SOFTWARE ENGINEERING

Software Process

Objectives

- To introduce software process models
- To describe three generic process models and when they may be used
- To describe outline process models for
  - requirement engineering
  - software development
  - testing and evolution
- To introduce CASE tools to support software process activities

THE SOFTWARE PROCESS

- A structured set of activities required to develop a software system
  - Specification
  - Design
  - Validation
  - Evolution
- A software process model is an abstract representation of a process
  - A description of a process from some particular perspectives

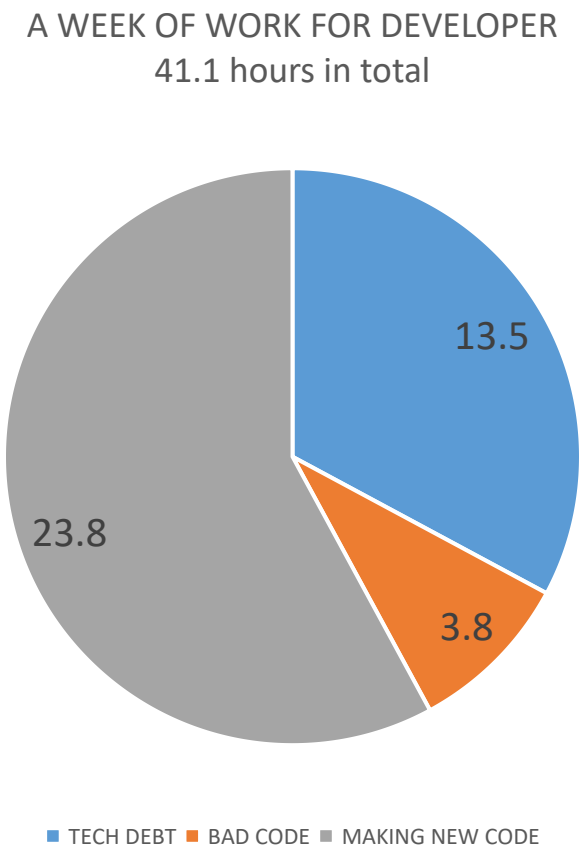
WHY USE SOFTWARE MODELS?

- An example: Building a skyscraper

1. Placement and location:
   - Blue Prints, Safety Checks, External Force Calculation
2. Design:
   - Architecture Design, Model Testing, Framing...
3. Cost Estimation
   - Bidding, Negotiation, Permits, Fees, ...
4. Construction
   - Break Ground, Compaction of Soil, Decking Plan, ...

WHY USE SOFTWARE MODELS?

- THE $85 Billion Cost of Bad Code



Source: pullrequest.com/blog/cost-of-bad-code

- TECH DEBT: A poor implementation which will have to be repaid with interest later on
- DEBUGGING bad code
- 1 hour saved now could cost 20+ hours later
- 20% of projects fail. Many of these are due to poor development practices

GENERIC SOFTWARE PROCESS MODELS

- The waterfall model
- Evolutionary development
- Component-based software engineering
- Variants of these models

WATERFALL MODEL

Requirements

Design

Implementation

Verification

Maintenance

WATERFALL MODEL

- HOW
- WHAT
- TESTING
- BUILD
- LIFECYCLE
- NEW FEATURES
- DEBUG
- DEV TOOLS

SOFTWARE EXAMPLE - Building a Form

Requirements

Design

Implementation

Verification

Maintenance

WATERFALL MODEL

Requirements

- Collect email address and message
- Send to and store in a database
- Prevent user from bad input

Design

Implementation

Verification

Maintenance

WATERFALL MODEL

Requirements

Design

- Use HTML and CSS for building the framework of the form
- Use JS for verification of the input
- Use JQuery and MySQL for contacting backend

Implementation

Verification

Maintenance

WATERFALL MODEL

Requirements

Design

Implementation

- CODE and DOCUMENT the work

Verification

Maintenance

WATERFALL MODEL

Requirements

Design

Implementation

Verification

- Does the form collect information?
- Does the form send that information to the database
- Does the form prevent bad user input?

Maintenance

WATERFALL MODEL

Requirements

Design

Implementation

Verification

Maintenance

- Create lifecycle plan, fix any bugs

QUIZ 1

Which area do you focus on building the actual product?

REQUIREMENTS

DESIGN

IMPLEMENTATION

VERIFICATION

MAINTAINANCE

QUIZ 2

We are looking to add some new features and fix bugs. Which part of the software development cycle are we in?

REQUIREMENTS

DESIGN

IMPLEMENTATION

VERIFICATION

MAINTAINANCE

QUIZ 3

We are trying to define the problem at hand. Which step in the software development lifecycle are we in?

- **REQUIREMENTS**
- **DESIGN**
- **IMPLEMENTATION**
- **VERIFICATION**
- **MAINTAINANCE**