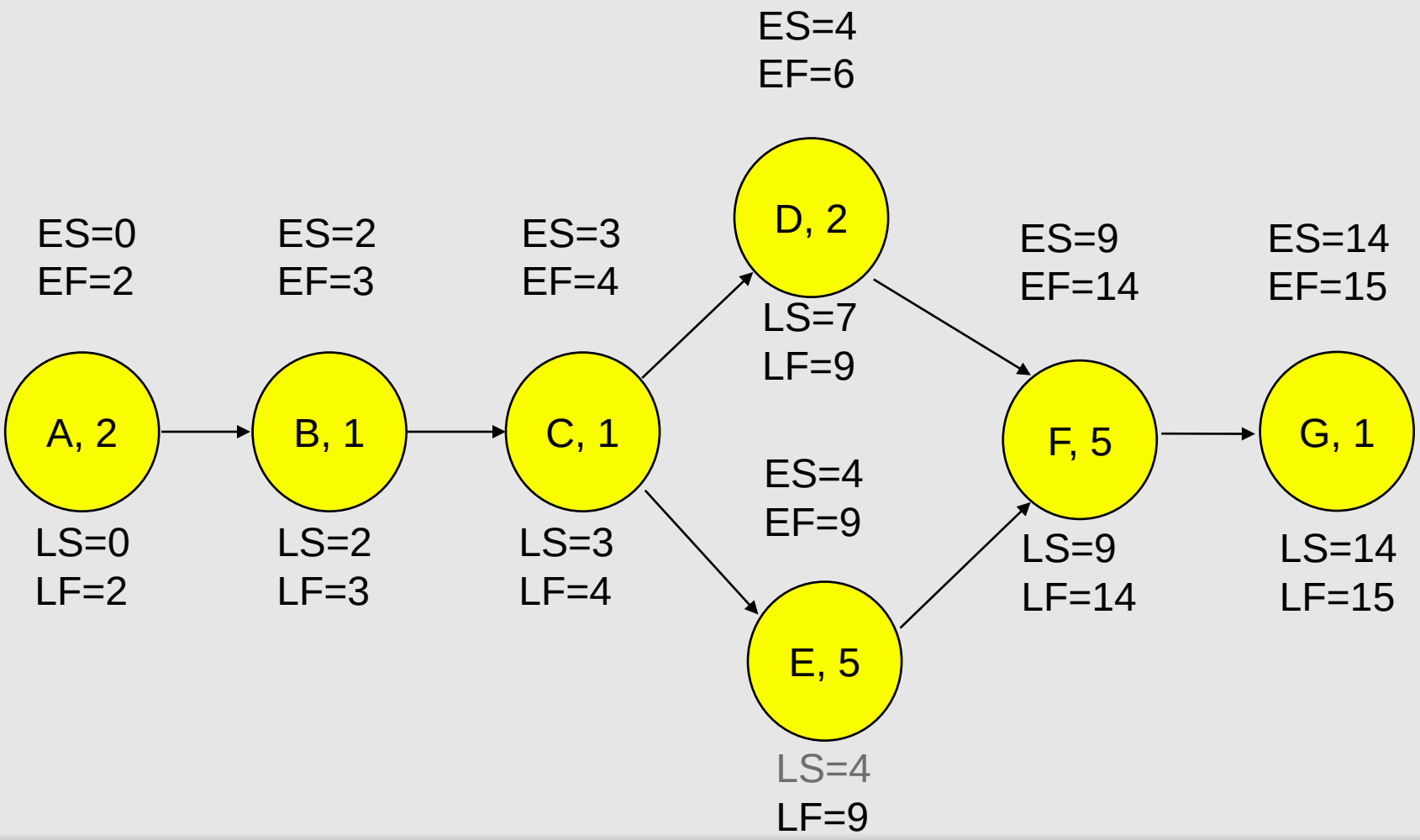
When I can start depends on when predecessors finish



Determine late starts and late finish times



Don’t delay the project



Critical Path & Slack