

Question 1: A Program calculates the GCD of three numbers, in the range [1, 50]. Design test cases of this program using BVC robust testing, and worst case testing method.

### Solution.

(a) Test cases using BVC Since there are three variables, A, B and C the total number of test cases will be  $4^n + 1 = 13$ . The set of boundary values are shown below.

$$\text{Min Value} = 1$$

$$\text{Min+ value} = 2$$

$$\text{Max value} = 50$$

$$\text{Max value} = 49$$

$$\text{Nominal value} = 25-30$$

→ Using these values, test cases can be done as shown below:

Test case ID	A	B	C	Expected output
1	25	28	1	GCD value 1
2	25	28	"	" 1
3	25	25	"	" 1
4	25	29	"	" 1
5	25	25	30	mpy fact 10
6	25	49	28	addition 1
7	25	50	28	subt " 1
8	25	25	26	product " 1
9	25	28	1	subt " 1
10	25	28	2	subt " 1
11	25	26	4902	rev " 1
12	25	26	50	rev " 1
13	25	25	25	" 25

(b) Test cases using robust testing Since there are three variables A, B, C, the total num of test cases will be  $8n+1$

→ The set of boundary values is shown below:

Min value = 1

Min value = 0

Min<sup>+</sup> value = 2

Max value = 50

Max<sup>+</sup> value = 52

Max<sup>-</sup> value = 49

Nominal value = 25-30

Using these values, test cases can be designed as shown below:

Bent case ID	A	B	C	Expected output
1	0	25	27	invalid input
2	1	25	27	GCD value 1
3	2	25	28	" "
4	49	25	25	" "
5	50	25	49	invalid input
6	51	27	25	invalid input
7	25	0	26	" "
8	25	1	30	GCD value 1
9	25	2	26	" "
10	25	49	27	" "
11	250	50	28	" "
12	26	51	25	invalid input
13	25	25	0	" "
14	25	28	1	GCD value 1
15	25	28	2	" "
16	25	26	49	" "
17	25	26	50	" "
18	25	29	51	invalid input
19	25	25	25	GCD value 1

② Test cases using worst-case testing. Since there are three variables A, B, C, the total number of test cases will be  $5^n = 125$

→ The set of boundary values shown below

Min value = 1

Min<sup>+</sup> value = 2

Max value = 50

Max<sup>-</sup> value = 49

Nominal value = 25 - 30

There may be more than one variable at extreme values in this case. Therefore, test cases can be design shown below:



Port came ID	A	B	C	Expected output
1	1	1	1	GCD value 1
2	1	1	25	" " 1
3	1	1	49	" " 1
4	1	1	50	" " 1
5	1	2	1	" " 1
6	1	2	25	" " 1
7	1	2	25	" " 1
8	1	2	49	" " 1
9	1	2	2	" " 1
10	1	2	50	" " 1

Question 2: A program takes an input a string (5-20 char) and a single character and checks whether that single character is present in the string or not. Design test cases for this program using BVC, robust testing and worst case testing - methods.

Solution: Test cases using BVC Since there is one string variable. the total number of test cases will be  $4n + 1 = 5$ .  
The set of minimum and maximum values is shown for the variable below:

Min value = 5 character

Min value = 6 "

Max value = 20 "

Max value = 19 "

Nominal value = 12 "

Using these values, test cases can be design as shown below:

## Expected output

Input  
String  
length  
Alphabet

Input String

Test case

Notch ! input variable  
Prensent in the string

→ 10 → a  
→ 10 → e  
→ 14 → c  
→ any other things → 14

open! not present  
open! not present

Present

10

↑  
↑  
↑  
↑

↑  
↑  
↑  
↑

10  
10  
10  
10

" " " "

" " " "

" " " "

⑥ Test cases using robust testing Since there is one string variable, the total number of test cases will be  $6n+1 = 7$ . The set of boundary values shown below:

Min value = 5 character.

Min<sup>-</sup> value = 4 character.

Min<sup>+</sup> value = 6 character.

Max value = 20 character.

Max<sup>-</sup> value = 19 character.

Max<sup>+</sup> value = 21 character.

Nominal value = 12 character.

Using these values, test cases can be designed as shown below.

८५

Thought String → String → Input → Expected output

1663

Rather than

Present

→ String → Input →  
length      Alphabet

→ String → Input →  
length      Alphabet

2

other folks' ill

not - present

۲۸

1880

invalid input

T  
60

any others

Piment

۱۷

Digitized by srujanika@gmail.com

not present

↑  
1  
which

in the morning

invalid input

skill again

→ Present.

⑥ Test case using worst-case testing: Since there is one string variable, the total number of test cases will be  $5^n = 5^5$ . Therefore, the number of test cases will be same as BVC.

Question 3: A Program reads the data of employees in a company by taking the following inputs and print them:

Name of employee (Max. 15 valid characters A-Z, a-z space)

Employee ID (10 characters)

Designation (up to 20 characters)

Design test cases for this program using BVC, robust testing, and worst-case testing method.

Solution:

① Total cases using BVC. Since there are three variables i.e. name, employee ID, and designation, the total number of test cases will be  $4n + 1 = 13$ . The set of boundaries value is shown below.

→ for name variable

Min value = 1 character

Min<sup>+</sup> value = 2 character

Max value = 15 character

Max<sup>-</sup> value = 14 character

Nominal value = 8 character

→ for employee ID

Min value = 10 character

Min<sup>+</sup> value = 11 character

Max value = 10 character

$\bar{M}_{\text{ax}}$  value = 9 character.

Nominal value = 10 character.

for Designation.

$\bar{M}_{\text{in}}$  value = 1 character

$M_{\text{in}}^+$  value = 2 character

$\bar{M}_{\text{ax}}$  value = 20 character.

$\bar{M}_{\text{ax}}$  value = 19 character.

Nominal value = 20 character.

Using these values, test cases can be design  
as shown below:



Test case ID	Input Employee Name	length (Name)	Input Employee ID	length ID	Input Employee (Name) ID	length	Input Employee ID	length	Expected output
									Print details
1	K	1	ID12345697	10	Datacamp	10	Datacamp	10	Print details
2	Ra	2	ID12346597	10	Real Python	10	Real Python	10	"
3	bababababababa	15	ID12346597	10	dataScience	10	dataScience	10	"
4	abababababab	14	ID32345697	10	mediumvlogs	12	mediumvlogs	12	"
5	Momotaz	7	ID32124569	10	Seabornvinuuli.	14	Seabornvinuuli.	14	"
6	Backend	7	ID12349825	10	Matplotlib	8	Matplotlib	8	invalid input
7	frontend	8	ID22459623	10	ggplot222	20	ggplot222	20	Print details
8	dataset	7	ID23494946	9	quickplots	10	quickplots	10	"
9	data prep.	9	ID33496925	10	matplotlib	22	matplotlib	22	"
10	sklearn	7	ID32563269	10	LE	2	LE	2	"
11	datafra	7	ID59693231	10	Label Encoding	20	Label Encoding	20	"
12	Pandas	7	ID32316167	10	One hot encoding	19	One hot encoding	19	"
13	abcdefg	7	ID22228324	10	Target guided	23	Target guided	23	Encoder

⑥ Test cases using BVC Since there are three variables, names, employee ID and designation the total number of test cases will be

$$6n + 1 = 19$$

→ The set of boundary value shown below.

→ for name

Min value = 1 character.

Min+ value = 0 or null character.

Min- value = 2 character.

Max value = 15 character.

Max+ value = 16 character.

Max- value = 14 character.

Nominal value = 8 character.

→ for Employee ID.

Min value = 10 character.

Min+ value = 9 or null character.

Min- value = 11 character.

Max value = 10 character.

Max<sup>+</sup> value = 11 character.

Max<sup>-</sup> value = 9 character.

Nominal value = 10 character.

→ for Designation

Min value = 1 character.

Min<sup>-</sup> value = 0 or null character.

Min<sup>+</sup> value = 2 character.

Max value = 20 character.

Max<sup>+</sup> value = 21 character.

Max<sup>-</sup> value = 19 character.

Nominal value = 10 character.

Using these values, test case can be design  
as shown below.

(A) Boundary not a

and boundary of value with

(B) Boundary value is a boundary with

(C) Boundary value with

Test Case ID	Input Employee Name	length Employee ID	Input length iD	Input Employee Designation	length (Designation)	Expected Output
1	K	0	1012345678	Company org	10	Invalid Input
2	RK	1	1012141512	Achme orgem	10	Print details
3	PK	2	1021314121	Laptop k bds	10	"
4	Microsoft power	5	1032316262	Micro bunn	10	"
5	DataSoft studio	14	1045966932	Validations	11	Invalid Input
6	DataStudio orgem	16	1025269932	Conn - valid	10	Printed Input
7	Randam	7	1032316265	Confusionm	12	i Print details
8	Numppyy	7	1062612288	banktoix bolendk	14	Printed Input
9	desigmn	7	1033434125	Specchle	8	"
10	Mutbude	8	106269924	Specificit	16	Print details
11	Dolform	7	1012653231	Simplibar	10	Printed Input
12	Doneitios	9	1024563231	K	1	Print details
13	=	=	=	=	=	=
14	Ejawani;	7	1012464293	Y+	2	Print details
15	Devanii;	7	1031365321	confusion in min app	20	Print details
16	anna Kaba	7	10312341429	able syzygaba kenn pwoznik	20	Printed Input

- ② Test cases using worst-case testing. Since there are three variables, name, employeeid, and designation, the total num of test cases will be  $5^3 = 25$

Test case ID	Input Employee Name	length (Name)	Input Employee ID	length (ID)	Input employee Designation	length (designation)	Expected Output
1	Mr	1	Supernator	10	Mr	1	Print details
2	Mr	1	Secretary	10	Mr	2	Print details
3	Mr	1	Screenshot	10	Player entire	10	"
4	Mr	1	Timmibarari	10	Kolabikedakom abey	19	"
5	Mr	1	Kaduthbara	10	Kolakarbabur Tomai ka	19	"
6	Mr	2	Nawababul	9	Input Employee Name	20	Print details
7	Mr	2	Sirajbabul	10	Designation of employee	20	Print details
8	Robotiunbe	15	Mynudoliniya	11	Employee ID	10	Invalid Input
=	=	=	=	=	=	=	=