Assignment 1

Name: Nur E Siam

Student ID : 103842784

Task 1

Taking these scenarios into account, I have found 26 test cases that would clearly reveal detectable outcomes when an incorrect operator is chosen.

Table1: Testcase Design

Test Case ID	Incorrect Operator	Error
1	A=(A-B)*B, C=A-5	Replaced '+' with '-'
2	A=(A*B)*B, C=A-5	Replaced '-' with '*'
3	A=(A+B)+B, C=A-5	Replaced '*' with '+'
4	A=(A+B)-B, C=A-5	Replaced '*' with '-'
5	A=(A-B)+B, C=A-5	Replaced '+' with '-' and '*' with '+'
6	A=(A-B)-B, C=A-5	Replaced '*' and '+' with '-'
7	A=(A+B)*B, C=A+5	Replaced '-' with '+'
8	A=(A+B)*B, C=A*5	Replaced '-' with '*'
9	A=(A-B)*B, C=A+5	Replaced '+' with '-' and '+' with '-'
10	A=(A*B)-B, C=A-5	Replaced '+' with '*' and '*' with '-'
11	A=(A+B)+B, C=A+5	Replaced '*' and '-' with '+'
12	A=(A*B)*B, C=A+5	Replaced '+' with '*' and '-' with '+'
13	A=(A-B)-B, C=A+5	Replaced '+' with '-', '*' with '-' and '-' with '+'
14	A=(A*B)-B, C=A*5	Replaced '+' with '*', '*' with '-' and '-' with '*'
15	A=(A*B)+B, C=A-5	Replaced '+' with '*', '*' with '+'
16	A=(A-B)-B, C=A*5	Replaced '+' with '-', '*' with '-' and '-' with '*'
17	A=(A+B)+B, C=A*5	Replaced '*' with '+' and '-' with '*'
18	A=(A*B)-B, C=A+5	Replaced '*' with '+', '*' with '-' and '-' with '+'
19	A=(A*B)+B, C=A+5	Replaced '+' with '*' and '-' with '+'

20	A=(A+B)-B, C= A*5	Replaced '*' with '-' and '-' with '*'
21	A=(A-B)+B, C=A+5	Replaced '+' with '-' and '*' with '+' and '-' with '+'
22	A=(A-B)+B, C=A*5	Replaced '+' with '-' and '*' with '+' and '-' with '*'
23	A=(A+B)-B, C=A+5	Replaced '*' with '-' and '-' with '+'
24	A=(A*B)+B, C=A*5	Replaced '+' with '*' and '*' with '+' and '-' with '*'
25	A=(A*B)*B, C=A*5	Replaced '+' with '*' and '-' with '*'
26	A=(A-B)*B, C=A*5	Replaced '+' with '-' and '-' with '*'

Task 2: (Evaluation of Test Case (A=10, B=0)

When the test scenario (A=10, B=0) The correct output for A=(A+B)*B, C=A-5 is

C= -5

However, the output of C= -5 can also be achieved using the following test cases:

Test Case ID	Incorrect Operator	Output
1	A=(A-B)*B, C=A-5	-5
2	A=(A*B)*B, C=A-5	-5
10	A=(A*B)-B, C=A-5	-5
15	A=(A*B)+B, C=A-5	-5

From the above, we can conclude that when B=0, the correct output can still be achieved even with the incorrect operators. As such 0 should not be used for testing.

Task 3:

I decided to code out a program on Python to find the concrete test cases by using my design in Task 1. From the conclusion drawn in Task 2, A and B cannot equal to 0, I decided to the values when 0<A>4 and 0<B>4.

From my results, I can conclude that the following test cases are the following:

1. A=1, B=2
2. A=1, B=3

3. A=2, B=3
4. A=3, B=2
5. A=3,B=3

Task 4:

I coded out the following program to find values of A that would not satisfy the testing objective.
I have found that when B =2, the values of A (-8, -4, 0, 2) should not be used as concrete test
cases.

```
import operator.py > ...
1    import operator
2
3    operations = [
4        operator.add,    # +
5        operator.sub,    # -
6        operator.mul     # *
7    ]
8
9    B = 2
10
11   for A in range(-100, 101):
12       expectedOutcome = (A + B) * 2 - 5
13       isIneffective = False
14
15       for i in range(3):
16           for j in range(3):
17               if i == 0 and j == 2:
18                   continue
19               A_custom = operations[i](A, B)
20               C_custom = operations[j](A_custom, B)
21               C_custom = C_custom - 5
22
23               if expectedOutcome == C_custom:
24                   isIneffective = True
25                   break
26
27           if isIneffective:
28               break
29
30       if isIneffective:
31           print(f"A = {A}, B = {B} is ineffective in detecting operator errors.")
32
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS

```
or.py'
A = -8, B = 2 is ineffective in detecting operator errors.
A = -4, B = 2 is ineffective in detecting operator errors.
A = 0, B = 2 is ineffective in detecting operator errors.
A = 2, B = 2 is ineffective in detecting operator errors.
PS H:\SWE 30009\Assignment 1>
```