Software Estimation

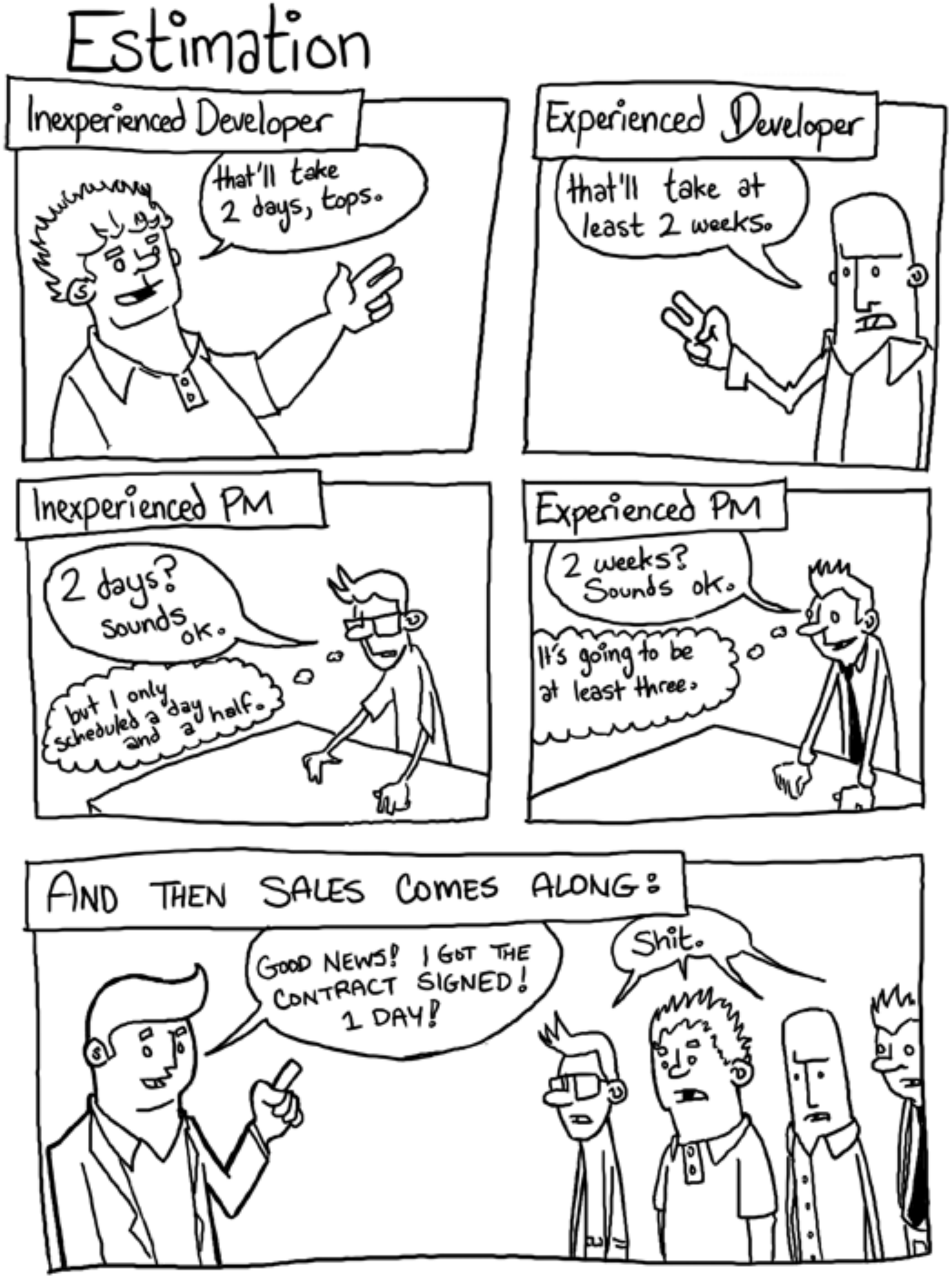
Some content adapted from “Rapid Development” by Steve McConnell

Can you estimate these?

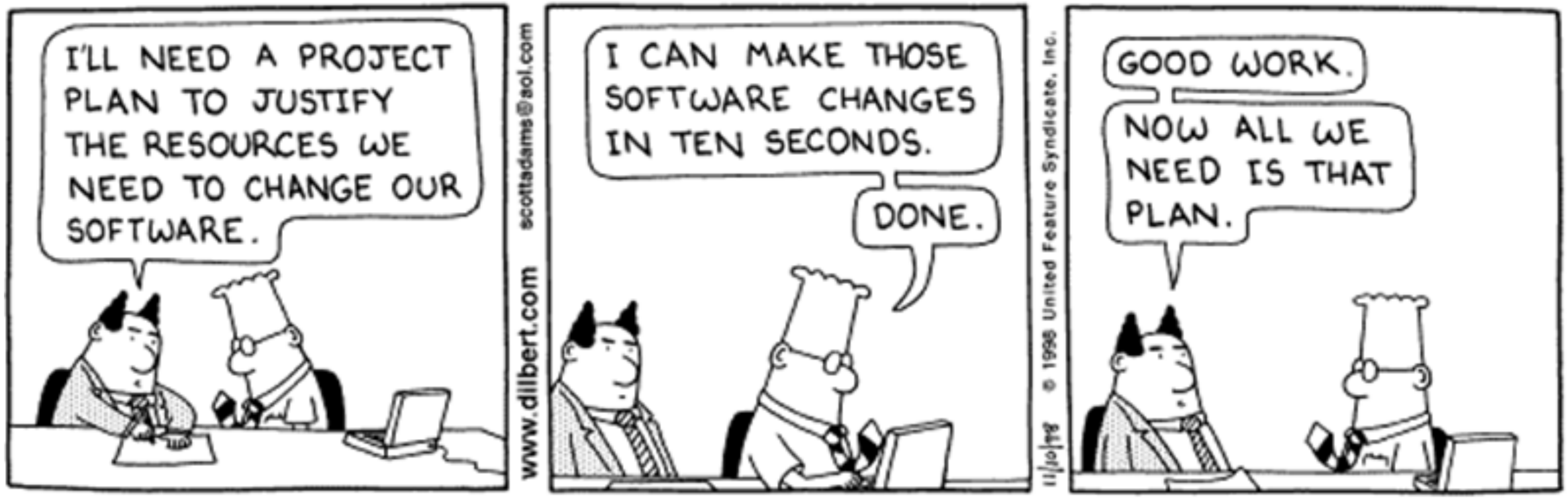
1. Surface temperature of the sun (in degrees C)
2. Latitude of Shanghai (in degrees)
3. Surface area of Asia (in km^2)
4. Birth date of Alexander The Great (year)
5. Global revenue of "Titanic" (in $)
6. Length of the Pacific coastline (Ca, Or, Wa) (in km)
7. Number of books published in USA, 1776 to 2004
8. Weight of the largest whale (in tonnes)

This is adapted from "Software Estimation" by Steve McConnell

Why Estimate


Estimation
Inexperienced Developer
that'll take 2 days, tops.
Experienced Developer
that'll take at least 2 weeks.
Inexperienced PM
2 days? sounds ok.
but I only scheduled a day and a half.
Experienced PM
2 weeks? Sounds ok.
It's going to be at least three.
AND THEN SALES COMES ALONG:
GOOD NEWS! I GOT THE CONTRACT SIGNED! 1 DAY!
Shit.

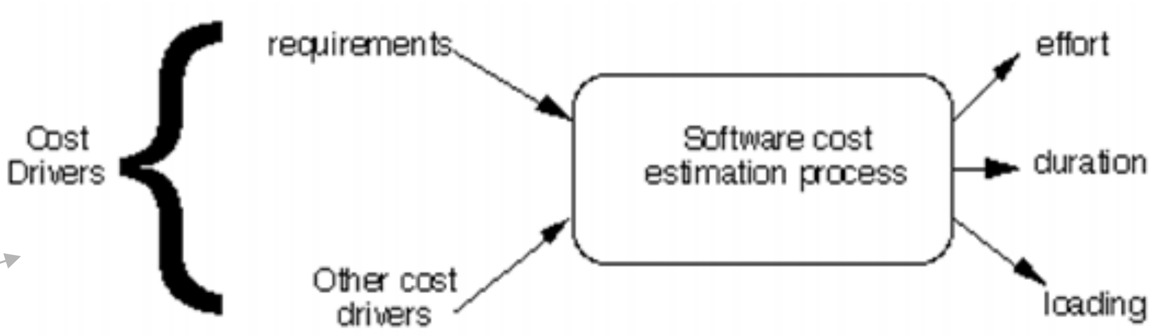
This way?

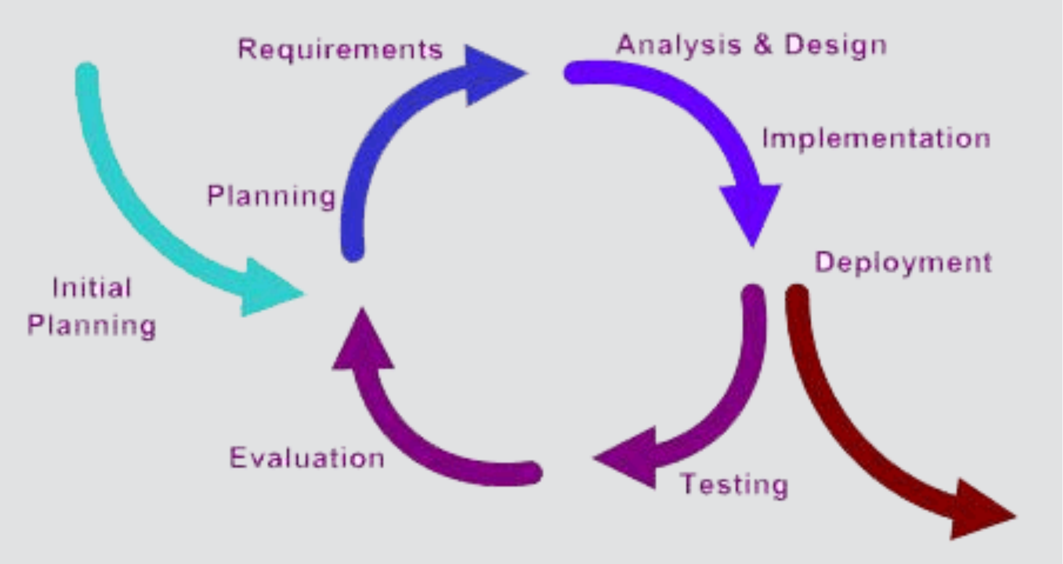

I'LL NEED A PROJECT PLAN TO JUSTIFY THE RESOURCES WE NEED TO CHANGE OUR SOFTWARE.
scottadams@aol.com
www.dilbert.com
I CAN MAKE THOSE SOFTWARE CHANGES IN TEN SECONDS.
DONE.
© 1998 United Feature Syndicate, Inc.
11/10/98
GOOD WORK.
NOW ALL WE NEED IS THAT PLAN.

# 1: Always give a range
Never give them a number

Numbers are for facts;
Ranges are for estimates;

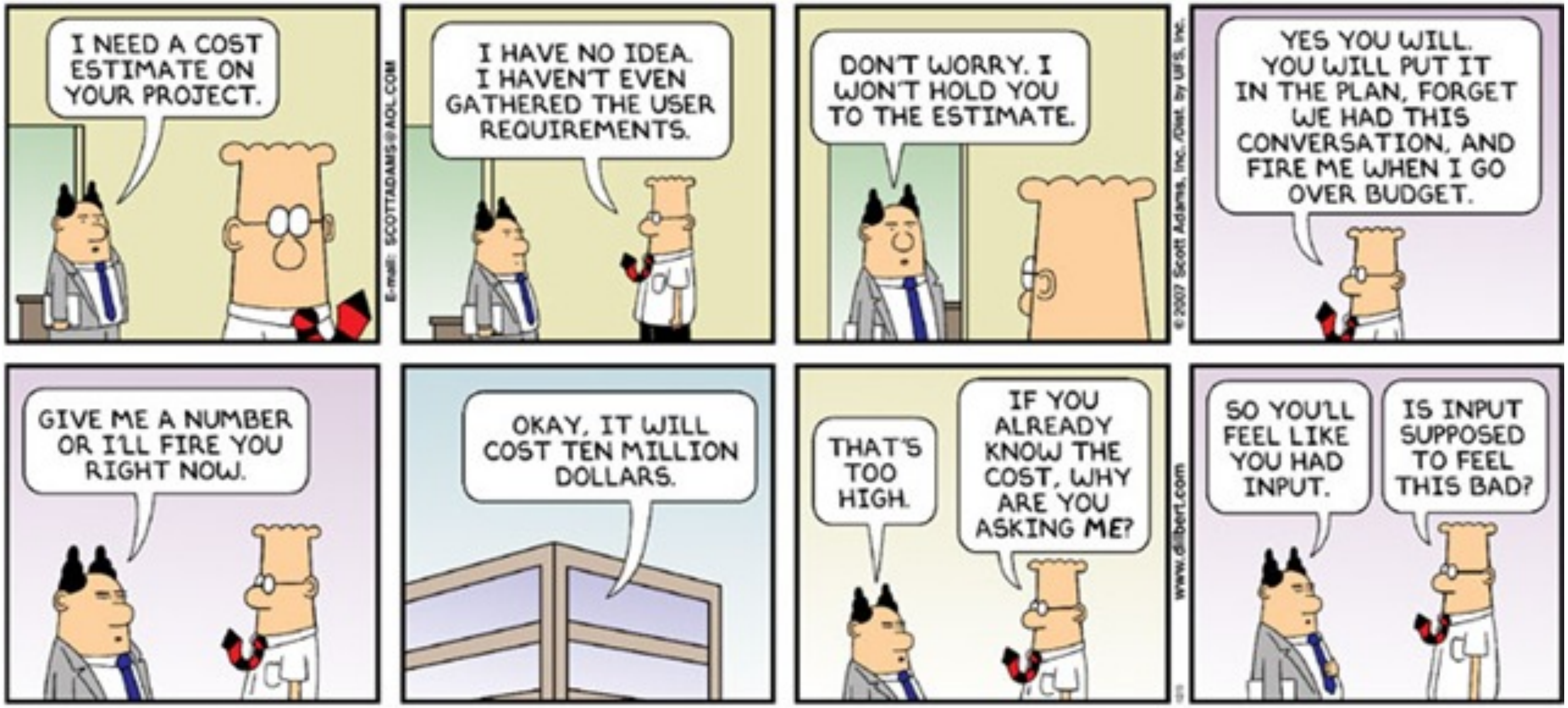
Approach


Cost
Drivers
requirements
Other cost
drivers
Software cost
estimation process
effort
duration
loading


Requirements
Analysis & Design
Implementation
Planning
Initial
Planning
Deployment
Evaluation
Testing

#2 Always ask what the estimate will be used for

Requirements is key


I NEED A COST ESTIMATE ON YOUR PROJECT.
I HAVE NO IDEA. I HAVEN'T EVEN GATHERED THE USER REQUIREMENTS.
DON'T WORRY. I WON'T HOLD YOU TO THE ESTIMATE.
YES YOU WILL. YOU WILL PUT IT IN THE PLAN, FORGET WE HAD THIS CONVERSATION, AND FIRE ME WHEN I GO OVER BUDGET.
GIVE ME A NUMBER OR I'LL FIRE YOU RIGHT NOW.
OKAY, IT WILL COST TEN MILLION DOLLARS.
THAT'S TOO HIGH.
IF YOU ALREADY KNOW THE COST, WHY ARE YOU ASKING ME?
SO YOU'LL FEEL LIKE YOU HAD INPUT.
IS INPUT SUPPOSED TO FEEL THIS BAD?
E-mail: SCOTTADAMS@AOL.COM
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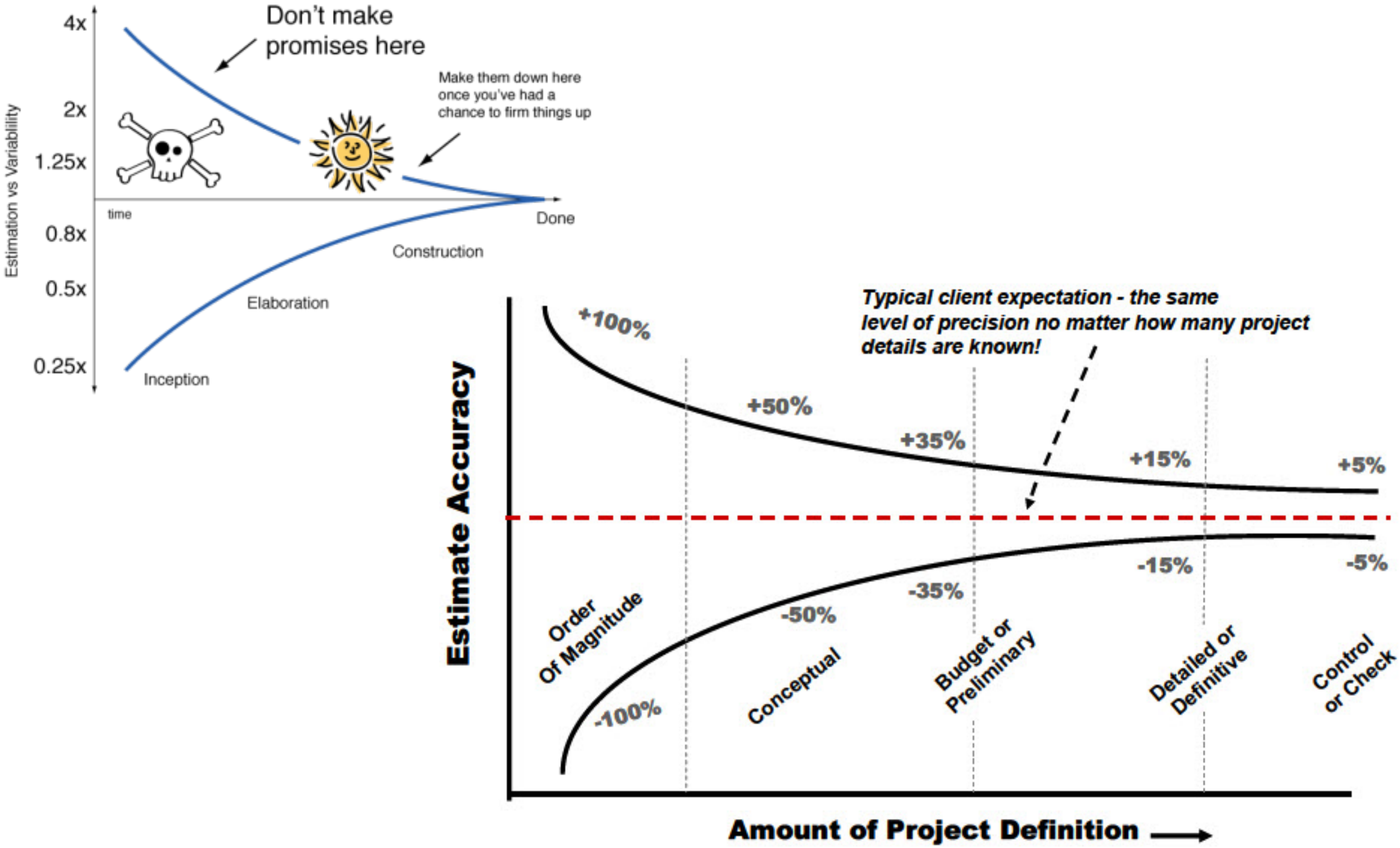
#3 Estimation != Commitment

Getting an estimate wrong doesn’t hurt

Iteratively increasing clarity



Don't make promises here

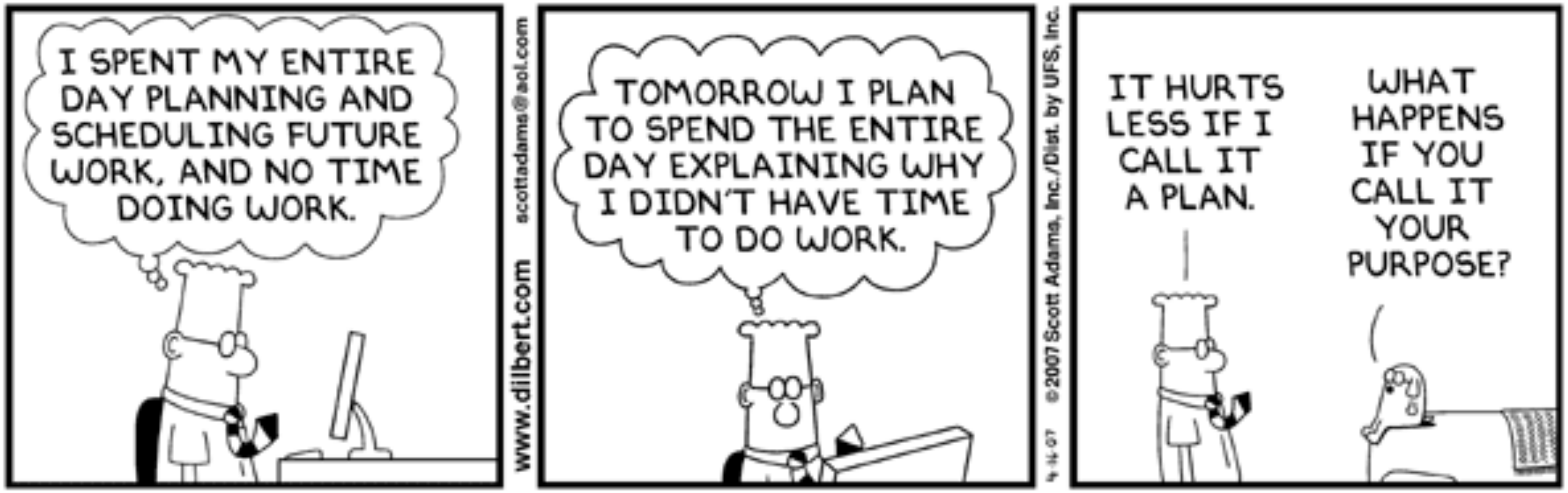
Make them down here once you've had a chance to firm things up

Typical client expectation - the same level of precision no matter how many project details are known!

#4 First try to measure, count and compute

Estimate only when necessary

Time to estimate


I SPENT MY ENTIRE DAY PLANNING AND SCHEDULING FUTURE WORK, AND NO TIME DOING WORK.
www.dilbert.com scottadams@aol.com
TOMORROW I PLAN TO SPEND THE ENTIRE DAY EXPLAINING WHY I DIDN'T HAVE TIME TO DO WORK.
4-16-07 © 2007 Scott Adams, Inc./Dist. by UFS, Inc.
IT HURTS LESS IF I CALL IT A PLAN.
WHAT HAPPENS IF YOU CALL IT YOUR PURPOSE?

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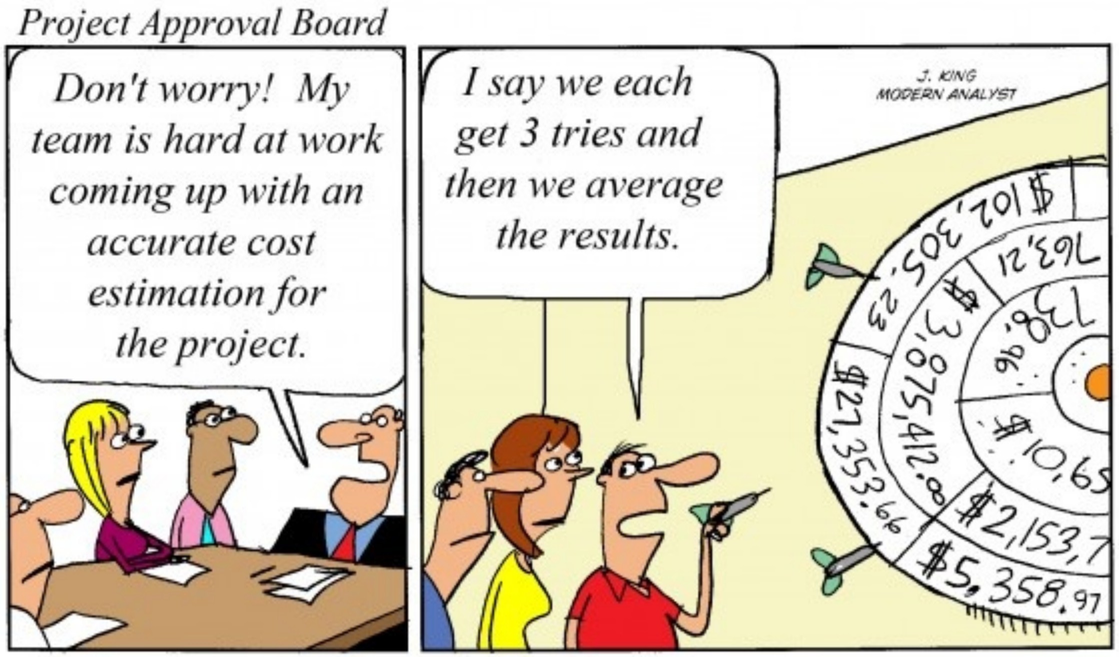
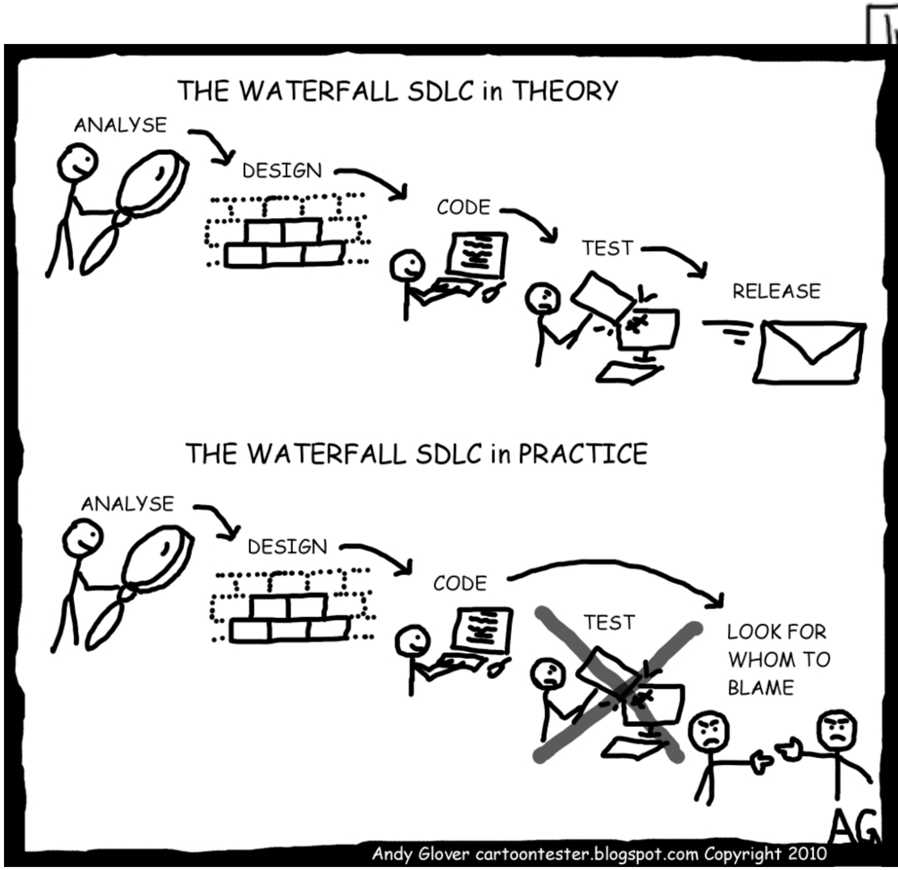
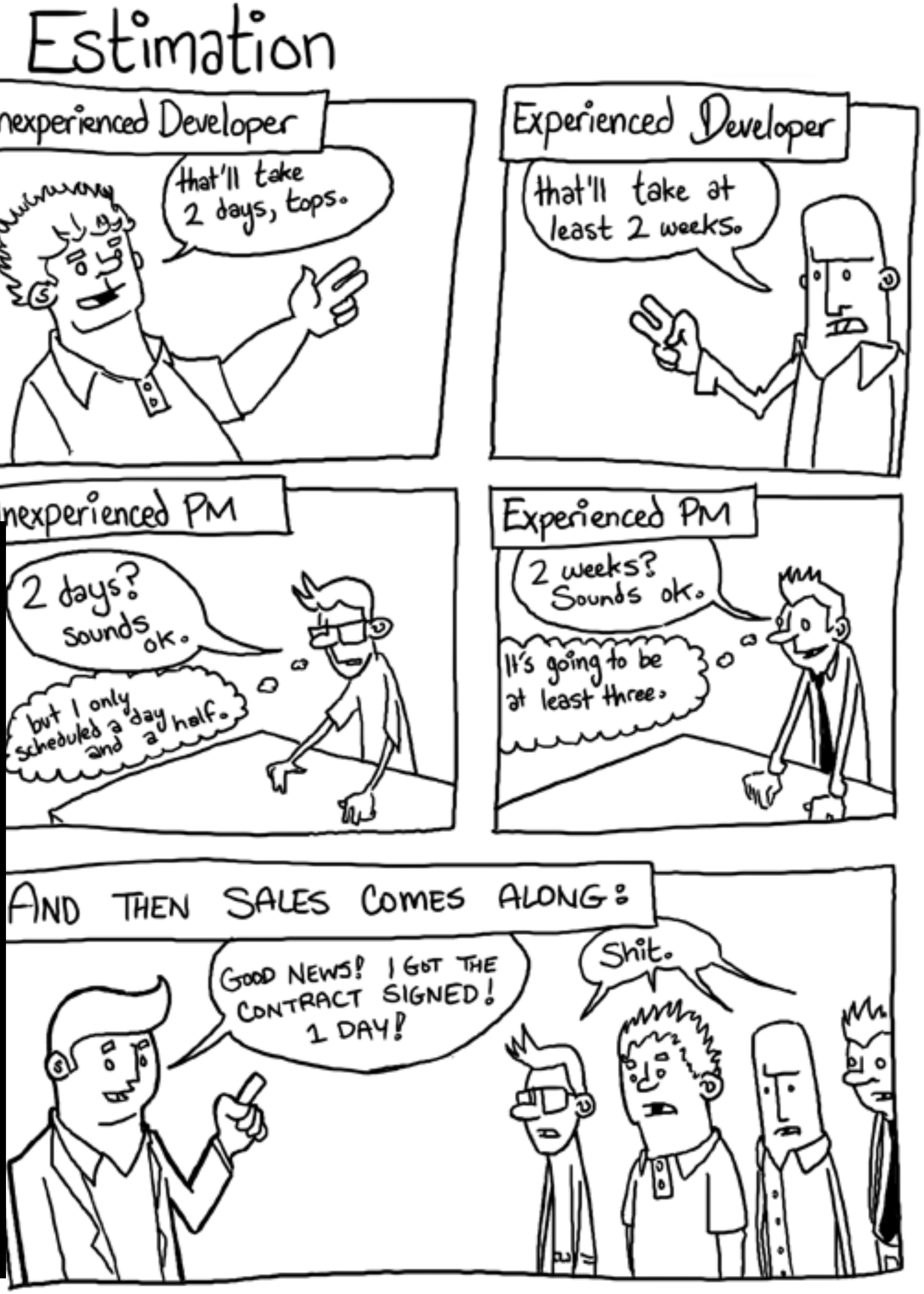
Team effort


Project Approval Board
Don't worry! My team is hard at work coming up with an accurate cost estimation for the project.
I say we each get 3 tries and then we average the results.
J. KING MODERN ANALYST
$102,305.23
763.21
138.96
$3,875,412.08
$10,65
$27,353.66
$2,153,7
$5,358.97

Reality



Andy Glover cartoontester.blogspot.com Copyright 2010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#5 Aggregate independent estimates

“Wisdom of the Crowds”

The law of large numbers
(or: statistics is on our side, for once)

- If we estimate with an error of x%
- The estimate of each scope item will have an error of x%
- But...
- Some items will be over-estimated, others under-estimated (maybe....)
- => The error on the total estimate is < x%

Estimation Methodologies

- Top-down
- Bottom-up
- Analogy
- Expert Judgment
- Priced to Win (request for quote – RFQ)
- Parametric or Algorithmic Method
  - Using formulas and equations

Wideband Delphi

- Group consensus approach
- Present experts with a problem and response form
- Conduct group discussion, collect anonymous opinions, then feedback
- Conduct another discussion & iterate until consensus
- Advantages
  - Easy, inexpensive, utilizes expertise of several people
  - Does not require historical data
- Disadvantages
  - Difficult to repeat
  - May fail to reach consensus, reach wrong one, or all may have same bias

Function Points

- Software size measured by number & complexity of functions it performs
- More methodical than LOC counts
- House analogy
  - House’ s Square Feet ~= Software LOC
  - # Bedrooms & Baths ~= Function points
  - Former is size only, latter is size & function
- Six basic steps

Function Point Process

- 1. Count # of business functions per category
  - Categories: outputs, inputs, DB inquiries, files or data structures, and interfaces
- 2. Establish Complexity Factor for each and apply
  - Low, Medium, High
  - Set a weighting multiplier for each (0 →15)
  - This results in the "unadjusted function-point total"
- 3. Compute an "influence multiplier" and apply
  - It ranges from 0.65 to 1.35; is based on 14 factors
- 4. Results in "function point total"
  - This can be used in comparative estimates

Function point multipliers

	Function Points		
Program Characteristic	Low Complexity	Medium Complexity	High Complexity
Number of Inputs	x 3	x 4	x 6
Number of Outputs	x 4	x 5	x 7
Inquiries	x 3	x 4	x 6
Logical internal files	x 7	x 10	x 15
External interface files	x 5	x 7	x 10

From Rapid Development by Steve McConnell

Counting the Number of Function Points

	Function Points		
Program Characteristic	Low Complexity	Medium Complexity	High Complexity
Number of Inputs	5 x 3 = 15	2 x 4 = 8	3 x 6 =18
Number of Outputs	6 x 4 = 24	6 x 5 = 30	0 x 7 = 0
Inquiries	0 x 3 = 0	2 x 4 = 8	4 x 6 = 24
Logical internal files	5 x 7 = 35	2 x 10 =20	3 x 15 = 45
External interface files	8 x 5 = 40	0 x 7 = 0	2 x 10 = 20
Unadjusted function-point total			287
Influence multiplier			1.20
Adjusted function-point total			344

From Rapid Development by Steve McConnell

Estimation Issues

- Quality estimations needed early but information is limited
- Precise estimation data available at end but not needed
  - Or is it? What about the next project?
- Best estimates are based on past experience
- Politics of estimation:
  - You may anticipate a "cut" by upper management
- For many software projects there is little or none
  - Technologies change
  - Historical data unavailable
  - Wide variance in project experiences/types
  - Subjective nature of software estimation

Over and Under Estimation

- Over estimation issues
  - The project will not be funded
    - Conservative estimates guaranteeing 100% success may mean funding probability of zero.
  - Danger of feature and scope creep
  - Be aware of “double-padding”: team member + manager

- Under estimation issues
  - Quality issues (short changing key phases like testing)
  - Inability to meet deadlines
  - Morale and other team motivation issues

Know Your Deadlines

- Are they ‘Real Deadlines’?
  - Tied to an external event
  - Have to be met for project to be a success
  - Ex: end of financial year, contractual deadline, Y2K
- Or ‘Artificial Deadlines’?
  - Set by arbitrary authority
  - May have some flexibility (if pushed)