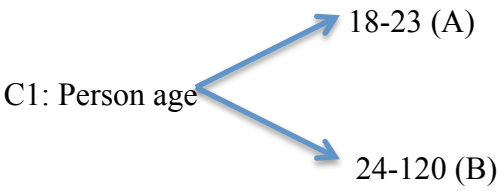
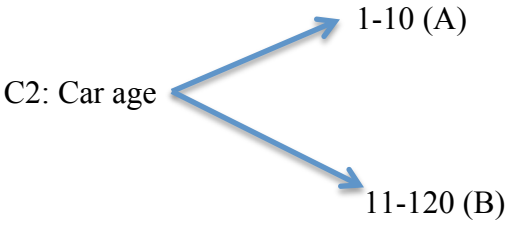
Problem 1

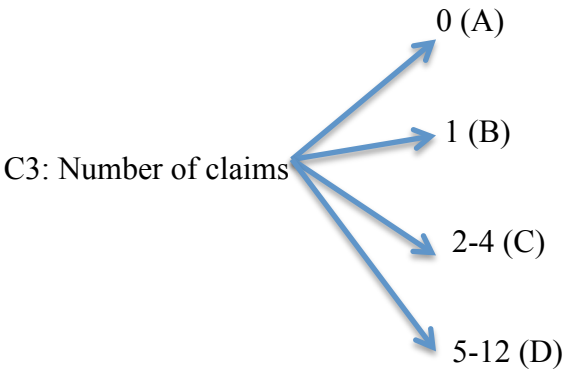
Input conditions	**Valid subdomains**	**Invalid subdomains**
Last name contains	Correct character	Incorrect character
Length of last name	<=20	>20
Person age	18-23 24-120	<=18 >120
Car type	Sedan minivan truck SUV	Others
Car age	1-10 11-120	<1 >120
Number of claims	0, 1, 2-4 5-12	>12

Strong normal equivalence tests:

2*2*4=16 valid multi-dim subdomains.







	C1	C2	C3	Tests
1	A	A	A	**Test #1:** Smith, 22 years old, sedan, 5 years car, 0 claim
2	A	A	B	**Test #2:** Smith, 22 years old, sedan, 5 years car, 1 claims
3	A	A	C	**Test #3:** Smith, 22 years old, sedan, 5 years car, 3 claims
4	A	A	D	**Test #4:** Smith, 22 years old, sedan, 5 years car, 8 claims
5	A	B	A	**Test #5:** John, 22 years old, sedan, 12 years car, 0 claim
6	A	B	B	**Test #6:** John, 22 years old, sedan, 12 years car, 1 claims
7	A	B	C	**Test #7:** John, 22 years old, sedan, 12 years car, 3 claims
8	A	B	D	**Test #8:** John, 22 years old, sedan, 12 years car, 8 claims
9	B	A	A	**Test #9:** Julia, 30 years old, SUV, 3 years car, 0 claim
10	B	A	B	**Test #10:** Julia, 30 years old, SUV, 3 years car, 1 claim
11	B	A	C	**Test #11:** Julia, 30 years old, SUV, 3 years car, 3 claims
12	B	A	D	**Test #12:** Julia, 30 years old, SUV, 3 years car, 8 claims
13	B	B	A	**Test #13:** Tom, 45 years old, sedan, 12 years car, 0 claim
14	B	B	B	**Test #14:** Tom, 45 years old, sedan, 12 years car, 1 claim
15	B	B	C	**Test #15:** Tom, 45 years old, sedan, 12 years car, 3 claims
16	B	B	D	**Test #16:** Tom, 45 years old, sedan, 12 years car, 8 claims

C1, C2 and C3 are related, so strong normal equivalence is above.

Weak robust equivalence:

1+1+2+1+2+1=8 1-dim subdomains.

Test # 1:

last name: Smith# | person age: 22 years old | car type: sedan

car age: 5 years | number of claims: 0

Test # 2:

last name: Smmmmmmmmmmmmmmmmmith | person age: 22 years old

car type: sedan | car age: 5 years | number of claims: 0

Test # 3:

last name: Smith | person age: 16 years old | car type: sedan

car age: 5 years | number of claims: 0

Test # 4:

last name: Smith | person age: 121 years old | car type: sedan

car age: 5 years | number of claims: 0

Test # 5:

last name: Smith | person age: 22 years old | car type: bicycle

car age: 5 years | number of claims: 0

Test # 6:

last name: Smith | person age: 22 years old | car type: sedan

car age: 0 years | number of claims: 0

Test # 7:

last name: Smith | person age: 22 years old | car type: sedan

car age: 121 years | number of claims: 0

Test # 8:

last name: Smith | person age: 22 years old | car type: sedan

car age: 5 years | number of claims: 14

Problem 2

Boundary Value Analysis test cases

1. Last name contains boundary

The last name contains only correct (valid) characters, so there are no boundaries here.

2. Size of last name boundary

The maximum size of the last name is 20 characters.

Test #1

last name: S (1 character) | person age: 22 years old | car type: sedan

car age: 5 years | number of claims: 0

Test #2

last name: SmithSmithSmithSmith (20 characters) | person age: 22 years old

car type: sedan | car age: 5 years | number of claims: 0

Test #3

last name: Sm (2 characters) | person age: 22 years old | car type: sedan

car age: 5 years | number of claims: 0

Test #4

last name: SmithSmithSmithSmit (19 characters) | person age: 22 years old

car type: sedan car age: 5 years number of claims: 0

3. Person age boundary

Assume the person age is an integer. The minimum age is 18 and the maximum age is 120.

Test #5

last name: Smith person age: 18 car type: sedan

car age: 5 years number of claims: 0

Test #6

last name: Smith person age: 19 car type: sedan

car age: 5 years number of claims: 0

Test #7

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 0

Test #8

last name: Smith person age: 23 car type: sedan

car age: 5 years number of claims: 0

Test #9

last name: Smith person age: 24 car type: sedan

car age: 5 years number of claims: 0

Test #10

last name: Smith person age: 25 car type: sedan

car age: 5 years number of claims: 0

Test #11

last name: Smith person age: 119 car type: sedan

car age: 5 years number of claims: 0

Test #12

last name: Smith person age: 120 car type: sedan

car age: 5 years number of claims: 0

4. Car type boundary

The car types are: sedan, minivan, truck, SUV, so there are no boundaries here.

5. Number of claims boundary

The maximum number of claims is 12

Test #13

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 0

Test #14

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 1

Test #15

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 2

Test #16

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 3

Test #17

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 4

Test #18

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 5

Test #19

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 6

Test #20

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 11

Test #21

last name: Smith person age: 22 car type: sedan

car age: 5 years number of claims: 12

6. Car age boundary

Assume the car age is an integer. The minimum car age is 1 and the maximum car age is 120.

Test #22

last name: Smith person age: 22 car type: sedan

car age: 1 year number of claims: 0

Test #23

last name: Smith person age: 22 car type: sedan

car age: 2 years number of claims: 0

Test #24

last name: Smith person age: 22 car type: sedan

car age: 8 years number of claims: 0

Test #25

last name: Smith person age: 22 car type: sedan

car age: 9 years number of claims: 0

Test #26

last name: Smith person age: 22 car type: sedan

car age: 10 years number of claims: 0

Test #27

last name: Smith person age: 22 car type: sedan

car age: 11 years number of claims: 0

Test #24

last name: Smith person age: 22 car type: sedan

car age: 119 years number of claims: 0

Test #26

last name: Smith person age: 22 car type: sedan

car age: 120 years number of claims: 0

Robustness test cases

The maximum size of the last name is 20 characters.

Test #26

last name: (0 characters) person age: 22 car type: sedan

car age: 120 years number of claims: 0

Test #27

last name: SmithSmithSmithSmithS(21 characters) person age: 22

car type: sedan car age: 120 years number of claims: 0

Assume person age is an integer. The minimum age is 18 and the maximum age is 120.

Test #28

last name: Smith person age: 17 car type: sedan

car age: 120 years number of claims: 0

Test #28

last name: Smith person age: 121 car type: sedan

car age: 120 years number of claims: 0

The maximum number of claims is 12.

Test #29

last name: Smith person age: 22 car type: sedan

car age: 120 years number of claims: -1

Test #30

last name: Smith person age: 22 car type: sedan

car age: 120 years number of claims: 13

Assume the car age is an integer. The minimum car age is 1 and the maximum car age is 120.

Test #31

last name: Smith person age: 22 car type: sedan

car age: 0 year number of claims: 0

Test #32

last name: Smith person age: 22 car type: sedan

car age: 121 years number of claims: 13

Problem 3

Decision-Table based testing

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
C1: $0<a\leq1000$	F	-	-	-	-	-	T	T	T	T	T
C2: $0<b\leq1000$	-	F	-	-	-	-	T	T	T	T	T
C3: $0<c\leq1000$	-	-	F	-	-	-	T	T	T	T	T
C4: $0<d\leq1000$	-	-	-	F	-	-	T	T	T	T	T
C5: $h^2>0$	-	-	-	-	F	-	T	T	T	T	T
C6: a=b	-	-	-	-	-	T	F	F	F	F	F
C7: c=d	-	-	-	-	-	-	T	T	T	T	T
C8: a=c	-	-	-	-	-	-	T	T	T	T	T
C9: a=d	-	-	-	-	-	-	T	T	T	T	T
C10: b=c	-	-	-	-	-	-	T	F	F	F	F
C11: b=d	-	-	-	-	-	-	-	T	F	F	F
C12: h=c	-	-	-	-	-	-	-	-	T	-	F
C13: h=d	-	-	-	-	-	-	-	-	-	T	F
A1: trapezoid											X
A2: right trapezoid											
A3: isosceles trapezoid											X
A4: scalene trapezoid											
A5: not trapezoid									X	X	
A6: invalid input	X	X	X	X		X	X	X			
A7: impossible					X						

	R 12	R 13	R 14	R 15	R 16	R 17	R 18	R 19	R 20	R 21	R 22
C1: $0<a\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C2: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C3: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C4: $0<d\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C5: $h^2>0$	T	T	T	T	T	T	T	T	T	T	T
C6: a=b	F	F	F	F	F	F	F	F	F	F	F
C7: c=d	T	T	T	T	T	T	T	T	T	T	F
C8: a=c	T	F	F	F	F	F	F	F	F	F	T
C9: a=d	F	T	F	F	F	F	F	F	F	F	T
C10: b=c	-	-	T	T	T	T	F	F	F	F	-
C11: b=d	-	-	T	T	T	F	T	F	F	F	-
C12: h=c	-	-	T	-	F	-	-	T	-	F	-
C13: h=d	-	-	-	T	F	-	-	-	T	F	-
A1: trapezoid					X					X	
A2: right trapezoid											
A3: isosceles trapezoid					X					X	
A4: scalene trapezoid											
A5: not trapezoid			X	X				X	X		
A6: invalid input		X									X
A7: impossible	X					X	X				

	R 23	R 24	R 25	R 26	R 27	R 28	R 29	R 30	R 31	R 32	R 33
C1: $0<a\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C2: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C3: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C4: $0<d\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C5: $h^2>0$	T	T	T	T	T	T	T	T	T	T	T
C6: a=b	F	F	F	F	F	F	F	F	F	F	F
C7: c=d	F	F	F	F	F	F	F	F	F	F	F
C8: a=c	F	F	F	F	F	F	F	F	F	F	T
C9: a=d	T	T	T	T	F	F	F	F	F	F	F
C10: b=c	F	F	F	F	T	T	T	T	F	F	F
C11: b=d	T	F	F	F	T	F	F	F	T	T	T
C12: h=c	-	T	F	F	-	T	F	F	T	F	F
C13: h=d	-	F	T	F	-	F	T	F	F	T	F
A1: trapezoid		X	X	X		X	X	X	X	X	X
A2: right trapezoid		X	X			X	X		X	X	
A3: isosceles trapezoid											
A4: scalene trapezoid											
A5: not trapezoid											
A6: invalid input	X										
A7: impossible					X						

	R 34	R 35	R 36	R 37	R 38	R 39	R 40	R 41	R 42	R 43	R 44
C1: $0<a\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C2: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C3: $0<c\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C4: $0<d\leq1000$	T	T	T	T	T	T	T	T	T	T	T
C5: $h^2>0$	T	T	T	T	T	T	T	T	T	T	T
C6: a=b	F	F	F	F	F	F	F	F	F	F	F
C7: c=d	F	F	F	F	F	F	F	F	F	F	F
C8: a=c	T	T	T	T	T	T	T	F	F	F	F
C9: a=d	F	F	F	F	F	F	F	T	F	F	T
C10: b=c	T	F	F	F	F	F	F	T	F	F	T
C11: b=d	-	T	T	T	F	F	F	T	T	T	F
C12: h=c	-	T	-	F	T	F	F	-	T	F	F
C13: h=d	-	-	T	F	F	T	F	-	F	T	F
A1: trapezoid				X	X	X	X				X
A2: right trapezoid					X	X					
A3: isosceles trapezoid											
A4: scalene trapezoid											
A5: not trapezoid											
A6: invalid input		X	X					X	X	X	
A7: impossible	X										

	R 45	R 46	R 47
C1: $0<a\leq1000$	T	T	T
C2: $0<c\leq1000$	T	T	T
C3: $0<c\leq1000$	T	T	T
C4: $0<d\leq1000$	T	T	T
C5: $h^2>0$	T	T	T
C6: a=b	F	F	F
C7: c=d	F	F	F
C8: a=c	F	F	F
C9: a=d	F	F	F
C10: b=c	F	F	F
C11: b=d	F	F	F
C12: h=c	T	F	F
C13: h=d	F	T	F
A1: trapezoid	X	X	X
A2: right trapezoid	X	X	
A3: isosceles trapezoid			
A4: scalene trapezoid			X
A5: not trapezoid			
A6: invalid input			
A7: impossible			

Tests:

R1: No Test.

R2: No Test.

R3: No Test.

R4: No Test.

R5: Test #1: a=11, b=12, c=13, d=333

R6: Test #2: a=11, b=11, c=13, d=333

R7: No Test.

R8: No Test.

R9: Test #3: a=22, b= 33, c=22, d=22

R10: Test #4: a=22, b= 33, c=22, d=22

R11: Test #5: a=11, b=15, c=11, d=11

R12: No Test.

R13: No Test.

R14: Test #5: a=22, b=33, c=33, d=33

R15: Test #6: a=22, b=33, c=33, d=33

R16: Test #7: a=11, b=15, c=15, d=15

R17: No Test.

R18: No Test.

R19: Test #8: a=22, b=33, c=18, d=18

R20: Test #9: a=22, b=33, c=33, d=33

R21: Test #10: a= 22, b=44, c=25, d=25

R22: No Test.

R23: No Test.

R24: Test #11: a=25, b=45, c=15, d=25

R25: Test #12: a=15, b=45, c=25, d=15

R26: Test #13: a=15, b=45, c=20, d=15

R27: No Test.

R28: Test #14: a=45, b=15, c=15, d=25

R29: Test #15: a= 45, b=15, c=25, d=15

R30: Test #16: a= 45, b=15, c=15, d=20

R31: Test #17: a= 45, b=25, c=15, d=25

R32: Test #18: a=5, b=20, c=25, d=20

R33: Test #19: a=45, b=20, c=15, d=20

R34: No Test

R35: No Test

R36: No Test

R37: Test #20: a=22, b=33,c=22, d=33

R38: Test #21: a=4, b=7, c=4, d=5

R39: Test #22: a=5, b=8, c=5, d=4

R40: Test #23: a=15, b=39, c=15, d=20

R41: No Test

R42: No Test

R43: No Test

R44: Test #24 a=22, b=25, c=25,d=22

R45: Test #25 a=22, b=33, c=25, d=27

R46: Test #26 a=3, b=6, c=4, d=5

R47: Test #27 a=3, b=6, c=5, d=4