## CSE142 – Spring 2016

## Homework #2

**Due: May 8th, 2016, 23:55**

In this homework you are going to write a C program that will repeatedly read an expression from the user that is made up of digits, +, - and parentheses, and evaluates the expression in modulo 10 and prints the result; if the expression is malformed your program will give an error message. The program will repeat this process until \* is entered as the expression.

Note: if you cannot calculate correctly the result but at least detect the errors correctly you will gain 50% of the full mark.

**Hint: An algorithm to evaluate the expressions is as follows**

* Find the closing and opening parenthesis of the (leftmost) inner most expression
* Do the computation implied in the expression found (in modulo 10), which will result again in a single digit
* Replace the innermost parentheses and the expression inside with the result you found
* Repeat until no parentheses can be found or an error condition is detected (such as an open parenthesis is not matched with a closing parenthesis or vice versa, or a non-digit character is found etc.)

Example run session:

> Enter expression: ((5+4)-2)-(3-4)

> 8

> Enter expression: ((1+4)

> ERROR

> Enter expression: 1-4

> 7 (In modulo 10, -3 is equal to 7 same numbers)

> Enter expression: 9+4+(1-(1-9))+2+(3+(5+5)+(5+(9+7)))

> 8

> Enter expression: \*

> Bye!

More examples:

> Enter expression: (5)-(1-(2-3))

> 3

> Enter expression: (x+4)

> ERROR

> Enter expression: -2

> 8

> Enter expression: -(9)

> 1

> Enter expression: (-4)

> 6

> Enter expression: ((1+2)+(2+3))-(1+(2-(3+(4+5)))))

> 7

> Enter expression: (((((5)))))-(2+3)

> 0

> Enter expression: 3+(((((5)))))

> 8

> Enter expression: 3+((((()))))

> ERROR

> Enter expression: \*

> Bye!