Beirut Arab University **Faculty of Science** **Department of Mathematics and Computer Science** **Lab 1 - Week 2**	**Course: CMPS242** **Semester: Fall 2021-2022** **Time: Thursday 8 - 11 a.m.** **Date : 16/09/2021**

Exercises:

1. Write a program "**identity.java**" that prints your identity and personal information as follows (Hint: use "println()" and "\n" for new lines, "\\" for backslash character and "\t" for tab spaces):

   My Name is: FirstName LastName

   I am born on: day\month\year
   *My Favorite hobby is: ****
   *My Favorite sport is: ****
   *My Favorite team is: ****
   *My Favorite movie is: ****

2. Suppose you have a given number of minutes and you want to calculate the equivalent number of hours, days, months and years. To calculate the number of hours you have to use the equation:

   Number of hours= number of minutes /60.

   To calculate the number of days you have to use the equation:

   Number of days= number of hours/24.

   To calculate the number of months you have to use the equation:

   Number of months= number of days/30.

   To calculate the number of years you have to use the equation:

   Number of years= number of months/12.

Write a java code to declare the needed variables, and then write the code to compute the number of hours, number of days, number of months and number of years.
The program should finally print all the results.

Sample output:
Number of minutes = 1814400, number of hours= 30240, number of days =1260, number of months= 42, and number of years= 3.5.

3. Write a java friendly program that will create a restaurant bill. The restaurant bill will include the base meal price, 5% tax as we need to pay our taxes to the restaurant and 15% tip to give some nice tips to the waitress.
The program will declare the needed variables; you need to declare an initial value for the Meal Charge.
The program will calculate the tax amount where
*taxAmount = tax * mealprice*,
the tips amount where *tipsAmount= mealprice* tips* and then the total value of the bill.
The program will finally print the value of the base meal (Meal Charge), tax amount, tip amount and the total bill.

Sample output 1:
Meal Charge: $12.5
Tax: $0.625
Tip: $1.875
Total Bill: $15.0

Sample output 2:
Meal Charge: $30.55
Tax: $1.5275
Tip: $4.5825
Total Bill: $36.66

4. In physics, a common useful equation for finding the position s of a body in linear motion at a given time t, based on its initial position s_0, initial velocity v_0, and rate of acceleration a, is the following:

$$s = s_0 + v_0 t + \frac{1}{2} a t^2$$

Write a java code to declare variables for s_0, v_0, a, and t, and then write the code to compute s on the basis of these values.

Sample output:

The position of a body with initial velocity v0= 0.0, initial position s0= 10.0, acceleration a= 2.0 and time t=5 equals 35.0.

5. Suppose we want to find the midpoint M (x, y) of the line segment from A (x1, y1) and B (x2, y2). To find this midpoint, we simply "average" the x and y coordinates. In other words, the x coordinate of the midpoint is $((x1+x2)/2)$ while the y-coordinate of the midpoint is $((y1+y2)/2)$.
Write a java program that will declare the values of the coordinates of points A & B and calculates the value of the coordinates of the midpoint M and print it.

Sample output 1:

The values of Coordinates of point A:
x1=2
y1=6
The values of Coordinates of point B:
x2=4
y2=2

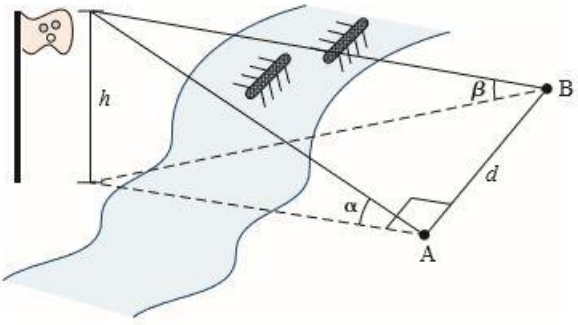
The midpoint M between A(2.0, 6.0)and B(4.0, 2.0) has coordinates: M(3.0, 4.0)

Sample output 2:

The values of Coordinates of point A:
x1=3
y1=5
The values of Coordinates of point B:
x2=2
y2=6
The midpoint M between A(3.0, 5.0)and B(2.0, 6.0) has coordinates: M(2.5, 5.5)

6. Write a java program that asks the user to enter 2 angles alpha and beta, and the distance between A and B and calculate the height h using the rule:

$$h = \frac{d \sin\alpha \sin\beta}{\sqrt{\sin(\alpha+\beta)\sin(\alpha-\beta)}}$$



Then print the results using formatting.

7. Write a java program that selects a winner among the party goers of the annual spring fraternity dance. The party goers will receive numbers **M + 1**, **M + 2**, **M + 3**, and so on, as they enter the house.
The starting value M is determined by the fraternity president. The last number assigned is M + N if there are N party goers. At the end of the party, we run the program that will randomly select the winning number from the range of M + 1 and M + N.

The program should ask the user to enter the starting number and the number of party goers, then calculate the winning number.
Note: use the Random class.