CS 175/501A – Spring 2020

CS 175-50: Introduction to Computer Science I

CS 501A-50: Programming Essentials

Homeworks n. 1

Assignment date:	**02/03/2020**
Due date:	**02/09/2020**
Drop-box closing date:	**02/09/2020**

Homework 1.1 (points: 15/100)
Practice exercise n. E1.1, page 25. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.
More details are available in the "HW1_1.pdf" file.

Homework 1.2 (points: 15/100)
Practice exercise n. E1.2, page 25. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.
More details are available in the "H1_2.pdf" file.

Homework 1.3 (points: 15/100)
Practice exercise n. E1.3, page 25. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.
More details are available in the "H1_3.pdf" file.

Homework 1.4 (points: 15/100)
Practice exercise n. E1.5, page 25. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.
More details are available in the "H1_4.pdf" file.

Homework 1.5 (points: 20/100)
Review exercise n. R1.9, page 24. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.

Homework 1.6 (points: 20/100)
Review exercise n. R1.10, page 25. Book: Horstmann, Java Concepts Early Objects, Eight Edition, Wiley.

Important instructions for the submission

Please submit on e-campus **one comprehensive .pdf file** containing the solutions of the exercises (source code and the output)

STANDARD LIBRARY ITEMS INTRODUCED IN THIS CHAPTER

```
java.io.PrintStream
   print
   println

java.lang.System
   out
```

REVIEW EXERCISES

▪ **R1.1** Explain the difference between using a computer program and programming a computer.

▪ **R1.2** Which parts of a computer can store program code? Which can store user data?

▪ **R1.3** Which parts of a computer serve to give information to the user? Which parts take user input?

▪▪ **R1.4** A toaster is a single-function device, but a computer can be programmed to carry out different tasks. Is your cell phone a single-function device, or is it a programmable computer? (Your answer will depend on your cell phone model.)

▪▪ **R1.5** Explain two benefits of using Java over machine code.

▪▪ **R1.6** On your own computer or on a lab computer, find the exact location (folder or directory name) of

a. The sample file `HelloPrinter.java`, which you wrote with the editor.

b. The Java program launcher `java.exe` or `java`.

c. The library file `rt.jar` that contains the run-time library.

▪▪ **R1.7** What does this program print?

```
public class Test
{
   public static void main(String[] args)
   {
      System.out.println("39 + 3");
      System.out.println(39 + 3);
   }
}
```

▪▪ **R1.8** What does this program print? Pay close attention to spaces.

```
public class Test
{
   public static void main(String[] args)
   {
      System.out.print("Hello");
      System.out.println("World");
   }
}
```

▪▪ **R1.9** What is the compile-time error in this program?

```
public class Test
{
   public static void main(String[] args)
   {
      System.out.println("Hello", "World!");
   }
}
```

R1.10 Write three versions of the `HelloPrinter.java` program that have different compile-time errors. Write a version that has a run-time error.

R1.11 How do you discover syntax errors? How do you discover logic errors?

R1.12 The cafeteria offers a discount card for sale that entitles you, during a certain period, to a free meal whenever you have bought a given number of meals at the regular price. The exact details of the offer change from time to time. Describe an algorithm that lets you determine whether a particular offer is a good buy. What other inputs do you need?

R1.13 Write an algorithm to settle the following question: A bank account starts out with $10,000. Interest is compounded monthly at 6 percent per year (0.5 percent per month). Every month, $500 is withdrawn to meet college expenses. After how many years is the account depleted?

R1.14 Consider the question in Exercise R1.13. Suppose the numbers ($10,000, 6 percent, $500) were user selectable. Are there values for which the algorithm you developed would not terminate? If so, change the algorithm to make sure it always terminates.

R1.15 In order to estimate the cost of painting a house, a painter needs to know the surface area of the exterior. Develop an algorithm for computing that value. Your inputs are the width, length, and height of the house, the number of windows and doors, and their dimensions. (Assume the windows and doors have a uniform size.)

R1.16 In How To 1.1, you made assumptions about the price of gas and annual usage to compare cars. Ideally, you would like to know which car is the better deal without making these assumptions. Why can't a computer program solve that problem?

R1.17 Suppose you put your younger brother in charge of backing up your work. Write a set of detailed instructions for carrying out his task. Explain how often he should do it, and what files he needs to copy from which folder to which location. Explain how he should verify that the backup was carried out correctly.

R1.18 Write pseudocode for an algorithm that describes how to prepare Sunday breakfast in your household.

R1.19 The ancient Babylonians had an algorithm for determining the square root of a number a. Start with an initial guess of $a / 2$. Then find the average of your guess g and a / g. That's your next guess. Repeat until two consecutive guesses are close enough. Write pseudocode for this algorithm.

PRACTICE EXERCISES

E1.1 Write a program that prints a greeting of your choice, perhaps in a language other than English.

E1.2 Write a program that prints the sum of the first ten positive integers, $1 + 2 + \cdots + 10$.

E1.3 Write a program that prints the product of the first ten positive integers, $1 \times 2 \times \cdots \times 10$. (Use * to indicate multiplication in Java.)

E1.4 Write a program that prints the balance of an account after the first, second, and third year. The account has an initial balance of $1,000 and earns 5 percent interest per year.

E1.5 Write a program that displays your name inside a box on the screen, like this: Dave
Do your best to approximate lines with characters such as | - +.