CS- 589 Homework1 Submission

Name: Raghunath Reddy B

CWID: A20332674

Email: rbasired@hawk.iit.edu

Date of Submission: 09/24/2014

Problem I

The following are the ranges for each grade which are related and specified in the given problem

Grades	**Exam-I**	**Exam-II**	**Project**	**Average = (Exam-1 +Exam-II + Project)/3**
No Grade or Grade E	0-49	0-59	0-49	0-74
Grade C	50-59	60-64	50-59	0-74
Grade B	60-100	65-100	60-100	0-74
Grade A	-	-	-	75-100
Valid Subdomains	**3**	**3**	**3**	**2**
Invalid Subdomains	**2(<0, >100)**	**2(<0, >100)**	**2(<0, >100)**	**2(<0, >100)**

Assumptions

- Exam I is Integer value.
- Exam II is Integer value.
- Project is Integer value.

Input Conditions

- 0<= Exam I <= 100
- 0<= Exam II <=100
- 0<= Project <=100
- The max size of the First Name is 12 characters
- The max size of Last Name is 20 characters
- Student# must be a 9 character string Format AXXXXXXXX.
- Student# must start with character “A”.
- X in Student# format is a digit.

Tabular Representation of Valid and Invalid Subdomains

Input Conditions	**Valid Sub Domains**	**Invalid Sub Domains**
Exam I	0 – 49 (1) 50 – 59 (2) 60 – 100 (3)	< 0 (4) > 100 (5)
Exam II	0 – 59 (6) 60 – 64 (7) 65 – 100 (8)	< 0 (9) > 100 (10)
Project	0 – 49 (11) 50 – 59 (12) 60 – 100 (13)	< 0 (14) > 100 (15)
Average	0 – 74 (16) 75 – 100 (17)	< 0 (18) > 100 (19)
Size of First Name	1 – 12 (20)	= 0 (21) > 12 (22)
Size of Last Name	1 – 20 (23)	= 0 (24) > 20 (25)
Student# is a 9-character string	Yes (26)	No (27)
Student# starts with "A"	Yes(28)	No (29)
X is a digit	Yes (30)	No (31)

The related input conditions from the above table are

- Exam I – 3 Valid Sub Domains
    - 0 - 49 (A)
    - 50 - 59 (B)
    - 60 – 100 (C)
- Exam II – 3 Valid Sub Domains
    - 0 – 59 (A)
    - 60 – 64 (B)
    - 65 – 100 (C)
- Project – 3 Valid Sub Domains
    - 0 – 49 (A)
    - 50 – 59 (B)
    - 60 – 100 (C)
- Average – 2 Valid Sub Domains
    - 0 – 74 (A)
    - 75 – 100 (B)

Hence, the no of potential test case for **Strong Normal Equivalence Tests** are: 3 * 3 * 3 * 2 = 54 tests.

a. Strong Normal Equivalence Test Cases

The following are the possible Test cases which we can generate from afore mentioned sub domains for Exam I, Exam II, Project and Average.

Test Case	Exam I (A/B/C)	Exam II (A/B/C)	Project (A/B/C)	Average (A/B)	Is Valid? (Yes/No)
T#1	A	A	A	A	Yes
T#	A	A	A	B	No
T#2	A	A	B	A	Yes
T#	A	A	B	B	No
T#3	A	A	C	A	Yes
T#	A	A	C	B	No
T#4	A	B	A	A	Yes
T#	A	B	A	B	No
T#5	A	B	B	A	Yes
T#	A	B	B	B	No
T#6	A	B	C	A	Yes
T#	A	B	C	B	No
T#7	A	C	A	A	Yes
T#	A	C	A	B	No
T#8	A	C	B	A	Yes
T#	A	C	B	B	No
T#9	A	C	C	A	Yes
T#10	A	C	C	B	Yes
T#11	B	A	A	A	Yes
T#	B	A	A	B	No
T#12	B	A	B	A	Yes
T#	B	A	B	B	No
T#13	B	A	C	A	Yes
T#	B	A	C	B	No
T#14	B	B	A	A	Yes
T#	B	B	A	B	No
T#15	B	B	B	A	Yes
T#	B	B	B	B	No
T#16	B	B	C	A	Yes
T#	B	B	C	B	No
T#17	B	C	A	A	Yes
T#	B	C	A	B	No
T#18	B	C	B	A	Yes
T#	B	C	B	B	No
T#19	B	C	C	A	Yes
T#20	B	C	C	B	Yes
T#21	C	A	A	A	Yes
T#	C	A	A	B	No
T#22	C	A	B	A	Yes

T#	C	A	B	B	No
T#23	C	A	C	A	Yes
T#24	C	A	C	B	Yes
T#25	C	B	A	A	Yes
T#44	C	B	A	B	No
T#26	C	B	B	A	Yes
T#	C	B	B	B	No
T#27	C	B	C	A	Yes
T#28	C	B	C	B	Yes
T#29	C	C	A	A	Yes
T#30	C	C	A	B	Yes
T#31	C	C	B	A	Yes
T#32	C	C	B	B	Yes
T#33	C	C	C	A	Yes
T#34	C	C	C	B	Yes

From the above mentioned #54 test case some of them are Invalid as the sub domains of entities Exam I, Exam II, Project does not relate or intend to Sub Domain of Average; as average = (Exam I + Exam II + Project)/ 3;

Consider Test Case # 2 from above table

Exam I Domain: A (0 – 49)

Exam II Domain: A (0 – 59)

Project Domain: A (0 – 49)

Average Domain: B (74 – 100)

T#2: **Last name=Reddy, First name=Raghunath, Student #=A11112222, Exam-1=49, Exam-2 = 59, Project=49** this implies i.e.; Average = 52.34 (Which doesn't fall in domain B). Hence this particular Test Case is not a valid one. Similarly we have other test cases which are not valid listed in the above table.

Hence, the no of potential strong equivalence test case are = 34 which are shown below.

Test Case #	**Test Cases**
T#1	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 50, Project=45
T#2	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 50, Project=55
T#3	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 50, Project=70
T#4	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 =63, Project=45
T#5	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 63, Project=55

T#6	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 50, Project=95
T#7	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 99, Project=49
T#8	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 99, Project=55
T#9	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 99, Project=62
T#10	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=45, Exam-2 = 99, Project=99
T#11	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 50, Project=45
T#12	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 50, Project=55
T#13	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 50, Project=90
T#14	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 63, Project=45
T#15	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 50, Project=55
T#16	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 50, Project=90
T#17	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 90, Project=45
T#18	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 90, Project=55
T#19	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 70, Project=65
T#20	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=55, Exam-2 = 99, Project=99
T#21	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 50, Project=45
T#22	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 50, Project=55
T#23	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 50, Project=65
T#24	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=85, Exam-2 = 50, Project=99
T#25	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 62, Project=45
T#26	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 62, Project=55
T#27	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 62, Project=65
T#28	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 62, Project=99

T#29	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 70, Project=45
T#30	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=95, Exam-2 = 95, Project=47
T#31	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 70, Project=55
T#32	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=95, Exam-2 = 95, Project=55
T#33	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=65, Exam-2 = 70, Project=65
T#34	Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam-1=95, Exam-2 = 90, Project=95

b. Weak Robust Equivalence Testing

From the above mentioned valid and invalid subdomains the following are the Invalid Sub Domains

Input Conditions	**Invalid Sub Domains**
Exam I	< 0 > 100
Exam II	< 0 > 100
Project	< 0 > 100
Average	< 0 > 100
Size of First Name	= 0 > 12
Size of Last Name	= 0 > 20
Student# is a 9-character string	No
Student# starts with "A"	No
X is a digit	No

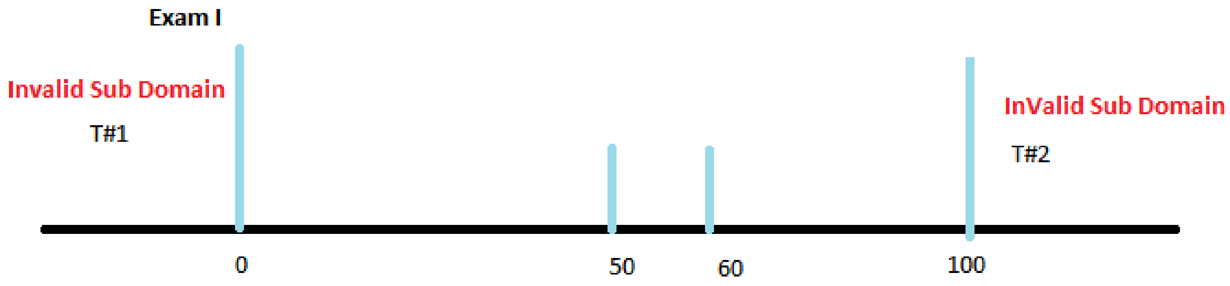
Note: Average is dependent on Exam I, Exam II and Project. Hence a robust equivalent test cases can't be designed for that input condition as the other input conditions will also fall into Invalid Sub Domains

Consider Average < 0 to achieve this.

Exam I = 0, Exam =0, Project = -10 (which violates the basic rule that only one input condition should be in its invalid sub domain)

So, the no of potential Weak Robust Equivalent test cases = 13

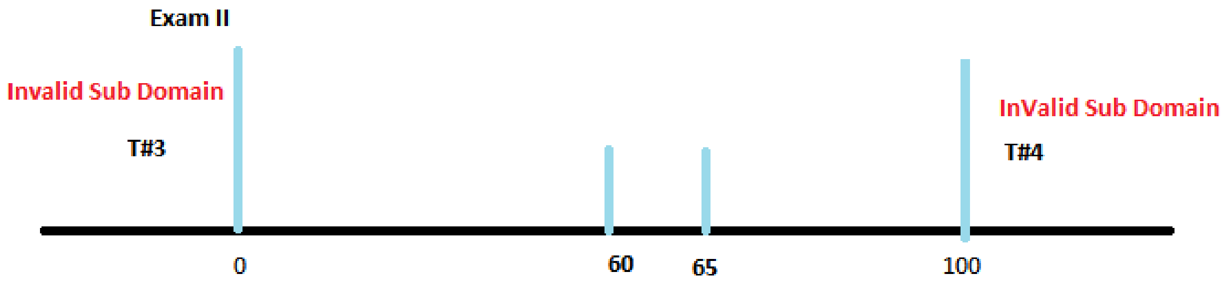
Exam I



T#1: Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam I =-10, Exam II = 62, Project=99

T#2: Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam I =110, Exam II = 62, Project=99

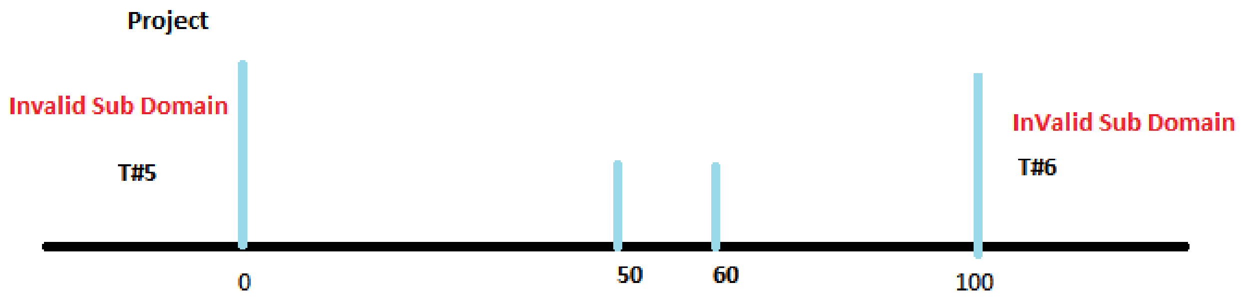
Exam II



T#3: Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam I =55, Exam II = -10, Project=99

T#4: Last name = Reddy, First name=Raghunath, Student #=A20332674, Exam I = 50, Exam II = 110, Project = 99

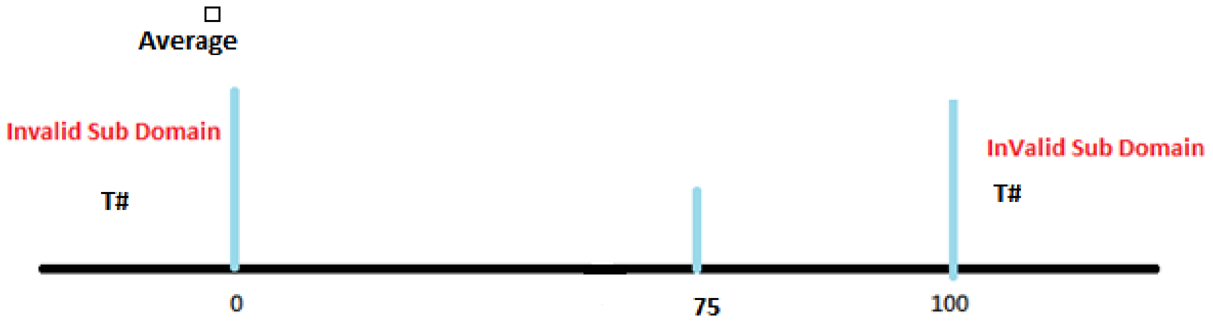
Project



T#5: Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam I =55, Exam II = 65, Project=-10

T#6: Last name = Reddy, First name=Raghunath, Student #=A20332674, Exam I = 50, Exam II = 65, Project = 110

Average



T#: Last name=Reddy, First name=Raghunath, Student #=A20332674, Exam I =-10, Exam II = -10, Project=-10 (Test Case not valid as Exam-I, Exam II, Project falls into invalid subdomains to check for average < 0 condition)

T#: Last name = Reddy, First name=Raghunath, Student #=A20332674, Exam I = 150, Exam II = 165, Project = 110

(Test Case not valid as Exam-I, Exam II, Project falls into invalid subdomains to check for average > 100 condition)

Size of First Name

T#7 Last name=reddy, First name=<empty>, Student #=A20332674, Exam I =55, Exam II = 65, Project=90

T#8 Last name=reddy, First name=RaghunathBasireddy, Student #=A20332674, Exam I =55, Exam II = 65, Project=90

Size of Last Name

T#9 Last name=<empty>, First name=Raghunath, Student #=A20332674, Exam I =55, Exam II = 65, Project=90

T#10 Last name=abcdefghijklmnopqrstuvw, First name=Raghunath, Student #=A20332674, Exam I =55, Exam II = 65, Project=90

Student# is a 9-character string

T#11 Last name=reddy, First name=Raghunath, Student #=A123456789, Exam I =55, Exam II = 65, Project=90

Student# starts with "A"

T#12 Last name=reddy, First name=Raghunath, Student #=B12345679, Exam I =55, Exam II = 65, Project=90

X in Student# is a digit (AXXXXXXXX)

T#13 Last name=reddy, First name=Raghunath, Student #=AA2345679, Exam I =55, Exam II = 65, Project=90

Problem II

1. Normal Boundary – Value Analysis Test Cases

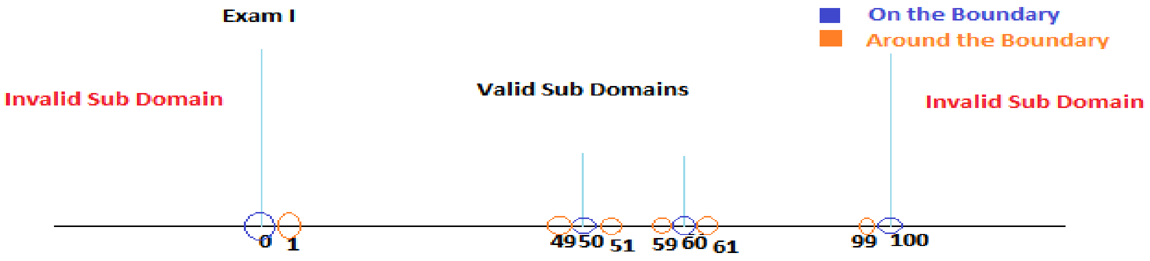
From the identified input conditions in the problem I the following are the inputs which are eligible for Boundary – Value Analysis

Total no of Potential Test cases are = 42

The following are the valid intervals for the related inputs identified.

- Exam I – 3 Valid Sub Domains
    - 0 - 49
    - 50 - 59
    - 60 – 100
- Exam II – 3 Valid Sub Domains
    - 0 – 59
    - 60 – 64
    - 65 – 100
- Project – 3 Valid Sub Domains
    - 0 – 49
    - 50 – 59
    - 60 – 100
- Average – 2 Valid Sub Domains
    - 0 – 74
    - 75 – 100
- Length of First Name – 1 Valid Sub Domain
    - 0 – 12
- Length of Last Name – 1 Valid Sub Domain
    - 0 – 20
- Student#
    - 9

Exam – I



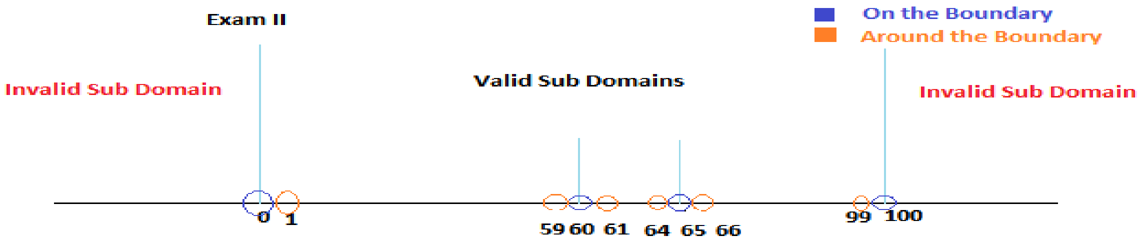
On the Boundary

Test Case #	Consideration	Test Case
T#1	Exam I = 0	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =0, Exam II = 62, Project=90
T#2	Exam I = 50	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 50, Exam II = 62, Project=90
T#3	Exam I = 60	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =60, Exam II = 62, Project=90
T#4	Exam I = 100	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =100, Exam II = 62, Project=90

Around the Boundary

Test Case #	Consideration	Test Case
T#5	Exam I = 1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =1, Exam II = 62, Project=90
T#6	Exam I = 49	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 49, Exam II = 62, Project=90
T#7	Exam I = 51	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =51, Exam II = 62, Project=90
T#8	Exam I = 59	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =59, Exam II = 62, Project=90
T#9	Exam I = 61	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =61, Exam II = 62, Project=90
T#10	Exam I = 99	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =99, Exam II = 62, Project=90

Exam – II



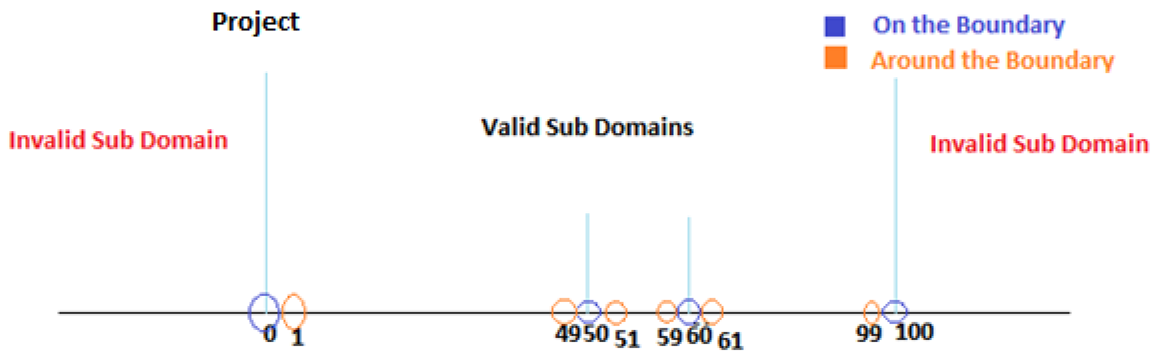
On the Boundary

Test Case #	Consideration	Test Case
T#11	Exam II = 0	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 0, Project=90
T#12	Exam II = 60	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 40, Exam II = 60, Project=90
T#13	Exam II = 65	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 65, Project=90
T#14	Exam II = 100	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 100, Project=90

Around the Boundary

Test Case #	Consideration	Test Case
T#15	Exam II = 1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 1, Project=90
T#16	Exam II = 59	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 59, Project=90
T#17	Exam II = 61	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 61, Project=90
T#18	Exam II = 64	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 64, Project=90
T#19	Exam II = 66	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 66, Project=90
T#20	Exam II = 99	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 99, Project=90

Project



On the Boundary

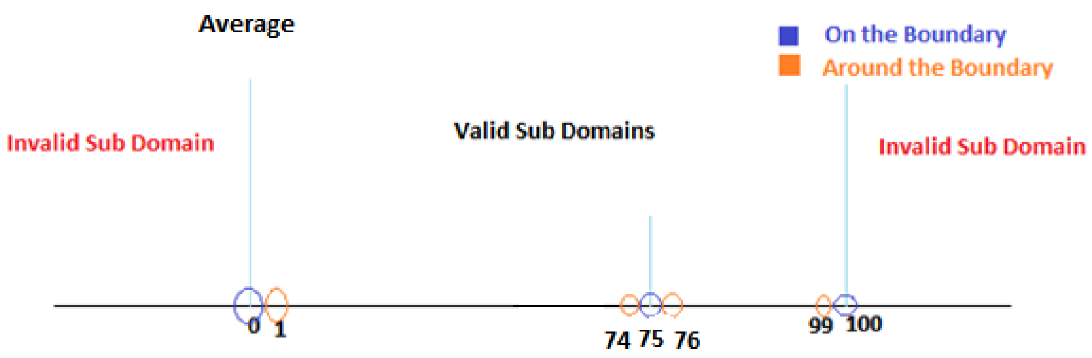
Test Case #	Consideration	Test Case
T#21	Project = 0	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=0
T#22	Project = 50	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 40, Exam II = 62, Project=50
T#23	Project = 60	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=60
T#24	Project = 100	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=100

Around the Boundary

Test Case #	Consideration	Test Case
T#25	Project = 1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=1
T#26	Project = 49	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 40, Exam II = 62, Project=49
T#27	Project = 51	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=51
T#28	Project = 59	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=59

T#29	Project = 61	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=61
T#30	Project = 99	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =40, Exam II = 62, Project=99

Average



On the Boundary

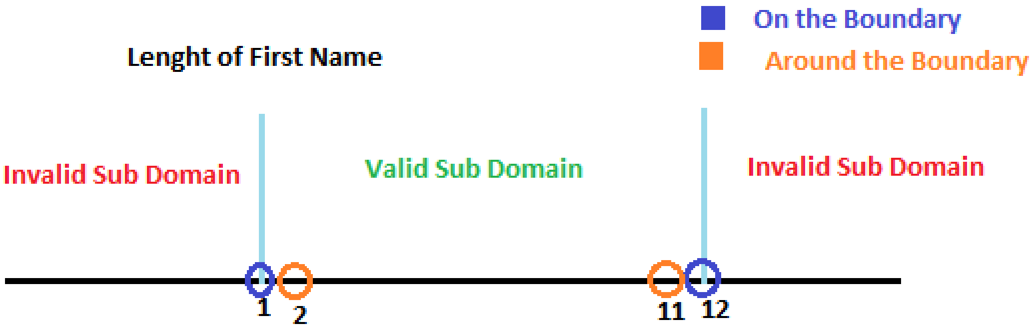
Test Case #	Consideration	Test Case
	Average = 0	Not a valid test as the values for Exam I = 0, Exam II = 0 and Project = 0 are satisfying the On the boundary condition for other input conditions
T#31	Average = 75	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 75, Exam II = 75, Project=75
	Average = 100	Not a valid test as the values for Exam I = 100, Exam II = 100 and Project = 100 are satisfying the On the boundary condition for other input conditions

Around the Boundary

Test Case #	Consideration	Test Case
	Average = 1	Not a valid test as the values for Exam I = 1, Exam II = 1 and Project = 1 are satisfying the On the boundary condition for other input conditions
T#32	Average = 74	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 74, Exam II = 74, Project=74

T#33	Average = 76	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =76, Exam II = 76, Project=76
	Average = 99	Not a valid test as the values for Exam I = 99, Exam II = 99 and Project = 99 are satisfying the On the boundary condition for other input conditions

Length of First Name



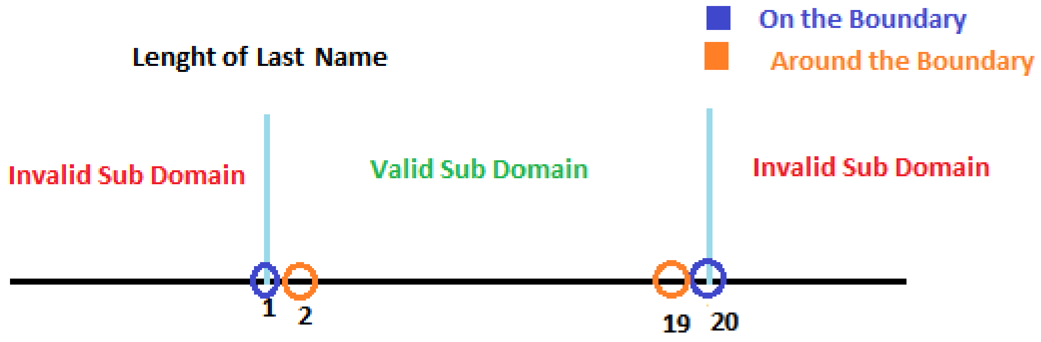
On the Boundary

Test Case #	Consideration	Test Case
T#34	Length of First Name = 1	Last name=reddy, First name=R, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80
T#35	Length of First Name = 12	Last name=reddy, First name=Raghunathabc, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Around the Boundary

Test Case #	Consideration	Test Case
T#36	Length of First Name = 2	Last name=reddy, First name=Ra, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80
T#37	Length of First Name = 11	Last name=reddy, First name=Raghunathab, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Length of Last Name



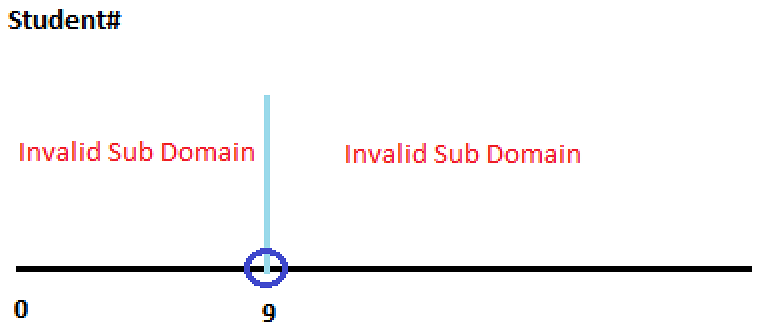
On the Boundary

Test Case #	Consideration	Test Case
T#38	Length of Last Name = 1	Last name=r, First name=Raghunath, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80
T#39	Length of First Name = 20	Last name=reddyabcdefghijklmno, First name=Raghunathabc, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Around the Boundary

Test Case #	Consideration	Test Case
T#40	Length of Last Name = 2	Last name=re, First name=Ra, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80
T#41	Length of Last Name = 19	Last name= reddyabcdefghijklmn, First name=Raghunathab, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Student#



On the Boundary

Test Case #	Consideration	Test Case
T#42	Student# must be 9 characters	Last name=Raghu, First name=Raghunath, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

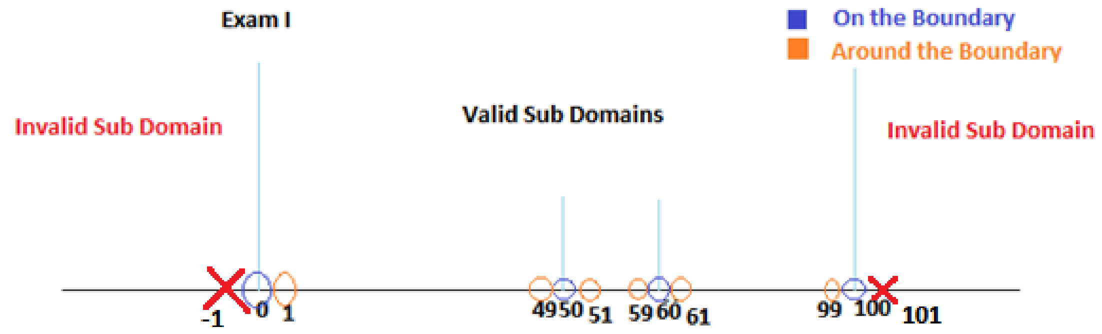
2. Robust Boundary – Value Analysis Test Cases

From the identified input conditions in the problem I the following are the inputs which are eligible for Robust Boundary – Value Analysis with Invalid Sub Domains

- Exam I – 2 Invalid Sub Domains
    - < 0
    - > 100
- Exam II – 2 Invalid Sub Domains
    - < 0
    - > 100
- Project – 2 Invalid Sub Domains
    - < 0
    - > 100
- Average – 2 Invalid Sub Domains
    - < 0
    - > 100
- Length of First Name – 2 Invalid Sub Domains
    - = 0
    - > 12
- Length of Last Name – 2 Invalid Sub Domains
    - = 0
    - > 20
- Student# - 2 Invalid Sub Domains
    - <9
    - >9

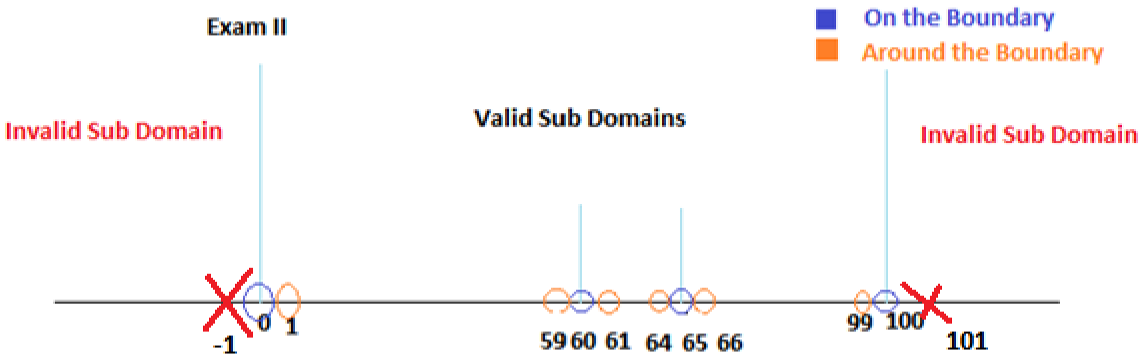
Hence, the total no of potential test cases are: 12

Exam I



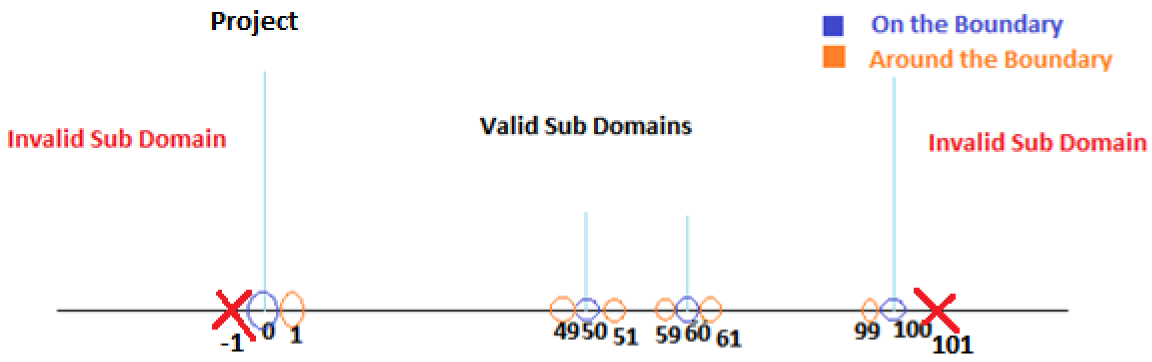
Test Case #	Consideration	Test Case
T#1	Exam I = -1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =-1, Exam II = 76, Project=76
T#2	Exam I = 101	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 101, Exam II = 74, Project=74

Exam II



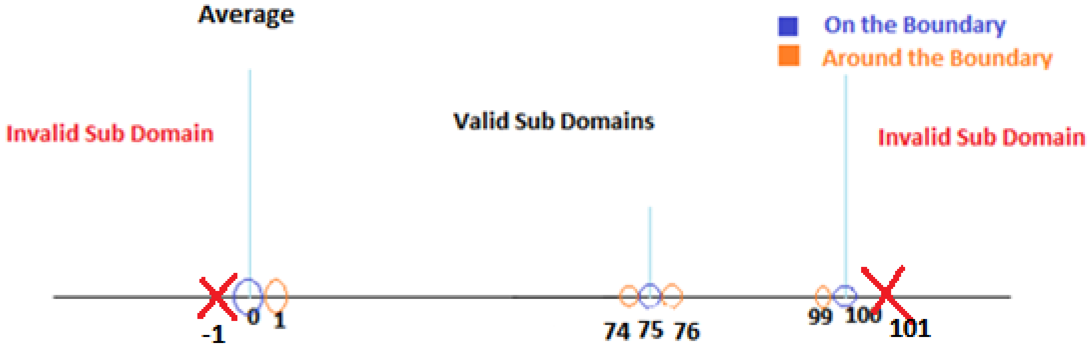
Test Case #	Consideration	Test Case
T#3	Exam II = -1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =76, Exam II = -1, Project=76
T#4	Exam II = 101	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 76, Exam II = 101, Project=74

Project



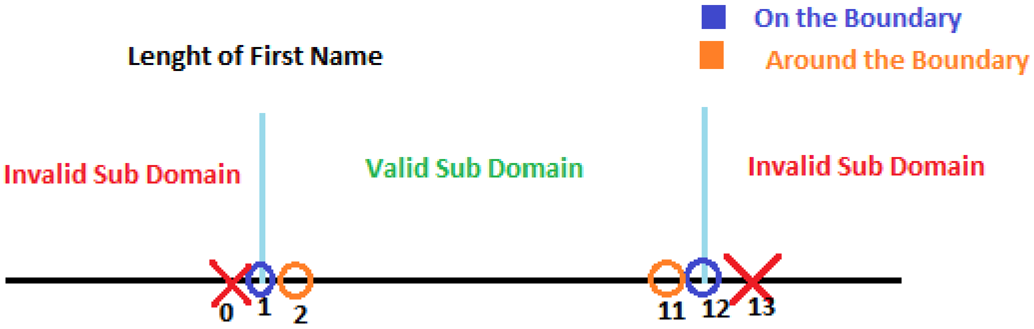
Test Case #	Consideration	Test Case
T#5	Project = -1	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I =76, Exam II = 76, Project=-1
T#6	Project = 101	Last name=reddy, First name=Raghunath, Student #=A22345679, Exam I = 76, Exam II = 76, Project=101

Average



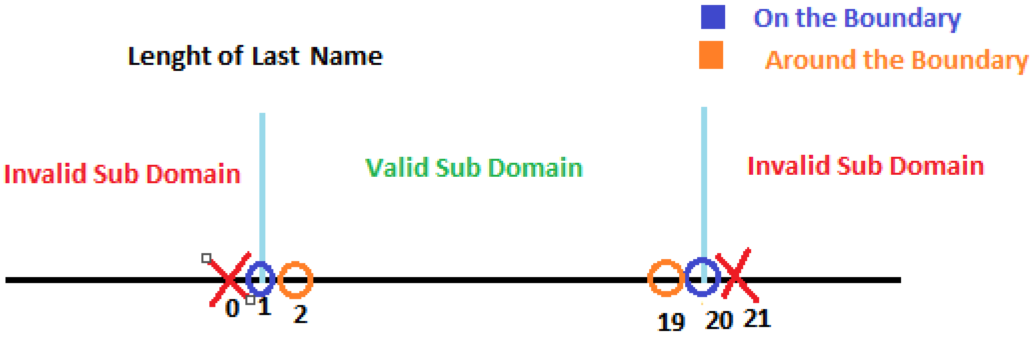
Test Case #	Consideration	Test Case
	Average = -1	Not a valid test as the values for Exam I = -1, Exam II = -1 and Project = - are satisfying the On the Invalid Sub Domain condition for other input conditions
	Average = 101	Not a valid test as the values for Exam I = 101, Exam II = 101 and Project = 101 are satisfying the On the boundary condition for other input conditions

Length of First Name



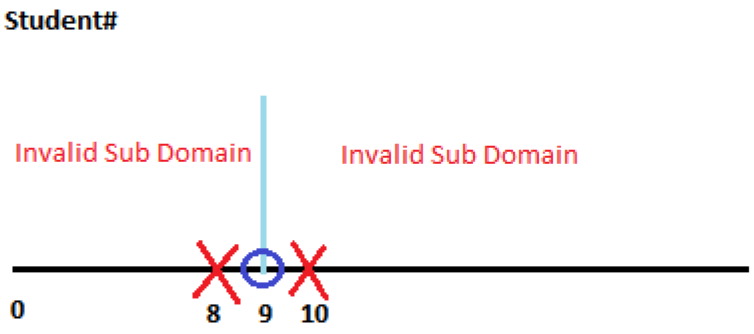
Test Case #	Consideration	Test Case
T#7	Length of First Name = 0	Last name=reddy, First name=<empty>, Student #=A22345679, Exam I =85, Exam II = 80, Project=80
T#8	Length of Last Name = 13	Last name=reddy, First name=Raghunathabcd, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Length of Last Name



Test Case #	Consideration	Test Case
T#9	Length of Last Name = 0	Last name=<empty>, First name=Raghunath, Student #=A22345679, Exam I =85, Exam II = 80, Project=80
T#10	Length of Last Name = 21	Last name=reddyabcdefghijklmnop, First name=Raghunath, Student #=A22345679, Exam I = 85, Exam II = 80, Project=80

Student#



Test Case #	Consideration	Test Case
T#11	Student# Characters = 8	Last name=Reddy, First name=Raghunath, Student #=A2234567, Exam I =85, Exam II = 80, Project=80
T#12	Student# Characters = 10	Last name=Reddy, First name=Raghunath, Student #=A223456790, Exam I = 85, Exam II = 80, Project=80

Problem III

Input Variables x1, y1, x2, y2, x3, y3

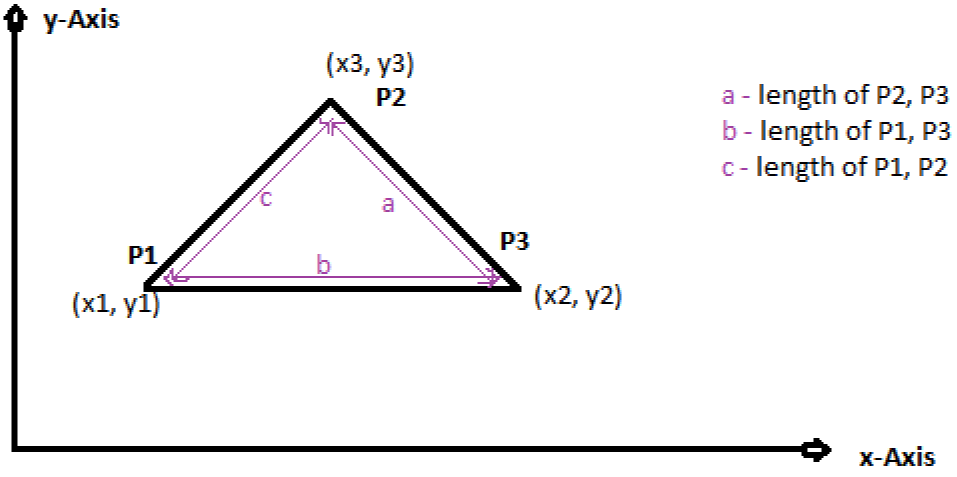
Co-Ordinates in XY Axis P1 (x1, y1), P2 (x2, y2), P3 (x3, y3)

Input Conditions Given

-100=x1< = 100'
-100=y1< = 100'
-100=x2< = 100'
-100=y2< = 100'
-100=x3< = 100'
-100=y3< = 100'

Assumptions

Let 'a' be the length of the side P2, P3
Let 'b' be the length of the side P1, P3
Let 'c' be the length of the side P1, P2



Input Conditions

C1: -100=x1< = 100'
C2: -100=y1< = 100'
C3: -100=x2< = 100'
C4: -100=y2< = 100'
C5: -100=x3< = 100'
C6: -100=y3< = 100'
C7: a<b+c
C8: b<a+c
C9: c<a+b
C10: a=b
C11: a=c
C12: b=c
C13: a = Sqrt(b^2 + c^2)
C14: b = Sqrt(a^2 + c^2)
C15: c = Sqrt(a^2 + b^2)

Actions

A1: Equilateral Triangle
A2: Isosceles Triangle
A3: Scalene Triangle
A4: Right Triangle
A5: Not a Triangle
A6: Invalid Input

Decision Table		Rule 1	Rule 2	Rule 3	Rule 4	Rule 5
C1:	-100=x1< = 100'	F	-	-	-	-
C2:	-100=y1< = 100'	-	F	-	-	-
C3:	-100=x2< = 100'	-	-	F	-	-
C4:	-100=y2< = 100'	-	-	-	F	-
C5:	-100=x3< = 100'	-	-	-	-	F
C6:	-100=y3< = 100'	-	-	-	-	-
C7:	a<b+c	-	-	-	-	-
C8:	b<a+c	-	-	-	-	-
C9:	c<a+b	-	-	-	-	-
C10:	a=b	-	-	-	-	-
C11:	a=c	-	-	-	-	-
C12:	b=c	-	-	-	-	-
C13:	a = Sqrt(b^2 + c^2)	-	-	-	-	-
C14:	b = Sqrt(a^2 + c^2)	-	-	-	-	-
C15:	c = Sqrt(a^2 + b^2)	-	-	-	-	-
A1:	Equilateral Triangle					
A2:	Isosceles Triangle					
A3:	Scalene Triangle					
A4:	Right Triangle					
A5:	Not a Triangle					
A6:	Invalid Input	X	X	X	X	X
A7:	Not a Valid Scenario					

Rule6	Rule7	Rule8	Rule9	Rule10	Rule11	Rule12	Rule13	Rule14	Rule15	Rule16
-	T	T	T	T	T	T	T	T	T	T
-	T	T	T	T	T	T	T	T	T	T
-	T	T	T	T	T	T	T	T	T	T
-	T	T	T	T	T	T	T	T	T	T
-	T	T	T	T	T	T	T	T	T	T
F	T	T	T	T	T	T	T	T	T	T
-	F	-	-	T	T	T	T	T	T	T
-	-	F	-	T	T	T	T	T	T	T
-	-	-	F	T	T	T	T	T	T	T
-	-	-	-	T	T	T	T	T	T	T
-	-	-	-	T	T	T	T	T	T	T
-	-	-	-	T	T	T	T	T	T	T
-	-	-	-	T	T	T	T	F	F	F
-	-	-	-	T	T	F	F	T	T	F
-	-	-	-	T	F	T	F	T	F	T
	X	X	X							
X										
				X	X	X	X	X	X	X

Rule17	Rule18	Rule19	Rule20	Rule21	Rule22	Rule23	Rule24	Rule25	Rule26	Rule27
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	F	F
T	F	F	F	F	F	F	F	F	T	T
F	T	T	T	T	F	F	F	F	T	T
F	T	T	F	F	T	T	F	F	T	T
F	T	F	T	F	T	F	T	F	T	F
X										
	X	X	X	X	X	X	X	X	X	X

Rule28	Rule29	Rule30	Rule31	Rule32	Rule33	Rule34	Rule35	Rule36	Rule37	Rule38
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
F	F	F	F	F	F	F	F	F	F	F
T	T	T	T	T	T	F	F	F	F	F
T	T	F	F	F	F	T	T	T	T	F
F	F	T	T	F	F	T	T	F	F	T
T	F	T	F	T	F	T	F	T	F	T
X	X	X	X	X	X	X	X	X	X	X

Rule39	Rule40	Rule41	Rule42	Rule43	Rule44	Rule45	Rule46	Rule47	Rule48	Rule49
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	F	F	F	F	F	F	F	F
F	F	F	T	T	T	T	T	T	T	T
F	F	F	T	T	T	T	T	T	T	T
F	F	F	T	T	T	T	F	F	F	F
T	F	F	T	T	F	F	T	T	F	F
F	T	F	T	F	T	F	T	F	T	F
	X	X								
	X									
X			X	X	X	X	X	X	X	X

Rule50	Rule51	Rule52	Rule53	Rule54	Rule55	Rule56	Rule57	Rule58	Rule59	Rule60
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T
F	F	F	F	F	F	F	F	F	F	F
T	T	T	T	T	T	T	T	F	F	F
F	F	F	F	F	F	F	F	T	T	T
T	T	T	T	F	F	F	F	T	T	T
T	T	F	F	T	T	F	F	T	T	F
T	F	T	F	T	F	T	F	T	F	T
					X		X			
					X					
X	X	X	X	X		X		X	X	X

Rule61	Rule62	Rule63	Rule64	Rule65	Rule66	Rule67	Rule68	Rule69	Rule70	Rule71	Rule72	Rule73
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T
F	F	F	F	F	F	F	F	F	F	F	F	F
F	F	F	F	F	F	F	F	F	F	F	F	F
T	T	T	T	T	F	F	F	F	F	F	F	F
T	F	F	F	F	T	T	T	T	F	F	F	F
F	T	T	F	F	T	T	F	F	T	T	F	F
F	T	F	T	F	T	F	T	F	T	F	T	F
X				X								
								X		X	X	X
X								X		X	X	
	X	X	X		X	X	X	X	X			

Note: Rule17, Rule40, Rule41, Rule55, Rule57, Rule61, Rule65, Rule69, Rule71, Rule72, Rule73 are valid and potential rules for which test cases can be considered.

Other rules are not valid for the following reasons

1. Triangle can never be both equilateral (a=b & b=c & a=c) and right(a = Sqrt(b^2 + c^2) Or b = Sqrt(a^2 + c^2) Or c = Sqrt(a^2 + b^2))
2. Triangle can have only one right angle (a = Sqrt(b^2 + c^2) Or b = Sqrt(a^2 + c^2) Or c = Sqrt(a^2 + b^2))
3. Triangle can never have such a case that length of a side equal to other two sides and the lengths of other two sides not equal (a=b, b=c, a<>c)
4. In a Right triangle if length of two sides are equal the angle projected by those two equal sides is always right angle (90 degrees)

The following are the potential test cases retrieved from decision table.

Test Cases #	**Test Cases**	**Output Action**
Rule17: T#1	x1=0, y1=0, x2=2, y2=2Sqrt(3), x3=4, y3=0	Equilateral Triangle
Rule40: T#2	x1=0, y1=4, x2=4, y2=0, x3=0, y3=0	Right & Isosceles (a=b & c^2 = a^2 + b^2)
Rule41: T#3	x1=-6, y1=0, x2=6, y2=0, x3=0, y3=7	Isosceles (a = b)
Rule55: T#4	x1=0, y1=4, x2=0, y2=0, x3=4, y3=0	Right & Isosceles (a=c & b^2 = a^2 + c^2)
Rule57: T#5	x1=-6, y1=0, x2=0, y2=7, x3=6, y3=0	Isosceles (a = c)
Rule61: T#6	x1=0, y1=0, x2=0, y2=4, x3=4, y3=0	Right & Isosceles (b=c & a^2 = b^2 + c^2)
Rule65: T#7	x1=0, y1=7, x2=-6, y2=0, x3=6, y3=0	Isosceles (b = c)
Rule69: T#8	x1=0, y1=0, x2=55, y2=0, x3=0, y3=75	Right & Scalene
Rule71: T#9	x1=-50, y1=0, x2=0, y2=0, x3=0, y3=-75	Right & Scalene
Rule72: T#10	x1=0, y1=80, x2=-90, y2=0, x3=0, y3=0	Right & Scalene
Rule73: T#11	x1=-3, y1=0, x2=5, y2=0, x3=0, y3=7	Scalene