**CSC 270 - Survey of Programming Languages**

**Assignment #14 – Familiarity With Scheme**

**Due Tuesday, November 30, 2021**

**Part I**

Using *mit-scheme on compsci.adelphi.edu*, evaluate the following expressions:

1. (+ 4 2)
2. (- 37 55)
3. (/ 108 12)
4. (\* 3.5 6.9)
5. (/(+(- 2002 1965) (- 1999 1966)) 2)
6. (\*(-(+ 22 12) (- 30 17)) 3)
7. (sin (/ 90 pi))
8. (log(/ 8 2.3))
9. (expt 10 0.4771)
10. (remainder (+ 37 55) (- 108 97))

**Part II**

If you travel at 55 miles per hour for 8 hours, you should discover that you have traveled 440 miles. Obviously, if you travel for less time, or if you increase your speed this will affect the number of miles that you have traveled.

Write a function in Scheme to calculate the number of miles traveled, given the speed (in miles per hour) and the time traveled (in hours). The formula is:

**Distance (in miles) = Speed (in miles per hour) \* Time Traveled (in hours).**

Run the program using mit-scheme for:

|  |  |
| --- | --- |
| **Speed** | **Time Traveled** |
| 55 | 2 |
| 55 | 4 |
| 55 | 6 |
| 55 | 8 |
| 60 | 2 |
| 60 | 4 |
| 60 | 6 |
| 60 | 8 |
| 65 | 2 |
| 65 | 4 |
| 65 | 6 |
| 65 | 8 |

**Part III**

You are driving down the highway when you realize that your speedometer is not working. And you are on a highway where the state police give out a LOT of speeding tickets!!

Since you know how many hours you have driven and your odometer (strangely enough) is working, you can calculate how fast you are going. If you have traveled 420 miles in six hours, your speed was 70 miles an hour and you are 15 miles per hour too fast!!

Write a program in Scheme to calculate how many miles per hour over the speed limit (of 55 mph) you are driving given the miles traveled and hours traveled. (If you are under the speed limit, it will be a **negative** number.

**Speed (in miles per hour) = Distance(in miles) / Time Traveled (in hours).**

Run the program using mit-scheme for:

|  |  |
| --- | --- |
| **Distance Traveled** | **Time Traveled** |
| 85 | 2 |
| 85 | 4 |
| 95 | 6 |
| 95 | 8 |
| 60 | 2 |
| 60 | 4 |
| 90 | 6 |
| 100 | 8 |
| 95 | 2 |

Then extend the previous program and have it print a message indicating whether we are over, under or at the speed limit. The message are:

|  |  |
| --- | --- |
| Over the speed limit | **over-limit** |
| At the speed limit | **at-limit** |
| Under the speed limit | **under-limit** |