Software Quality Assurance
Lecture 1

Introduction

Course Objectives

- After the completion of the course, the students will be able to understand-
  - Various approaches, techniques, technologies, and methodologies used in software quality assurance and testing.
  - The quality assurance process and its role in software development.
  - A variety of testing techniques, methods, and tools used in real life.
  - The impact of ISO 9126 and the capability maturity model Integration (CMMI) on software quality and testing.
  - How to develop Test Plan, how to design Test Cases and execute them, preparing bug-report and test summary report
  - Different types of software testing tools

Course Prerequisite

- Software Engineering – A Practitioners Approach by

  Roger S. Pressman
- A solid understanding of the SDLC (Software Development Life Cycle)
- Software process activities
  - Generic activities
  - Umbrella activities

What is Software?

- What is Software?
  - More than *computer programs*
  - Computer programs, procedures, and possibly associated documentation and data pertaining to the operation of a computer system.

- Two major types of Software:
  - Generic –Stand alone, sold on open market
  - Customized –For specific customer

What is Software Quality?

- Software Quality (as per **ISO**/ IEC 9126):

  The totality of functionality and features of a software product that contribute to its ability to satisfy stated or implied needs.

- Software Quality (as **IEEE** Std 610):

  The degree to which a component, system or process meets specified requirements and/or user/customer needs and expectations.

What is Software Quality?

- According to **ISO 9126**, software quality consists of:
  - Functionality
  - Reliability
  - Usability
  - Efficiency
  - Maintainability
  - Portability

Introduction

- What's the main challenges of software development now-a-days?
  - High **Cost**
  - Difficult to deliver on **Time**
  - Low **Quality**

Introduction

- What is Software **Q**uality **A**ssurance?
- What is Software **T**esting?
- What are the differences between them?

Introduction

Software Quality Assurance (SQA):

- Defined as a planned and systematic approach to the evaluation of the quality of and adherence to software product standards, processes, and procedures.
- An umbrella activity that is applied throughout the software process.
- Consists of a means of monitoring the software engineering processes and methods used to ensure quality.
- An effective approach to produce high quality software.

Introduction

❑ Software Testing:

- Software Testing is the process of executing a system or component under specified conditions with the intent of finding defects/bugs and to verify that it satisfies specified requirements.
- Main goal ==> To detect bugs
- Have different levels
- **Static** testing vs. **Dynamic** testing
- **Manual** testing vs. **Automated** testing

QA vs. Testing

Software Quality Assurance

- Process-oriented activity
- Oriented to bug prevention

Software Testing

- Product-oriented activity
- Oriented to bug detection

Introduction

- What is the **COST** of a bug?

Introduction

- Failure Example 01
- Flight Ariane 5

  (Most Expensive Computer Bug in History)

  On June 4, 1996, the rocket Ariane 5 tore itself apart 37 seconds after launch because of a malfunction in the control software making the fault most expensive computer bug in history.

  ==> mission critical issue

Introduction

- Failure Example 02
- Lethal X-Rays :**Therac-25 system**

  Therac-25 was a radiation therapy machine produced by Atomic Energy of Canada Limited (AECL) in 1986. But initially lot of people died because of massive overdose of radiation. And this is happen because of a software bug.

  ==> safety critical issue

Introduction

- Why do we need to study this course?
- What are the outcomes of this course?

Summary

- Thanks a lot for your attention.
- Any questions??!!?

Welcome to the course Software Quality Assurance