CIS 103 Examination 1 Practice

1. Answer the following questions

a. Name two programming languages
   Java and C++

b. What is a flowchart?
   A pictorial representation of the logical steps it takes to solve a problem

c. What is pseudocode?
   An English-like representation of the logical steps it takes to solve a problem

d. Give an example of a single-alternative decision pseudocode
   if radius < 0 then
     display "invalid radius"
   endif

e. Give an example of an input operation
   get radius

f. Give an example of processing
   compute circumference of a circle as diameter times 3.1416

g. Give an example of an output operation
   display circumference

h. What is a compiler?
   language translator - convert the source code into machine language and check syntax errors

i. Describe the steps to writing a computer program
   Understand the problem
   Plan the logic using flowchart or pseudocode or both
   Use a compiler to code the program
   Test the program
   Put the program into production

j. What is a syntax error?
   misuse of a language's grammar rules

k. Comment the following variables
   studentLastName - good descriptive identifier
   studentLast - good but most people would interpret Last as meaning Last Name
   stuLast - OK but not recommended
   student last - not legal (embedded space)

l. Assume lastName and firstName are string variables. Assume age and height are numeric variables.

Validate the following assignments:
   lastName = "Nguyen" - valid
   lastName = Nguyen - invalid (Nguyen is not a string)
   "Nguyen" = lastName - invalid (value on left must be a variable)
   height = 5.5 - valid
   height = lastName - invalid (the data types do not match)
   height = "5.5" - invalid (the data types do not match)
age = firstName - invalid (the data types do not match)
height = height + 2.8 - valid
2. Create a Raptor flowchart to represent the logic of a program that allows the user to enter the width and length of a room’s floor in feet. The program outputs the area of the floor in square feet. The program also computes and output the number of 12-inch square titles needed to tile the floor.

Use a named constant for constant value. Use a camel casing to name a variable.

**Input sample**
Enter the width: 12
Enter the length: 100

**Output sample**
Area of the floor: 1200
Number of titles: 100

**Solution:**
3. Convert the Raptor flowchart below to a complete Java program.

Use a named constant for constant value. Use a camel casing to name a variable.

Solution

```java
import java.util.*;
public class Test
{
    public static void main(String [] args)
    {
        System.out.print("Enter the width:");
        Scanner input = new Scanner(System.in);
        double width;
        width = input.nextDouble();
        System.out.print("Enter the length:");
```
double length;
length = input.nextDouble();
double area;
area = width * length;
final double TITLE_12 = 12.0;
double titles;
titles = area/TITLE_12;
System.out.println("Area of the floor: "+ area);
System.out.println("Number of titles: " + titles);
}

What output does the flowchart below display?
Answer: 10

sum = 0
count = 1
count <= 4 (1 <= 4) Yes
    sum = sum + count = 0 + 1 = 1
count = count + 1 = 1 + 1 = 2
count <= 4 (2 <= 4) Yes
    sum = sum + count = 1 + 2 = 3
count = count + 1 = 2 + 1 = 3
count <= 4 (3 <= 4) Yes
    sum = sum + count = 3 + 3 = 6
count = count + 1 = 3 + 1 = 4
count <= 4 (4 <= 4) Yes
    sum = sum + count = 6 + 4 = 10
count = count + 1 = 4 + 1 = 5
count <= 4 (5 <= 4) No
display sum (It displays 10)

5. What output does the flowchart below display? Assume that the user enters the following input:

4
3
6
5
7
0
Answer: 10

Input n  (n is 4)
4 is not equal to zero (T)
if 4 is divisible by 2  (T)
   sum = sum + n = 0 + 4 = 4

Input n  (n is 3)
3 is not equal to zero (T)
if 3 is divisible by 2  (F)
Input n (n is 6)
  6 is not equal to zero (T)
  if 6 is divisible by 2 (T)
    sum = sum + n = 4 + 6 = 10

Input n (n is 5)
  5 is not equal to zero (T)
  if 5 is divisible by 2 (F)

Input n (n is 7)
  7 is not equal to zero (T)
  if 7 is divisible by 2 (F)

Input n (n is 0)
  0 is not equal to zero (F)
  exit the loop

Display sum (sum is 10)

6. Running or walking burns out about 375 calories per mile. Write a program named calories to calculate how many miles you would have to run or walk to burn off the hamburger, french fries, and soft drink that you consume. Use the table shown below for the calculation.

<table>
<thead>
<tr>
<th>Food</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger</td>
<td>400</td>
</tr>
<tr>
<td>French Fries</td>
<td>275</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>150</td>
</tr>
</tbody>
</table>

The program would likely run as follows:

Input
How many hamburgers did you consume? 3
How many french fries did you consume? 1
How many soft drinks did you consume? 2

Output
You ingested 1775.0 calories.
You will have to run 4.733333333333333 miles to expend that much energy.
import java.util.*;
public class calories{

    public static void main(String [] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("How many hamburgers did you consume? ");
        int burgers;
        burgers = input.nextInt();
        System.out.print("How many french fries did you consume? ");
        int frenchFries;
        frenchFries = input.nextInt();
        System.out.print("How many soft drinks did you consume? ");
        int softDrinks;
        softDrinks = input.nextInt();
        final double HAMBURGER_CALORIES = 400.0;
        final double FRENCH_FRY_CALORIES = 275.0;
        final double SOFT_DRINK_CALORIES = 150;
        double totalCalories;
        totalCalories = burgers*HAMBURGER_CALORIES +
                        frenchFries*FRENCH_FRY_CALORIES +
                        softDrinks*SOFT_DRINK_CALORIES;
        System.out.println("You ingested "+totalCalories+" calories.");
        double miles;
        final double CALORIES_PER_MILE = 375;
        miles = totalCalories/CALORIES_PER_MILE;
        System.out.println("You will have to run "+miles+" miles to expend that much energy.");
    } // end main
} // end class

7. A phone company charges 25 cents per minute for a call above 30 minutes. All other calls that are less than 30 minutes will be charge 15 cents per minute. Create a Raptor flowchart that inputs the duration of the call and then displays the charge.
Start

CHARGE1 ← 0.25

CHARGE2 ← 0.15

"Enter the call duration: (minutes)."
GET minutes

minutes >= 30

Yes

charges ← minutes * CHARGE1

No

charges ← minutes * CHARGE2

PUT "Duration call: " + minutes

PUT "Total charge: $" + charges

End