

Do not use any data structures such as array or ArrayList to store data.

Do not write other methods, basically write the code in the main () method. Do not write OOP.

1. The amount of time it takes an object to travel a certain distance when traveling at a constant rate of speed is given by the formula $t = d / r$ where d is the distance in meters and r is the rate of speed in meters per second.

Write a program that asks the user to enter the distance and the rate of speed, then calculates and prints the time.

- a. Use a **sentinel controlled** or a **flag controlled while loop** to repeatedly accept the user input and calculate the result until the user choose not to.
- b. Use if-else structure to valid the user inputs. You can combine two expressions using a logical operator (AND / OR). Print an error message if the inputs are invalid.
- c. In the end, the average value is printed.
- d. The results should be formatted appropriately.

[This program is similar to SimpleInterest.java program we completed in the Lab.]

Sample run with valid input:

```
Enter the distance in meters (-1 to exit): 150
Enter the rate of speed in meters per second: 40

Time: 3.75

Enter the distance in meters (-1 to exit): 200
Enter the rate of speed in meters per second: 35

Time: 5.71

Enter the distance in meters (-1 to exit): 100
Enter the rate of speed in meters per second: 30

Time: 3.33

Enter the distance in meters (-1 to exit): -1

Average: 4.27
```

Sample run with invalid input:

```
Enter the distance in meters (-1 to exit): -200
Enter the rate of speed in meters per second: 35

Invalid input, both distance and speed must be greater than zero

Enter the distance in meters (-1 to exit): 200
Enter the rate of speed in meters per second: -35

Invalid input, both distance and speed must be greater than zero

Enter the distance in meters (-1 to exit): -200
Enter the rate of speed in meters per second: -35

Invalid input, both distance and speed must be greater than zero
```

2. Enhance the software company program you have completed in Assignment 4.

A software company offers three types of services: development, training, and consulting. The hourly rates are shown below.

Service Type	Service	Hourly Rate
1	Development	\$65.50
2	Training	\$50.50
3	Consulting	\$80.00

Write a **menu-driven** program that asks the user to enter the service type and the hours spent, then calculates and outputs the service charge.

- The program should have a menu so the user can select the service type or exit the program.

```
*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****
```

- It is required to use a flag-controlled or a sentinel-controlled **while** loop so that the program can continue to run until the user enters 0. Inside the loop, a **switch** structure is used to help select a service type and output the cost for each service.
- Your program should also calculate and output the total service charges of each service, and the overall service charges of all services.

Sample run:

```
*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 1
Enter the hours spent: 35.5

Development charge before tax: $2,325.25

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 2
Enter the hours spent: -8

The hours spent must be greater than zero.
Try again.

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 2
Enter the hours spent: 8

Training charge before tax: $404.00
```

```

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 3
Enter the hours spent: 5

Consulting charge before tax: $400.00

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 6

Invalid service type number (enter 1, 2, or 3).
Please try again.

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 2
Enter the hours spent: 40

Training charge before tax: $2,020.00

*****
1 --- Development
2 --- Training
3 --- Consulting
0 --- Exit
*****

Select a number: 0

Total service charge before tax for each service type:

Development: $2,325.25
Training: $2,424.00
Consulting: $400.00

Overall charge before tax of all service types: $5,149.25

Thank you for using this program!

```

Due: Wednesday, 10/12/22

- To receive full credit, the assignment must be submitted by the due date.
- Late submissions will incur a penalty of 5% per day.
- **Upload the source code files to D2L.**

Style, form, documentation, naming convention, and more

Each program should have a file header section. /* * Author: Your name * Date: Date of completion * Assignment: Assignment # NameOfSourceCode.java * Description: The program description */	Up to 5% deduction
Each program should be written with the appropriate form and style. Use indentation, blank line, and comments to make the source code easy to read.	Up to 5% deduction
Use Java naming convention and meaningful names to name the classes, methods, variables, constants, and other identifiers in the programs.	Up to 5% deduction
Format the output appropriately	Up to 5% deduction