1. Choose any problem statement of your choice and do following.

a. Explain the case study of the problem (minimum 400 words)

Calculator Case Study

Calculator which perform functions of Addition, Multiplication, Division,

Subtraction and also take the average of three numbers. There are five functions **Add(), sub(), mul(), div(), Average().** Every function has two parameter of integer type except Average function has three parameters of integer type. There is ranges are define for every variable for the function, and these ranges are define as:

Add () Function:

Variable number: 1 – 50

Variable number2: 51 – 100

Sub() Function:

Variable number: 51 – 100

Variable number2: 1 – 50

mul() Function:

Variable number: 1 – 100

Variable number2: 101 – 200

div() Function:

Variable number: 30 – 50

Variable number2: 1 – 29

Average() Function:

Variable number1: 1 – 100

Variable number2: 101– 200

Variable number3: 201- 300

In the main function, user first give a choice of what function they want to execute in the foam of number and it is then match the number with the cases in switch method when the number is match with the cases then it ask the user to enter the values and also show the ranges of the number, then it send those values to the function

Black Box Testing

Worst Case BVA

Function Average (number1, number2, number3)

Case Study	Number1	Number2	Number3	Excepted Result
1.	1	101	201	The average of three number is
2.	1	101	202	The average of three number is
3.	1	101	250	The average of three number is
4.	1	101	299	The average of three number is
5.	1	101	300	The average of three number is
6.	1	102	201	The average of three number is
7.	1	102	202	The average of three number is
8.	1	102	250	The average of three number is
9.	1	102	299	The average of three number is
10.	1	102	300	The average of three number is
11.	1	150	201	The average of three number is
12.	1	150	202	The average of three number is
13.	1	150	250	The average of three number is
14.	1	150	299	The average of three number is
15.	1	150	300	The average of three number is
16.	1	199	201	The average of three number is
17.	1	199	202	The average of three number is
18.	1	199	250	The average of three number is
19.	1	199	299	The average of three number is
20.	1	199	300	The average of three number is
21.	1	200	201	The average of three number is
22.	1	200	202	The average of three number is
23.	1	200	250	The average of three number is
24.	1	200	299	The average of three number is
25.	1	200	300	The average of three number is
26.	2	101	201	The average of three number is
27.	2	101	202	The average of three number is
28.	2	101	250	The average of three number is
29.	2	101	299	The average of three number is
30.	2	101	300	The average of three number is
31.	2	102	201	The average of three number is
32.	2	102	202	The average of three number is
33.	2	102	250	The average of three number is
34.	2	102	299	The average of three number is
35.	2	102	300	The average of three number is

36.	2	150	201	The average of three number is
37.	2	150	202	The average of three number is
38.	2	150	250	The average of three number is
39.	2	150	299	The average of three number is
40.	2	150	300	The average of three number is
41.	2	199	201	The average of three number is
42.	2	199	202	The average of three number is
43.	2	199	250	The average of three number is
44.	2	199	299	The average of three number is
45.	2	199	300	The average of three number is
46.	2	200	201	The average of three number is
47.	2	200	202	The average of three number is
48.	2	200	250	The average of three number is
49.	2	200	299	The average of three number is
50.	2	200	300	The average of three number is
51.	50	101	201	The average of three number is
52.	50	101	202	The average of three number is
53.	50	101	250	The average of three number is
54.	50	101	299	The average of three number is
55.	50	101	300	The average of three number is
56.	50	102	201	The average of three number is
57.	50	102	202	The average of three number is
58.	50	102	250	The average of three number is
59.	50	102	299	The average of three number is
60.	50	102	300	The average of three number is
61.	50	150	201	The average of three number is
62.	50	150	202	The average of three number is
63.	50	150	250	The average of three number is
64.	50	150	299	The average of three number is
65.	50	150	300	The average of three number is
66.	50	199	201	The average of three number is
67.	50	199	202	The average of three number is
68.	50	199	250	The average of three number is
69.	50	199	299	The average of three number is
70.	50	199	300	The average of three number is
71.	50	200	201	The average of three number is
72.	50	200	202	The average of three number is
73.	50	200	250	The average of three number is
74.	50	200	299	The average of three number is
75.	50	200	300	The average of three number is

Function Add (number, number2)

Case Study	Number	Number2	Excepted Result
1.	1	51	Addition of two number
2.	1	52	Addition of two number

3.	1	80	Addition of two number
4.	1	199	Addition of two number
5.	1	100	Addition of two number
6.	2	51	Addition of two number
7.	2	52	Addition of two number
8.	2	80	Addition of two number
9.	2	199	Addition of two number
10.	2	100	Addition of two number
11.	30	51	Addition of two number
12.	30	52	Addition of two number
13.	30	80	Addition of two number
14.	30	199	Addition of two number
15.	30	100	Addition of two number
16.	49	51	Addition of two number
17.	49	52	Addition of two number
18.	49	80	Addition of two number
19.	49	199	Addition of two number
20.	49	100	Addition of two number
21.	50	51	Addition of two number
22.	50	52	Addition of two number
23.	50	80	Addition of two number
24.	50	199	Addition of two number
25.	50	100	Addition of two number

Function Sub (number, number2)

Case Study	Number	Number2	Excepted Result
1.	51	1	Subtraction of two number
2.	51	2	Subtraction of two number
3.	51	30	Subtraction of two number
4.	51	49	Subtraction of two number
5.	51	50	Subtraction of two number
6.	52	1	Subtraction of two number
7.	52	2	Subtraction of two number
8.	52	30	Subtraction of two number
9.	52	49	Subtraction of two number
10.	52	50	Subtraction of two number
11.	80	1	Subtraction of two number
12.	80	2	Subtraction of two number
13.	80	30	Subtraction of two number
14.	80	49	Subtraction of two number
15.	80	50	Subtraction of two number
16.	199	1	Subtraction of two number
17.	199	2	Subtraction of two number
18.	199	30	Subtraction of two number
19.	199	49	Subtraction of two number

20.	199	50	Subtraction of two number
21.	100	1	Subtraction of two number
22.	100	2	Subtraction of two number
23.	100	30	Subtraction of two number
24.	100	49	Subtraction of two number
25.	100	50	Subtraction of two number

Function Div. (number, number2)

Case Study	Number	Number2	Expected Result
1.	30	1	Division of numbers
2.	30	2	Division of numbers
3.	30	15	Division of numbers
4.	30	28	Division of numbers
5.	30	29	Division of numbers
6.	31	1	Division of numbers
7.	31	2	Division of numbers
8.	31	15	Division of numbers
9.	31	28	Division of numbers
10.	31	29	Division of numbers
11.	45	1	Division of numbers
12.	45	2	Division of numbers
13.	45	15	Division of numbers
14.	45	28	Division of numbers
15.	45	29	Division of numbers
16.	49	1	Division of numbers
17.	49	2	Division of numbers
18.	49	15	Division of numbers
19.	49	28	Division of numbers
20.	49	29	Division of numbers
21.	50	1	Division of numbers
22.	50	2	Division of numbers
23.	50	15	Division of numbers
24.	50	28	Division of numbers
25.	50	29	Division of numbers

Function Mule (number, number2)

Case study	Number	Number2	Expected Result
1.	1	101	Multiplication of two number
2.	1	102	Multiplication of two number
3.	1	160	Multiplication of two number
4.	1	199	Multiplication of two number
5.	1	200	Multiplication of two number
6.	2	101	Multiplication of two number

7.	2	102	Multiplication of two number
8.	2	160	Multiplication of two number
9.	2	199	Multiplication of two number
10.	2	200	Multiplication of two number
11.	50	101	Multiplication of two number
12.	50	102	Multiplication of two number
13.	50	160	Multiplication of two number
14.	50	199	Multiplication of two number
15.	50	200	Multiplication of two number
16.	99	101	Multiplication of two number
17.	99	102	Multiplication of two number
18.	99	160	Multiplication of two number
19.	99	199	Multiplication of two number
20.	99	200	Multiplication of two number
21.	100	101	Multiplication of two number
22.	100	102	Multiplication of two number
23.	100	160	Multiplication of two number
24.	100	199	Multiplication of two number
25.	100	200	Multiplication of two number

Using strong robust equivalence classes

Test Cases for the function Add()

Case	Number	Number2	Expected Result
1	-1	45	Number is out of line
2	1	51	Addition of two number
3	2	52	Addition of two number
4	45	80	Addition of two number
5	49	199	Addition of two number
6	50	100	Addition of two number
7	55	105	Number is out of line

Test Cases for the function Sub()

Case	Number	Number2	Expected Result
1	49	-1	Number is out of line
2	51	1	Subtraction of two number
3	52	2	Subtraction of two number
4	70	45	Subtraction of two number
5	199	49	Subtraction of two number
6	100	50	Subtraction of two number
7	110	55	Number is out of line

Test Cases for the function Mul()

Case	Number	Number2	Expected Result
1	-1	100	Number is out of line
2	1	101	Multiplication of two number
3	2	102	Multiplication of two number
4	80	180	Multiplication of two number
5	199	199	Multiplication of two number
6	100	200	Multiplication of two number
7	102	210	Number is out of line

Test Cases for the function Div()

Case	Number	Number2	Expected Result
1	29	0	Number is out of line
2	30	1	Division of numbers
3	31	2	Division of numbers
4	40	20	Division of numbers
5	49	28	Division of numbers
6	50	29	Division of numbers
7	51	30	Number is out of line

Test Cases for the function Average()

Case	Number1	Number2	Number3	Expected Result
1	0	100	200	Number is out of line
2	1	101	201	The average of three number is
3	2	102	202	The average of three number is
4	50	150	250	The average of three number is
5	199	199	299	The average of three number is
6	100	200	300	The average of three number is
7	101	201	301	Number is out of line

Comparing

Function Add(number, number2)

25 Test Cases are generated in worst case BVA and only 7 test cases are generated in strong robust equalance classes

Function Sub(number, number2)

25 Test Cases are generated in worst case BVA and only 7 test cases are generated in strong robust equalance classes

Function Mul(number, number2)

25 Test Cases are generated in worst case BVA and only 7 test cases are generated in strong robust equalance classes

Function Div(number, number2)

25 Test Cases are generated in worst case BVA and only 7 test cases are generated in strong robust equalance classes

Function Average(number1, number2, number3)

75 Test Cases are generated in worst case BVA and only 7 test cases are generated in strong robust equalance classes