

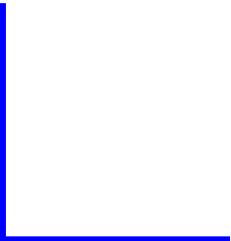


Software Engineering

Lecture 8

Intro to Estimation

Gregory S. DeLozier, Ph.D.
Kent State University
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Estimation

- Why is it so hard?
- What are we trying to do?
- What are some methods of estimation

Definition

- Estimation (or estimating)
 - is the process of finding an estimate,
 - or approximation,
 - which is a value that is usable for some purpose
 - even if input data may be
 - incomplete,
 - uncertain, or
 - unstable.

Software Estimation

- Estimate
 - How long it will take
 - What resources will be required
 - When it can be delivered
 - What its characteristics will be
- Why?

Why Estimate?

- to know if something is feasible
- to know if something is feasible with our constraints
- to know if we have what we need to start
- to know how much we can deliver by a given date
- to know when to start if delivery is due on a date
- to estimate cost/benefit when prioritizing

Why is Estimating Hard?

- Uncertainty
- Unfamiliarity
- Newness

- Software is not alone in this.
 - Pipelines, bridges, rockets - often over budget.

- Software suffers more, though
 - If we had made an identical one before, we'd have it
 - Software is _always_ new.

Estimation Methods

- Judgement and experience
- Comparison
- Decomposition
- Parametric

Expertise

- Experience
- Heuristics
- Intuitive application of other rules

Comparison

- Find something a lot like this one
- How did that turn out?
- Gets better with experience

Decomposition

- Break into subtask components
- Estimate those
 (using some method)
- Add up the subtask estimates

Parametric

- Mathematically represent relationships
 - cost vs characteristics
 - e.g. $\text{sidewalk_cost} = \$20 * \text{sq_ft}$
- These relationships can be derived from data
- Apply relationships to create an estimate
- See paper in reading for details

Informal Methods

- inchstones
- planning poker

Inchstones

- break down the thing to be estimated
 - dozens to hundreds of task parts
- guess the cost of parts
 - relative ordering is ok
- actually do some of the task parts
- use these to produce an estimate for the rest
- some people use $\text{high} + \text{low} + 2 * \text{average}$ as a heuristic

Inchstone Exercise

- How long will it take you to multiply two 10-digit numbers together on paper?
- Don't actually do the computation.
- Present an answer supported by evidence.

Planning Poker

- A method for group estimation
- 1. Talk about the problem.
- 2. Everyone "plays a card" - makes an estimate
(t-shirt sizes, for instance - XS,S,M,L,XL
- 3. Talk about with outliers
- 4. Repeat until estimates are consistent within two sizes
- There are variations
- Easy to use cards
- We're going to try an online version

Planning Poker Exercise

- Read these details:

<https://www.mountangoatsoftware.com/agile/planning-poker>

- Go here:

<https://www.planningpoker.com>

Reading

- <https://en.wikipedia.org/wiki/Estimation>
- <https://www.liquidplanner.com/blog/5-methods-of-project-estimation/>
- <https://www.mountangoatsoftware.com/agile/planning-poker>
- <http://www.costandvalue.org/download/?id=1554> (Parametric Estimation)
- https://en.wikipedia.org/wiki/Planning_poker