SE202 Introduction to Software Engineering

Lecture 3-1
Project Management

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Last Lecture
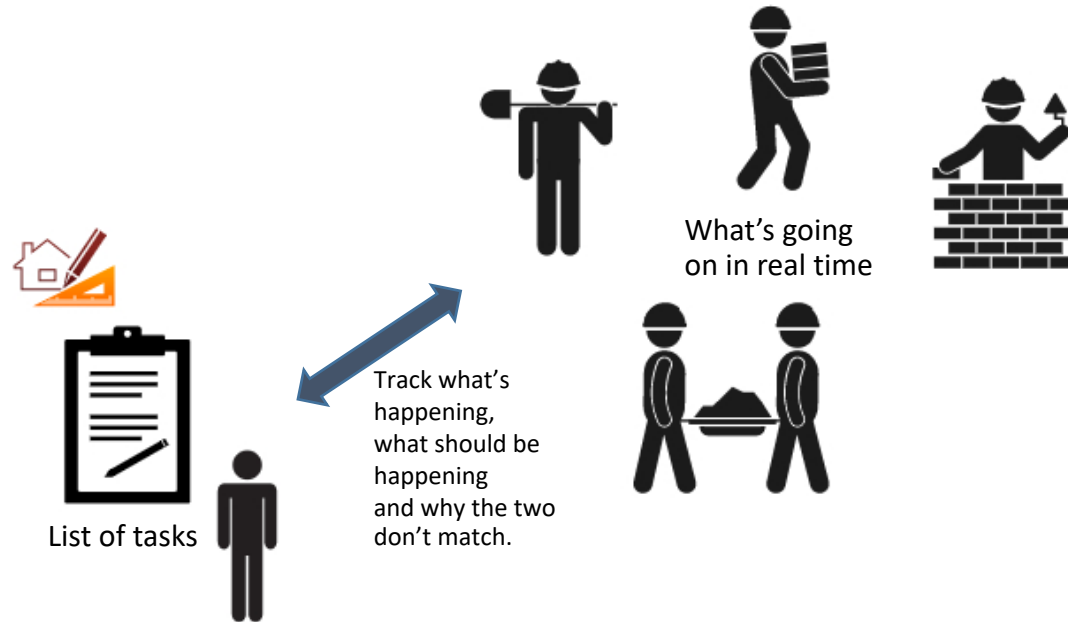
Software document

Document management system

GitHub – source code version control

Project team and stakeholders

Today's Topics

- Introduction to Project Management
- Project management activities
- Vision and scope document
- Project planning
- Project estimation

What is Project Management?

What's going on in real time

Track what's happening, what should be happening and why the two don't match.

List of tasks

- **Project management** is a set of activities involved in ensuring that software is delivered on time and on schedule and in accordance with the requirements of the organizations developing the software and procuring the software.
  - Ensure that goals are set, tracked and eventually met.
  - Keep team members on track and focused on the problems at hand
- *No matter how big the project is, management tasks must be performed!!*

Success criteria

- Deliver the software to the customer at the agreed time.

- Keep overall costs within budget.

- Deliver software that meets the customer's expectations.

- Maintain a happy and well-functioning development team.

Iron triangle

A?

D?

B?

C?
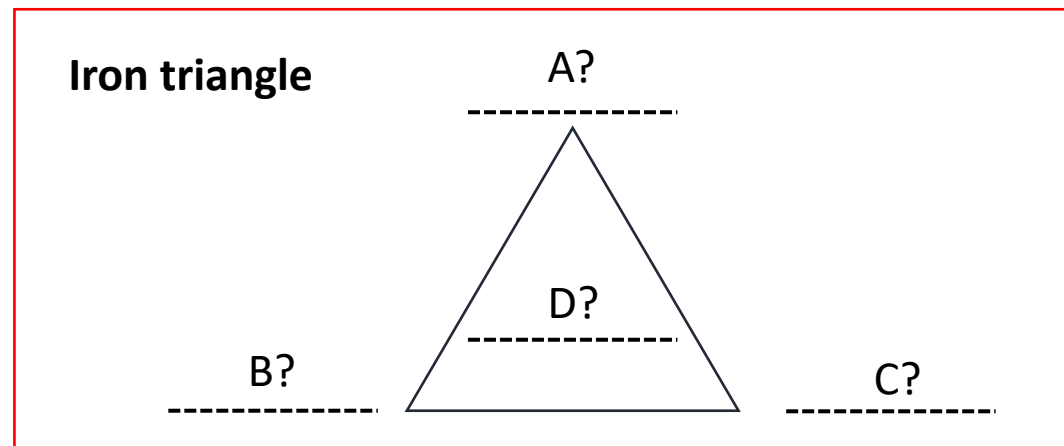
Key management responsibilities

Executive sponsor

- Providing necessary resources such as budgets, hardware, and personnel
- Making "go/no-go" decisions and deciding when to cancel the project
- Defining the business case
- Working with users and other stakeholders to get buy-in
- Supporting the project team

Project manager

- Helping define the project requirements
- Tracking project tasks
- Responding to unexpected problems
- Managing risk
- Keeping users up-to-date on the project's progress
- Managing resources such time, people, budget, hardware and software tools
- Managing delivery

Project management activities

Vision and Scope Document

Project Plan

Risk Management

Report

People management

Project management activities (1)

- Vision and scope document
  - Project managers must identify the main stakeholders to drive the scope of the project

- Project planning
  - Project managers are responsible for planning, estimating and scheduling project development and assigning people to tasks.

- Risk management
  - Project managers assess the risks that may affect a project, monitor these risks and take action when problems arise.

Project management activities (2)

- Reporting
  - Project managers are usually responsible for reporting on the progress of a project to customers and to the managers of the company developing the software.

- People management
  - Project managers have to choose people for their team and establish ways of working that leads to effective team performance

Understand the project needs

Project manager

Team members
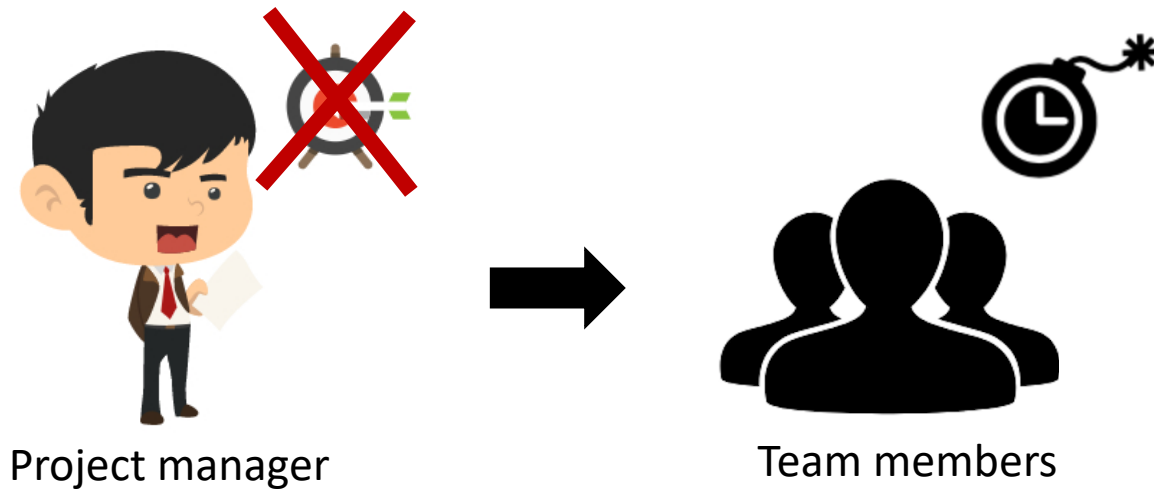
Resulting of lacking understood of the project needs
- Narrow focus on individual problems
- Lose track of the big picture
- Software that solves wrong problems
- Project fails

Vision and Scope document

- The vision and scope document is one of the most important tools for a project manager
  - helps project managers avoid that problem by catching misunderstandings early on in the project
- The scope of a project
  - Features that will be developed and the work that will be done to implement those features
- The vision of the project
  - A description of the goal of the software that fulfills needs of certain users and stakeholders
- [Important] Review the vision and scope document

Vision and scope document outline

1. Problem Statement
   a. Project background
   b. Stakeholders
   c. Users
   d. Risks – generated by a project team's brainstorming session
   e. Assumptions – made by stakeholders, users or project team

2. Vision of the Solution
   a. Vision statement
   b. List of features – about 10 features
   c. Scope of phased release (optional)
   d. Features that will not be developed

Project planning

- Project managers are responsible for planning, estimating and scheduling project development and assigning people to tasks.

- The project plan is an output of the project planning that defines the work that will be done on the project and who will do it. The project plan consists of
  - A statement of work (SOW) that describes all work products
  - A resource list
  - A work breakdown structure and a set of effort estimates
  - A project schedule
  - A risk plan

It is important that the organization reach consensus on the project plan!!
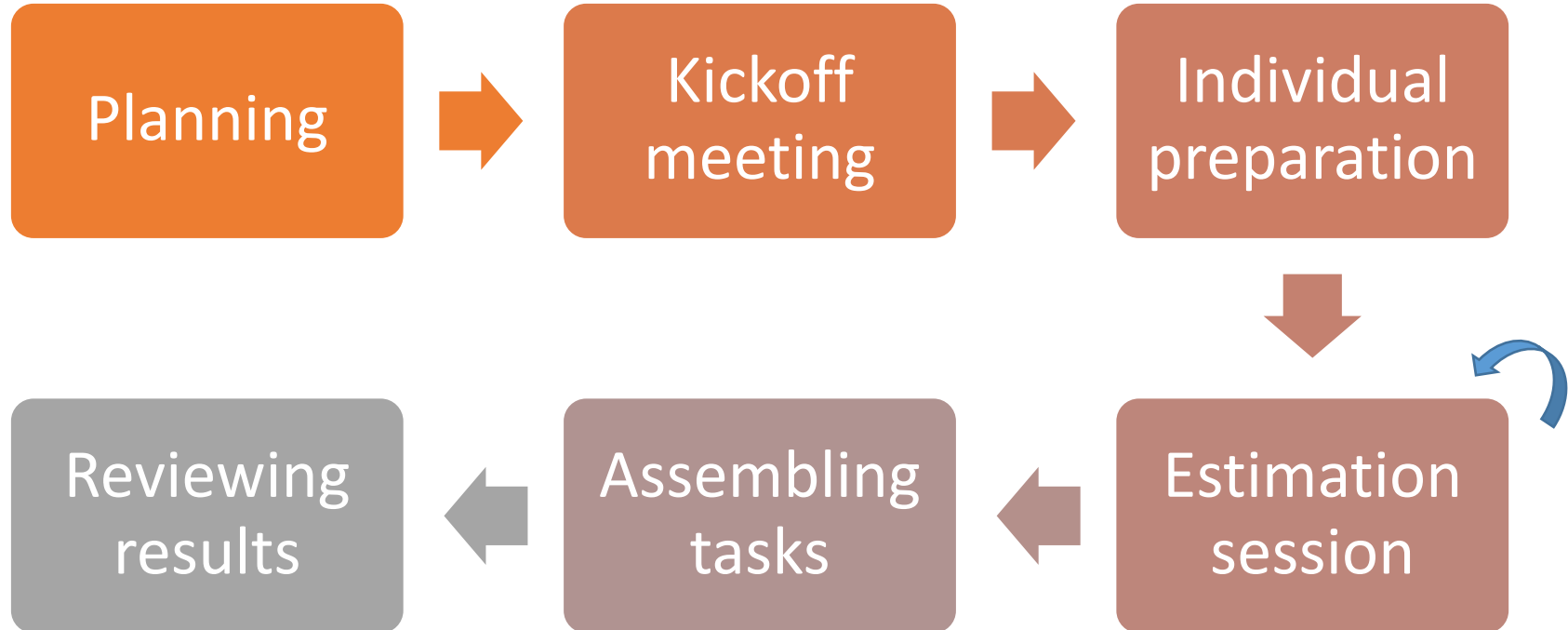
Project estimation

- Project estimation is part of the project planning that project manager helps the team to create estimates for software project.
- A sound estimate starts with a work breakdown structure (WBS).
  - A WBS is a list of tasks that, if completed, will produce the final product.
  - There are many ways to decompose a project into tasks.
    - by feature, by project phase ,or by some combination of the two
- Once the WBS is created, the team must create an estimate of the effort required to perform each task.
- The most accurate estimates are those that rely on prior experience
- No estimate is guaranteed to be accurate
- The goal of estimation is to calculate an honest, well-informed opinion of the effort required to do a task from those people in the organization who have the most applicable training and knowledge.

Assumptions Make Estimates More Accurate

- Assumptions bring the following benefits
  - To deal with incomplete information
  - To find a compromise to resolve disagreements
  - To do a risk assessment for the project plan
- For the estimates to be most effective, the assumptions must be written down.

Wideband Delphi Estimation

- Wideband Delphi is a process developed in 1940.
- It depends on group estimation
- Wideband Delphi process

Planning	→	Kickoff meeting	→	Individual preparation
Reviewing results	← Assembling tasks	←	Estimation session	↻

Planning

- Project Manager selects a team and a moderator
- Team consists of 3-7 team members
- Representation from all groups like development, testing etc
- The moderator is unbiased and manages the meeting.
- The moderator also ensures that everyone participates.
- The project manager must be a member of the estimation team so that the team is aware of the priority of the requirements.

Kickoff Meeting

- Explain the Delphi process
- Read the vision and scope document or any supporting documents [Pre-requisites]
- Review the goals of the estimation session
- Brainstorm and note down the assumptions
- Generate the initial WBS Decide upon the unit for estimation
- The output of the session is a high-level list of tasks and a set of assumptions written by the moderator and distributed to the team.

Individual Preparation

- Each member of the estimation team individually creates a set of preparation results in order to prepare for the next estimation session meeting.
  - Estimate the time required for each task
  - Add any additional tasks to the WBS
  - Add any missing assumptions

Task list

Tasks to achive goal   Time

Calendar waiting time, delays

Project overhead tasks

Assumptions

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

A set of preparation

Estimation Session

- Moderator distributes an empty form to each estimator.
- Each estimator fills in the estimation form based on his or her preparation results.
- Moderator shares the estimates on a white board so that estimators can see the range of estimates
- Team members revises estimates based on group discussions
- Estimates are revised until no estimator wants to changes his/her estimates.
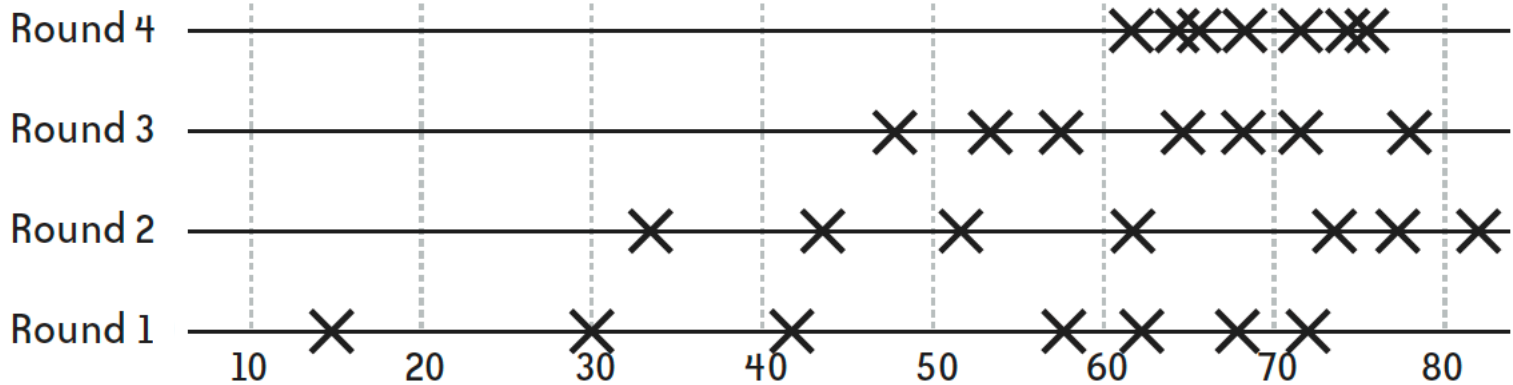- Estimators agree that the estimates are acceptable

Filled-in estimation form

Name	Mike		Date 4/3/2004				Estimation form / / /

Goal statement To estimate the time to develop prototype for customers A & B   **Units** days

Category ☑ goal tasks ☑ quality tasks   ☐ waiting time ☐ project overhead

WBS# or priority	Task name	Est.	Delta 1	Delta 2	Delta 3	Delta 4	Total	Assumptions
1	Interview customers (A+B)	3	+2	+1				Needs off-site tri
2	Develop requirements docs	6	+5	-2	+1			Start from scratc
3	Inspect requirements docs	1	+2	+2	-2			Team of 4 BSAs
4	Do rework	1	+4					
5	Prototype design	20	-3	4	-2			Includes DB
6	Test design	5	+3					20% exists now
	Delta		+13	+5	-3			
	Total	36	49	54	51			

Initial estimates

Round 1

10 20 30 40 50 60 70 80

Effort estimates (not including overhead or calendar waiting time)
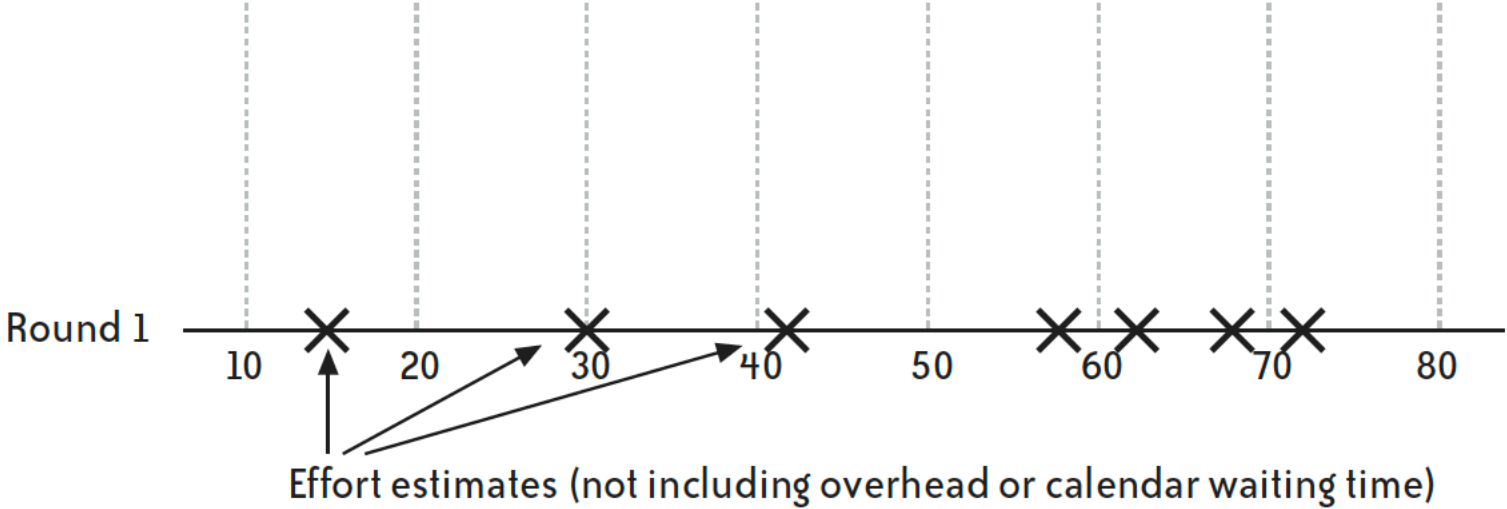
Converging estimate results

Round 4

Round 3

Round 2

Round 1

10 20 30 40 50 60 70 80

Assemble Tasks & Review Results

- Project Manager works with the team and collects the estimates from team members

- Compiles the final WBS, estimations and assumptions

- Reviews the final estimates with the estimation team

Summarized results of estimation

Goal statement	To estimate the time to develop prototype for customers A & B								

Estimators	Mike, Quentin, Jill, Sophie							Units	days

Shaded items must be discussed

WBS# or priority	Task name	M.	Q.	J.	S.	Best-case	Worst-case	Avg.-hi & lo	Notes
1	Interview customers (A+B)	6	4	3	3	3	6	3.5	
2	Develop requirements docs	5	10	2	5	2	10	5	Discrepancy between Q. and J.
3	Inspect requirements docs	7	5	6	5	5	7	5.5	
4	Do rework	8	7	9	7	7	9	7.5	
5	Prototype design	28	23	31	25	23	31	26.5	
6	Test design	9	7	6	6	6	9	6.5	
	Total	63	56	57	51	46	72	54.5	

Why Wideband Delphi ?

- It produces several important elements of the project plan.
  - a work breakdown structure (WBS) and total of estimates
  - a list of assumptions
- Wideband Delphi works because it requires the entire team to correct one another in a way that helps avoid errors and poor estimation
- Delphi addresses the problem through the discussion of assumptions and the generation of consensus among the estimation team members.

Other Estimation Techniques

- Proxy Based Estimating (PROBE)
  - PROBE is based on the idea that if an engineer is building a component similar to one he built previously, then it will take about the same effort as it did in the past.
- COCOMO II
  - The COCOMO calculation incorporates 15 cost drivers, variables that must be provided as input for a model that is based on the results of the previous studied projects. The output of the model is a set of size and effort estimates that can be developed into a project schedule.
- The Planning Game
  - The Planning Game is the software project planning method from Extreme Programming (XP)
  - The planning process is highly iterative to create user stories between the engineering team ("Development") and the stakeholders ("Business")

In class assignment

- Form your team of 3-4 people

- Appoint one member being a moderator

- Given documents of vision and scope, a set of preparation, estimation form and summary of estimation form, Moderator conducts the Wideband Delphi process:
  - Kickoff meeting
  - Individual preparation
  - Estimation session
  - Assemble Tasks & Review Results

- Submit all the documents form to Google classroom