CS684 Spring 2024-25

CS684: Embedded System Course

Assignment 1: Reactive Kernel

Prerequisite:

- Before starting this assignment, go through the resources provided on Reactive Kernel Resources
- Inspect and analyze the C codes, both written by hand and synthesized.

Resources:

- Download the `Assignment-1.tar.gz` file. Extract the file using command `tar -xzvf Assignment-1.tar.gz`
- You will find following directory structure:

```
Assignment-1/
Assignment-1/freq/
Assignment-1/freq/freq.c
Assignment-1/freq/main.c
Assignment-1/freq/freq.h
Assignment-1/cube_avg/
Assignment-1/cube_avg/cube_avg.c
Assignment-1/cube_avg/cube_avg.h
Assignment-1/cube_avg/main.c
```

Problem Statement:

Write reactive kernel for finding

1. **Mean of cubes**
2. **Frequency of first element in a series**

I. Mean of cubes:

At each step, input is a single integer x. Mean of cubes has to be found for a sequence of x's seen so far. Following is the expected output:

```
[ronakupasham  (master *) cube_avg ./cube_avg
x = 2
cube_avg = 8.000000
x = 3
cube_avg = 17.500000
x = 4
cube_avg = 33.000000
x = 2
cube_avg = 26.750000
x = 1
cube_avg = 21.600000
x = ^C
ronakupasham  (master *) cube_avg
```

- For compiling and running the program follow these steps:

cd </path/to/cube_avg>
gcc -c cube_avg.c
gcc -c main.c
gcc -o cube_avg main.o cube_avg.o
./cube_avg

II. Frequency of first element in a series:

At each step, input is a single integer x. You have to calculate the number of times the first element of the series is occurring in a series of inputs Following is the expected output:

```
[ronakupasham  (master *) freq gcc -c freq.c
[ronakupasham  (master *) freq gcc -c main.c
[ronakupasham  (master *) freq gcc -o freq main.o freq.o
[ronakupasham  (master *) freq ./freq
x = 5
frequency = 1
x = 2
frequency = 1
x = 3
frequency = 1
x = 5
frequency = 2
x = 5
frequency = 3
x = 6
frequency = 3
x = 8
frequency = 3
x = 5
frequency = 4
x = ^C
ronakupasham  (master *) freq
```

- For compiling and running the program follow these steps:

cd </path/to/freq>
gcc -c freq.c
gcc -c main.c
gcc -o freq main.o freq.o

./freq

> Note: Your output should be exactly same as expected output including variables name as it will be autoevaluated.

Submission Instructions:

- This assignment is an individual task
- Complete the necessary files given in the folder
- Compress the folder `Assignment-1` in a `.tar.gz` file and provide the name as `<rollno>_Assignment_1.tar.gz`
- Submit it on moodle

> Note: Make sure you have removed all the print statements from the file except the lines wihich prints sum of squares and frequency. Else your submission will not be evaluated.