

SE1011 Detailed Course Objectives

Dr. Walter Schilling

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Note: You may use one (1) 8.5 x 11 sheet of paper for review notes if you so desire.

1. Week 1

(a) Writing Computer Software

- i. Describe the steps involved in creating and running a Java program
- ii. Describe the contents of source (.java) and class (.class) files
- iii. Explain what happens (at a high level) when a Java program is compiled
- iv. Explain what happens (at a high level) when a Java program is run
- v. Describe the difference between compilation and execution errors
- vi. Explain why a Java Virtual Machine (JVM) is required in order to run a Java program
- vii. Describe how bytecode makes Java programs portable
- viii. List the basic steps involved in software development

(b) Algorithms and Design

- i. Define the term algorithm
- ii. Explain the motivation for doing design before coding
- iii. Make use of variables and operations to perform calculations
- iv. Construct and interpret flowcharts representing sequential, conditional, and looping structures
- v. Construct and interpret pseudocode representing sequential, conditional, and looping structures
- vi. Use flowcharts and pseudocode to describe algorithmic solutions to simple problems

2. Week 2

(a) Primitive datatypes, Variables, Identifiers

- i. List the primitive types supported in Java: int, long, float, double, and char
- ii. Select the most appropriate primitive type to store a given piece of data
- iii. Use the assignment and compound assignment statements

(b) Java Programming Basics

- i. Recognize code documentation in source code
- ii. Demonstrate at least two forms of syntax for adding comments to source code
- iii. Replace hard coded constants with named constants

(c) Standard Java Classes

- i. Demonstrate the use of `JOptionPane.showMessageDialog`
- ii. Demonstrate the use of `JOptionPane.showInputDialog`
- iii. Demonstrate the use of `String.substring`
- iv. Demonstrate the use of `String.length`

(d) Arithmetic expressions

- i. Demonstrate proper use of the following arithmetic operators: +, -, *, /,
- ii. Identify and avoid unintended integer division errors
- iii. Distinguish between binary and unary operations
- iv. Define operator precedence
- v. Interpret arithmetic expressions following operator precedence rules
- vi. Define and apply type casting
- vii. Interpret code that makes use of shorthand assignment operations: *=, /=, +=, -=, and %=

(e) Standard input/output

- i. Use wrapper classes to perform type conversion, e.g., `int num = Integer.parseInt("14");`
- ii. Explain the source of data associated with the system input buffer: `System.in`
- iii. Perform standard/console input using the `Scanner` class
- iv. Explain the destination for data sent to the system output buffer: `System.out`
- v. Perform standard/console output using the `System.out.println` method

3. Week 3

(a) Selection statements

- i. Define the functionality of the following relational operators: `<`, `<=`, `!=`, `==`, `>=`, `>`
- ii. Use relational operators to control program flow
- iii. Define the functionality of the following boolean operators: `&&`, `||`, and `!`
- iv. Use boolean and relational operators to construct meaningful boolean expressions
 - v. Use boolean expressions control program flow
 - vi. Describe the behavior of an `if` statement
 - vii. Describe the program flow through a series of nested `if` statements
 - viii. Use nested `if` statements to control program flow
 - ix. Use a `switch` statement to control program flow
 - x. Rewrite a `switch` statement with one or more (potentially nested) `if` statements
 - xi. Explain the purpose of the `case`, `break` and `default` reserved words

(b) Iteration statements

- i. Interpret code that makes use of the following looping constructs: `while`, `do-while`, and `for`
- ii. Design and write code that makes use of the following looping constructs: `while`, `do-while`, and `for`
- iii. Describe how the following constructs differ: `while`, `do-while`, and `for`
- iv. Rewrite a given `while` and `for` and vice versa

4. Week 4

(a) Midterm Exam 1