ANKARA UNIVERSITY

COMPUTER ENGINEERING DEPARTMENT

Computer Programming II

Spring 2022-23

PA2
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Date: 07/04/2023 – 14/04/2023 23:55
Duration : 7 days

Task: For this assignment, your job is to create maze calculator.

The object of this game is to perform arithmetical operations along the given route.

Information about input file:

Input format:

<row: integer>[WS]<column: integer>
Maze content: <S> | <0-9> | <*,+,-> | <[<0-9>*]>
<start_row: integer>[WS]<start_column: integer>
Route: <d | u | r | l | q>*

-The board size is dynamic and will be determined by your programs according to the given input. Write the necessary algorithm to determine the size of the board.

-In the given input, initial maze content will be given after the size of board. Maze can contains digits (0-9), operators (*, -, +), left and right brackets (e.g., [46]) to represent numbers which greater than 9. "S" represents the start position of player.

-After setting initial maze content, start position of player is provided in the input file. First integer number is row number of player and second integer number is column number.

-In this state, the initial board settings finish and user starts to play. Player can traverse within the maze using characters 'd','r','l','u'.

- o 'd' is the command to go 'down' for the player
- o 'r' is the command to go 'right' for the player
- o 'l' is the command to go 'left' for the player
- o 'u' is the command to go 'up' for the player
- o 'q' is the command to quit from maze game.

For ex;

```
5 20 // row and column
S3*[46]19[296]126449
485163+45*5[95]81625
7823-[24]98-3[567]26
178[98]65+4538245017
[143]6785432[6543]90
0 0 // start positions
rrrdrrrurddllddq // route
```

The rules for playing the game:

-The game starts from the starting point(S). The initial operator is + and the initial score is 0.

-At first, you must print the inital maze.

-In each step, you will read only one character from route and you MUST print the command as “command:%c”. You can assume that the player will not move to the invalid direction (outside of the maze).

-When you move on the maze, if you see a digit, perform arithmetical operations according to the current operator.

-If you see an operator (*,-,+), you must change the current operator and print: “Operator changed to %c\n” (e.g., Operator changed to *).

-If you see left brackets i.e., “[“, you must go right until you see right brackets. Note that, in the input file right commands will not be provided to you. You must go right automatically. You must combine the digits in brackets into a single number.

-If you see right brackets i.e., “]“, you must go left until you see left brackets. Note that, in the input file left commands will not be provided to you. You must go left automatically. You must combine the digits in brackets into a single number. In this case, calculate the value of the number in reverse. For ex; if you read [46] from the left, this number is equal to 64.

-In the up and down commands, we will not give any inputs that you will meet with a number in the brackets.

-When you do arithmetical operation, you must print the score in the output file format, e.g., 3 * 46 = 138. In this example, 3 is the previous score, * is the current operator, 46 is the new number and 138 is new score.

-If you see q, you must print “Game is over. Your score is %d!\n”.

-The output of the example:

```
S3*[46]19[296]126449
485163+45*5[95]81625
7823-[24]98-3[567]26
178[98]65+4538245017
[143]6785432[6543]90

command:r // print the current command
0 + 3 = 3 // print the arithmetic operation
command:r
Operator changed to * // print operator changing
command:r // note that, you see [ and go until ]
3 * 46 = 138
command:d
Operator changed to +
command:r
138 + 4 = 142
command:r
142 + 5 = 147
command:r
Operator changed to *
command:u
147 * 296 = 43512
command:r43512 * 1 = 43512
command:d // note that, you see ] and go until [
43512 * 59 = 2567208
command:d
Operator changed to -
command:l
2567208 - 8 = 2567200
command:l
2567200 - 9 = 2567191
command:d
Operator changed to +
command:d
2567191 + 4 = 2567195
command:q // print the final score
Game is over. Your score is 2567195!
```

Warning: Any form of code copying, including the copies from the internet, is strictly prohibited. If we determine similarities between your codes with any other students in the class, it will be treated as cheating and will be punished. So, you would increase the risk of cheating when you see somebody else's code directly or see a solution in the internet (i.e. somebody else might have also copied the same code from the internet like you, so both of these codes will be evaluated as copies, since they both copy from an external source. Such attempts will always be considered as cheating). You are supposed to write the program by yourselves.

Testing:

As usual, use *input redirection* mechanism of your operating system to test your programs. For example, if your executable is called as PA2, redirect the input1.txt file to standard input using < operator and redirect your outputs to a file using > operator such as:

```
> ./PA2<input1.txt>myOutput1.txt
```

Then compare your outputs file with the given output files such as:

```
>diff myOutput1.txt output1.txt
```

Repeat this steps for all the given input and output files. In addition, create and try your own input outputs.

Submission:

Before submission, rename your source file name as StudentNumber.c.