Lab 5

1. Write a Java program that asks when you are leaving for work and outputs an appropriate message, according to the following rules:

- If leaving before 6, "Drive.''
- If leaving between 6 and 8 inclusive, "Take a train.''
- If leaving after 8, "Take a bus.''

Note: Your time should be an integer that represents the hour you are leaving.

```
import java.util.Scanner;

class Transportation
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("When are you leaving for work? ");
        int time = input.nextInt();
        if (time < 6)
        {
            System.out.println("Drive.");
        }
        else if (time <= 8)
        {
            System.out.println("Take a train.");
        }
        else
        {
            System.out.println("Take a bus.");
        }
    }
}
```

2. Write a program 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.

```
import java.util.Scanner;

class Triangle
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter 3 edges for a triangle: ");
        double s1 = input.nextDouble();
```

```
        double s2 = input.nextDouble();
        double s3 = input.nextDouble();
        if((s1+s2>s3) && (s2+s3>s1) && (s3+s1>s2))
        {
            System.out.println("Perimeter = " + (s1+s2+s3));
        }
        else
        {
            System.out.println("Triangle not valid.");
        }
    }
}
```

3. Suppose you shop for rice in two different packages. You would like to write a program to compare the cost. The program prompts the user to enter the weight and price of the each package and displays the one with the better price. Here is a sample run:

```
Enter weight and price for package 1: 50 24.59
Enter weight and price for package 2: 25 11.99
Package 2 has a better price.
```

```
import java.util.Scanner;

class Rice
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter weight and price for package 1: ");
        double w1 = input.nextDouble();
        double price1 = input.nextDouble();

        System.out.print("Enter weight and price for package 2: ");
        double w2 = input.nextDouble();
        double price2 = input.nextDouble();

        if((price1/w1) < (price2/w2))
        {
            System.out.println("Package 1 has a better price.");
        }
        else
        {
            System.out.println("Package 2 has a better price.");
        }
    }
}
```

4. (Find the number of days in a month) Write a program that prompts the user to enter the month and year. Display the number of days in the month. For example, if the user entered month 2 and year 2012, your program should display 29 days. If the user entered month 3 and year 2015, your program should display 31 days.

- A year is a leap year if it is divisible by 4 but not by 100, or if it is divisible by 400. Use conditional statements and/or a switch statement.

```
import java.util.Scanner;

class DaysInMonth
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the month and year for the amount of days
in a month: ");
        int month = input.nextInt();
        int year = input.nextInt();
        switch(month)
        {
            case 1:
                System.out.println("31 Days");
            break;
            case 2:
                if((year%4==0 && year % 100 != 0) || (year % 400 == 0)) {
                    System.out.println("29 days");
                } else {
                    System.out.println("28 days");
                }
                break;
            case 3:
            case 5:
            case 7:
            case 8:
            case 10:
            case 12:
                System.out.println("31 Days");
                break;
            case 4:
            case 6:
            case 9:
            case 11:
                System.out.println("30 Days");
                break;
            default:
                System.out.println("Month or year input is incorrect. Try
again.");
        }
    }
}
```

5. (Financial application: calculate tips) Write a program that reads the subtotal and the gratuity rate, then compute and display the gratuity and total. For example, if the user enters 10 for subtotal and 15% for gratuity rate, the program displays $1.5 as gratuity and $11.5 as total. Here is a sample run:

```
Enter the subtotal and a gratuity rate: 10 15
The gratuity is $1.5 and the total is $11.5
```

```
import java.util.Scanner;

class Gratuity
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the subtotal and a gratuity rate: ");
        double subtotal = input.nextDouble();
        double gratuityRate = input.nextDouble();
        double gratuity = subtotal * (gratuityRate / 100);
        double total = subtotal + gratuity;
        System.out.println("The gratuity is $" + gratuity + " and the
total is $" + total);
    }
}
```

6. Write a switch statement to convert an int month to the month name. If the month is not a valid number give a statement that says something like “not a month”. You should use Scanner for this question.

- Now use a switch statement to display how many days are in a given month. The month is represented in int form. January, March, May, July, August, October, and December have 31 days April, June, September, and November have 30 days. February has 28 or 29.
- Now combine the two to take an int month and convert it to words and tell how many days it has.

```
import java.util.Scanner;

class Month
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a month: ");
        int month = input.nextInt();
        switch(month)
        {
            case 1:
                System.out.println("January has 31 days.");
                break;
```

```
            case 2:
                System.out.println("February has 28 or 29 days.");
                break;
            case 3:
                System.out.println("March has 31 days.");
                break;
            case 4:
                System.out.println("April has 30 days.");
                break;
            case 5:
                System.out.println("May has 31 days.");
                break;
            case 6:
                System.out.println("June has 30 days.");
                break;
            case 7:
                System.out.println("July has 31 days.");
                break;
            case 8:
                System.out.println("August has 31 days.");
                break;
            case 9:
                System.out.println("September has 30 days.");
                break;
            case 10:
                System.out.println("October has 31 days.");
                break;
            case 11:
                System.out.println("November has 30 days.");
                break;
            case 12:
                System.out.println("December has 31 days.");
                break;
            default:
                System.out.println("Not a month.");
        }
    }
}
```

7. A shipping company uses the following function to calculate the cost (in dollars) of shipping based on the weight of the package (in pounds):

$$c(w) = \begin{cases} 3.5, \text{if } 0 < w <= 1 \\ 5.5, \text{if } 1 < w <= 3 \\ 8.5, \text{if } 3 < w <= 10 \\ 10.5, \text{if } 10 < w <= 20 \end{cases}$$

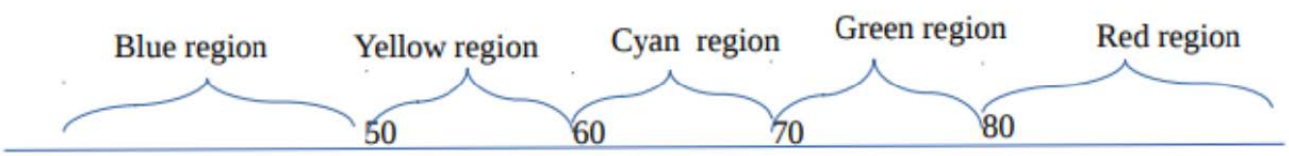
- Write a program that prompts the user to enter the weight of the package and display the shipping cost. If the weight is greater than 20, display a message “the package cannot be shipped.” If the weight is 0 or less, say “the package cannot be a zero or a negative weight”.

```
import java.util.Scanner;

class ShippingCost
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the weight of the package: ");
        double weight = input.nextDouble();
        // Check if the weight is greater than 20
        if (weight > 20) {
            System.out.println("The package cannot be shipped.");
        } else if (weight <= 0) {
            System.out.println("The package cannot have a zero or negative
weight.");
        } else {
            // Calculate the shipping cost based on the weight
            double shippingCost = 0.0;
            if (weight <= 1) {
                shippingCost = 3.5;
            } else if (weight <= 3) {
                shippingCost = 5.5;
            } else if (weight <= 10) {
                shippingCost = 8.5;
            } else {
                shippingCost = 10.5;
            }

            // Display the shipping cost
            System.out.println("The shipping cost is: $" + shippingCost);
    }
}
```

8. Depending on the value of an int variable, t, a space is divided into 5 regions as shown in the picture. Write a Java program that outputs a message giving the correct region for that value of t.




```
import java.util.Scanner;
```

```
class Region
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        System.out.println("Please enter the value of t:");
        int t = input.nextInt();

        if (t <= 50) {
            System.out.println("Blue region");
        } else if (t <= 60) {
            System.out.println("Yellow region");
        } else if (t <= 70) {
            System.out.println("Cyan region");
        } else if (t <= 80) {
            System.out.println("Green region");
        } else {
            System.out.println("Red region");
        }
    }
}
```