ANKARA UNIVERSITY

COM101B

Fall 2016

Programming Assignment #2

Due Date: 11/12/2016, 23:55

Aim: Aim of this programming assignment is gaining experience on the development of a simple interpreter. This interpreter evaluates a set of pre-defined commands from the command line. The purpose of using this interpreter is to store a set of attributes for rectangles or squares in the memory and calculate some useful geometric functions using them. Hence, there is a secondary purpose of practicing with C arrays and functions as well.

Rectangle Interpreter:

The interpreter can evaluate a couple of simple commands:

[R/r] [params]: read a rectangle. params of a rectangle is composed of 4 integers:

[upper left corner x coord, upper left corner y coord, width, height]

[S/s] [params]: read a square. params of a square is composed of 3 integers:

[upper left corner x coord, upper left corner y coord, width]

[P/p] [command]: print the requested data according to the following commands:

-D/d: print all the rectangles and the squares previously read. Print them in this format:

[upper left x coord, upper left y coord, lower right x coord, lower right y coord]

-R/r [index]: print the area of the rectangle specified with the index parameter

-I/i : print total intersection area of the given rectangle/square set

-N/n : print net surface area of all rectangles/squares.

-B/b : print the bounding box coordinates of the data in this format:

[upper left x coord, upper left y coord, lower right x coord, lower right y coord]

[Q/q] : terminate the program.

<u>Some important constraints to consider:</u>

- The number of geometric objects, i.e. rectangles and squares, cannot exceed 100.
- In the Cartesian Coordinates, a region cannot be covered by more than two rectangles at the same time. In other words, there can be regions where two rectangles overlap, but not three at the same time.

- Net surface area is the coverage of the planar region occupied by all rectangles/squares. Therefore, a region that is covered with more than one rectangle is counted just once. (i.e. net surface area of two rectangles A and B is Area(A) + Area(B) – Intersection (A , B)).
- The interpreter is case insensitive. Hence, all commands can arbitrarily be capitalized (or not).
- There are three error cases that the interpreter handles and reports (refer to input4.txt and output4.txt for exemplary error cases):
    - When a command is not recognized
    - When a print command is wrong
    - When a rectangle index is invalid

Please refer to the given example I/O files to learn how the interpreter reacts in each command and each error case. Pay attention to the given I/O format.

Testing and validating your program:

We provide you 4 sample input/output files. These files are generated under Ubuntu; hence, if you want to view these I/O files under Windows OS, you can use **Notepad++** program, which is a free platform independent application. Otherwise, you may not see the it properly.

Assume that your executable program file is **PA2**, test your implementation from an Ubuntu terminal as follows:

> ./PA2<input1.txt>my_output1.txt

Make sure that my_output1.txt is exactly the same with output1.txt file and so on for the other test sample files. You can compare two files automatically line by line using **diff** command from an Ubuntu terminal:

>diff my_output.txt output.txt

Submission:

Please before submitting your source file, rename it as **StudentNumber.c.**

Notes: Please use our Moodle news forum for additional questions and discussions related with this assignment.

Have fun ☺