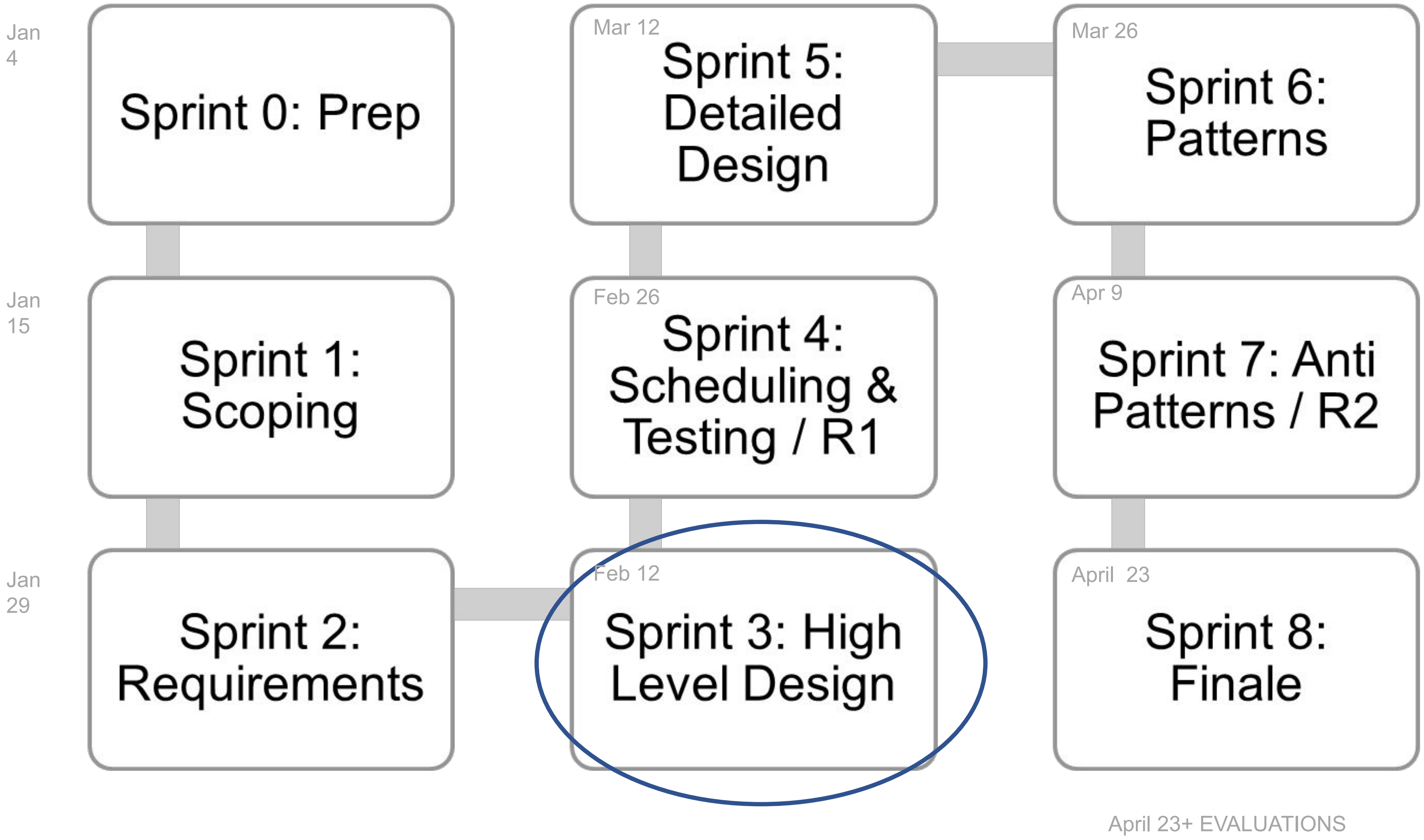
Requirements Estimation

Where are we..



Jan 4
Sprint 0: Prep

Jan 15
Sprint 1: Scoping

Jan 29
Sprint 2: Requirements

Feb 12
Sprint 3: High Level Design

Feb 26
Sprint 4: Scheduling & Testing / R1

Mar 12
Sprint 5: Detailed Design

Mar 26
Sprint 6: Patterns

Apr 9
Sprint 7: Anti Patterns / R2

April 23
Sprint 8: Finale

April 23+ EVALUATIONS

Lecture topics will follow this flow

As the projects tracks these sprints

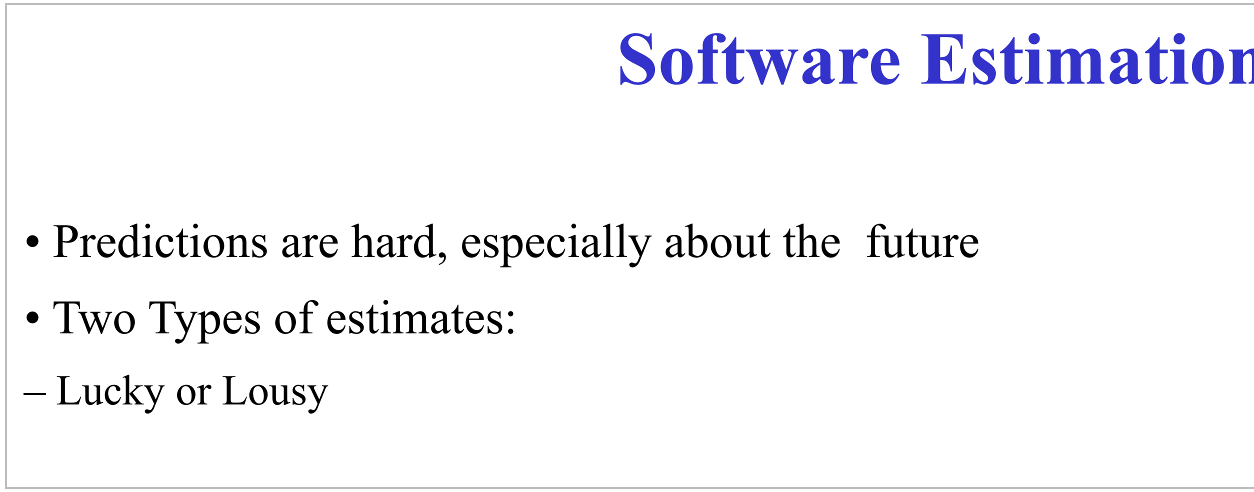
Submissions due along the way

Guest lectures from startups and Industry leaders

EACH SPRINT IS 2 WEEKS, Friday start.

What is Software Estimation?

Lets take some examples..



Software Estimation

- Predictions are hard, especially about the future
- Two Types of estimates:

– Lucky or Lousy

Can you estimate these?

1.Distance from Diorectors office to OAT
2. Surface temperature of the sun (in degrees C)
3. Latitude of Shanghai (in degrees)
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

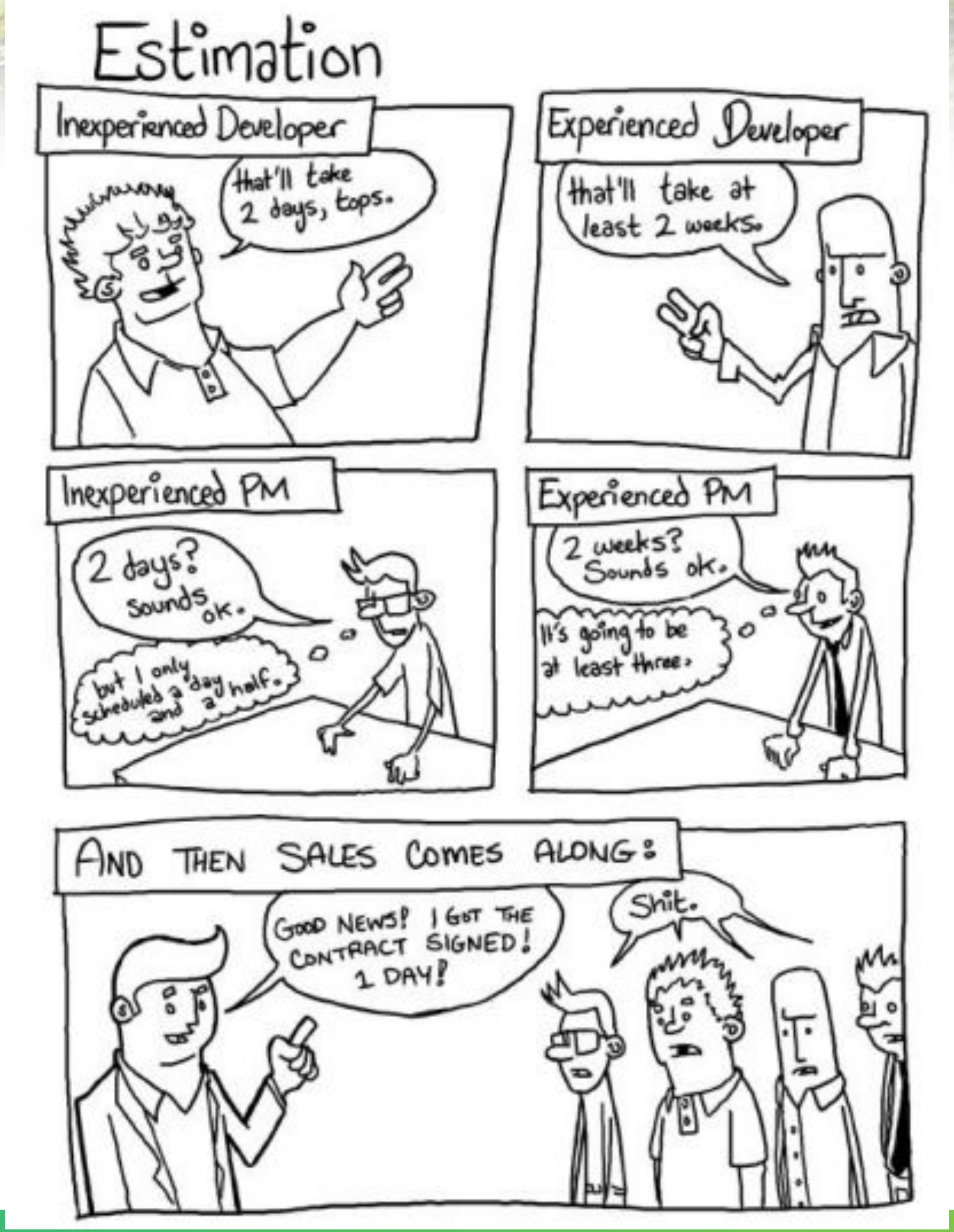
On what basis did you estimate? – Experience right?

(History matters…)

Likely as an “average” probability | For most software projects there is no such ‘average’

Remember, an “exact estimate” is an oxymoron

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.

.. Not this way, though

I'LL NEED A PROJECT PLAN TO JUSTIFY THE RESOURCES WE NEED TO CHANGE OUR SOFTWARE.
I CAN MAKE THOSE SOFTWARE CHANGES IN TEN SECONDS.
DONE.
GOOD WORK.
NOW ALL WE NEED IS THAT PLAN.
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11/10/98

Estimations

- Created, used or refined during
  - Strategic planning
  - Feasibility study
  - Proposals
  - Vendor and sub-contractor evaluation
  - Project planning (iteratively)

- Basic process

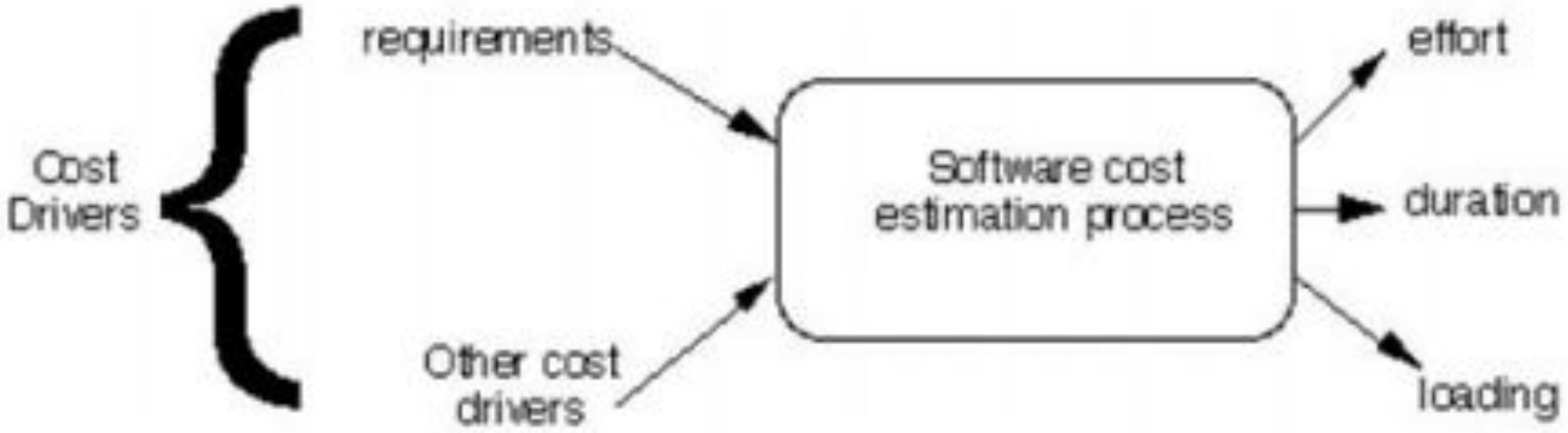
1) Estimate the **size** of the product
2) Estimate the **effort** (man-hours/man-months)
3) Estimate the **schedule**

– NOTE: Not all of these steps are always explicitly performed

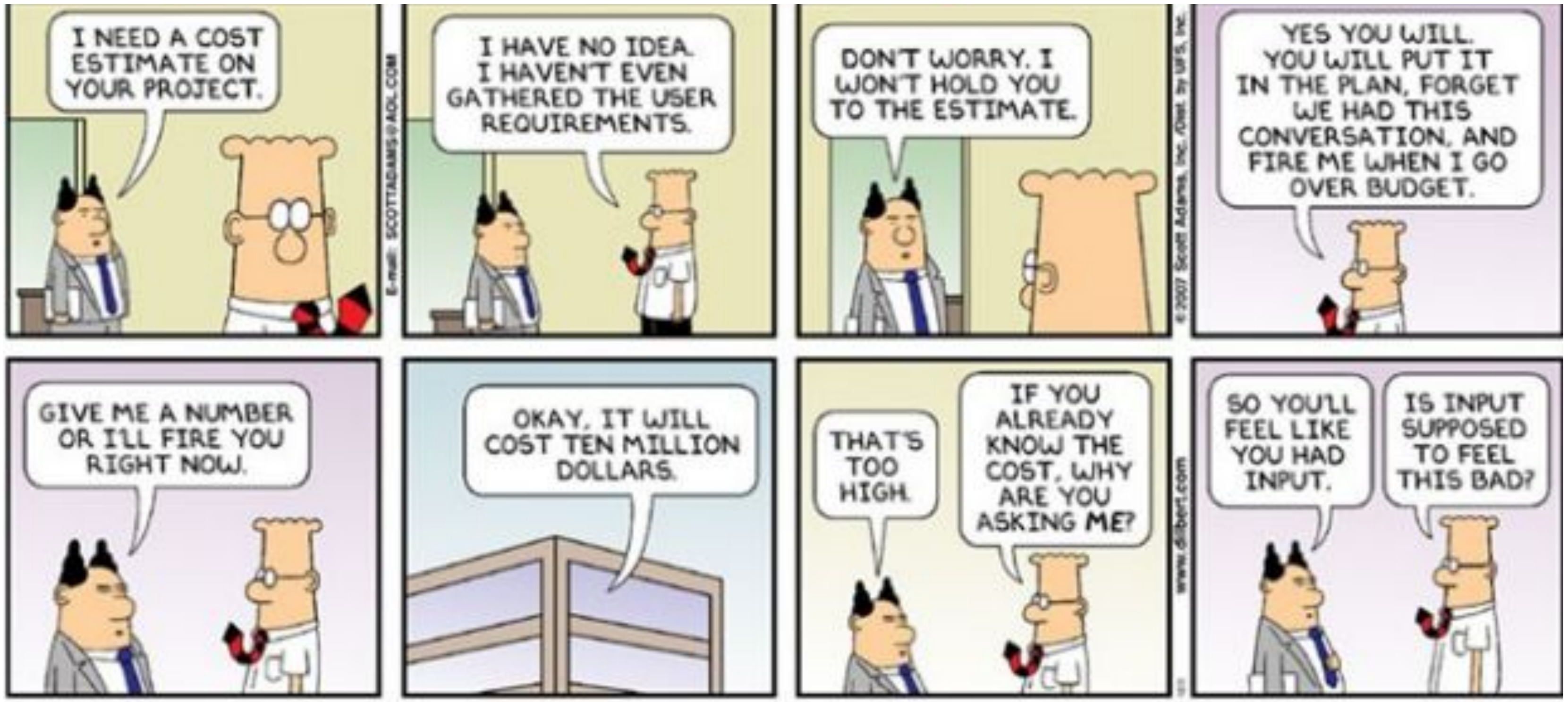
1: Always give a range Never give them a number

Numbers are for facts; Ranges are for estimates;

Approach: understand what it “may” take



#2 Always ask what the estimate will be used for


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?
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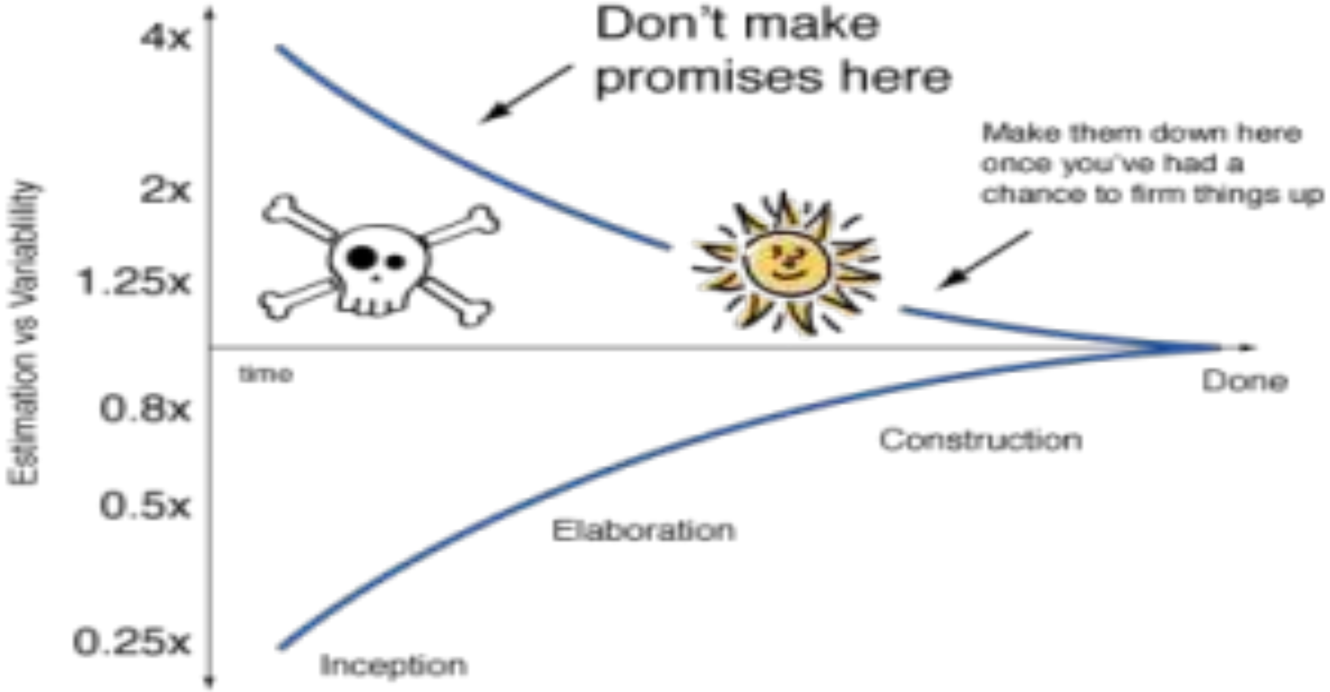
#3 Estimation != Commitment

So, Getting an estimate wrong doesn't hurt

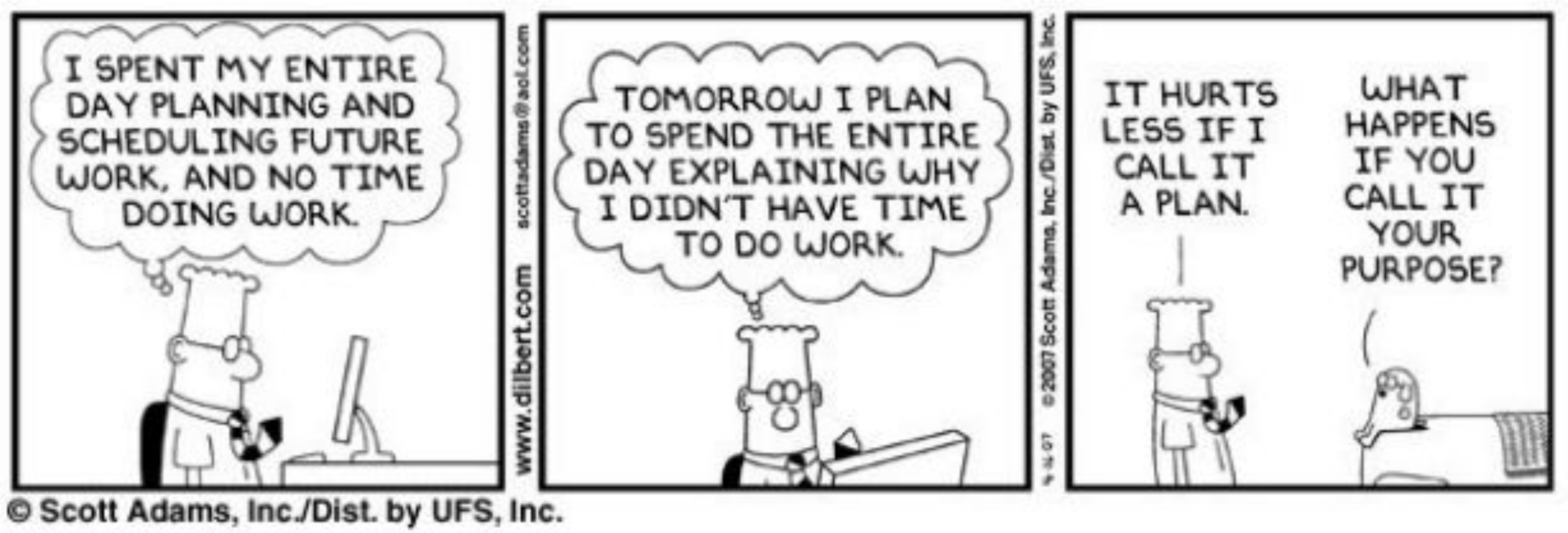
Iteratively increasing clarity



#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.
TOMORROW I PLAN TO SPEND THE ENTIRE DAY EXPLAINING WHY I DIDN'T HAVE TIME TO DO WORK.
IT HURTS LESS IF I CALL IT A PLAN.
WHAT HAPPENS IF YOU CALL IT YOUR PURPOSE?
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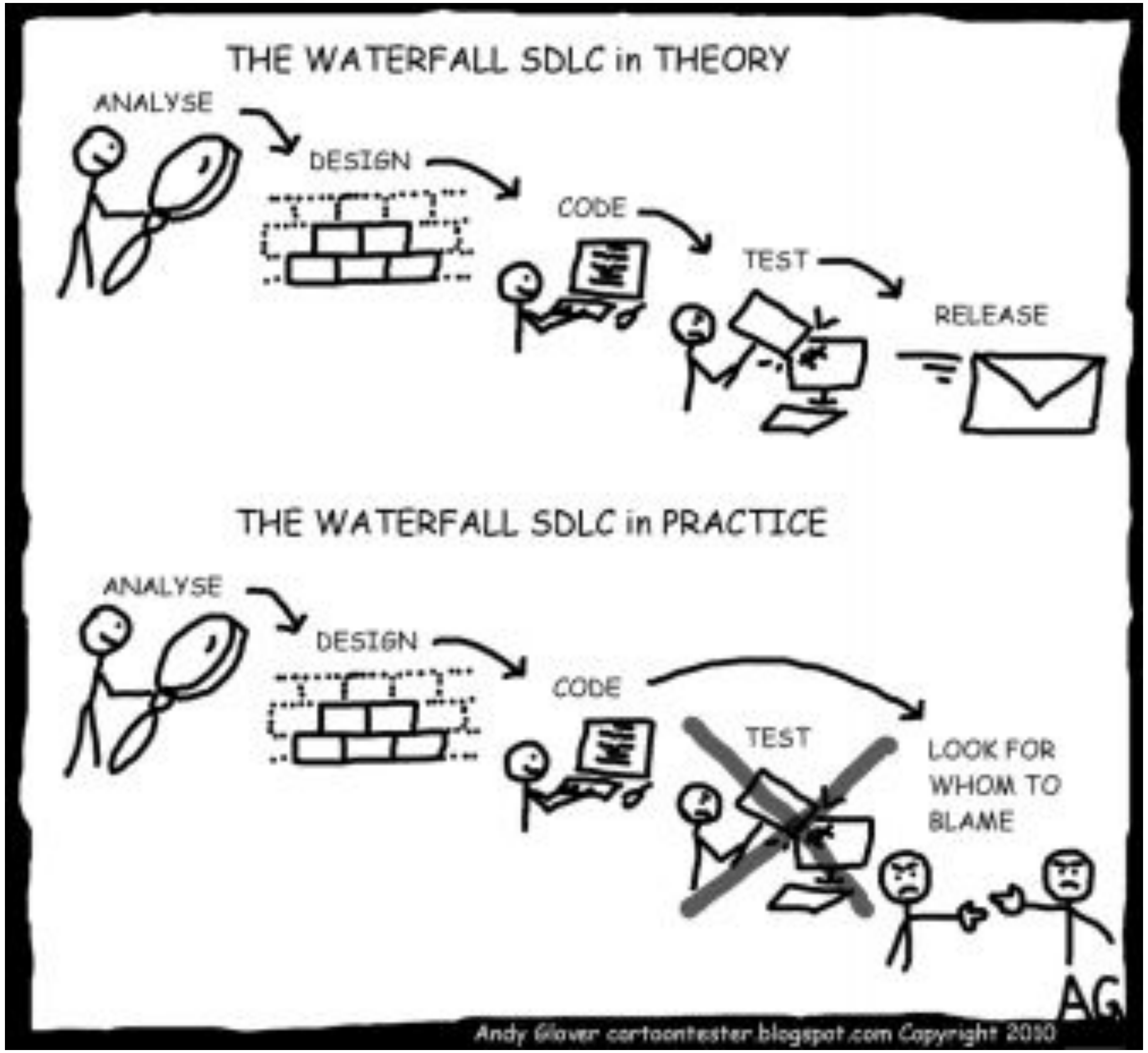
#5 Needs to be Team effort

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
$3,875,412.00
$27,353.66
$10,65
$2,153,7
$5,358.97

..

Mindful of Reality



Andy Glover cartoontester.blogspot.com Copyright 2010

#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

A measure: 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

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)

Project Management

Two over-arching inter-dependent aspects of software projects

– Process

– Project Management

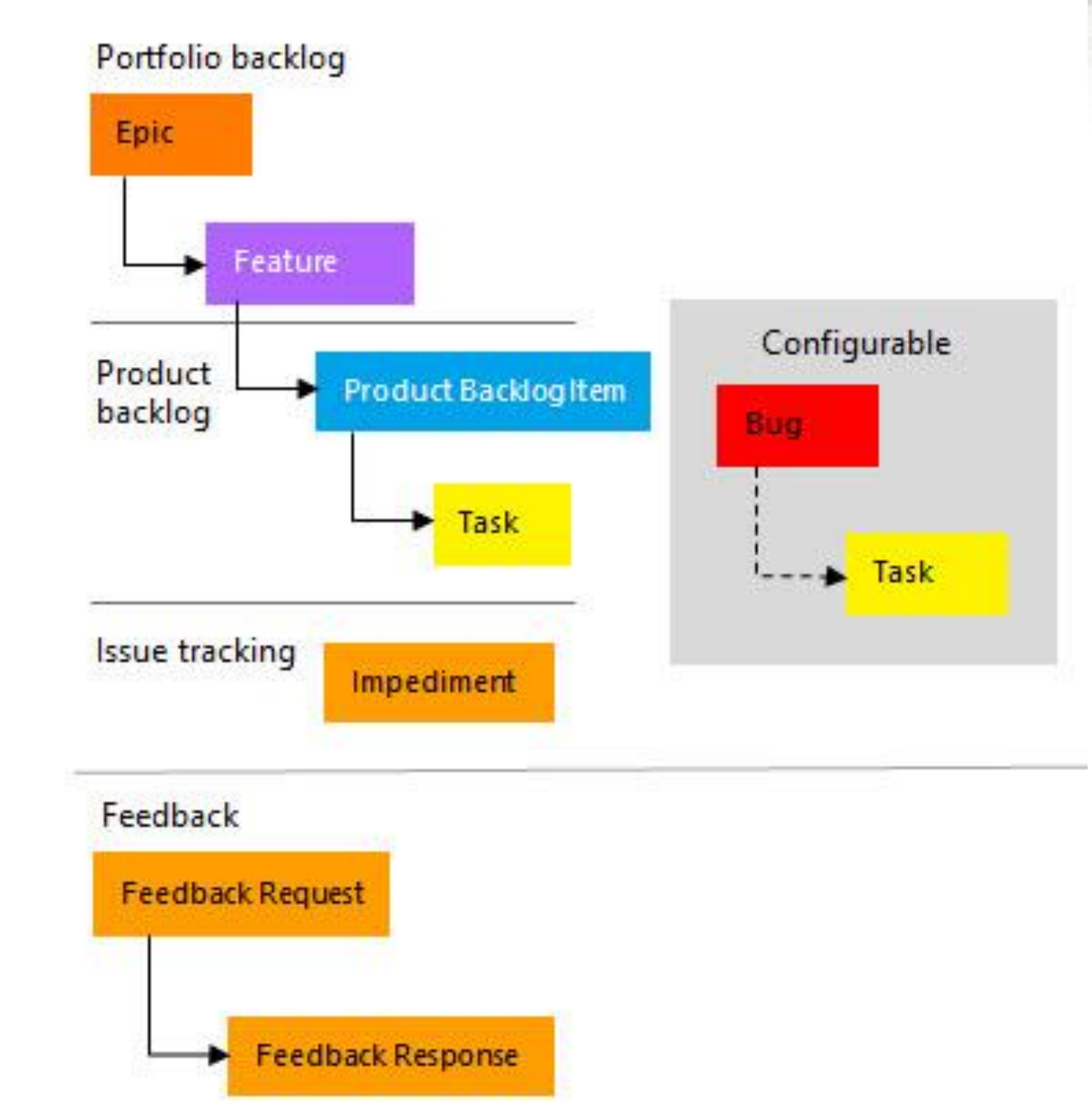
Main responsibilities of a project manager are

– Project planning

– Project monitoring and control

Annexure

Agile, recap



Portfolio backlog

Epic

Feature

Product backlog

Product Backlog Item

Task

Configurable

Bug

Task

Issue tracking

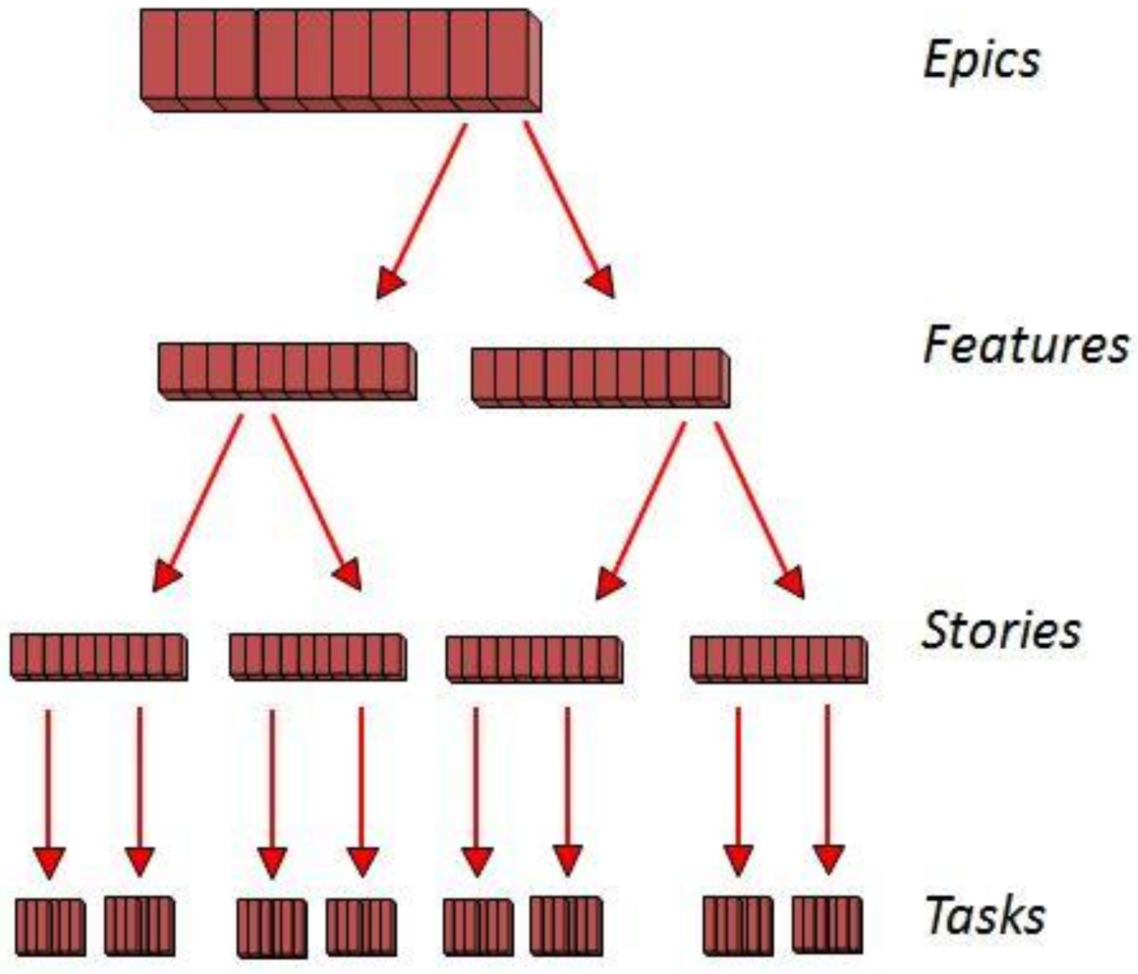
Impediment

Feedback

Feedback Request

Feedback Response

In Agile



Release theme. Summary of what will be in a release (as the end users can see/experience)

List key features in the release

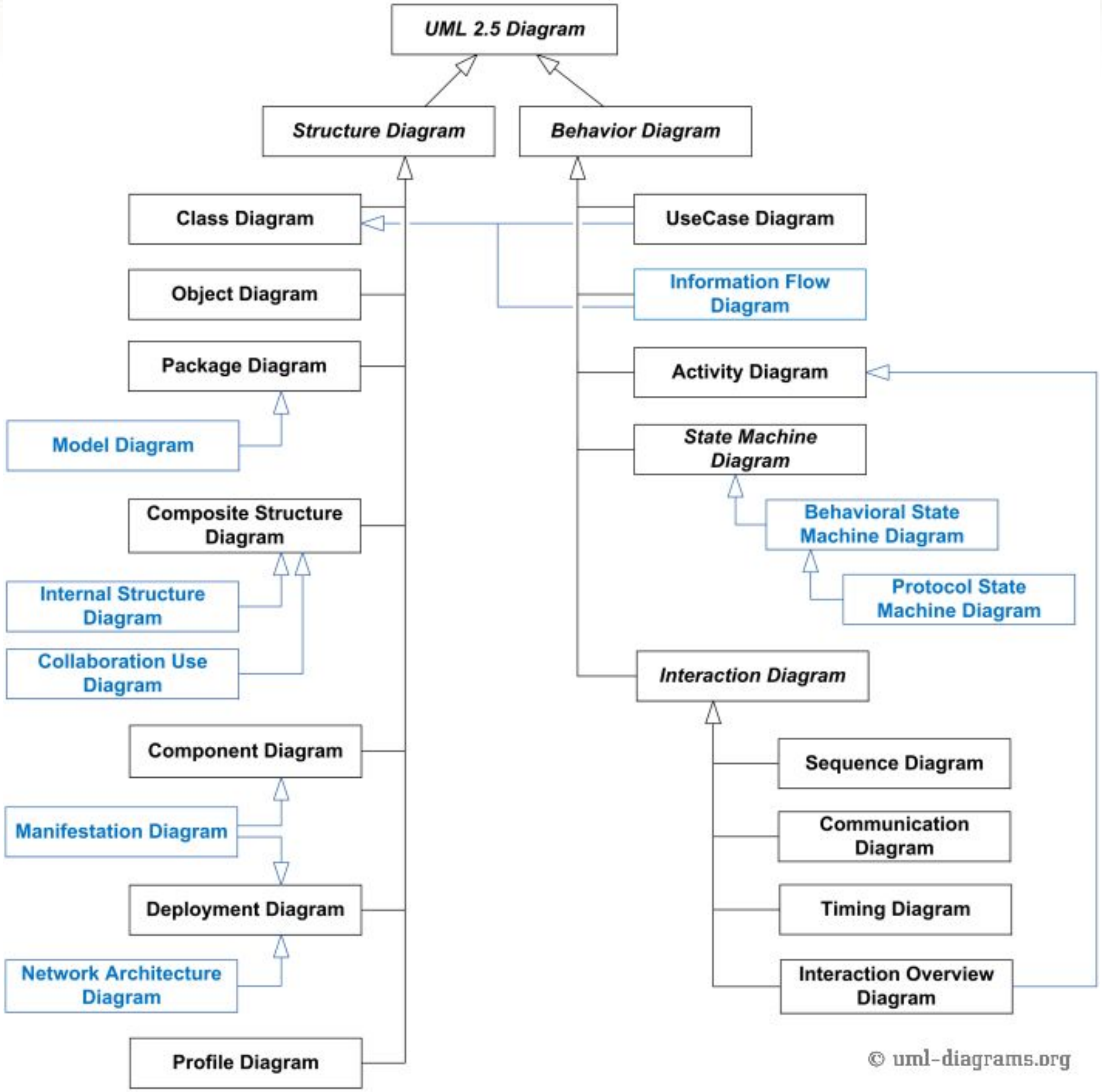
For each feature, list few capabilities that the user can see/do

Work items.. To be setup at start of sprint

UML

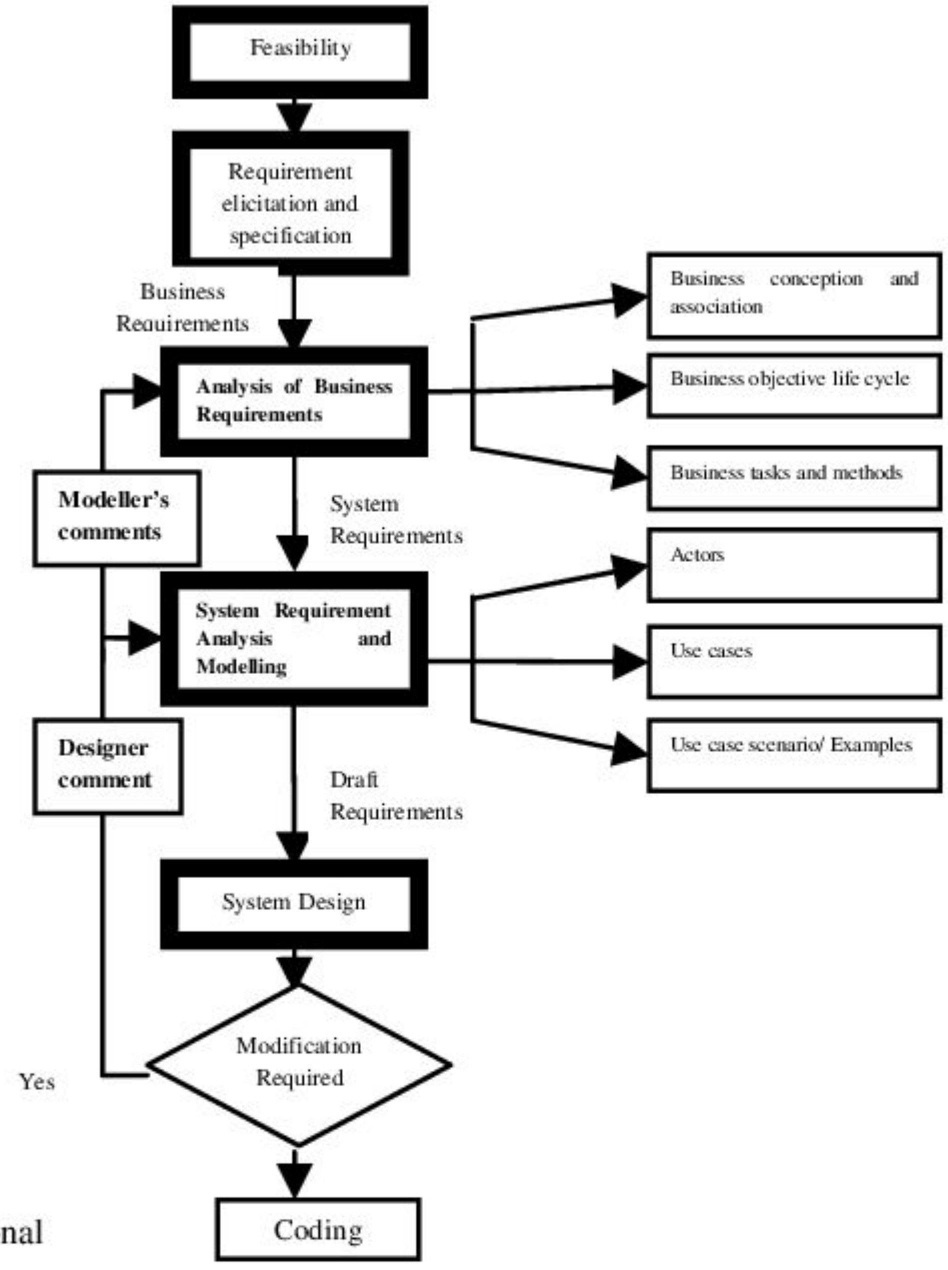
- *UML*, short for Unified Modeling Language
- A standardized modeling language
- As a set of diagrams
- To help project teams define, design and deliver projects
- Through.. UML Artifacts for
  - Specifying
  - Visualizing
  - Constructing
  - Documenting

- *A standard way to visualize the way a system has been designed. Similar to blueprints used in other fields of engineering.*



https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/

Requirements modelling Framework


Feasibility
Requirement elicitation and specification
Business Reauirements
Analysis of Business Requirements
Business conception and association
Business objective life cycle
Business tasks and methods
Modeller's comments
System Requirements
System Requirement Analysis and Modelling
Actors
Use cases
Use case scenario/ Examples
Designer comment
Draft Requirements
System Design
Modification Required
Yes
Coding

*Optional

Process of analysing Requirements

For each business process identified to be in scope:

- Critical Workflows and/or Use Cases are modeled as UML Action Diagrams.
- Analyst documents Action Diagrams.
- Stakeholders review documented Action Diagrams.
- Use Cases identified in Action Diagrams are further analyzed.
- Analyst documents Use Cases, [Entity] Class model, and Business Rules.
- Required interfaces and reports are identified and documented.
- Analyst drafts Administration Use Cases.

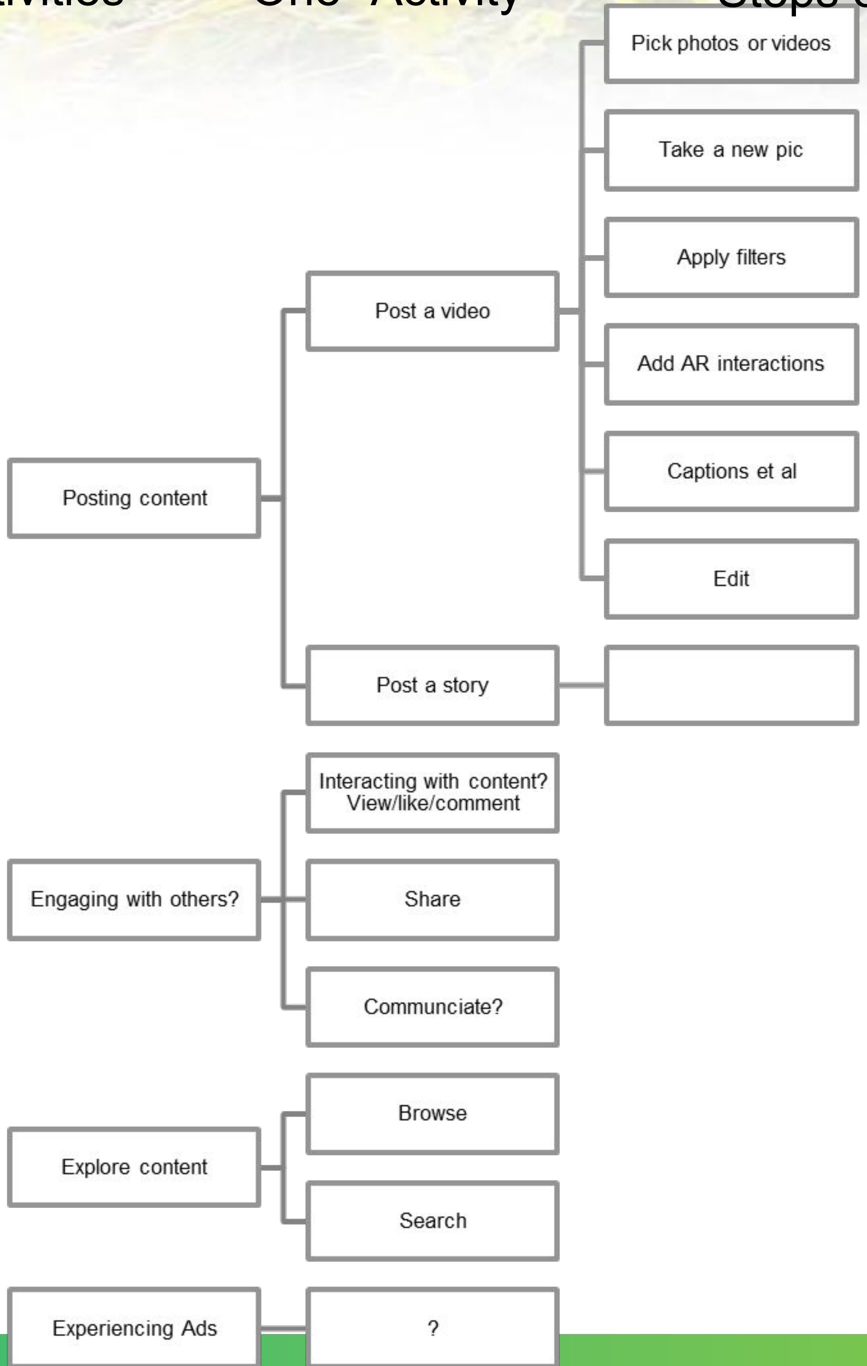
SCENARIO
Set of “related” activities

USECASE
One “Activity”

TASKS
Steps or tasks

Example Insta

- Posting Videos
- Filters
- Communciate with others/ Chat
- Create posts & stories
- View stories & posts .. Like/react
- Reels
- Store users pics/videos
- Share/Save the posts
- Search
- Sponsored ads
- Manage multiple accts
- Biz & verified acvccounts
- Network.. Follow Unfollow

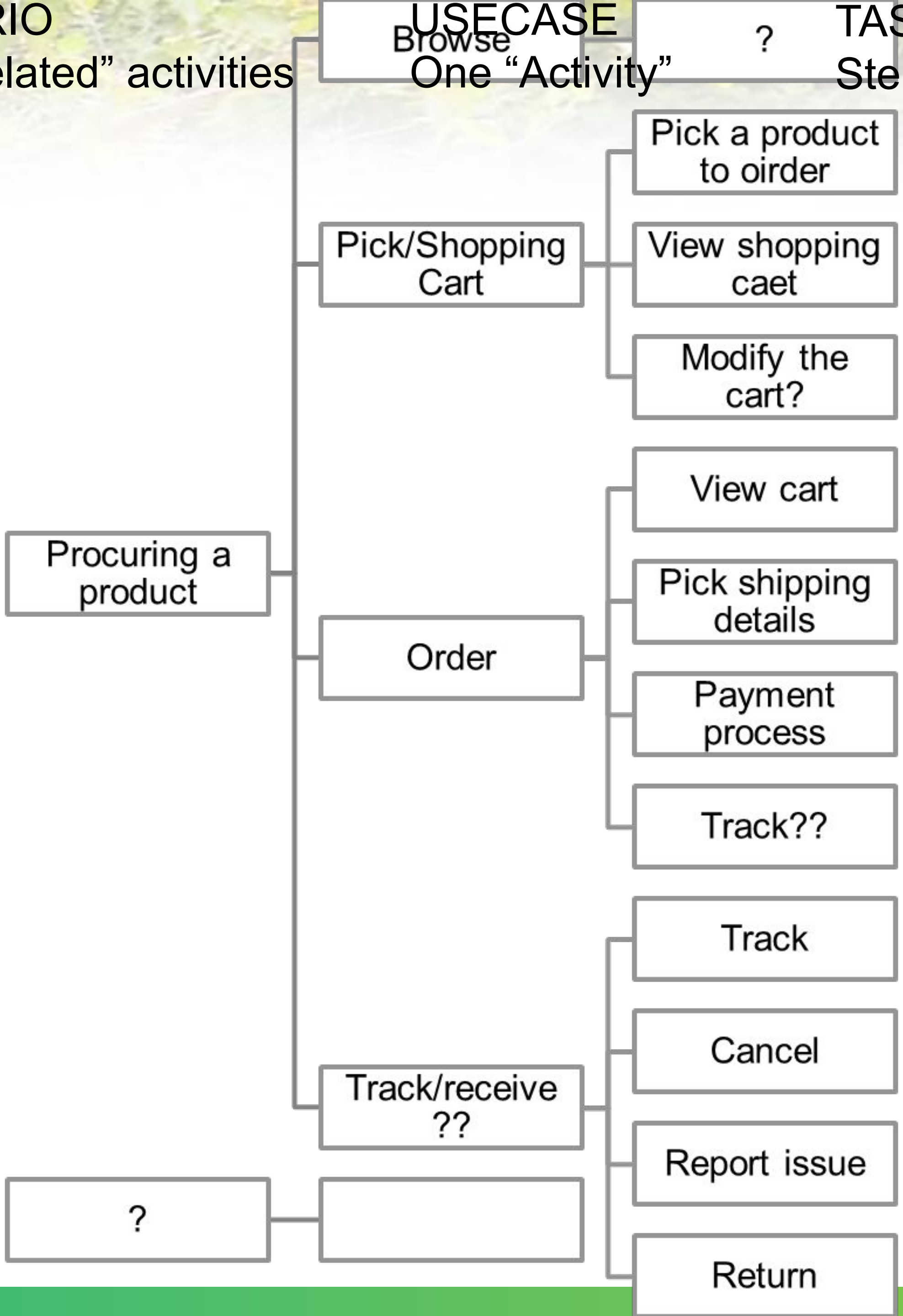

Posting content
Post a video
Pick photos or videos
Take a new pic
Apply filters
Add AR interactions
Captions et al
Edit
Post a story
Engaging with others?
Interacting with content? View/like/comment
Share
Communciate?
Explore content
Browse
Search
Experiencing Ads
?

eCom example

SCENARIO
Set of “related” activities

USECASE
One “Activity”

TASKS
Steps or tasks



- Procuring a product
  - Browse
    - ?
  - Pick/Shopping Cart
    - Pick a product to oirder
    - View shopping caet
    - Modify the cart?
  - Order
    - View cart
    - Pick shipping details
    - Payment process
    - Track??
  - Track/receive ??
    - Track
    - Cancel
    - Report issue
    - Return
- ?