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# Document History



Date	Course Version No.	Software Version No.	Developer / SME	Reviewer	Approver	Change Record Remarks
Jan 2015	1.0	NA	Rathnajothi Perumalsamy		Mahima Sharma	Initial Draft
May 2015	1.1	NA	Shraddha P Jadhav	Veena Deshpande / Satish Joshi	Mahima Sharma	Added contents related to algorithm design and techniques.
May 2016	1.2	NA	Anjulata Tembhare	Kavita Arora	Mahima Sharma	Removed some Topics as per new ToC

Keep this as a hidden slide.

Note to coordinators: Not to be printed for the class book.

## Course Goals and Non Goals



### Course Goals

- To learn about how to write good program by understanding concepts like
  - Readability
  - Maintainability
  - Modularity
  - Defensive programming
  - Algorithm analysis and design
- To learn about how to write pseudocode in design phase
- To develop robust programs by performing Code Reviews and Unit Testing (test cases/results)
- Understanding Software testing



### Course Non Goals

- To learn any specific language features in this course.  
(Language features will be covered in subsequent modules.)

## Intended Audience

Novice Developers



## Day Wise Schedule



### Day 1

- Lesson 1: Introduction to program development with pseudocode
- Lesson 2: Good Programming Practices

### Day 2

- Lesson 2: Good Programming Practices (Continued)
- Lesson 3: Algorithm Analysis and Design
- Lesson 4: Algorithm Design Techniques

### Day 3

- Lesson 5: Exception Handling
- Lesson 6: Software Reviews and Testing

## Table of Contents



### Lesson 1: Introduction to program development with pseudocode

- 1.1 Introduction to Programs
- 1.2 Types of projects
- 1.3 SDLC process of waterfall model
- 1.4 Introduction to Pseudocode
  - What is Pseudocode?
  - Why Pseudocode?
  - How to write Pseudocode?
  - Best practices of writing pseudocode
  - Example of Pseudocode
- 1.5 Usage of variables and operators
- 1.6 Introduction to control constructs
  - Conditional Statement
  - Looping statement
  - Guidelines for conditional and looping statements
- 1.7 Introduction to arrays

## Table of Contents



### Lesson 2: Good Programming Practices

#### ■ 2.1 Readable

- Naming Conventions
- Comments
- Guidelines for writing good code

#### ■ 2.2 Maintainable

- Remove Hardcoded constants

#### 2.3 Modular

- Introduction to subroutines
- Characteristics of well defined subroutines
- Best practices to follow when creating subroutines
- Guidelines to follow while using arguments in subroutines
- Best practices to follow for return values from subroutines

#### 2.4 Coupling and Cohesion

#### 2.5 Robust program

- Difference between correctness and robustness

## Table of Contents



### Lesson 3: Algorithm Analysis and Design

- 3.1 Algorithm Analysis and efficiency
- 3.2 Measuring Unit for Algorithm
- 3.3 Order of Growth
  - Asymptotic notations
- 3.4 Best/Worst/Average case
- 3.5 Efficiency of algorithm

### Lesson 4: Algorithm Design Techniques

- 4.1 Algorithm Design Technique
- Brute Force
- Divide and Conquer
- Decrease and Conquer
- Backtracking
- Branch and Bound



## Table of Contents



### Lesson 5: Exception Handling

#### ▪ 5.1 What is exception handling?

- Guidelines for creating exceptions
- Importance of Exception Handling

#### 5.2 Case study

#### 5.3 Defensive Programming

- What is Defensive Programming
- Purpose of defensive programming
- Techniques of defensive programming
  - Input Validation
  - Error Handling
  - Error containment

## Table of Contents



### Lesson 6: Software Reviews and Testing

- 6.1 What is software Testing?
- 6.2 What is Debugging?
  - Debugging Techniques
  - Difference between testing and debugging

### 6.3 Software Testing Principles

#### 6.4 TestCase

- What is Test case?
- How to write Test case
- Guidelines for implementing test cases
- Example of Test case

### 6.5 Exhaustive Testing and Economics of Testing

## Table of Contents



### Lesson 6: Software Reviews and Testing(Contd..)

- 6.6 Testing Techniques
  - Static Testing
  - Dynamic Testing
- 6.7 Static Testing
  - Self review
  - Peer Review
  - Group Review

## Table of Contents



### 6.8 Dynamic Testing

- Blackbox Testing
- WhiteBox Testing

### 6.9 Testing Approaches

- Unit Testing
- Integration Testing
- System Testing
- Verification and Validation testing
- Acceptance Testing
- Regression testing

## Next Step Courses



Any programming language