

Introduction to Software Engineering

CMPT 276

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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.

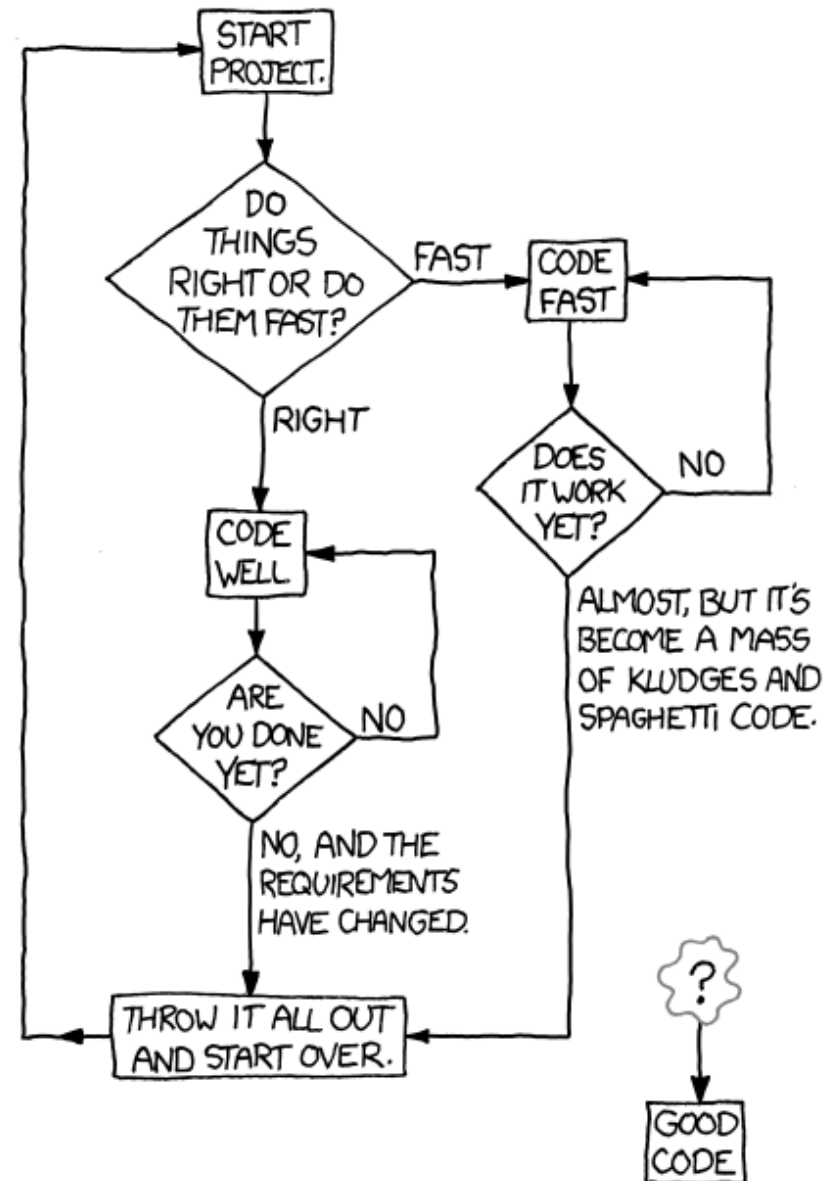
- How can we create reliable systems economically and quickly?

- Cheaper to use..

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

- Majority of costs is for..

HOW TO WRITE GOOD CODE:



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.