Software Engineering

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Software Projects

- Goal: to build a software system that meets certain requirements such as cost, schedule, quality, etc
- Lots of projects fail (how motivating Rafal thanks)
  - $\frac{1}{3}$ of projects are runaways with cost or schedule overrun of more than 125%
  - Estimating time and cost can be hard
- Why do projects fail? Lots of reasons
  - It can be hard to get good, clear objectives (only to be expected when you're working on something that's never been done before)
  - Bad planning, sometimes people are just shitty with planning. Lots of companies try not to plan because they don't use proper methodologies around projects
  - No project management methodology (tied into last bullet)
  - New technology is always entering the market and we're always trying to focus on something new to ensure product doesn't become irrelevant. Challenging approach, have to learn new tech, what if it's buggy because it's so new? Lots of problems with that one
  - Insufficient staff
- All of the failing reasons listed above relate to project management
  - effective project management is essential to having a successful project
- Why improve project management?
  - Managing commitments is a lot easier when there's better predictability, predictability can increase with better project management
  - Lowers costs because rework is reduced, resources are managed better, planning is better, so many reasons
  - Quality is improved because you have proper planning and quality control. Quality is one of the end goals so this is good
  - You have better control because everything is being managed and monitored
    - Change control, management, and monitoring. How fast can you adjust to changes?
  - Better visibility on project health/state which can help with intervention if something is going wrong
  - Better for handling risks and reducing chances of failure
    - Stays on schedule, ensures requirements are met, etc
  - Higher customer satisfaction (because you stay on schedule and requirements are met)
  - Organizational improvement (organization as in the company, not as in staying organized)

Project management process

- Three phases:
  - Planning
    - Done before a lot of the engineering process and closure after the process
    - *This is what we're focusing on* (I think)
  - Monitoring and Control
    - Done in paralell with the engineering process
  - Closure
- Basic objective of project management: to create a plan to meet the commitments of the project
- Key tasks:

  - Estimate the effort
    * Cost and duration should be committed at the start
    * Requires effort estimation in terms of person-months
      · Does this mean in terms of amount of people *and* months it'll take or is person-months some measurement I've never heard of?
    * Effort estimation is a key to planning: schedule, cost, resources all depend on it
    * Many problems come from improper estimation
    * Even though it's important af, it's also hard af to estimate effort
      · Estimation accuracy improves when more information about the project is known (like requirements and shit)
      · Early estimations are generally more inaccurate than later estimations because there are more uncertainties and. . . ?? The slides are all pixelated for me and I'm having trouble reading them
    * Effort estimation models try to determine the effort estimate from parameter values
      · It requires input about the project, can't work in a vacuum..?
    * Top down estimation determines the total effort first, then the effort for components
      · It's a simple approach, estimate the effort based on size and productivity
      · You also use the effort distribution data from similar projects to estimate the effort for different . . . ? pixelated slides are the worst man
    * Cocomo Model (someone really had to name this Cocomo and now the Beach Boys will be stuck in my head forever)
      · The initial estimate is $a \times \text{size}^b$ where you have some standard values for a, b given. . . and the slide changed
      · Cocomo stands for constructive cost model and was based on the number of lines of code
      · Procedural cost estimate model
  - Define project milestones and create a schedule
  - Define quality objectives and a quality plan
  - Identify risks and make plans to mitigate them
  - Define measurement plan, project-tracking procedures, training plan, team orgainzation, etc
- I got distracted by football highlights from yesterday my b
  - Still can't believe Dallas one that game though