

Structured Systems Analysis and Design & Project (ICS 261)

(Week 1, Session 1) Monsoon 2016

SSAD - What can we expect?

- ▶ Creating user-friendly software
 - ▶ Frontend: GUI / Web
 - ▶ Backend: Databases + Network
- ▶ By the end of this course you should be able to creating reasonably large, maintainable software using
 - ▶ Software engineering principles, processes and more...



What do these have in common?

- They all need a *lot* of software to operate. How much?
 - The Boeing 777 flies with over 4,000,000 lines of code on-board.
 - A typical top-level game has between 1 and 2 M SLOC (source lines of code)
- These are **huge** software systems that can not be thought of one line or class at a time. The software engineer needs to think about the design at different levels—from a line of code up to the entire system.



Software engineering design

$$1 \text{ SLOC/min/SE} * 60 \text{ min/hr} * 40 \text{ hrs/wk} = 2,400 \text{ SLOC/wk/SE}$$

$$2,400 \text{ SLOC/wk/SE} * 50 \text{ wk/year} = 120,000 \text{ SLOC/year/SE}$$

$$2 * 10^6 \text{ SLOC} / 1.2 * 10^5 \text{ SLOC/yr/SE} = \sim 17 \text{ SEs for the year}$$



Teamwork



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Sign in using our secure server

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One large ecommerce application. Complex!!!

One small software upgrade. Easy.

One 90 minute outage. Priceless?

This is a financial-critical system.

This team needed a better understanding of the process for developing a financial-critical system, and how to bring an upgrade

Software development process

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The software engineer's daily job is to answer questions about the software system.

- ▶ How can I help the customer? What is required to solve the customer's problem?
- ▶ How will the user interact with the system?
- ▶ What operating system, language, hardware is going to be used?
- ▶ What is the overall software system structure and how do different components interact with each other?
- ▶ What code do I have to write?
- ▶ How do I organize my team so we are effective?
- ▶ Can we finish the game in time to have it on the shelves for Christmas shopping?



To answer those questions, the software engineer must work with many people.

- ▶ Customers asking for the system
- ▶ People who will use the system
- ▶ Domain experts: banking, avionics, security, medical, scientists, ...
- ▶ Engineers from other engineering disciplines
- ▶ Most closely with the other software engineers on the project

Communication



Yes, software engineers get their hands dirty writing programs using the latest technologies and techniques.

Maintenance
Agile, SCRUM
Interaction
Desktop, embedded, mobile, web-based
Open source
Networks
Extreme programming
Concurrency
Teams
Data flow
SVN, CVS
Accessibility
Computer games
Testing
Functions, Methods
Security
Websites
Ruby, PHP
Graphics
Hardware
User-centered
GUI
AJAX
Meetings
Linux, .NET, OS X
Software architecture
SQL
UML
Financial systems
Requirements scenarios
Databases
Design patterns
Java, C++, Python
Objects, classes
Software models



Attitude

- ▶ To be confident of setting up your own computer, automate routine tasks, and be skilful with several aspect of software development (most of the time).
- ▶ You can't say – I can't do it because no one taught me how.
 - ▶ Useful [links](#) to online reading material will be provided
 - ▶ You are expected to do most of the work
 - ▶ Because *doing is learning*.
- ▶ The more you struggle now, the easier it will be later.



Important link

moodle.iiit.ac.in

Keep checking at least once every day...