Decision Table Based Testing

Introduction

- Deal with a combination of input
- Different combinations of inputs results in different actions being taken

- Decision Table has four parts

Conditions	Condition entries
Actions	Actions Entries

Decision Table Example

Limited entry table: Condition entries restricted to binary
Extended entry table: Condition entries have more than two.

Conditions	**Printer does not print**	Y	Y	Y	Y	N	N	N	N
	A red light is flashing	Y	Y	N	N	Y	Y	N	N
	Printer is unrecognized	Y	N	Y	N	Y	N	Y	N
Actions	**Check the power cable**			X					
	Check the printer-computer cable	X		X					
	Ensure printer software is installed	X		X		X		X	
	Check/replace ink	X	X			X	X		
	Check for paper jam		X		X				

Steps in Forming Decision Table

- Identify the decision variables.
- Identify the possible values for each decision variable
- Form a table, list all variables and actions and enumerate the allowed combinations of each of the variables.
- Identify the cases when values assumed by a variable are immaterial for a given combination of other input variables. Represent such variables by don’t care symbol.
- For each combination of decision variables, list out the expected result or action.

Generate the decision table for triangle problem

- **STEP 1:** identify the decision variables
  - C1: a < b+c
  - C2: b < a+c
  - C3: c< a+b
  - C4: a=b?
  - C5: a=c?
  - C6: b=c?

Generate the decision table for triangle problem

- **Step 2:** Identify the possible values for each decision variable

  - All are Conditional hence T or F

Generate the decision table for triangle problem

- **Step 3:** Form a table, list all variables and actions and enumerate the allowed combinations of each of the variables.

	rules															
C1: a<b+c?	32F								32T							
C2: b<a+c?	16F				16T				16F				16T			
C3: c<a+b?	8F		8T		8F		8T		8F		8T		8F		8T	
C4: a=b?	4T	4F	4T	4F	4T	4F	4T	4F	4T	4F	4T	4F	4T	4F	4T	4F
C5: a=c?	2F	2T														
C6: b=c?	…….															
A1:Equilateral																
A2:Isosceles																
A3: Scalene																
A4: Not a Triangle																

Generate the decision table for triangle problem

- **Step 4**: Identify the cases when values assumed by a variable are immaterial for a given combination of other input variables.

	1-32	33-48	49-56	57	58	59	60	61	62	63	64
C1: a<b+c?	F	T	T	T	T	T	T	T	T	T	T
C2: b<a+c?	-	F	T	T	T	T	T	T	T	T	T
C3: c<a+b?	-	-	F	T	T	T	T	T	T	T	T
C4: a=b?	-	-	-	T	T	T	F	T	F	F	F
C5: a=c?	-	-	-	T	T	F	T	F	T	F	F
C6: b=c?	-	-	-	T	F	T	T	F	F	T	F
A1:Equilateral				X							
A2:Isosceles								X	X	X	
A3: Scalene											X
A4: Not a Triangle	X	X	X								
A5: impossible					X	X	X				
Rule Count											

Generate the decision table for triangle problem

- **Step 5:** Generate Test Cases

Case ID	a	b	c	Expected Output
1	4	1	2	Not a Triangle
2	1	4	2	Not a Triangle
3	1	2	4	Not a Triangle
4	5	5	5	Equilateral
5	???	???	???	Impossible
6	???	???	???	Impossible
7	2	2	3	Isosceles
8	???	???	???	Impossible
9	2	3	2	Isosceles
10	3	2	2	Isosceles
11	3	4	5	Scalene

Next Date Function

- Step 1: Identify the decision variables: 3 variables – month, day, year
  - C1: month in?
  - C2: day in?
  - C3: year in?

  - A1: Impossible date
  - A2: Increment day
  - A3: Reset day
  - A4: Increment Month
  - A5: Reset month
  - A6: Increment year

Next Date Function

- Step 2: Identify the possible values for each variables
  - M1: {month has 30 days}
  - M2: {month has 31 days}
  - M3: {month is feb}

  - D1={ 1<=d<=28}
  - D2={d=29}
  - D3={d=30}
  - D4={d=31}

  - Y1={y is leap year}
  - Y2={y is common year}

Next Date Function

- Step 3: Form a table, list various decision variables, actions and enumerate all possible combinations of each variable

Rule	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
C1	M1	M1	M1	M1	M1	M1	M1	M1	M2	M2	M2	M2	M2	M2	M2	M2	M3	M3	M3	M3	M3	M3	M3	M3
C2	D1	D1	D2	D2	D3	D3	D4	D4	D1	D1	D2	D2	D3	D3	D4	D4	D1	D1	D2	D2	D3	D3	D4	D4
C3	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2
A1							x	x												x	x	x	X	x
A2	x	x	x	x					x	x	x	x	x	x			x							
A3					x	X									X	x		?						
A4					x	x									?	?								
A5															?	?								
A6															?	?								

Next Date Function

- Step 4: Identify the cases when the values assumed by a variable (or set of variables) are immaterial for a given combination of other input variables. Represent such variables using don't care symbol.

C1:month in	M1	M1	M1	M1	M2	M2	M2	M2	M3	M3	M3	M3	M3	M3
C2: day in	D1	D2	D3	D4	D1	D2	D3	D4	D1	D1	D2	D2	D3	D4
C3: year in	-	-	-	-	-	-	-	-	Y1	Y2	Y1	Y2	-	-
A1:Impossible				x								x	x	x
A2:Inc day	x	x			x	x	x		X	?				
A3:Reset day			x					X		?	X			
A4: Increment month			x					?		?	x			
A5: Reset Month								?						
A6:Increment year								?						

Next Date Function

- The decision table produced above doesn't help us in the case where month in M2 and day in D4
  - M1: {month has 30 days}
  - M2: {month has 31 days}
  - M3: {month is February}
  - M4: {month is December}
  - D1={ 1<=d<=27}
  - D2={d=28}
  - D3={d=29}
  - D4={d=30}
  - D5={d=31}
  -
  - Y1={y is leap year}
  - Y2={y is common year}

Next Date Function

C1:month in	M1	M1	M1	M2	M2	M3	M3	M3	M3	M3	M3	M4	M4
C2: day in	D1-D3	D4	D5	D1-D4	D5	D1	D2	D2	D3	D3	D4-D5	D1-D4	D5
C3: year in	-	-	-	-	-	-	Y1	Y2	Y1	Y2	-	-	-
A1:Impossible			x							x	x		
A2:Inc day	x			x		x	x					x	
A3:Reset day		X			X			X	X				X
A4: Increment month		x			x			x	x				
A5: Reset Month													X
A6:Increment year													X

Example

- Assume your local baseball squadron offers free tickets to kids and discounted tickets to senior citizens. One game a year, free hats are given to all fans. (Note: If male then blue hat else pink hat)

Solution

c1 Age	age < 5	age < 5	age between 5 to 65	age between 5 to 65	age above 65	age above 65
C2 Gender	M	F	M	F	M	F
A1 Free Ticket	X	X				
A2 Discounted Ticket					X	X
A3 Normal Ticket			X	X		
A4 Blue Hat	X		X		X	
A5 Pink Hat		X		X		X