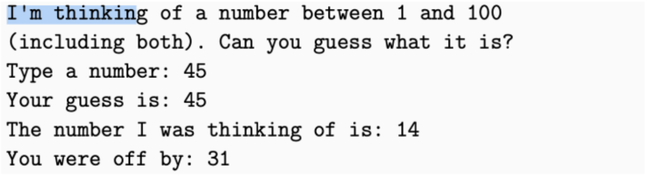
January 23rd 2025

CSCI 218: Programming II (Spring 2025)

Practice Exercise

Task 1:

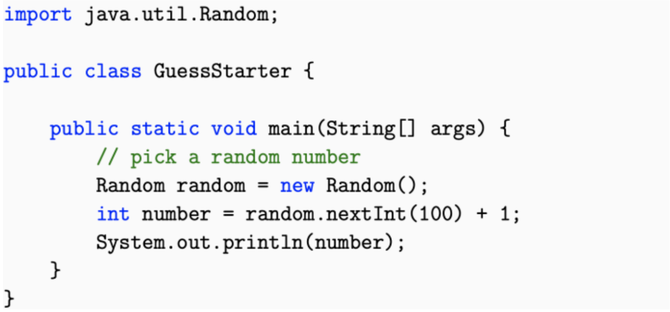
The goal of this exercise is to program a “Guess My Number” game. When it’s finished, it will work like this:



```
I'm thinking of a number between 1 and 100
(including both). Can you guess what it is?
Type a number: 45
Your guess is: 45
The number I was thinking of is: 14
You were off by: 31
```

Fig 1

To choose a random number, you can use the Random class in java.util. Here’s how it works:



```
import java.util.Random;

public class GuessStarter {

    public static void main(String[] args) {
        // pick a random number
        Random random = new Random();
        int number = random.nextInt(100) + 1;
        System.out.println(number);
    }
}
```

Fig 2

Random must be imported before we can use it. And as we saw with Scanner, we must use the new operator to create a Random (number generator). Then we can use the method nextInt to generate a random number. In this example, the result of nextInt(100) will be between 0 and 99, including both. Adding 1 yields a number between 1 and 100, including both.

Todo: **Modify the program to prompt the user and function as Fig 1, then use a Scanner to read a line of user input.**

Task 2:

Herupu Cooperation needs a program to calculate how much to pay their employees.

Pay = hours worked * base pay

- Hours over 40 gets paid 1.5 the base pay
- The base pay must be no less than $8.00
- The number of hours must be no more than 60

Todo: **Create a Java program to print pay based on base pay and hours worked**

Task 3:

Write a program to generate 1 to 13 times table – *use any formatting styles*

Task 4:

A class called **Circle** is described as follows. It contains:

- Two private instance variable: radius (of type double) and color (of type String) with a default value of 1.0 and “red” , respectively.
- Two overloaded constructor : a default constructor with no argument, and a constructor which takes a double argument for radius.
- Two public methods : getRadius() and getArea() which returns the radius and area of this instance respectively.

Todo:

- Implement this using a java program.
- Compile “Circle.java”. Can you run the Circle class? Why?
- Modify the class Circle to include a third constructor for instantiating a Circle instance with two arguments – a double for radius and a String for color.
- Create a Class **CircleDriver.java** and Test your program by creating two objects

Task 5:

Write a Java class called **Student** which can be used to represent the details of a Student together with some associated operations. The Student class will have the following information:

- Title of the student (eg, Mr, Miss, Ms, Mrs etc)
- A first name (given name)
- A last name (family name/surname)
- Student number (ID) – an integer number (of type **long**)
- A date of birth (in day/month/year format – three ints) **- (Do NOT use the Date class from JAVA)**
- There are two assignments, each marked out of a maximum of 100 marks and equally weighted. The marks for each assignment are recorded separately.
- There is weekly practical work. The marks for this component are recorded as a total mark obtained (out of a maximum of 10 marks) for all practical work demonstrated during the semester.
- There is one final examination that is marked out of a maximum of 100 marks and recorded separately.
- An overall mark (to be calculated within the program)
- A final grade, which is a string (to be calculated within the program)

The final grade is to be awarded based on an overall mark, which is a number in the range 0 to 100 and is obtained by calculating the weighted average of the student's performance in the assessment components.

The criterion for calculating the weighted average is as defined below: The two assignments together count for a total of 40% (20% each) of the final grade, the practical work is worth 10%, and the final exam is worth 50% of the final grade.

A grade is to be awarded as follows: An overall mark of 80 or higher is an HD, an overall mark of 70 or higher (but less than 80) is a D, an overall mark of 60 or higher (but less than 70) is a C, an overall mark of 50 or higher (but less than 60) is a P, and an overall mark below 50 is an N.

The student class will have at least the following constructors and methods:

(i) two constructors - one without any parameters (the default constructor), and one with parameters to give initial values to instance variables.

(ii) a reasonable number of set and get methods.

(iii) method **printInfo()** to print the student’s information

(iv) methods to compute the final overall mark and the final grade. These two methods will be void methods that set the appropriate instance variables. Remember one method can call another method. If you prefer, you can define a single method that sets both the overall mark and the final string grade.