

CITC-1301 Introduction to Programming

Chapter 2 Exercises

Exercise 1: Distance Traveled

Assuming there are no accidents or delays, the distance a car travels down an interstate can be calculated with the following formula:

$$\text{Distance} = \text{Speed} * \text{Time}$$

A car is traveling at 70 miles per hour. Write a program that displays the following:

- The distance the car will travel in 5 hours.
- The distance the car will travel in 10 hours.
- The distance the car will travel in 15 hours.

Output:

```
A car traveling 70 miles per hour will travel the following distances:  
- 350 miles in 5 hours  
- 700 miles in 10 hours  
- 1050 miles in 15 hours
```

Exercise 2: Miles-per-Gallon

An automobile's miles-per-gallon (MPG) can be calculated with the following formula:

$$\text{MPG} = \text{Miles driven} / \text{Gallons of gas used}$$

Write a program that asks the user for the number of miles driven and the gallons of gas used. It calculates the vehicle's MPG and displays the result.

Output:

```
This program calculates a vehicle's MPG.  
  
Number of miles traveled? 342 [ENTER]  
Gallons of gasoline used? 11 [ENTER]  
  
A vehicle that uses 11.0 gallons of gasoline to travel 342.0 miles gets 31.1 miles per gallon.
```

Exercise 3: Celsius to Fahrenheit Temperature Converter

Write a program that converts Celsius temperatures to Fahrenheit temperatures. The formula is as follows:

$$F = \frac{9}{5}C + 32$$

The program asks the user to enter a temperature in Celsius, then displays the temperature converted to Fahrenheit.

Output:

```
This program converts a temperature from Celsius to Fahrenheit.  
  
Temperature: 26 [ENTER]  
  
26 Celsius is 78.8 Fahrenheit.
```

Exercise 4: Planting Grapevines

A vineyard owner is planting several new rows of grapevines and needs to know how many grapevines to plant in each row. The owner has determined that after measuring the length of a future row, they can use the following formula to calculate the number of vines that will fit in the row, along with the trellis end-post assemblies that will need to be constructed at each end of the row:

$$V = \frac{R - 2E}{S}$$

The terms in the formula are:

- V – the number of grapevines that will fit in a row.
- R – the length of a row, in feet.
- E – the amount of space, in feet, used by an end-post assembly.
- S – the space between vines, in feet.

Write a program that makes the calculation for the vineyard owner. The program shall ask the user to input the following:

- The length of the row, in feet.
- The amount of space used by an end-post assembly, in feet.
- The amount of space between the vines, in feet.

Once the input data has been entered, the program shall calculate and display the number of grapevines that will fit in the row.

Output:

```
This program calculates the number of grapevines that fit in a row.  
  
Length of row (in feet): 500 [ENTER]  
Amount of space used by end-post assembly (in feet): 3 [ENTER]  
Amount of space between vines (in feet): 2 [ENTER]  
  
Number of grapevines that fit in a row 500.0 feet in length: 247.0.
```