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SCAN ME

Meetings on Thursdays from 5:35pm-6:35pm! @CUE 219

Lect. #4: Project Management
Project Scheduling 1


dilbert.com/strip/1994-10-17

Announcements

- Sandi Brabb will be speaking next Tuesday, 9.6.22, and next Thursday, 9.8.22.

- PM1 is due next Tuesday, 9.6.22, by 11:59 pm.

- PM2 will be available next Tuesday, 9.6.22.

- A lot of you have already signed up for a team! Good on you! However, no one has chosen a team captain/project manager which you'll need to do by the deadline: 9.15.22.

- Questions?

Agenda for Today

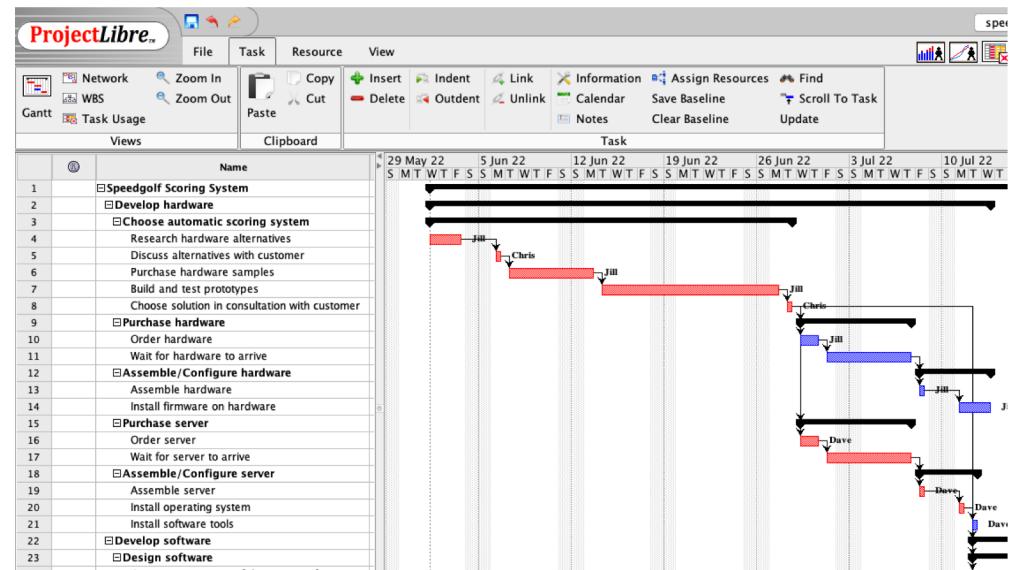1. Project Scheduling 1: Estimating Resources and Task Durations
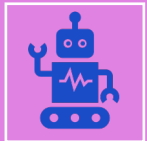
2. Project Libre

Poll

What are your thoughts on working remotely?

A. I'd be interested in full-time remote roles

B. I'd like to work mostly at home, some in office (3/2)

C. I'd like to work mostly in office, some at home (3/2)

D. I'm not interested in any remote work

E. Other

PM: Project Scheduling

- A schedule is a timetable for tasks

- Scheduling involves:

  - Estimating resources needed for each task

  - Estimating task durations

  - Calculating:
    - Start and end times
    - Slack
    - Critical path

- In "classical" PM, a Gantt chart shows the schedule

PM: Project Scheduling
Estimating Resources

To estimate the resources required, we need to ask the following questions:

• What resources are available for the project?

• In what quantities are these resources available?

• When are these resources available?

Answers to these questions influence estimates of the task durations

PM: Speedgolf Example
Estimating Resources

- Three workers are available for the project
  - Chris, UI designer and software engineer
  - Dave, Software engineer
  - Jill, Electrical engineer
- Other resources
  - Sensor hardware
  - Programming tools
  - Test server and live server
  - Wireless network

jooinn.com/images/group-of-people-18.jpg

PM: Project Scheduling
Estimating Task Durations

- **Estimating task durations is a challenge!**

- Ideally, should be done by worker who will perform the task

- Need to know resources available

- Can't sandbag, but can't be too optimistic

- Better to be overly aggressive rather than overly conservative; workers often perform to expectations

- May not be possible to estimate all durations at project start; may need to progressively refine

- Ideally, inaccurate estimates will cancel each other out

PM: Speedgolf Example
Project Objective Reredux

Create and install a scoring system at Palouse Ridge Golf Club that enables a speedgolf tournament to be automatically scored, with real-time (hole-by-hole) results displayed on a website. The project requires delivery of a wireless hardware infrastructure and a software application. It must be started on Jan. 2, 2023, and completed by Jun. 30, 2023.

Up to this point, we've discussed project requirements, statement of work, deliverables, acceptance criteria, work breakdown structures, (augmented) responsibility assignment matrixes, and network diagrams.

PM: Speedgolf Example
Work Breakdown Structure (WBS)

Recall, the WBS for our speedgolf example:
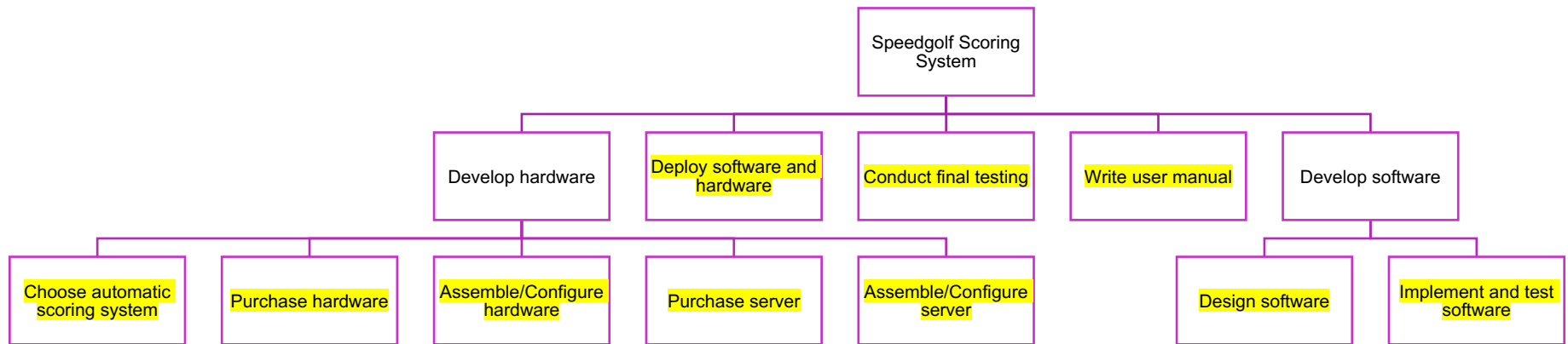
- Note that highlighted text indicates a work package!
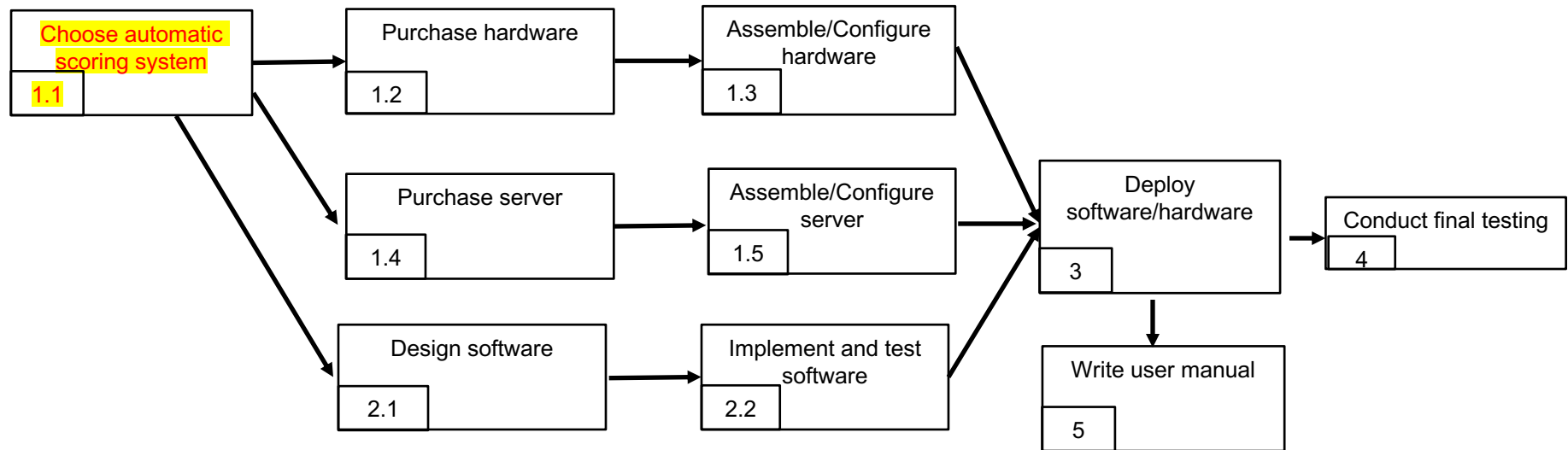- Each work package is associated with a deliverable

PM: Speedgolf Example
WBS in Table Form

WBS #	Description	Responsible	Deliverable for Each Work Package
1	Develop hardware	Dave	
1.1	Choose automatic scoring system	Dave	Technical memo stating choice and rationale
1.2	Purchase hardware	Jill	Hardware
1.3	Assemble/configure hardware	Dave	Hardware assembled and configured
1.4	Purchase server	Dave	Server
1.5	Assemble/configure server	Jill	Server assembled and configured
2	Develop software	Chris	
2.1	Design software	Chris	Interface prototypes
2.2	Implement and test software	Chris	Software implemented and tested
3	Deploy software and hardware	Chris	Hardware and software in place
4	Conduct final testing	Chris	System meeting acceptance criteria
5	Write user manual	Chris	User manual

PM: Speedgolf Example
Estimating Task Durations

```
┌─────────────────────┐      ┌─────────────────────┐      ┌─────────────────────┐
│ Choose automatic    │      │ Purchase hardware   │      │ Assemble/Configure  │
│ scoring system      │ ───▶ │                     │ ───▶ │ hardware            │
│ ┌────┐              │      │ ┌────┐              │      │ ┌────┐              │
│ │1.1 │              │      │ │1.2 │              │      │ │1.3 │              │
└─┴────┴──────────────┘      └─┴────┴──────────────┘      └─┴────┴──────────────┘
```

			Deploy software/hardware	Conduct final testing

Purchase hardware — 1.2

Assemble/Configure hardware — 1.3

Purchase server — 1.4

Assemble/Configure server — 1.5

Design software — 2.1

Implement and test software — 2.2

Deploy software/hardware — 3

Conduct final testing — 4

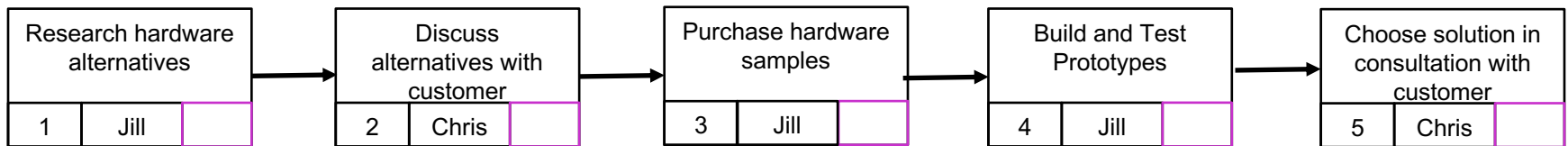Write user manual — 5

Schedule tasks for work package 1.1

Breakout Discussion (5 min)

- Estimate task durations for each of these tasks **in whole days**. Provide a brief rationale for each estimate.

Research hardware alternatives		
1	Jill	

→

Discuss alternatives with customer		
2	Chris	

→

Purchase hardware samples		
3	Jill	

→

Build and Test Prototypes		
4	Jill	

→

Choose solution in consultation with customer		
5	Chris	

- Choose someone to explain your estimates with rationales for them.

- Write down the total number of days you think it will take to complete work package 1.1 (sum of days for 5 tasks!)
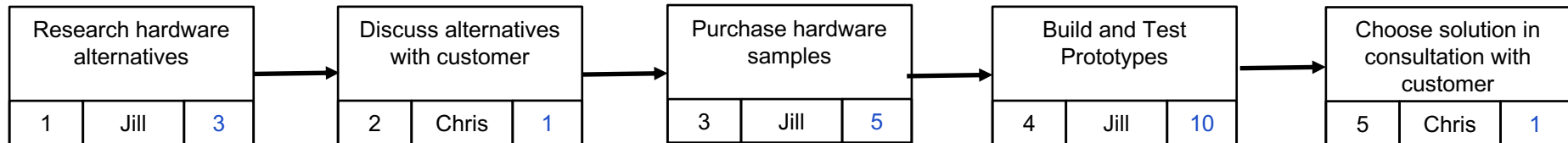
Poll

I estimated n days to complete work package 1.1. What was the estimate in your group?

A. 5 <= days < 10

B. 10 <= days < 15

C. 15 <= days <= 20

D. > 20

E. < 5

PM: Speedgolf Example
Estimating Task Durations: Work Package 1.1

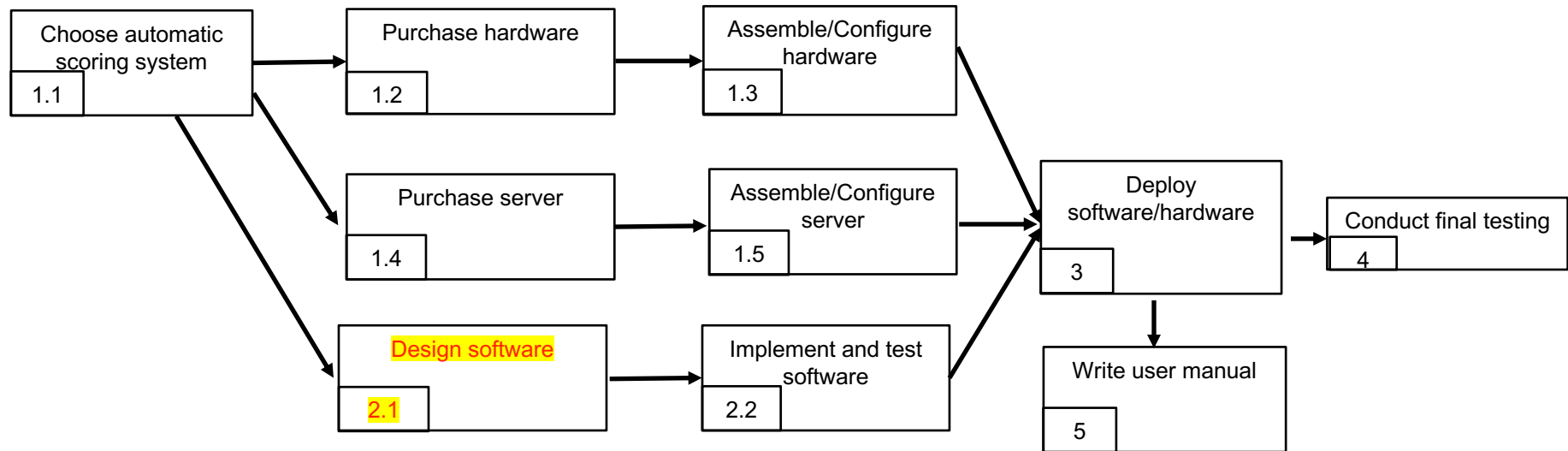| Research hardware alternatives				Discuss alternatives with customer				Purchase hardware samples				Build and Test Prototypes				Choose solution in consultation with customer		
1	Jill	3	→	2	Chris	1	→	3	Jill	5	→	4	Jill	10	→	5	Chris	1

Rationale

1. Requires web search and phone calls, may have to wait some time for people to call back, need to prepare presentation for customer

2. Should be a 1-2 hour meeting

3. Must allow time for both purchasing and shipping

4. Hardest to estimate, highly dependent on number of prototypes needed, probably best to progressively refine

5. Should be a 1-2 hour meeting

PM: Speedgolf Example
Estimating Task Durations

Choose automatic scoring system	Purchase hardware	Assemble/Configure hardware
1.1	1.2	1.3

Purchase server	Assemble/Configure server	Deploy software/hardware	Conduct final testing
1.4	1.5	3	4

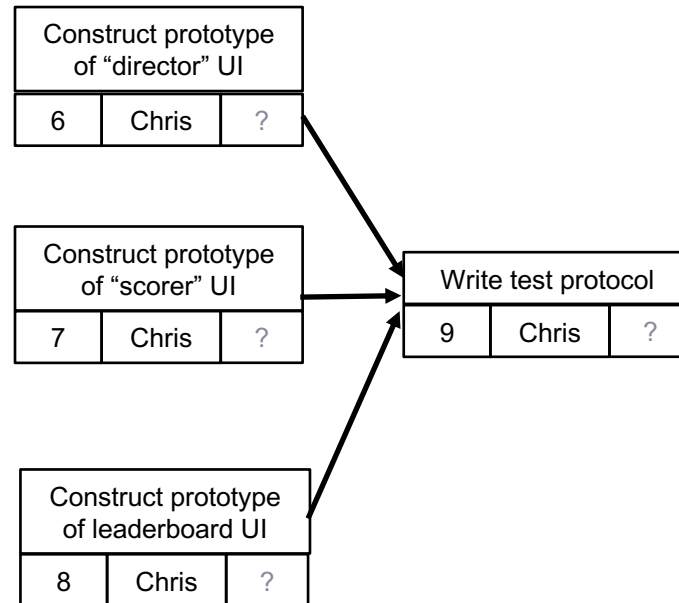| Design software	Implement and test software	Write user manual
2.1	2.2	5

- Schedule tasks for work package 2.1
- There are three user interfaces to design: one for the director, one for the scorer, and one for the spectator (leaderboard)
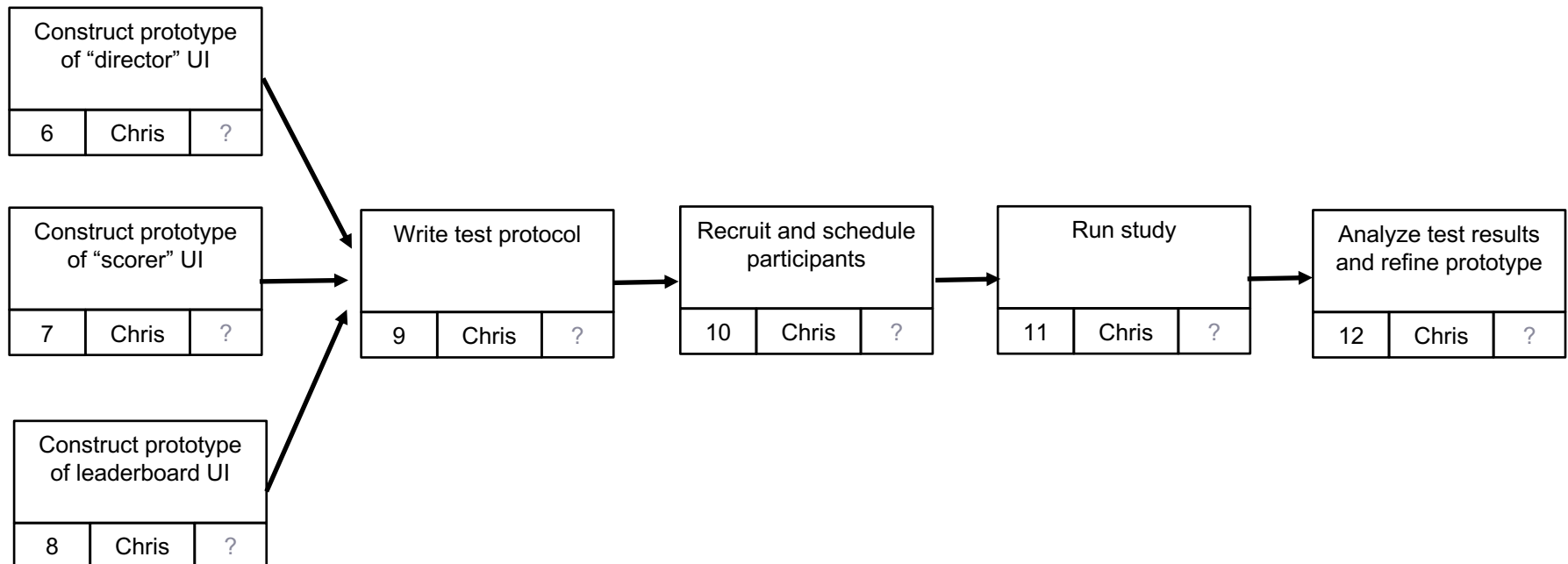
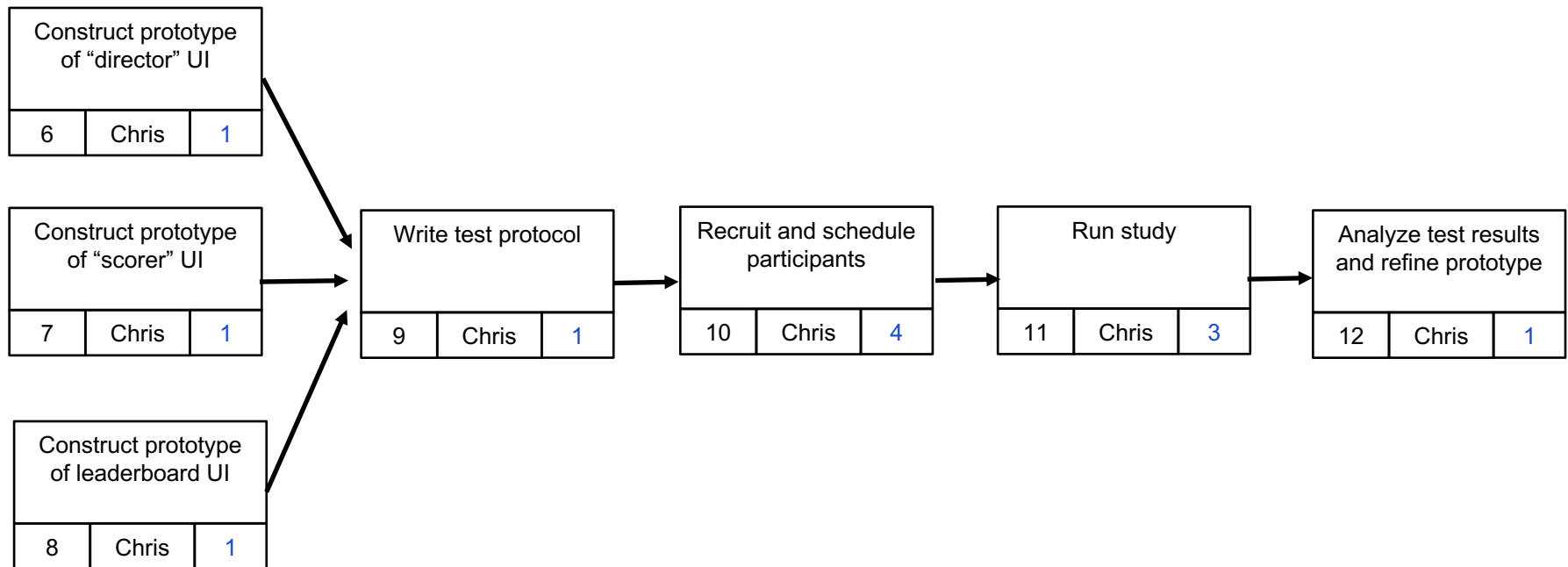First consider three interfaces; can be done in parallel!

Breakout Discussion (5 min)

- Break work package into 7 tasks
- Estimate task durations for each task in whole days
- Provide a brief rationale for each estimate
- Choose someone to explain your estimates and rationales

PM: Speedgolf Example
Estimating Task Durations: Work Package 2.1

Construct prototype of "director" UI		
6	Chris	1

Construct prototype of "scorer" UI		
7	Chris	1

Construct prototype of leaderboard UI		
8	Chris	1

Write test protocol		
9	Chris	1

Recruit and schedule participants		
10	Chris	4

Run study		
11	Chris	3

Analyze test results and refine prototype		
12	Chris	1

Rationale
6-8. Can mock up with art supplies in a few hours, but must schedule 1 day for each task
9. Can use existing template and complete in an hour or two
10. May need more or less time depending on availability of participants; may need to contact many more than are needed
11. Again, depends on availability of participants and whether they can be used to test all three UIs
12. Depends on experience of worker; could take an hour or two or a full day

PM: Project Libre
PM2

- Create new project in Project Libre
- Set start date
- Type all entries from the ARAM you created for PM1 (this should include all the items in the WBS and the ~25 tasks you added)
- Use the indent function to indent work packages under work items and tasks under work packages
- Add resource names under Resource tab with hourly pay rates
- Write resource in Resource Names column under Task tab
- Write predecessor number for each task in Predecessors column
- Write duration of each task in days in Duration column
- Resolve resource conflicts
- Intro to PL: https://www.youtube.com/watch?v=9xwR4JCBaIU