CMPT 473
Software Testing, Reliability and Security

Intro to Software Quality

Nick Sumner

Today

- Quiz
- Administrivia
- Overview
- Intro to Software Quality

Course Website

- http://www.cs.sfu.ca/~wsumner/teaching/473/
  - Policies
  - Schedule
  - Reading
  - Assignments
  - Exam/Course Project
  - …

People

- Instructor: Nick Sumner
  - Office Hour: Wednesday 3:30-4:30
  - Office: TBD

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- TAs: Poornima
  Kumar Shivam

Grading

- 45% Exercises
- 30% Exam
- 25% Quizzes (Dropping the worst 2) & Homework

Exercises

- 5ish Exercises

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- Practical experience learning how to use tools & techniques

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- Exercises may be turned in late with a 20% penalty for each day.

Exams

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  1) Written final exam

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     - Requires meeting with me by the middle of the semester to get a project approved (and to commit to a project)

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- Why two options?

Reading

- Not *required* to purchase any books for the course

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- Books available online or through library for reading assignments

Reading

- Not *required* to purchase any books for the course
- Books available online or through library for reading assignments
- Still need to complete reading assignments before class for the day they are assigned

End of the Administrivia

Q&A

What is Software Quality?

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- Bad software costs developers and users ***billions*** of dollars a year, but why?
  - What is `good' software?
  - What is `bad' software?



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News release

Tim Hortons app violated privacy law
collection of 'vast amounts' of sensi
location data

GATINEAU, QC, June 1, 2022 – People who downloaded th
Hortons app had their movements tracked and recorded eve
minutes of every day, even when their app was not open, in
violation of Canadian privacy laws, a joint investigation by
and provincial privacy authorities has found.

NewScientist

SUBSCRIBE AND SAVE 72%

r, but

Log4j software bug is 'severe risk' to the entire internet

A flaw in a commonly used piece of software has left millions of web servers vulnerable to exploitation by hackers

TECHNOLOGY 13 December 2021

By Matthew Sparkes



Office of the Privacy Commissioner of Canada

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Simple Flying

Home › Airline News

Southwest Airlines Says Its Scheduling Software Should Be Fixed Today

Southwest has shared that the scheduling problems from last December will be fixed today.

BY **RILEY PICKETT** PUBLISHED FEB 10, 2023



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What is Software Quality?

- Bad software costs developers and users ***billions*** of dollars a year, but why?
  - What is `good' software?
  - What is `bad' software?
  - Try to identify 5-6 most important characteristics of `quality' software. (and examples)

It is a Matter of Perspective

Your *role* relative to the software changes what is important to you.

- End Users

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  - Is it responsive?

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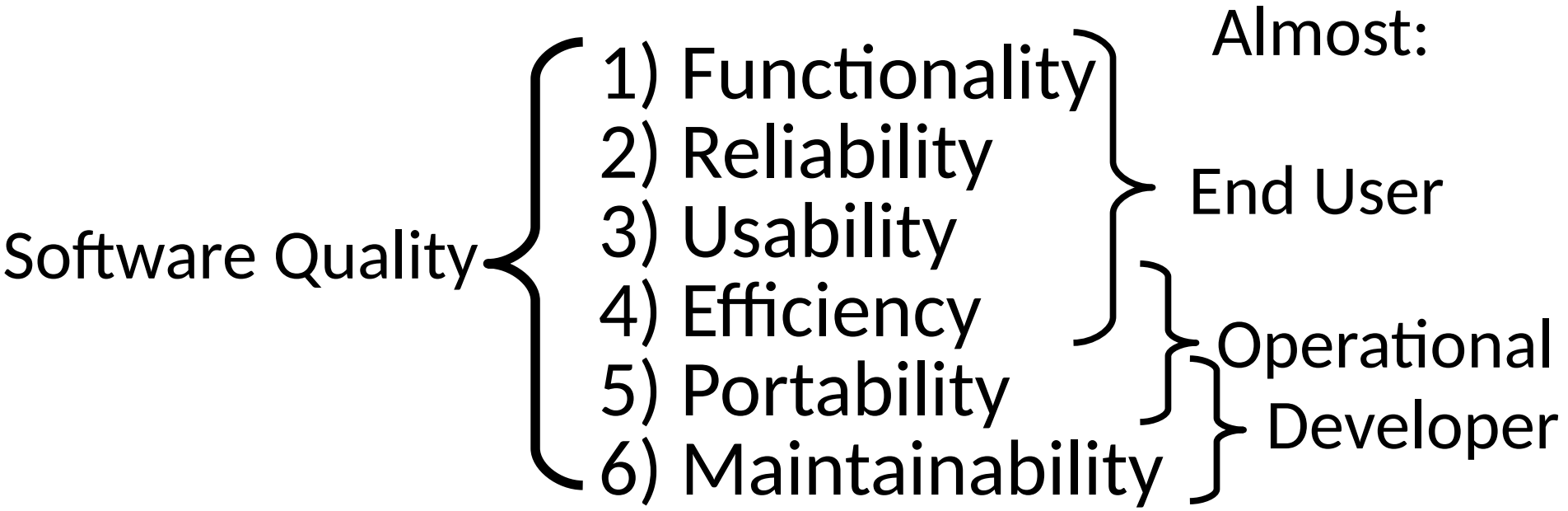
Standardized

- ISO/IEC 9126 groups them as:

Software Quality
1) Functionality
2) Reliability
3) Usability
4) Efficiency
5) Portability
6) Maintainability

Standardized

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Going Deeper

- Reliability – Doesn't just mean not having faults!

Going Deeper

- Reliability – Doesn't just mean not having faults!
  - Avoid failure resulting from software faults
  - Maintain performance in the face of faults or attacks
  - Reestablish performance and data after a failure

Going Deeper

- Usability- Beyond adequate to polished

Going Deeper

- Usability- Beyond adequate to polished
  - Helps user understand whether the program meets their needs
  - Features & uses are easy to learn
  - Easy to operate & control
  - Liked!

Going Deeper

- Maintainability- Makes developers lives easier

Going Deeper

- Maintainability- Makes developers lives easier
  - Defects are easy to identify
  - Changes are easy to understand & don't affect other components
  - The software is easy to test

Measuring Quality

How Can We Measure Quality?

These characteristics may be vague or ill defined.

So how do we do it?

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So how do we do it?

- Planning
  - Decide what criteria are most important
  - Form a plan to assess them, directly or indirectly

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So how do we do it?

- Planning
- Process
  - Code reviews help to improve maintainability & reduce bugs
  - Regular monitoring

How Can We Measure Quality?

These characteristics may be vague or ill defined.

So how do we do it?

- Planning
- Process
- Testing!!
  - Show that you meet the minimum agreed requirements
  - Observe defects and performance issues.

Quality Processes

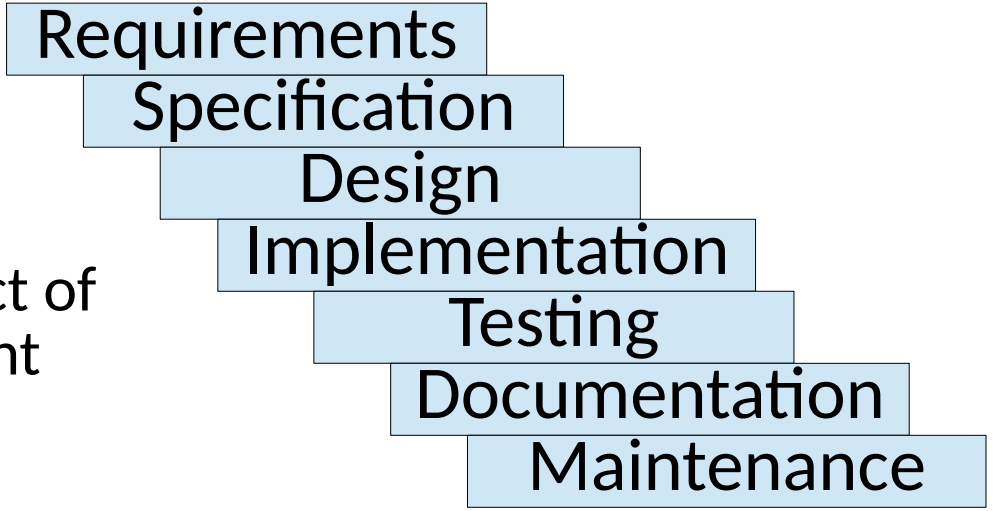
Quality as a Process

The quality of software comes from the quality of the process used to build it.

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In *every* aspect of development



Quality as a Process

How can we assist the process?

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- Synthetic- Tools and techniques structured to create better software
- Analytical- Tools and techniques that measure the quality of software

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- Analytical- Tools and techniques that measure the quality of software

- Manual- Driven interactively by developers
- Automated- Function w/o developer intervention

Quality as a Process

	Synthetic	Analytical
Manual	• **design methodologies** • **prototyping** • **coding standards** • **templates** • **documentation standards**	
Automated		

Quality as a Process

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Manual	• design methodologies • prototyping • coding standards • templates • documentation standards	• **walk-throughs** • **inspections** • **audits**
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Quality as a Process

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Manual	• design methodologies • prototyping • coding standards • templates • documentation standards	• walk-throughs • inspections • audits
Automated	• program generators • compilers • development environments	• **model checkers** • **program verifiers** • **program checkers** • **unit testing** • **integration testing** • **system testing**

Quality as a Process

Integrating these into the process is a core part of the quality plan

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- Set goals
- Establish practices
- Measure progress

So What Will We Do?

- We'll mostly consider how analytical tools and techniques can help ensure quality.

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- Starting with **TESTING**.