1.
2. **Implement class <u>RandomNumber</u>** that randomly generates an integer between 1 and 12 and displays the English month name January, February, …, December for the number 1, 2, …, 12, accordingly.

```java
public class RandomMonth
{
    public static void main(String[] args)
    {
        int number = (int) (Math.random() * 12) + 1;
        System.out.println("Randon generated number is: " + number);
        if (number == 1)
            System.out.println("Month is Januaray");
        else if (number == 2)
            System.out.println("Month is Feburary");
        else if (number == 3)
            System.out.println("Month is March");
        else if (number == 4)
            System.out.println("Month is April");
        else if (number == 5)
            System.out.println("Month is May");
        else if (number == 6)
            System.out.println("Month is June");
        else if (number == 7)
            System.out.println("Month is July");
        else if (number == 8)
            System.out.println("Month is August");
        else if (number == 9)
            System.out.println("Month is September");
        else if (number == 10)
            System.out.println("Month is October");
        else if (number == 11)
            System.out.println("Month is November");
        else // if (number == 12)
            System.out.println("Month is December");
    }
}
```

Output – lab1MyName (run)

```
run:
Randon generated number is: 9
Month is September
BUILD SUCCESSFUL (total time: 0 seconds)
```

2. **Implement class CheckISBN_10**, An ISBN-10 (International Standard Book Number) consists of 10 digits: $d_1d_2d_3d_4d_5d_6d_7d_8d_9d_{10}$. The last digit, d_{10}, is a checksum, which is calculated from the other nine digits using the following formula:
$(d_1 * 1 + d_2 * 2 + d_3 * 3 + d_4 * 4 + d_5 * 5 + d_6 * 6 + d_7 * 7 + d_8 * 8 + d_9 * 9) \% 11$
If the checksum is 10, the last digit is denoted as X according to the ISBN-10 convention.
Write code that prompts the user to enter the first 9 digits and displays the 10-digit ISBN (including leading zeros). Your program should read the input as an integer.

```
1     package chapter3.liang;
2
3  ⊟  import java.util.Scanner;
4     public class CheckISBN_10
5     {
6         public static void main(String[] args)
7  ⊞      {...43 lines }
50    }
51
```
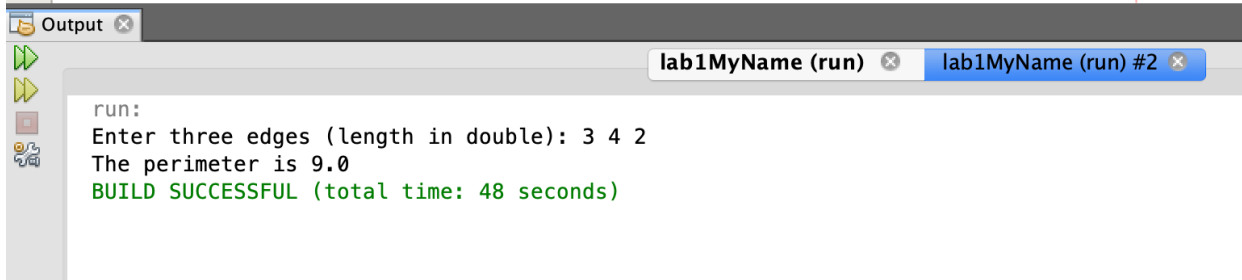
Output – lab1MyName (run)

```
run:

Enter the first 9 digits of an ISBN as integer: 013601267
The ISBN-10 number is 0136012671


Enter the first 9 digits of an ISBN as integer: 013031997
The ISBN-10 number is 013031997X
```
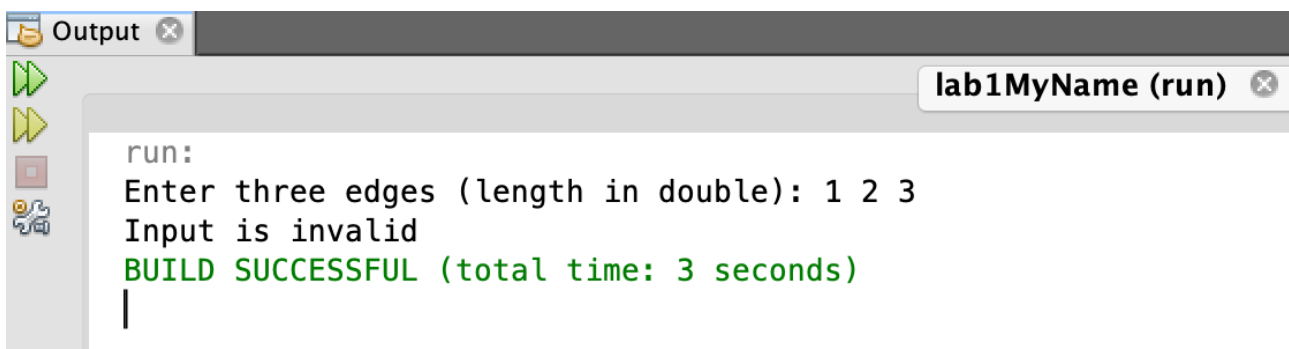
3. **Implement class TrianglePerimeter** that reads three edges for a triangle and computes the perimeter if the input is valid. Otherwise, display that the input is invalid. The input is valid if the sum of every pair of two edges is greater than the remaining edge.

```java
public class TrianglePerimeter
{

    public static void main(String[] args)
    {
        java.util.Scanner input = new java.util.Scanner(System.in);

        // Enter three edges
        System.out.print(
                "Enter three edges (length in double): ");
        double edge1 = input.nextDouble();
        double edge2 = input.nextDouble();
        double edge3 = input.nextDouble();

        // Display results
        boolean isValid = (edge1 + edge2 > edge3)
                && (edge1 + edge3 > edge2) && (edge2 + edge3 > edge1);

        // Display results
        if (isValid)
            System.out.println("The perimeter is " + (edge1 + edge2 + edge3));
        else
            System.out.println("Input is invalid");
    }
}
```
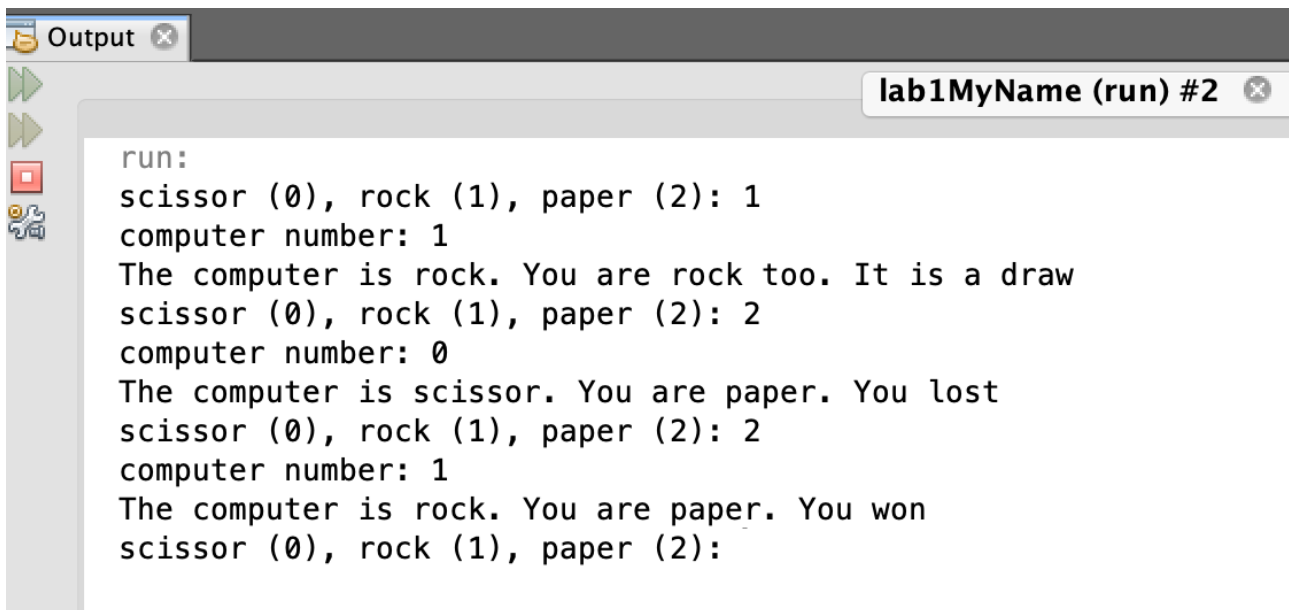
Output lab1MyName (run)   lab1MyName (run) #2

```
run:
Enter three edges (length in double): 3 4 2
The perimeter is 9.0
BUILD SUCCESSFUL (total time: 48 seconds)
```

Output lab1MyName (run)

```
run:
Enter three edges (length in double): 1 2 3
Input is invalid
BUILD SUCCESSFUL (total time: 3 seconds)
```

4. **Implement class RockPaperScissors:** Play the popular scissor-rockpaper game. (A scissor can cut a paper, a rock can knock a scissor, and a paper can wrap a rock.) The program randomly generates a number 0, 1, or 2 representing scissor, rock, and paper. The program prompts the user to enter a number 0, 1, or 2 and displays a message indicating whether the user or the computer wins, loses, or draws.

```java
public class RockPaperScissors
{
    public static void main(String[] args)
    {
        int computerNumber = (int) (Math.random() * 3);
        java.util.Scanner input = new java.util.Scanner(System.in);
        System.out.print("scissor (0), rock (1), paper (2): ");
        int userNumber = input.nextInt();
        System.out.println("computer number: " + computerNumber);
        switch (computerNumber)
        {
            case 0:
                if (userNumber == 0)
                    System.out.print("The computer is scissor. You are scissor too. It is a draw");
                else if (userNumber == 1)
                    System.out.print("The computer is scissor. You are rock. You won");
                else if (userNumber == 2)
                    System.out.print("The computer is scissor. You are paper. You lost");
                break;
            case 1:
                if (userNumber == 0)
                    System.out.print("The computer is rock. You are scissor. You lost");
                else if (userNumber == 1)
                    System.out.print("The computer is rock. You are rock too. It is a draw");
                else if (userNumber == 2)
                    System.out.print("The computer is rock. You are paper. You won");
                break;
            case 2:
                if (userNumber == 0)
                    System.out.print("The computer is paper. You are scissor. You won");
                else if (userNumber == 1)
                    System.out.print("The computer is paper. You are rock. You lost");
                else if (userNumber == 2)
                    System.out.print("The computer is paper. You are paper too. It is a draw");
                break;
        } System.out.println("");
    }
}
```

Output

lab1MyName (run) #2

```
run:
scissor (0), rock (1), paper (2): 1
computer number: 1
The computer is rock. You are rock too. It is a draw
scissor (0), rock (1), paper (2): 2
computer number: 0
The computer is scissor. You are paper. You lost
scissor (0), rock (1), paper (2): 2
computer number: 1
The computer is rock. You are paper. You won
scissor (0), rock (1), paper (2):
```

5. Implement class **RockPaperScissorsIFsOnly.** **Replace the switch statement of problem 4 with Ifs.**

6. **Implement class <u>DayOfTheWeek</u>**: (Science: day of the week) Zeller's congruence is an algorithm developed by Christian Zeller to calculate the day of the week. The formula is

$$h = \left(q + \frac{26(m + 1)}{10} + k + \frac{k}{4} + \frac{j}{4} + 5j \right) \% 7$$

where
 h is the day of the week (0: Saturday, 1: Sunday, 2: Monday, 3: Tuesday, 4: Wednesday, 5: Thursday, 6: Friday).
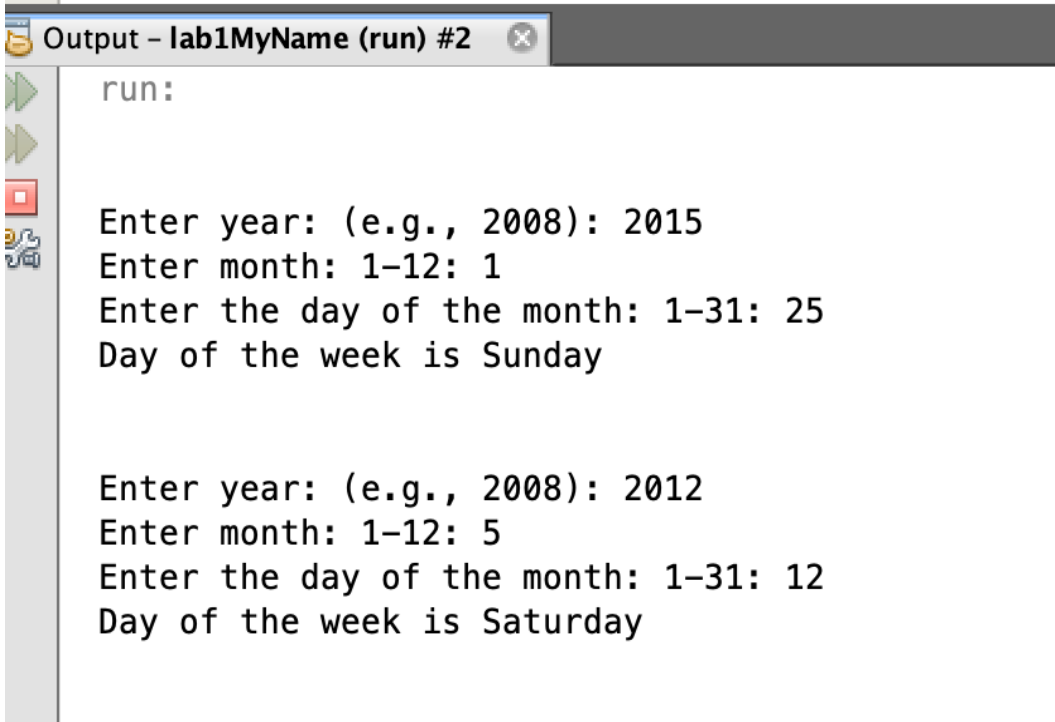 q is the day of the month.
 m is the month (3: March, 4: April, …, 12: December). January and February are counted as months 13 and 14 of the previous year.
 j is the century (i.e., year / 100).
 k is the year of the century (i.e., year % 100).

Note that the division in the formula performs an integer division. Write a program that prompts the user to enter a year, month, and day of the month, and displays the name of the day of the week.

```java
1    package chapter3.liang;
2    import java.util.Scanner;
3
4    public class DayOfTheWeek
5    {
6        public static void main(String[] args)
7        {...59 lines }
66   }
67
```

Output – lab1MyName (run) #2

```
run:

Enter year: (e.g., 2008): 2015
Enter month: 1-12: 1
Enter the day of the month: 1-31: 25
Day of the week is Sunday


Enter year: (e.g., 2008): 2012
Enter month: 1-12: 5
Enter the day of the month: 1-31: 12
Day of the week is Saturday
```