Department of Computer Engineering

CENG113 – Computer Programming I
FALL 2023 - 2024

Lab Guide #3 – Week 4

OBJECTIVE : To get acquainted
You will learn:
1. Math Class Methods
2. Thinking of algorithms

Instructor : Yusuf Evren AYKAÇ
Assistants : Nisanur M. MERCİMEK, Yusuf Şevki GÜNAYDIN, Elif ŞANLIALP

1. Write a Java program that gets four positive double numbers (**q, r, s, t**) from the user as input data, and calculates the result of the formula below, and displays the result on the screen.

$$\left(\frac{\left(q^3 + s\right)^4}{\sqrt[5]{t^2}} + \sqrt{\left| \frac{r * s}{\sqrt{r^3}} \right|} \right)^3 = ?$$

Example Run:
```
Enter a value for q: 1.2
Enter a value for r: 5
Enter a value for s: 2.1
Enter a value for t: 2.2
The result is 3915538.1
```

Application Name: LabGuide3_1
Class Name: Question_1.java

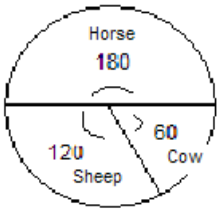
2. Write a Java program that reads a five-digit binary number, converts that number to decimal, and displays the decimal number and the sum of its digits.

Example Run1:
```
Enter a binary number : 11111
Decimal equivalent is 31 and sum of its digits is 4
```

Example Run2:
```
Enter a binary number : 11101
Decimal equivalent is 29 and sum of its digits is 11
```

Application Name: LabGuide3_2
Class Name: Question_2.java

3. In a farm, there are several cows, sheep and horses. Write a Java program that gets the number of animals from the user and calculates the central angle for each animal, if their numbers are shown in a circle graphic, as below:



Example Run1:
```
Enter the number of cows: 200
Enter the number of sheep: 400
Enter the number of horses: 600

The angle of cows is 60.00 degrees
The angle of sheep is 120.00 degrees
The angle of horses is 180.00 degrees
```

Example Run2:
```
Enter the number of cows: 500
Enter the number of sheep: 500
Enter the number of horses: 500

The angle of cows is 120.00 degrees
The angle of sheep is 120.00 degrees
The angle of horses is 120.00 degrees
```

Example Run3:
```
Enter the number of cows: 213
Enter the number of sheep: 512
Enter the number of horses: 418

The angle of cows is 67.09 degrees
The angle of sheep is 161.26 degrees
The angle of horses is 131.65 degrees
```

Application Name: LabGuide3_3
Class Name: Question_3.java

4.
Write a Java program that prompts the user for the Cartesian coordinates of two points (x1, y1) and (x2, y2) and displays the distance between them computed using the following formula:

$$\text{Distance} = \sqrt{(x1-x2)^2+(y1-y2)^2}$$

Example Run:
```
Enter x1: 4.5
Enter y1: 3.1
Enter x2: 2.4
Enter y2: 1.4
Distance is 2.702
```

Application Name: LabGuide3_4
Class Name: Question_4.java

5.
Write a Java program that gets three objects' prices (PC, camera, cell phone) and a budget in dollars from the user. The program should calculate how many of each object can be bought by the user and how much money will be left after buying them. **(Hint: You can use modulus operator)**

Example Run:
```
Enter the price of PC ($): 1300
Enter the price of camera ($): 750
Enter the price of cell phone ($): 420

Enter your budget ($): 6500

You can buy 5 PCs and 0$ will remain in your pocket
You can buy 8 cameras and $500 will remain in your pocket
You can buy 15 cell phones and $200 will remain in your pocket
```

Application Name: LabGuide3_5
Class Name: Question_5.java