

# 2024 Fall CPSC 240 Assignment 2

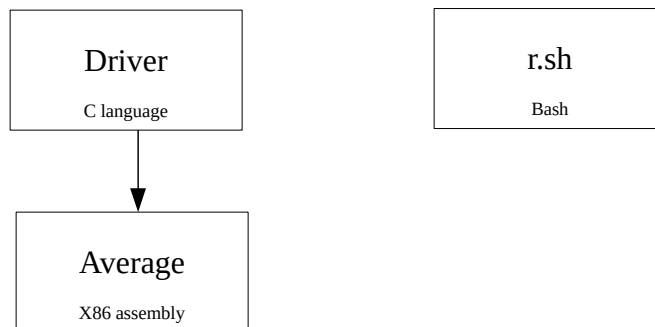
## Average Driving Time

### Prologue

Imagine a messenger service which delivers high-valued cargo to paying customers most of whom are hospitals and urgent care medical facilities. One heavily serviced route goes from Fullerton to Santa Ana from there to Long Beach, and finally returns to Fullerton. The driver of the delivery van may select the physical streets. The distance from the delivery service headquarters in Fullerton to the first customer in Santa Ana depends on the route selected by the driver of that day. A similar statement can be said for the route from Santa Ana to Long Beach. We want an assembly program that will compute the average speed of the delivery van for the entire trip.

### Requirements

Make a hybrid program with the main module in C language and the computational module in X86 modern assembly language. The structure adheres to the basic diagram shown below.



### Definitions

The program of Assignment 1 is the set of three modules represented by three rectangles in the above diagram. The arrow points to a module that will be called by the earlier module.

For us in this class each module contains the source code of one function. In general programming a module may contain multiple functions.

The language of the file r.sh is bash, which is sometime written Bash.

## Dialogue

When you are testing your program it should produce output like the following. We call the output the dialog because the human user and the machine are communicating with each other.

Welcome to <fill in name of program> maintained by <fill in your name>

Please enter your first and last names: Linda Garcia

Please enter your title such as Lieutenant, Chief, Mr, Ms, Influencer, Chairman, Freshman, Foreman, Project Leader, etc: Vice-president

Thank you Vice-president Linda Garcia

Enter the number of miles traveled from Fullerton to Santa Ana: 15.7

Enter your average speed during that leg of the trip: 42.6

Enter the number of miles traveled from Santa Ana to Long Beach: 19.2

Enter your average speed during that leg of the trip: 53.9

Enter the number of miles traveled from Long Beach to Fullerton: 28.2

Enter your average speed during that leg of the trip: 64.9

The inputted data are being processed

The total distance traveled is 63.1 miles.

The time of the trip is 1.15927445 hours

The average speed during this trip is 54.43059661 mph.

The driver has received this number 54.43059661 and will keep it for future use.

Have a great day.

A zero will be sent to the operating system as a signal of a successful execution.

Color codes:

Yellow: driver function

Pink: average function

Green: user inputs

There are no integers in this program. All the numbers are floating point numbers stored in the component of the CPU called SSE. Do not use any registers from the FPU component.

## Dialogue showing input validation

Welcome to Vehicle Speed maintained by Mauricio Vega

Please enter your first and last names: Linda Garcia

Please enter your title such as Lieutenant, Chief, Mr, Ms, Influencer, Chairman, Freshman, Foreman, Project Leader, etc: Vice-president

Thank you Vice-president Linda Garcia

Enter the number of miles traveled from Fullerton to Santa Ana: 5.0

Enter your average speed during that leg of the trip: 10.X5

Invalid data detected. Try again

Enter your average speed during that leg of the trip: 15.0

Enter the number of miles traveled from Santa Ana to Long Beach: 4.0

Enter your average speed during that leg of the trip: 5.0

Enter the number of miles traveled from Long Beach to Fullerton: 6.0

Enter your average speed during that leg of the trip: WA4.0

Invalid data detected. Try again

Enter your average speed during that leg of the trip: 10.0

The inputted data are being processed

The total distance traveled is 15.0 miles.

The time of the trip is 1.9333333333 hours

The average speed during this trip is 7.7758621 mph.

The driver has received this number 7.7758621 and will keep it for future use.

Have a great day.

A zero will be sent to the operating system as a signal of a successful execution.

## Simple inputs to check your math

Welcome to Vehicle Speed maintained by Mauricio Vega

Please enter your first and last names: Linda Garcia

Please enter your title such as Lieutenant, Chief, Mr, Ms, Influencer, Chairman, Freshman, Foreman, Project Leader, etc: Vice-president

Thank you Vice-president Linda Garcia

Enter the number of miles traveled from Fullerton to Santa Ana: 5.0

Enter your average speed during that leg of the trip: 10.0

Enter the number of miles traveled from Santa Ana to Long Beach: 4.0

Enter your average speed during that leg of the trip: 2.0

Enter the number of miles traveled from Long Beach to Fullerton: 6.0

Enter your average speed during that leg of the trip: 12.0

The inputted data are being processed

The total distance traveled is 15.0 miles.

The time of the trip is 3.00000000 hours

The average speed during this trip is 5.000000000 mph.

The driver has received this number 7.7758621 and will keep it for future use.

Have a great day.

A zero will be sent to the operating system as a signal of a successful execution.

## **Partial credit explained**

Partial credit will be awarded in proportion to the amount of the specification correctly implemented.

The program must execute and close gracefully in order to receive partial credit.

Do not submit non-running programs.

The grader (or the professor) is not allowed to fix errors in your submitted program. Even errors as small as wrong line endings in source code files cannot be fixed by the grader or the professor.

Wrong line endings always result in a score of zero.

## **Professionalism**

The source files should carry the following information:

- A notice of license
- Author information
- Program information
- Statement of purpose
- Statement of testing: which computer, results of testing
- Individual file (module) information

Requirements for the text section

- Code is grouped in logical blocks
- Each block accomplishes a known purpose
- The purpose is stated in a header preceding the block itself

Reasons for professionalism in software technology

In the corporation you will often work in teams. If you perform well you may be promoted to a higher position. Your place in the team you're leaving will be filled by another person, who has to quickly learn everything you've been doing. The more information you can leave for the new employee the better will be your standing in the organization, and the new employee will be forever grateful.

Sources for "professionalism"

At the present time the sources are limited. Use posed programs as models of the layout of a professional source file.

**Due date**

September 25, 2024 @ midnight between September 25 and 26.

[Officially midnight belongs to the next day.]

Send the three individual files as 3 separate attachments to [cpsscgrader@proton.me](mailto:cpsscgrader@proton.me)

Use the instructions for submissions of programs that appeared in Assignment 1.