Introduction to Software Engineering

CMPT 276

Based on slides from Software Engineering 9th ed, Sommerville; Ch1

Topics

1) What is software engineering?
2) What types of software are there?
   (And how do we develop them?!?)

Software Engineering

Software Engineering

- Software engineering is concerned with..

Discipline:
Using appropriate theories and methods to solve problems meeting business and financial constraints.

All Aspects:
Not just writing code: includes project management, development of tools, methods etc. to support software production.

- It is a discipline concerned with all aspects of software production..

(Loose) Overview of Job Terminology

- Programmer
  - (code monkey)
- Engineer
  - In Canada, "Engineer" often refers to licensed members of the engineering profession.
- Software Developer
  - Someone who applies..
  - SFU SoSy program focuses on this.

Importance of Software Engineering

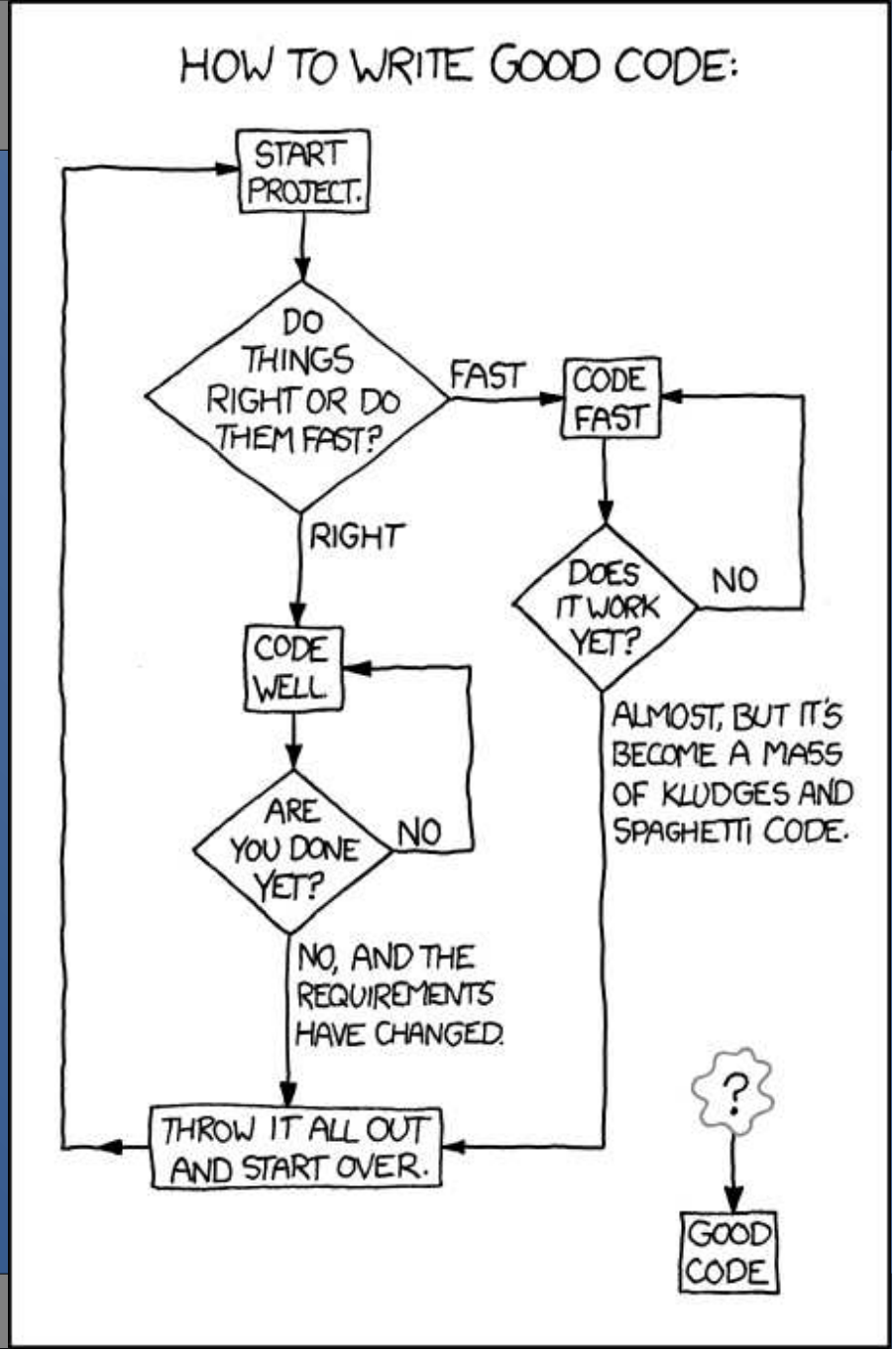
- Society increasingly reliant on software systems.
  - Power grid, cell phone network, transportation network, Internet, Interact (debit cards), email, etc.

Importance of SE.

- How can we create reliable systems economically and quickly?
  - Cheaper to use..

    methods vs write the programs as if it was a..

  - Majority of costs is for..



http://xkcd.com/844/

Software Process Activities

-
  - customer and developers define software features and constraints on its operation.
-
  - design and program the software.
-
  - ensure software is what customer requires.
-
  - modify software to reflect changing customer and market requirements.

Essential Attributes of Good Software

- Maintainability
  - Change is inevitable: develop software so that it can..
- Dependability and Security
  - Must be..
    not cause physical or economic damage on failure.
  - Malicious users unable to access/damage system.
- Efficiency
  - Efficient use of resources: processing time, memory.
- Acceptability
  - Software must be acceptable its users:
    understandable, usable, and
    compatible with other systems.

Software Engineering
Diversity

Activity: Classify Types

- In a group of ~2, complete the following table

Application	Category	Hardest thing about doing it right?
World of Warcraft		
Anti-lock brake controller		
TD Bank online banking		
Angry Birds Android App		

Application Types

- Embedded
  - Software..
  - More embedded systems than any other type of system.
- Entertainment
  - Games primarily for personal use.
- Batch processing
  - Ex: payroll; monthly billing by a phone company
- Modelling and simulation
  - For scientists and engineers to..
  - Ex: car crashes, nuclear reactions, weather prediction

Application Types (cont.)

- Web software
  - Reuses many system components
- Software as a Service
  - Applications run..
    Users don't buy software buy pay according to use
  - Ex: Google docs, Amazon Web Services, etc.
  - Cloud ‘as-a-service’ types:
    - Software as a Service (SaaS)
    - Infrastructure as a Service (IaaS)
    - Platform as a Service (PaaS)

General Software Issues

- Diverse Types of Systems
  - Distributed systems operate across networks:..
- Changing Environment
  - Software has to keep up with rapidly changing business and society
  - Must change existing software and rapidly develop new software
- Security and Trust
  - Software is intertwined with all aspects of our lives:..

Diversity of Projects

- Common Need: All software projects should be..
- Different Needs: Different types of systems require..
  - Games developed in..
  - Life-critical systems need..
  - No one method is better than others in all cases.
- Select software engineering methods and tools by:
  - type of application being developed,
  - the requirements of the customer, and
  - the background of the development team.

Summary

- Software engineering is a discipline concerned with all aspects of software production.
- Essential software attributes:
  - maintainability, dependability & security, efficiency, and acceptability.
- Software process activities:
  - specification, development, validation and evolution.
- Fundamentals of software engineering are applicable to all types of system development.
- Different types of system requires different software engineering tools and techniques for their development.