Investigation : Variables

For the first part of this exercise, write the following segments of code in Java and answer the questions that follow.

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Example 1:
a) Trace the following program.

Memory	Output
SomeNumber = 1 SomeNumber = 2 SomeNumber = 3	3

```
public static void main(String[] args)
{
	int someNumber1, someNumber2, someNumber3;

	someNumber1= 1;
	someNumber2= 2;
	someNumber3= someNumber1+ someNumber2;

	System.out.println(someNumber3);
}
```

b) Is the output what you expected? Explain
This was the output I expected as if you add

Example 2:
a) Trace the following program. What is the order of operations?

Memory	Output
BMI = 22 Height = 76 Weight = 89331699	263.7567568

```
public static void main(String[] args)
{

	double BMI,weight,height;
	BMI = 22;
	height = 76;

	weight= 83 + (BMI/703)*(height*height);

	System.out.println(weight);
}
```

****

Exercise - Variables

1. **Create a program that declares and assigns values to variables that would be needed to create a student card (e.g. last name, first name, student number, home form, grade, and school). Be sure there is also a suitable variable for ". Print the card neatly in the middle of the output screen**

```
String surname;
surname = "Singh";
String name;
name = "Gurpreet";
int studentN;
studentN = 897163;
int grade;
grade = 11;
String school;
school = "Harold M. Brathwaite";
System.out.println(name);
System.out.println(surname);
System.out.println(studentN);
System.out.println(grade);
System.out.println(school);
```

2. **Create variables to hold the following list of stats of a hockey player: name, team, number, position, goals, assists. Create appropriate variable types. Assign the statistics of your favourite player and output the data in the following format:**

Output
Team Number Name Position Goals Assists Points

```
String team;
team = "Montreal Canadien";
String name;
name = "Tomas Tatar";
int number;
number = 90;
String position;
position = "Left Wing";
int goals;
goals= 21;
int assists;
assists = 35;
int points;
points = 56;
System.out.print(team);
System.out.println (number + "\t" + name + "\t" + position);
System.out.println(goals + "\t" + assists + "\t" + points);
```

3. **Create 4 variables called mark1, mark2, mark3, mark4, that will store double values. Assign mark1 a value of 55.5, mark2 a value of 76.5, mark3 a value of**

66.6, and mark4 a value of 78.2. Calculate and output the average of the 4 marks.

```
double mark1;
mark1 = 55.5;
double mark2;
mark2 = 76.5;
double mark3;
mark3 = 66.6;
double mark4;
mark4 = 78.2;
double average;
average = ((mark1+mark2+mark3+mark4)/4);
System.out.print("The total average is" + " " + average);
```

4. **Write a program that declares three variables A, B, and C. Set these variables to any integers you desire between 1 and 10, then print the value A + B × C.**
   a. **Rewrite so it reassigns new values to A, B, and C after they have been output with the original formula, then declares a new value D and outputs the value** of A + B × C - D.

```
int A;
A = 5;
int B;
B = 8;
int C;
C = 3;
System.out.println(A*B*C);
int D;
D = (A*B*C);
System.out.print(A*B*C-D);
```

5. **Write a program to calculate the total number of hours someone has watched TV in their life if their age is 15 and they watched 3 hours a day. Assume they did not watch TV until they were 2 yrs old. Forget about leap years.**

```
int year;
year = 365;
int age;
age = 15;
int startage;
startage = 2;
int watchtime;
watchtime = ((age-startage)*365);
System.out.print("Total hours someone has watched TV is"+ " "
watchtime);
```

6. **Create a program that declares and assigns values to any variables that would be needed to calculate the formula: *Area (of a circle) = Pi x r***

```
double pi;
```

```
pi=3.14159;
int r;
r=5;
double area;
area=pi*(r^2);
System.out.print(area);
```

7. **Write a program that declares variables named width and height. In your program, output the area of a rectangle and the area of a right-angled triangle given the values you assigned for width and height.**

```
int height;
        height = 10;
        int width;
        width = 5;
        int arearectangle;
        arearectangle = height*width;
        System.out.println("The area of a rectangle with a height of 10 and
width of 5 is " + arearectangle);
        int areatriangle;
        areatriangle = height*width/2;
        System.out.println("The area of a triangle with a aheight of 10 and
width of 5 is " + areatriangle);
```

8. **Create the following string in JAVA: *x* = *"abcdefghijklmnopqrstuvwxyza"*. What is the output for the following commands? Indicate the type of value that was returned.**

   a. **System.out.println (x.length( ));**
      27
   b. **System.out.println (x.equals("abcdefg"));**
      False
      System.out.println (x.charAt(0));
      a
   c. **System.out.println (x.charAt(15));**
      p
   d. **System.out.println (x.charAt(26));**
      a
   e. **System.out.println (x.charAt(27));**

```
Exception in thread "main" java.lang.StringIndexOutOfBoundsException:
String index out of range: 27
at java.lang.String.charAt(Unknown Source)
at Question8.main(Question8.java:34)
```

   f. **System.out.println (x.charAt(40));**

```
Exception in thread "main" java.lang.StringIndexOutOfBoundsException:
String index out of range: 40
at java.lang.String.charAt(Unknown Source)
at Question8.main(Question8.java:34)
```

   g. **System.out.println (x.indexOf('a'));**
      0
   h. **System.out.println (x.indexOf('x'));**
      23

i. **System.out.println (x.indexOf(‘a’, 10);**
   26
j. **System.out.println (x.indexOf(‘M’));**
   -1
k. **System.out.println (x.substring(20));**
   uvwxyza
l. **System.out.println (x.substring(2, 5));**
   cde
m. **System.out.println (x.substring(18, 30));**

```
Exception in thread "main" java.lang.StringIndexOutOfBoundsException:
String index out of range: 30
at java.lang.String.substring(Unknown Source)
at Question8.main(Question8.java:63)
```