Planning calendar time and resource allocation

Estimation and Planning

- Based on the work packages and estimates for activities the following is worked out:
  - sequence of activities, duration in time, and allocated persons
  - a time and resource allocation schedule, possibly with related costs

I.e:

- Estimating the amount of hours for executing the different activities **when** allocated to the available resources form the basis for the project schedule
- It is a good idea to separate completely estimation from planning – i.e. estimate first, then plan

From Estimate to Plan

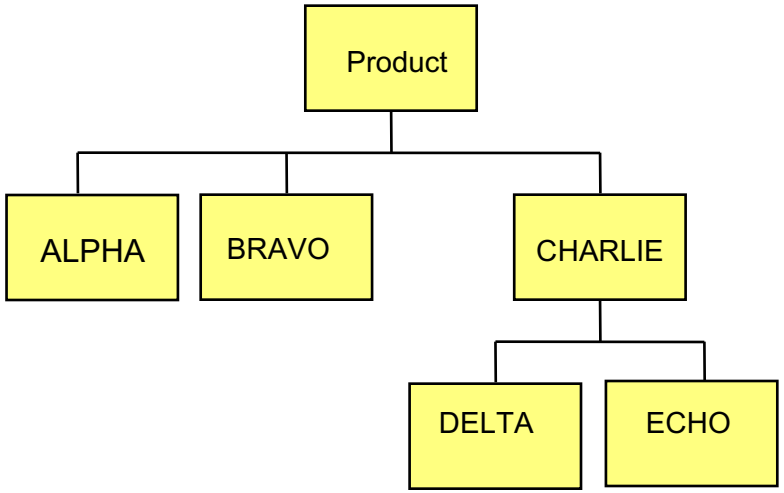
- Estimate in **hours of work** so there can be no doubt about what you are talking about. A day can f.ex. be anything between 6 and 16 hours. A week can be from 30 to 100 hours etc.
- Take into account that people are not effective 7.5 hours per day, 37 hours per week !!

- Effectivity factor: How much time can each project participant *effectively* work on the project. It takes time to read mails, participate in department meetings, holding staff interviews, read professional journals etc. In addition, there is a difference in the level of experience.
  - Example: Effective work hours = Working hours * 70-80%

- Availability factor: What percentage of their time are they *available* on the project. E.g. if they are only working part-time or (worse) allocated to other projects too.
  - Effective work hours: 2 projects = 40%, 3 projects = 20%, 4 projects = 10% etc. (forget it!)

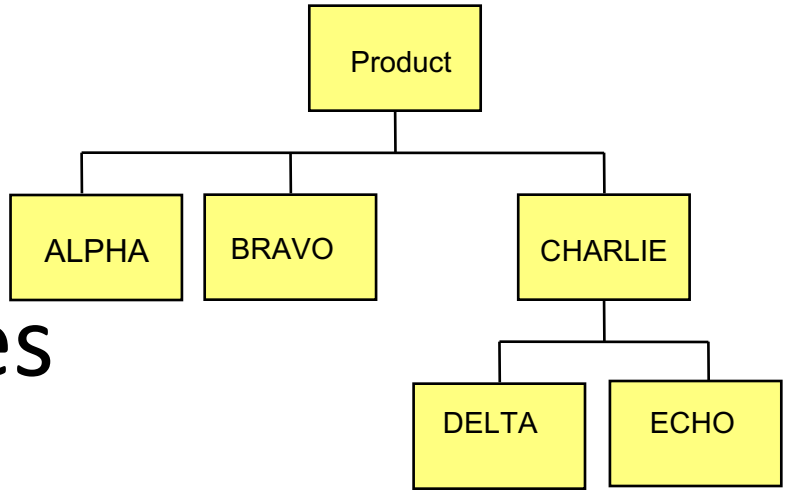
From estimate to plan

- an example from start to end



	Vo	Vs	Vp	Vm	S
Work package ALPHA	20	25	50	29	6
Work package BRAVO	30	40	50	40	4
Work package DELTA	15	20	40	23	5
Work package ECHO	10	15	20	15	2
Total				107	9

$$S = \sqrt{\Sigma V}$$



Allocation of resources

- a person is allocated to an activity

	Vm	S	Hans Hansen	Mia Madsen
Work package ALPHA	29	6		29
Work package BRAVO	40	4		40
Work package DELTA	23	5	23	
Work package ECHO	15	2	15	
Total	107	9	38	69

Availability and effectivity

- **Mia Madsen**
  - Available 3 days per week => 60% on the project
  - Experienced => Effectivity factor 70%
  - Which gives 0.70*0.60*37h = 15.5 hours/week

- **Hans Hansen**
  - Available 2 days per week => 40% on the project
  - New-hire => Effectivity factor 50%
  - Which gives 0.50*0.40*37h = 7.4 hours/week

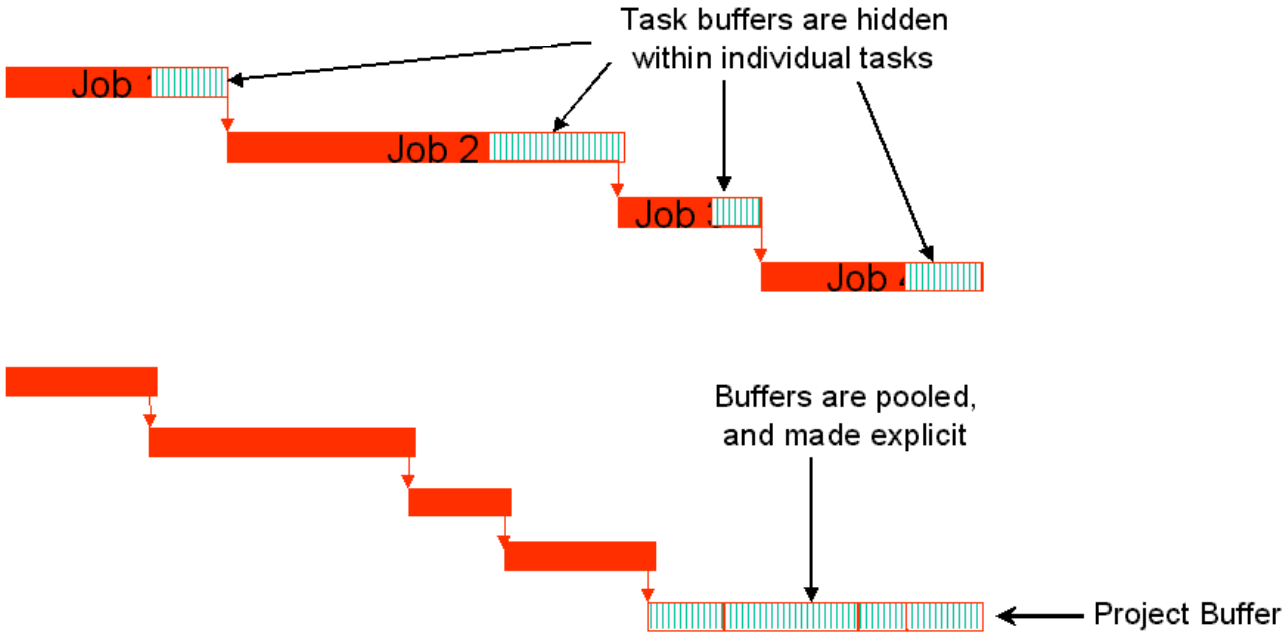
Planning in calendar time

- **Calendar time for work package A and B (Mia):**
  - 69 hours / 15.5 hours per week
    => ~ 4.5 calendar weeks.
    (as opposed to 69 / 37 = ~ 1.9)

- **Calendar time for work package D and E (Hans):**
  - 38 hours / 7.4 hours per week
    => ~ 5.2 calendar weeks.
    (as opposed to 38 / 37 = ~ 1.0)

Plan with the uncertainty

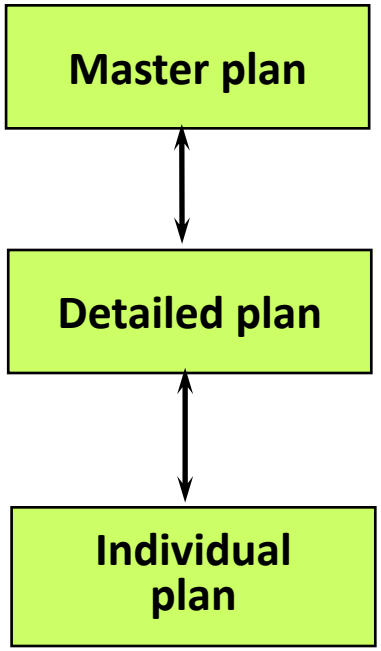
- Uncertainty is in principle planned the same way as ordinary activities
  - either as extension of the individual activities
  - or as a buffer for later (project manager's reserve)



Barnes (2012)

Schedules and tools

Three levels of plans



- **Master plan** (overall project plan) which covers the whole project.
- **Detailed plan** which covers one or more phases on the project in detail (3-6 months horizon).
- **Plan for each participant** (typically 4-8 week horizon).

Planning techniques

Milestone

- **Milestones** are good for marking points in time, where a delivery/release shall be made. Can also be used as the only technique on very simple projects f.ex. with only 10 activities or 2 persons

Gantt

- **Gantt-charts** are diagrams showing activity schedules as bars vs. time. Demonstrates overlap and dependencies (time and resources)

Wall plan

- **Wall plans** are activity plans that hang on a wall in the project room. They are created and maintained by all participants on the project. Give an excellent overview and creates commitment

PERT

- **Programme Evaluation Review Technique** a diagramming technique to deal with slack (lead and lag time) and demonstrate critical path for the project

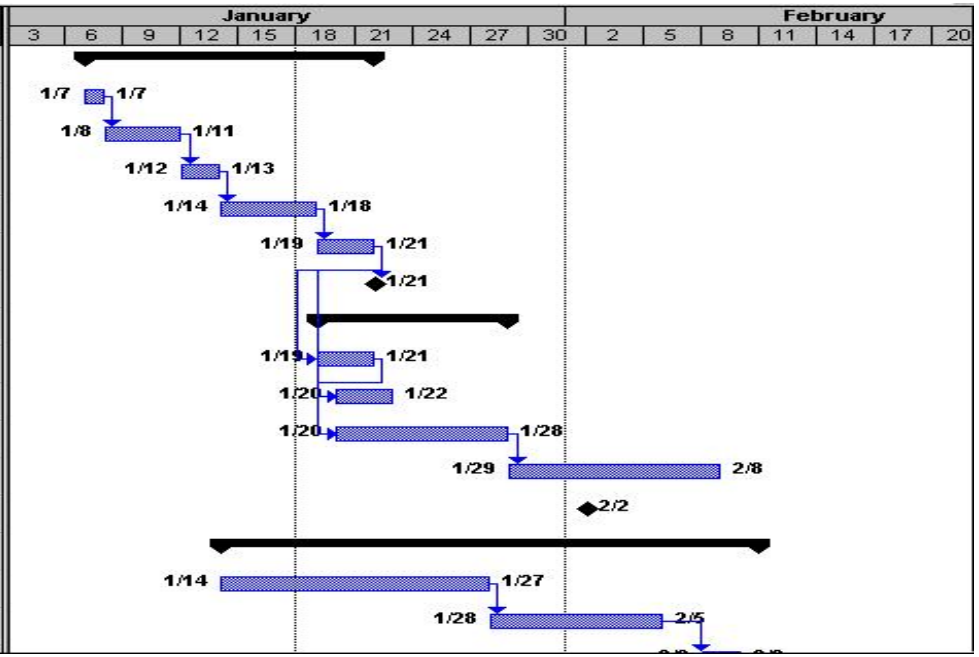
Milestones

- Milestones:
  - Marks scheduled points in time, where the project has achieved a well-defined result (baseline).
  - Used for demonstrating to the outside (stakeholders), how far the project has come and to ensure, that the project is “on track".
- There is always a milestone at:
  - every phase boundary (gate)
  - achievement of a project goal (f.ex. a delivery).
- Extra milestones should be added for very long phases.

Gantt-charts

- Gantt-charts are best when scheduling with simple dependencies
- Gantt-charts give a good overview of the various activities, their timing and the plan as a whole

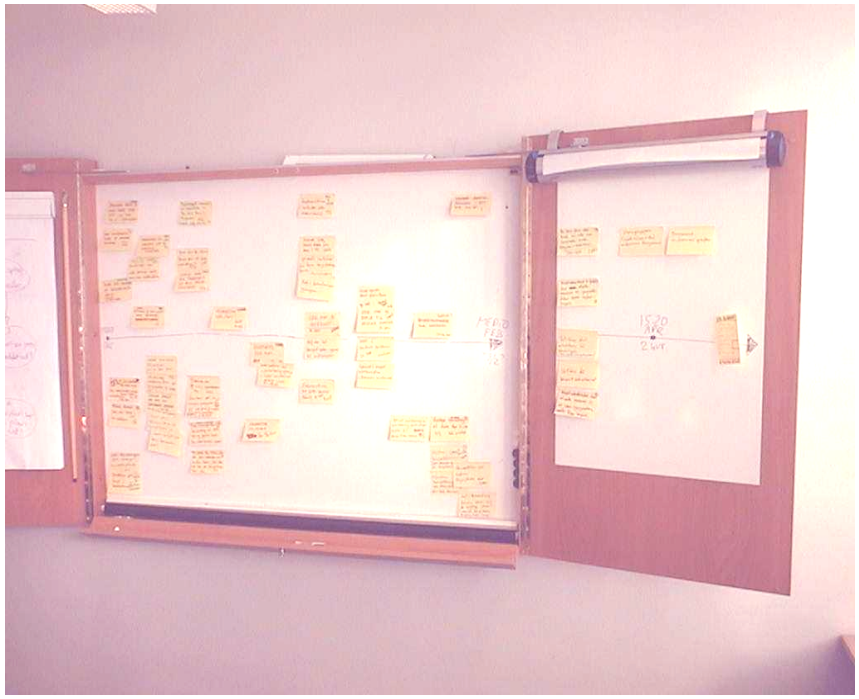
WBS	Task Name
1	**Define specifications**
1.1	Identify customers
1.2	Interview 10 customers
1.3	Interpret requirements
1.4	Benchmark products
1.5	Define target PDS
1.6	Target PDS Released
2	**Generate concepts**
2.1	Review comp products
2.2	Search patents
2.3	Brainstorm concepts
3	Select top 2 concepts
4	MQ Presented
5	**Profile motor power**
5.1	Design test stand
5.2	Build test stand



http://www.me.umn.edu/courses/me4054/assignments/wbsgantt.html

Wall plan (Planning Board)

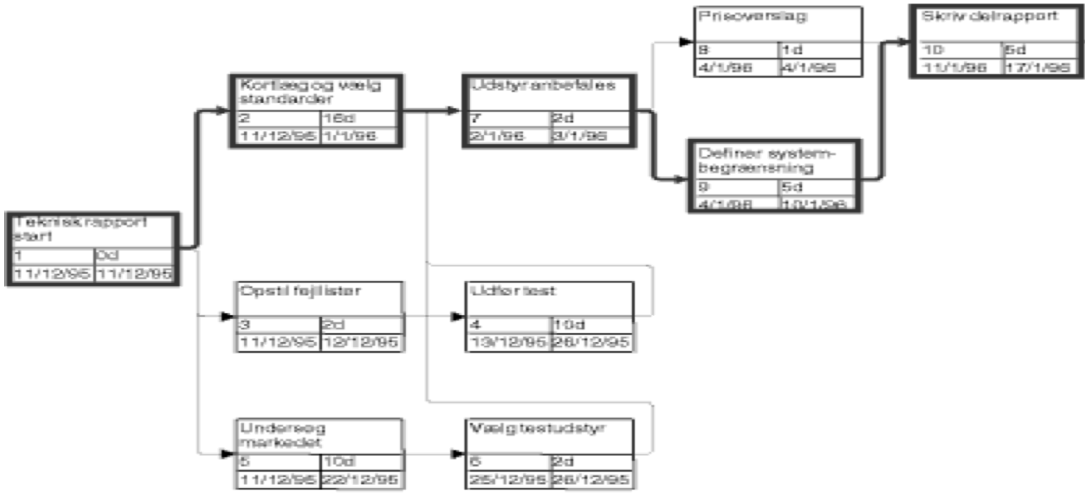
- A board or taped brown paper on a wall is used to hold the plan.
- Planned activities are written on index cards or sticky notes. They are then placed on the wall and moved about until a plan emerges.
- The wall plan should be created and maintained by the whole project group in order to achieve ”commitment” to the plan.
- Typically used on agile projects (e.g. SCRUM boards)



PERT (Programme Evaluation Review Technique)

- All activities are plotted in a connected network
- An activity can only start, when the preceding activities have been completed
- Can be used to find the earliest and latest start and end points for activities, and the **critical path** on the project

Latest start	Latest end
Activity	**Duration**
Earliest start	Earliest end

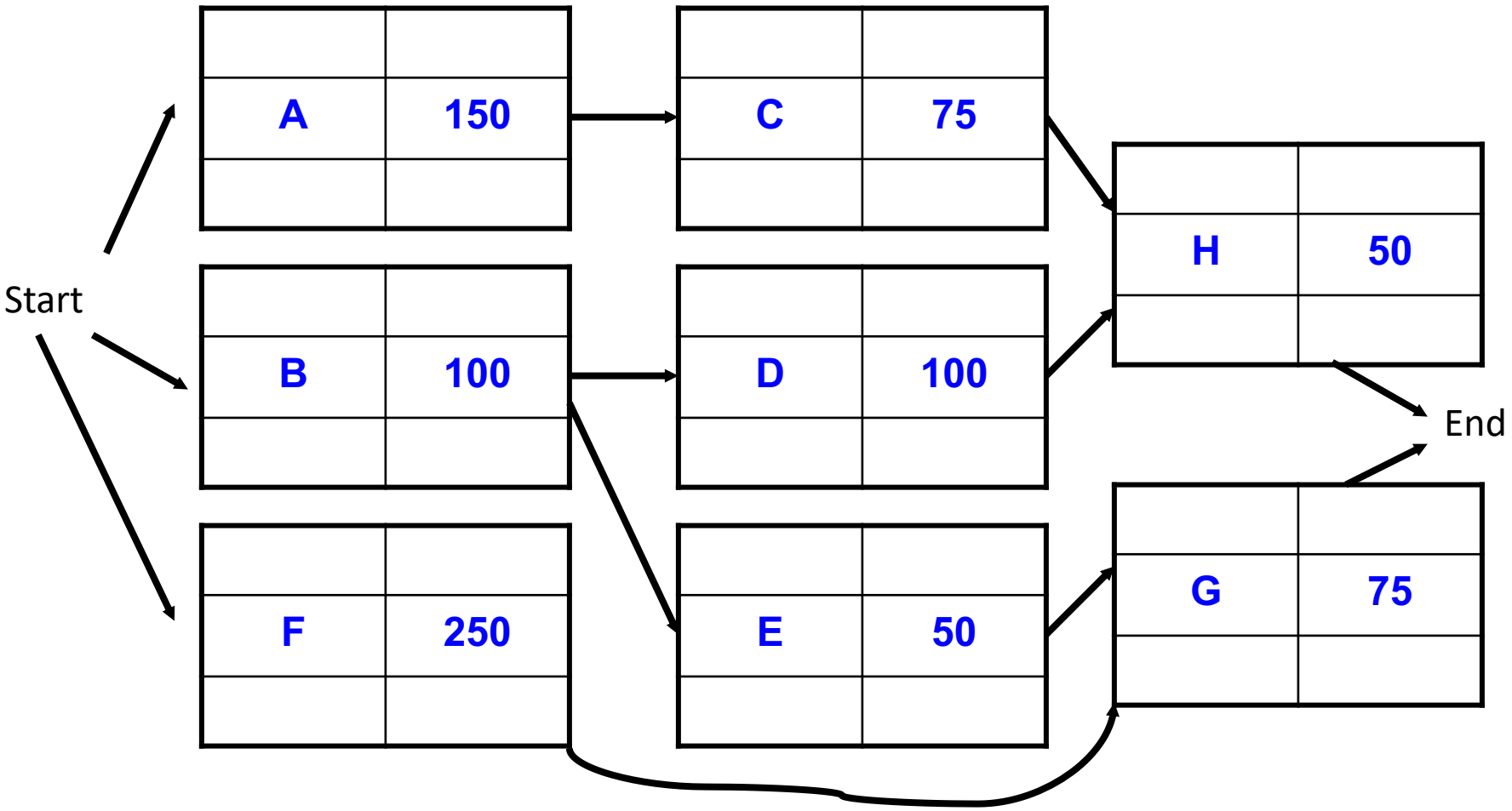


Network planning – a PERT example

		Predecessors	Duration
A	Decide the exhibition theme ”Women in Roskilde”		150
B	Describe the concept of the exhibition		100
C	Find exhibition items / contracts with museums etc.	A	75
D	Write the marketing material	B	100
E	Decide the order of display; change walls and sound	B	50
F	Write a book and brochure for the visitors		250
G	Unpack and hang exhibits on the walls	E, F	75
H	Train the museum staff	C, D	50

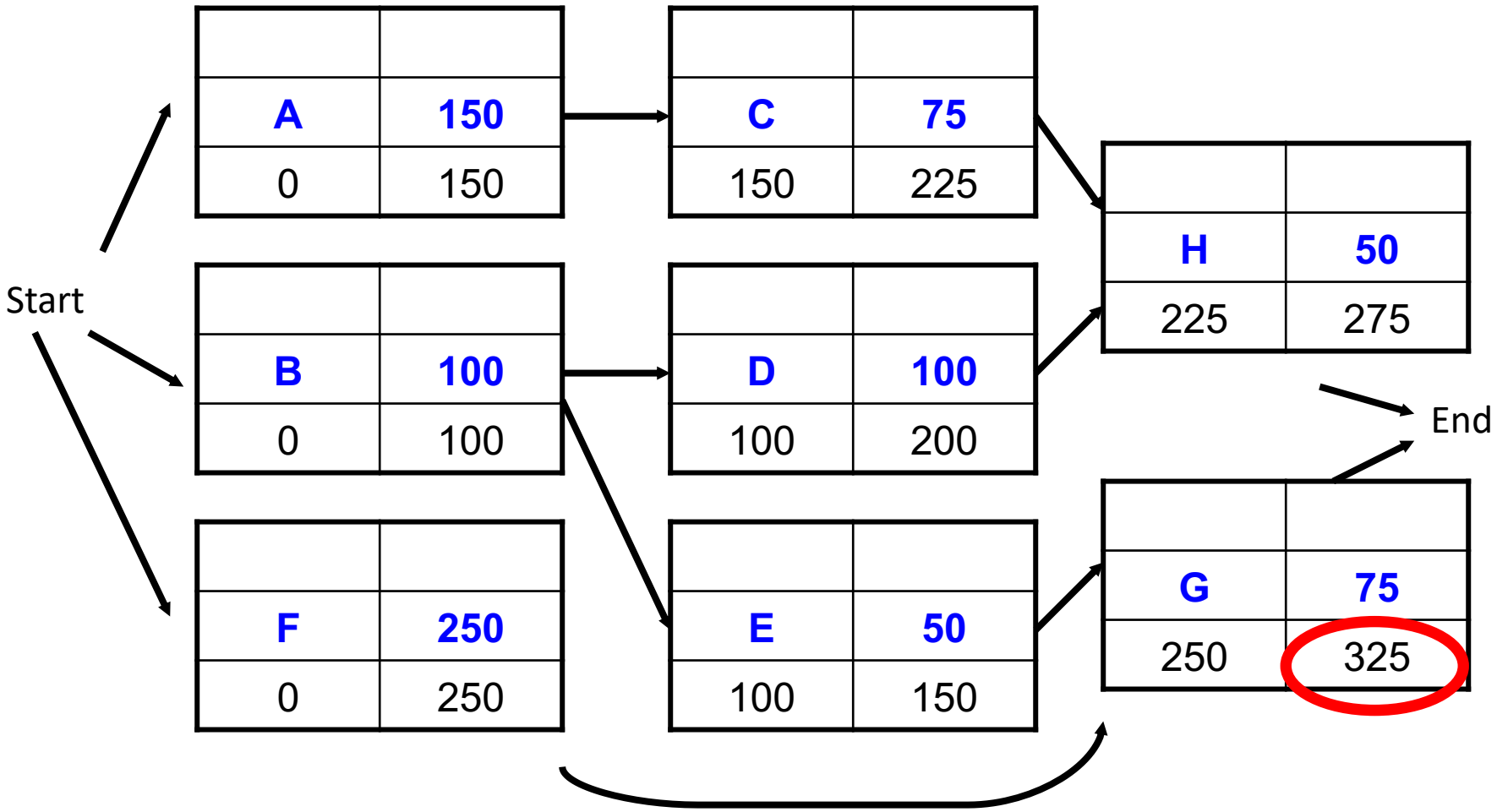
Latest start	Latest end
Activity	**Duration**
Earliest start	Earliest end

We first draw the network



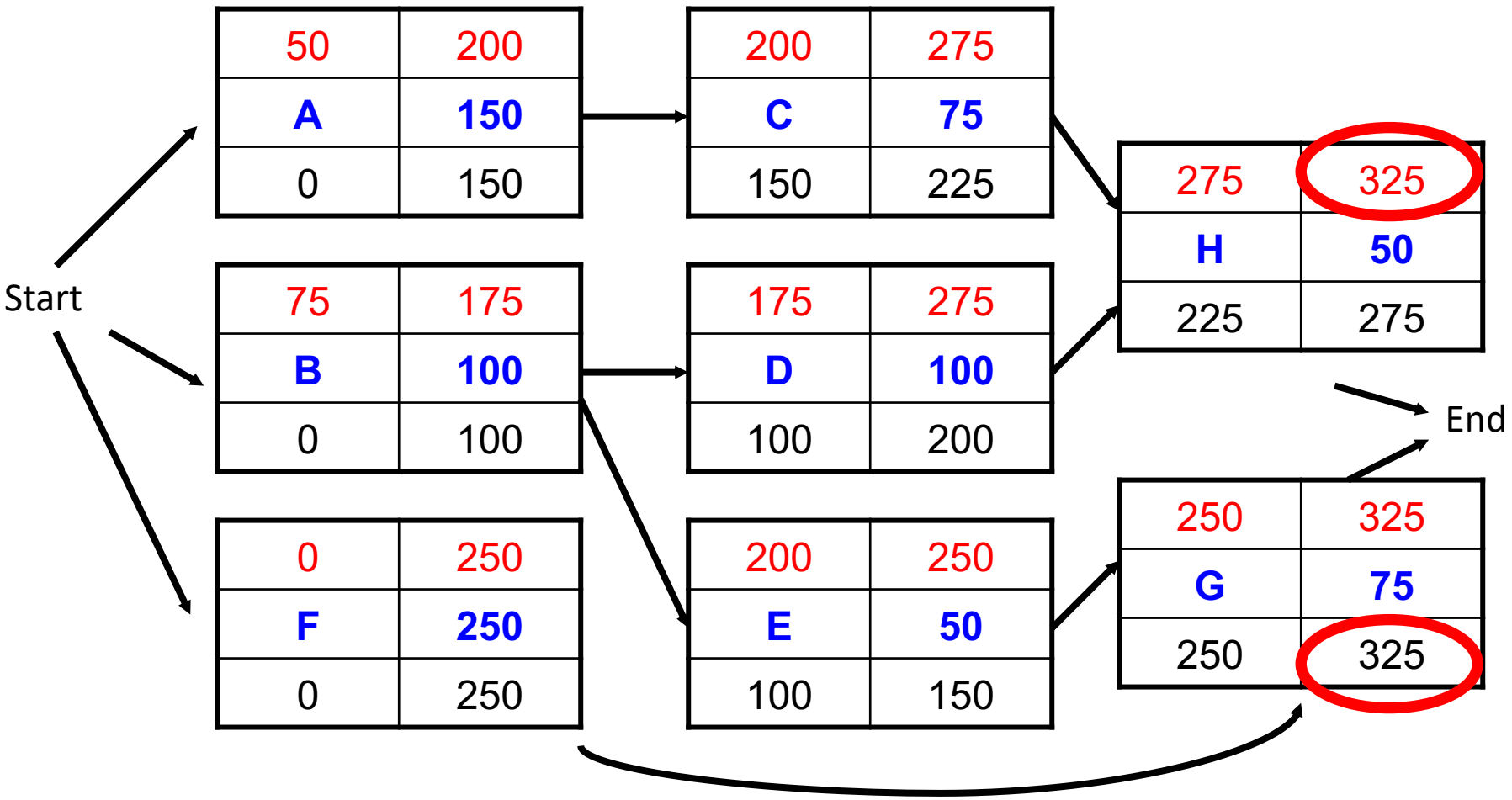
Latest start	Latest end
Activity	**Duration**
Earliest start	Earliest end

We then calculate forwards …



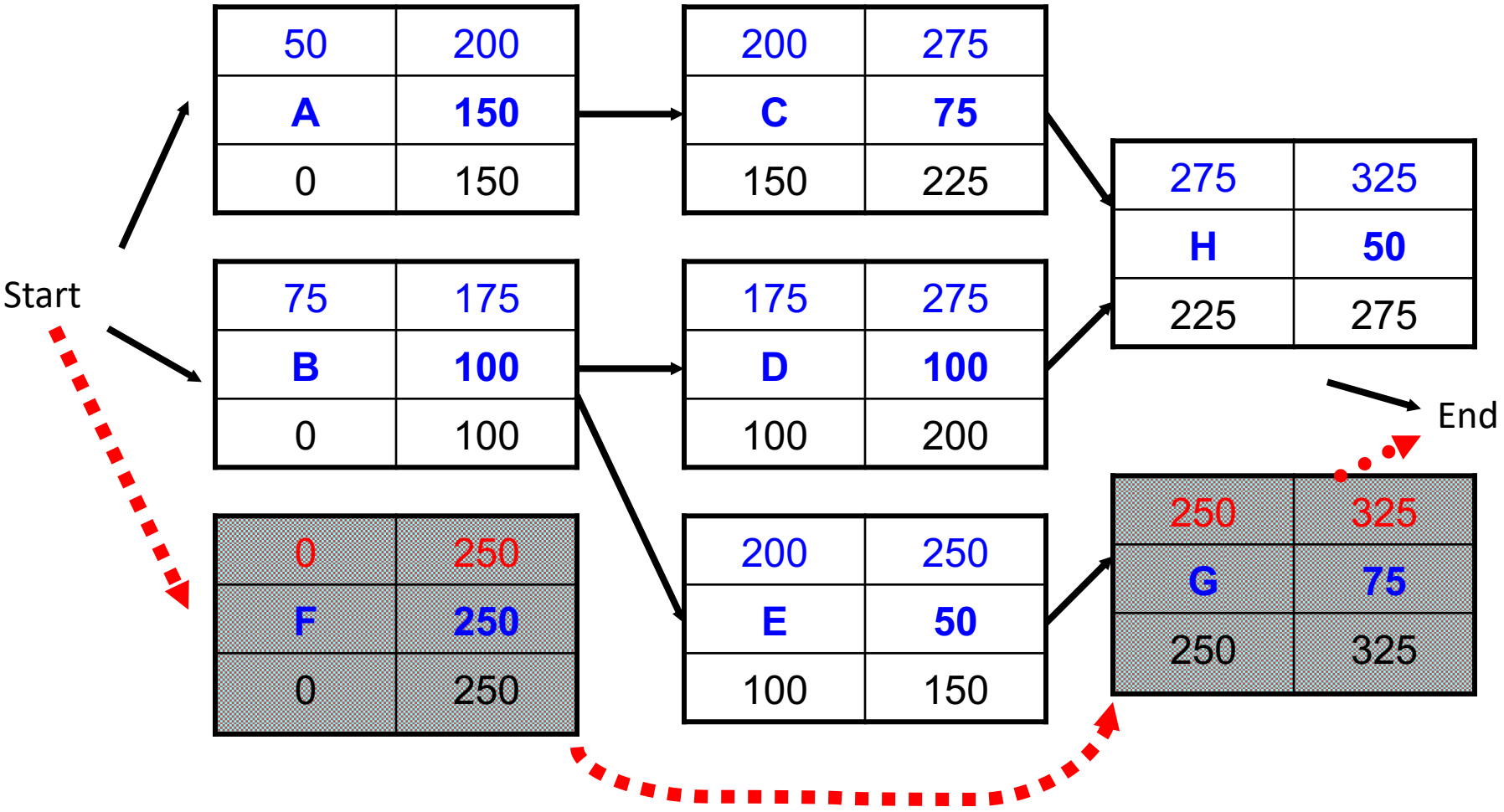
Latest start	Latest end
Activity	**Duration**
Earliest start	Earliest end

And backwards – starting with 325



Latest start	Latest end
Activity	**Duration**
Earliest start	Earliest end

Critical path: Activities which, if delayed, will delay the whole project



Exercise 2: Allocate participants to activities

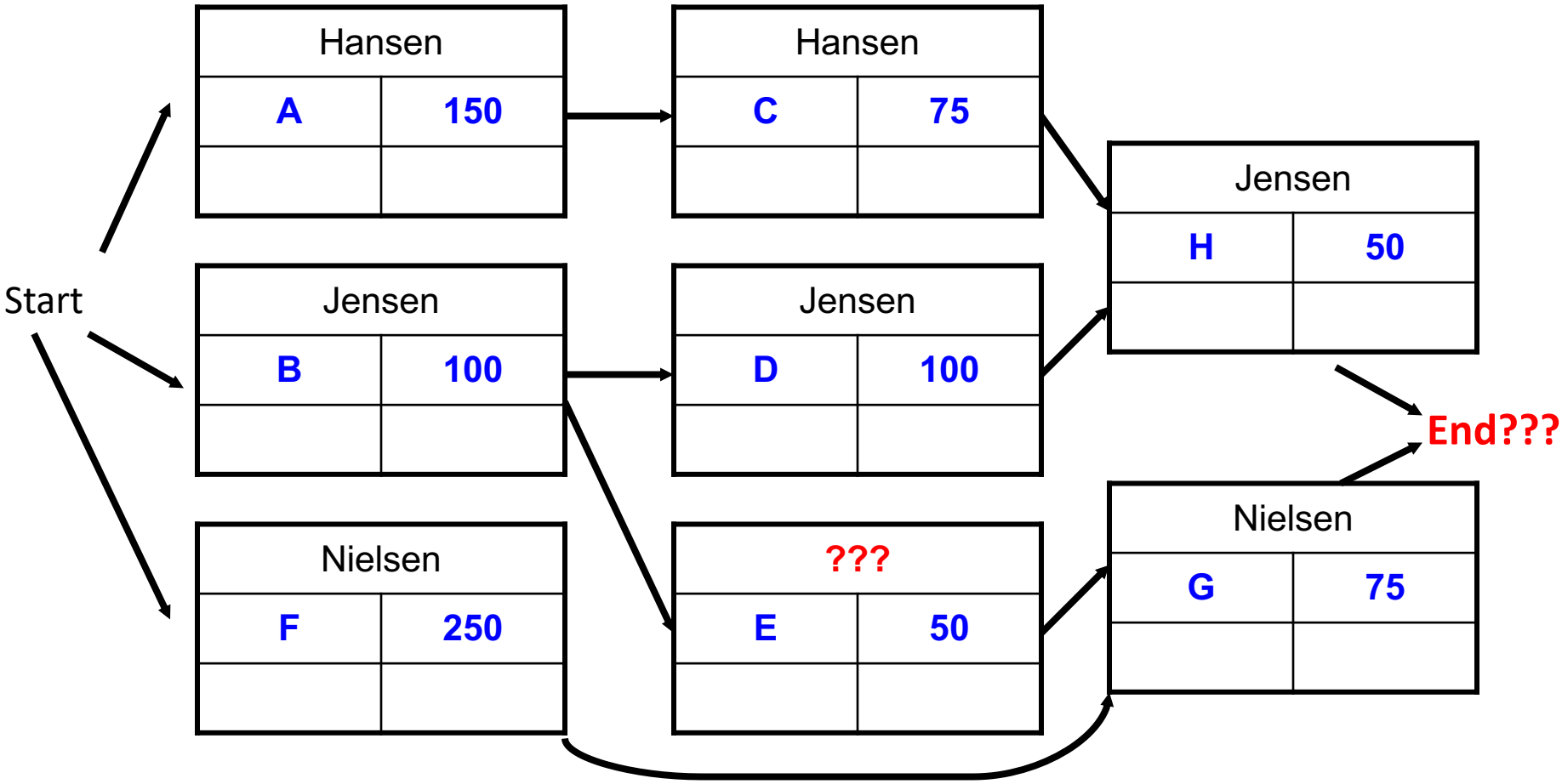
- Form groups of three
- 3 persons are assigned to the project:
  - All are available full time @ 25 effective hours per week
  - HANSEN is good at contracts => A and C
  - JENSEN is good at writing and can make everything ”sound” right => B, D and H
  - NIELSEN is a specialist on visitors => F and G
  - All can do E (but no one likes it)
- Add persons and weeks to the network
  - See next slide or: 83a_PERT network for exercise 2.pptx

Person	
Activity	**Duration**
First week	**Last week**

- Who should be allocated to ”E”, and when are we finished ?
- Summary in the plenary

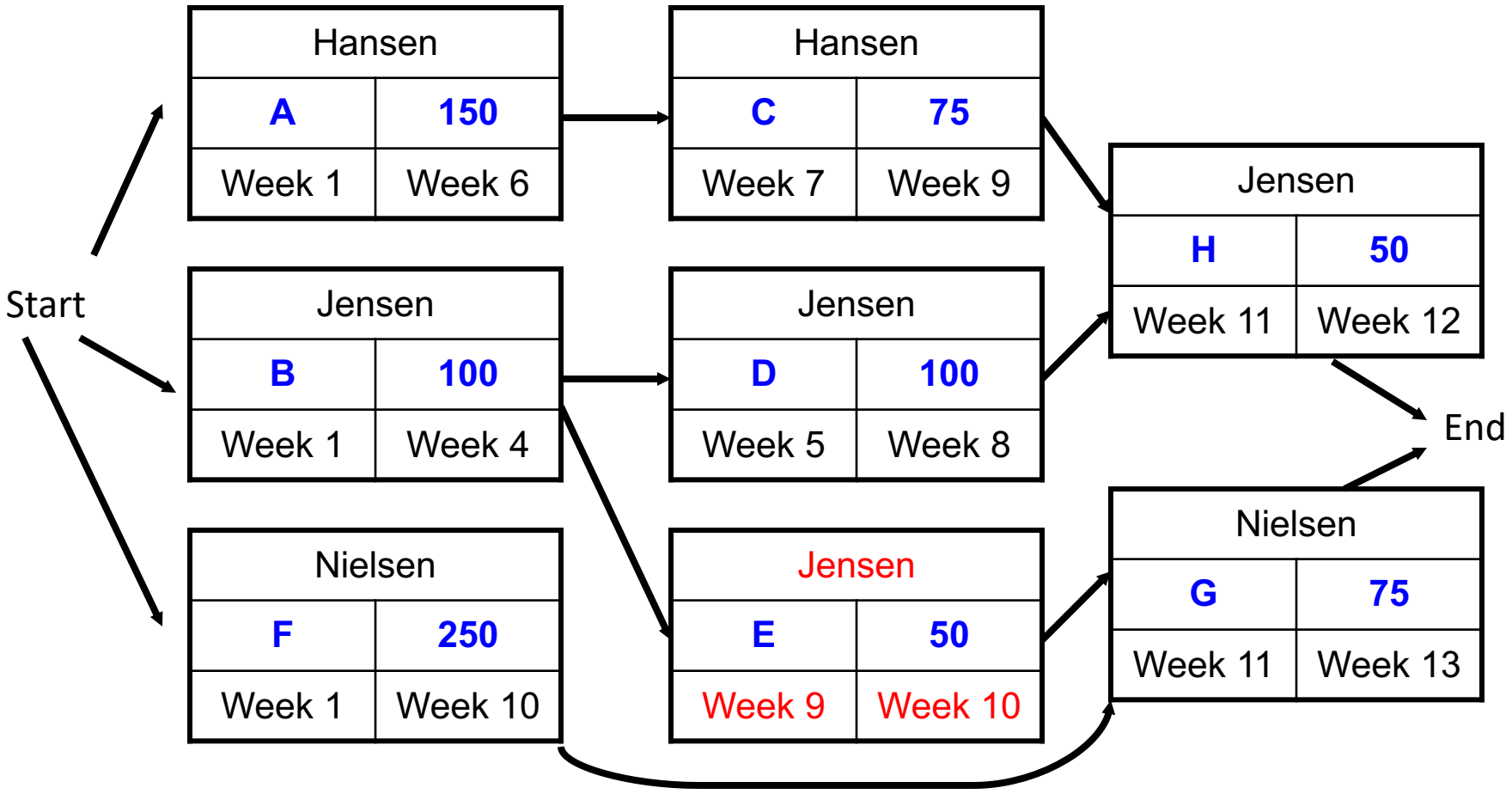
Person	
Activity	Duration
First week	Last week

Same network now with persons …



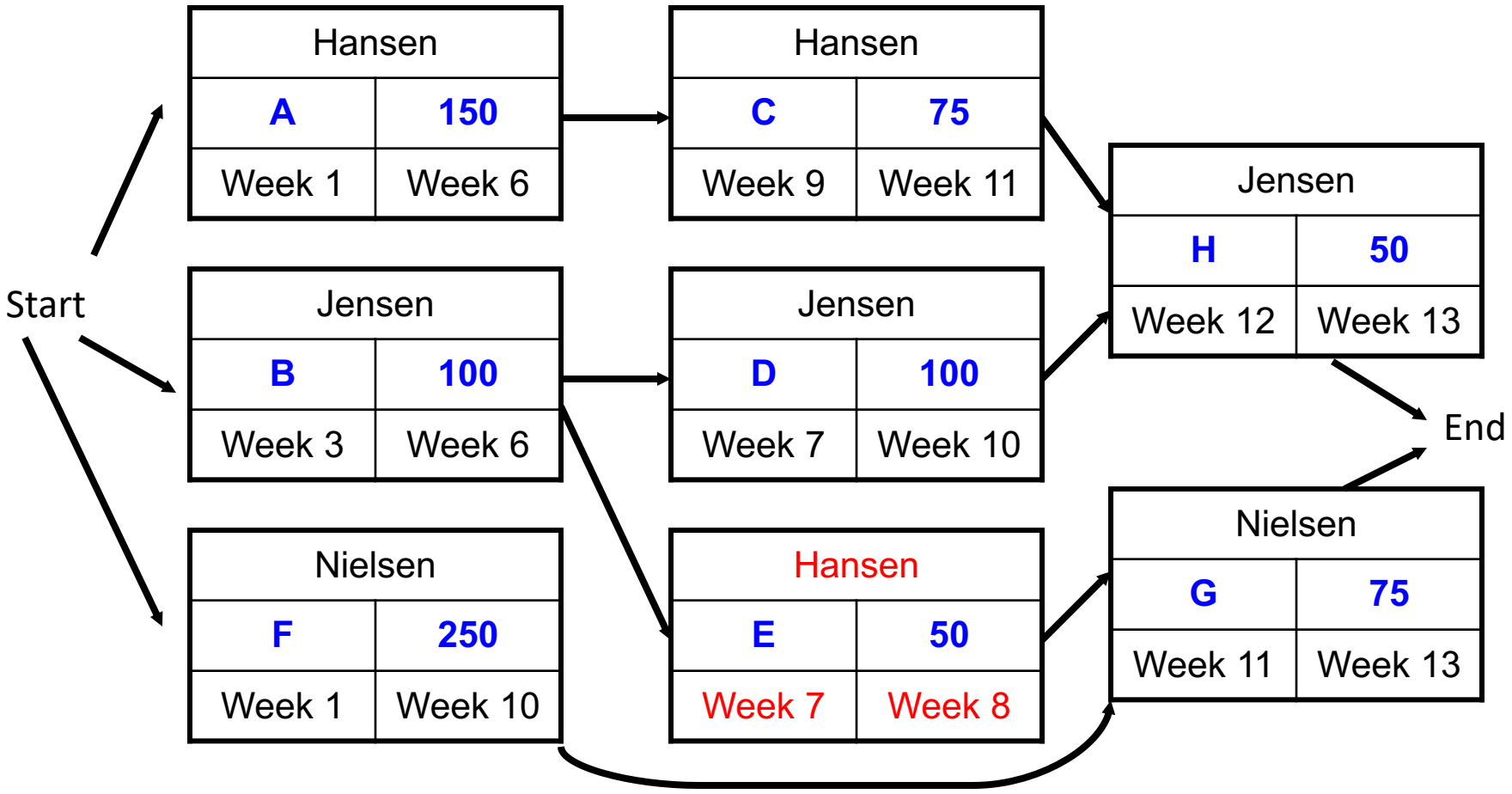
Who should be allocated to ”E”, and when are we finished ?

We can allocate ”E” to Jensen in order to finish before week 14



PS: Hansen is available for other assignments from week 10, and Jensen from week 13

We can also allocate ”E” to Hansen in order to finish before week 14



PS: Jensen doesn’t have to start until week 3 because B,D,H is not critical path.
Hansen is available for other assignments from week 12. Jensen has no work to do in week11.

Plan your own work

- No matter how well you plan the project, it is of little use, if the individual project participant does not manage his/her own work
- Useful tools to manage the project group:
  - Master plan and detailed plans
  - Activity plans for each participant
  - List of open issues (outstanding issues)
- Weekly status meetings in the project group
  - Detailed plan is revisited and progress (or remaining time) is reported for all activities
  - Open issues list is examined - Issues closed, added, changed etc.
  - Status and problems are discussed / solved at the meeting

Home assignment no. 8

The description of home assignment no. 8 can be found on Moodle under today's subject:

- Give a description of the estimation technique used on the project
- Present the arguments for the selection of this estimation technique and how well the estimates matched reality
- Reflections over alternative relevant (i.e. better) estimation techniques

Upload the result no later than Tuesday Nov 6th at 23:55