

# Faculty of Engineering and Information Technology

## School of Software

**31927 - Applications Development with .NET**  
**32998 - .NET Applications Development**

### **SPRING 2018**

### **ASSIGNMENT 1 SPECIFICATION**

**DUE DATE – Monday, 17<sup>th</sup> September 2018**  
**This assignment is worth 25% of the total marks**

#### **Requirement Assignment Documentations**

**This assignment is split into two documents.**

1. Assignment Specification. This document contains the specification for what you will be required to do.
2. Assignment Addendum. This document contains all other details regarding the assignment, including assignment submission and the assessment scheme.

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#### **Requirement**

In this assignment you are to prepare a C# program that will act as a simple equation solver. The equation solver will be run from the command line and will only work with integer numbers, a single variable (X) and the following arithmetic operators: + - \* / % ^2. The % operator is the modulus operator, not the percentage. ^2 is the square of a number/variable (e.g.  $X^2 = X^2$ )

For example, if the C# program is compiled to Equ.exe, the following demonstrates how it will appear in the command line:

```
calc 3X + 5 = 8  
X = 1
```

In the command line, the argument is entered as the “calc” keyword followed by a space and followed by a sequence of numbers, variables, and operators, such as:  
calc <Equation formula>

Hitting the enter key will cause the program to evaluate the arguments and print the result as one or more numbers separated by “,”:

```
X=<result>,<result>.
```

The console should remain open and allow the user to continue to enter equations to be solved.

The program must follow the math rules of solving equations with 1 variable type (i.e. linear and quadric style equations). For example:

$$2X - 1 = 0$$

$$3X + 8X = 33$$

$$4X - 7 = 8X - 5$$

$$X / (x+12) = 1 / 13$$

$$X^2 + X^2 + 4X + 9X + X = 10 + 1 * 2 \% 4$$

The program must follow the usual laws of arithmetic which says:

1. The \* / and % operators must all be evaluated before the + and – operators.

2. Operators must be evaluated from left to right.

For example, using Rule 1

$$X = 2 + 4 * 3 - 6$$

Becomes

$$X = 2 + 12 - 6$$

Which results in

$$X = 8$$

$$X^2 + 2X^2 = 27$$

Becomes

$$3X^2 = 27$$

Which results in  $X = 3$

$$X^2 - 4 = 11 * 7$$

Becomes

$$X^2 - 4 = 77$$

Becomes

$$X^2 = 81$$

Which results in  $X = 9$

If we did not use Rule 1 then  $2+4*3-6$  would become  $6*3-6$  and then  $18-6$  and finally 12. This is an incorrect result.

If we do not use Rule 2 then the following illustrates how it can go wrong

$$4*5\%2$$

Going from left to right we evaluate the \* first, which reduces the expression to  $20\%2$  which becomes 0. If we evaluated the % first then the expression would reduce to  $4*1$  which becomes 4. This is an incorrect result. Remember, we are using integer mathematics when doing our calculations, so we get integer results when doing division. For example:

$$\text{calc } X = 20 / 4$$

$$X = 5$$

Also note that we can use the unary + and – operators. For example:

$$\text{calc } X = -5 / +2$$



## Assignment Objectives

The purpose of this assignment is to demonstrate competence in the following skills.

- Problem solution
- Employ basic mathematic skills to develop C# program
- Program design
- Array and string manipulation
- Command line arguments
- Creating Object Oriented methods in C#

These tasks reflect all the subject objectives.

The solution of this assignment will take between 200 and 300 lines of code, including white space (blank lines) comments, etc. The exact number will depend on how the students solve the task. As part of your subject workload assessment, it is estimated this assignment will take more than 30 hours to complete.

# Assignment Project Exam Help

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