# Software Development

# Learning Outcomes

- Discuss the factors in coding

- Understand the importance of reuse

- List the various coding guidelines

- Summarize the steps in the code documentation

# Software Implementation

- Software Implementation/Development/Coding is an important step in SDLC

- It results in an executable version of the software

- Coding guidelines are defined by the organization

- The different tools such as compilers, debuggers, and interpreters are used by the developers

- Programming languages such as C, C++, Python, etc. are selected based on the requirements specifications of the problem

# Important Aspects

- Selection of a language

- Reuse of a software

- Configuration management

- Host-target management

# Language Selection

- For what application the software is used?

- Use of new technology

- What is the time necessary for the software launch?

- Scalability

- Security features

- Tools availability

- Efficiency

# Reuse of a software

- Use of commercial-off-the-shelf (COT)

- Reuse of software can be done at:

  - The abstraction level

  - The component level

  - The object level

  - The system level

# Implementation Aspects

# Important Aspects

- ☐ **Selection of a language**

- ☐ **Reuse of a software**

- ☐ **Configuration management**

- ☐ **Host-target management**

# Configuration management

- Configuration management is a process of managing the changes during software development.

- There are three main activities in configuration management

  - Version management

  - System integration

  - Problem tracking

# Host-target management

- Resolves the differences between the development system and the actual customer's computer system environment

- The environment may refer to hardware, operating system, database management system, web, cloud support, etc.

- The Integrated Development Environment (IDE), simulators. Compilers, testing tools are used

# Coding

## Coding Phase

- The coding phase of software development refers to converting the design of a system into a high-level language program

- Standard coding practices that make the code uniform though it is managed by a team of different programmers

- Each programmer must have a good knowledge of the programming language, databases, web, cloud platform, mobile app, and any other tools related to the problem

# Standard Requirements in Coding

- Modular approach

- Common notations

- Portability and Generality

- Efficient error checking and debugging

- The size and cost of the code

- The programming language

# Coding Guidelines

- The size of the functions

- Global and local with block and file scopes

- Documentation

- Naming conventions

- Uniformity in  handling errors

- Avoiding the use of unconditional statements

- Relevant identifiers and constant

# Side Effects

- Side effects of the function call are very critical

- A side effect of a function code is a modification of the parameters that are outside its definition

- Some I/O operations or parameters passed by reference may create an ambiguous alteration of the values and generate wrong results

- Side effects must be avoided

# Coding Documentation

# Coding Documentation

- Coding documentation is an effective means of connecting humans and machines. The steps are:

- Introduction, README file

- Explain the functionality of each module, the parameters, their type, and return value.

- Discuss naming conventions

- Name the contributors in a team with proper citations

- Give details of the license and version of the software

- Contact Information

- Version

# Example

README FILE

HOSPITAL MANAGEMENT SYSTEM

Description

Prerequisites

Installation Guide

License and contact us

# Example

Function to insert a new patient record

int Insert_Patient(int Patient_waiting_no, char Patient_Name, char Doctor_Name)

Description

Insert a new patient name and number for a doctor

Parameters

Patient_Waiting_no is an integer, Patient_Name and Doctor_Name are of string data type

What Function returns

Adds the record and returns the patient number after inserting a record.

This number is unique and can be used in all the other modules

**Unit 3 – Software Development**

# Code Review

# Code Review

- Code review is done after the compilation of a coding module

- Review can identify the algorithmic, logical, and poor programming code

- It does not check the syntax errors

- Different team members working on software check for any problems or defects

- The review helps in improving the quality and working of the software

# Code Review

- Are the requirements totally covered in various test cases?

- Is the software design consistent?

- Is the developed code following the standard coding style?

- Are there enough test cases to verify the developed software?

- Are there any security threats to the software?

- Is the code documentation complete?

- Are there any major drawbacks or flaws in the software?

# Types of code reviews

- **Code Walkthrough:** The purpose of a code walkthrough is to find out if there are any algorithmic and logical errors.

- The minutes of the code walkthrough are recorded and used as coding guidelines.

- It is an informal method but a person's experience, knowledge about the domain, common sense, etc. is used

# Types of code reviews

- **Code Inspection:** Unlike code walkthrough, in this process, some common programming errors are examined.

- The choice of algorithm, techniques used in programs, library files usage, coding standard, etc. are checked

# Contact Information

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