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Homework 03: Decision Tables

<u>Assignment Description</u>

Part 1: Do Problem 8 on page 131 of Jorgensen's <u>Software Testing</u>.   You must include a decision table as part of your submission.   See the syllabus for a link to the online version of this book.

For your reference, I've included the problem here:

"The retirement pension salary of a Michigan public school teacher is a percentage of the average of their last 3 years of teaching Normally, the number of years of teaching service is the percentage multiplier. To encourage senior teachers to retire early, the Michigan legislature enacted the following incentive in May of 2010:

Teachers must apply for the incentive before June 11, 2010. Teachers who are currently eligible to retire (age >= 63 years) shall have a multiplier of 1.6% on their salary up to, and including, $90,000, and 1.5% on compensation more than $90,000. Teacher who meet the 80 total years of age plus years of teaching shall have a multiplier of 1.55% on their salary up to, and including, $90,000 and 1.5% on compensation more than $90,000.

Make a decision table to describe the retirement pension policy; be sure to consider the retirement eligibility criteria carefully. What is the compensation multiplier for a person who is currently 64 with 20 years of teaching whose salary is $95,000?"

Be sure to include your assumptions and complete decision table plus any reductions that simplify the table to reach your final answer.

Part 2: Create a complete set of test cases for the <u>microwave oven state diagram</u>. You may assume that the only possible combinations of states and events are included in the state diagram. Be sure to cover all possibilities. Include your state table and test cases in your answer. How many tests are required to fully test the solution?

<u>Summary</u>

The first part of this assignment featured the use of a decision table to plot the pension plan information of a school district. To receive a pension bonus, participants had to apply by a certain deadline and were classified into three groups based on their age and how long they worked. The bonus was than distributed on a sliding scale based on one's group membership. Those who were above the age of 63 received the largest bonus of 1.6% up to $90,000, while those who were not yet 63 but had a combined 80 years of both age and years spent teaching qualified for a 1.55% bonus up to $90,000. Additionally, both groups received a 1.5% bonus on their salary more than $90,000. Teachers who were under the age of 63 and did not have a combined 80 years of age and work did not qualify for any bonus.

The second part of this assignment involved state diagrams and test cases for evaluating a microwave oven. I first created the state diagram to easily view the relationships and transitions between states and events. From this, I was able to then compile a list of test cases based on these factors. Going off the state diagram, it is reasonable to assume that 54 test cases are required to fully test the system. This is

because there are 6 states with 8 events and 1 with 9. When I created my list, most of these test cases result in no action and therefore no change. However, I still think that it is still warranted to test them to ensure reliability.

I enjoyed this assignment and believed it to be good practice. I found going through each of the state relationships in Part 2 to be very thorough and helped me better consider just how many moving parts there are in even a small system (such as a microwave). To ensure the reliability of a system, all these interactions should ideally be tested. I feel that I can apply this to code by focusing on the interactions between classes and methods. Often more complex programs feature many of each of these, so ensuring that all of these individual sub-processes fit together and support each other in the correct manner will go along way in improving the system's quality.

Detailed Results

Part 1: Decision Table			
Time (Years)	**Less than 63 (Age) and Less than 80 (Age + Work)**	**80 (Age + Work)**	**More than 63 (Age)**
Apply by Deadline	T	T	T
Not Applicable	X		
1.55% <= $90,000, 1.5% > $90000		X	
1.60% <= $90,000, 1.5% > $90,000			X

Part 2: State Table							
State/Event	**Waiting**	**Full Power**	**Half Power**	**Set Time**	**Disabled**	**Enabled**	**Operation**
Half Power	Half Power Set Power = 300		Half Power Set Power = 300				
Full Power	Full Power Set Power = 600	Full Power Set Power = 600					
Timer		Set Time Set Time = [Number]	Set Time Set Time = [Number]				
Door Open				Disabled Display 'Waiting'			
Door Closed				Enabled Display 'Ready'	Enabled Display 'Ready'		
Number				Set Time Set Time = [Number]			
Start						Operation	

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					Operate Oven	
						Waiting Display Time
Cancel						Waiting Display Time
Timeout						Waiting Display Time

Part 2: Test Case List				
Test Case #	State	Event	Action	New State
1	Waiting	Half Power	Set Power = 300	Half Power
2	Waiting	Full Power	Set Power = 600	Full Power
3	Waiting	Timer	N/A	Waiting
4	Waiting	Door Open	N/A	Waiting
5	Waiting	Door Closed	N/A	Waiting
6	Waiting	Number	N/A	waiting
7	Waiting	Start	N/A	Waiting
8	Waiting	Cancel	N/A	Waiting
9	Full Power	Half Power	Set Power = 300	Half Power
10	Full Power	Full Power	Set Power = 600	Full Power
11	Full Power	Timer	Set Time	Set Time
12	Full Power	Door Open	N/A	Full Power
13	Full Power	Door Closed	N/A	Full Power
14	Full Power	Number	N/A	Full Power
15	Full Power	Start	N/A	Full Power
16	Full Power	Cancel	N/A	Full Power
17	Half Power	Half Power	Set Power = 300	Half Power
18	Half Power	Full Power	Set Power = 600	Half Power
19	Half Power	Timer	Set Time	Set Time
20	Half Power	Door Open	N/A	Half Power
21	Half Power	Door Closed	N/A	Half Power
22	Half Power	Number	N/A	Half Power
23	Half Power	Start	N/A	Half Power
24	Half Power	Cancel	N/A	Half Power
25	Set Time	Half Power	N/A	Set Time
26	Set Time	Full Power	N/A	Set Time
27	Set Time	Timer	N/A	Set Time
28	Set Time	Door Open	Display 'Waiting'	Disabled
29	Set Time	Door Closed	Display 'Ready'	Enabled
30	Set Time	Number	Set Time = [Number]	Set Time
31	Set Time	Start	N/A	Set Time
32	Set Time	Cancel	N/A	Disabled

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33	Disabled	Half Power	N/A	Disabled
34	Disabled	Full Power	N/A	Disabled
35	Disabled	Timer	N/A	Disabled
36	Disabled	Door Open	N/A	Disabled
37	Disabled	Door Closed	Display 'Ready'	Enabled
38	Disabled	Number	N/A	Disabled
39	Disabled	Start	N/A	Disabled
40	Disabled	Cancel	N/A	Disabled
41	Enabled	Half Power	N/A	Enabled
42	Enabled	Full Power	N/A	Enabled
43	Enabled	Timer	N/A	Enabled
44	Enabled	Door Open	N/A	Enabled
45	Enabled	Door Closed	N/A	Enabled
46	Enabled	Number	N/A	Enabled
47	Enabled	Start	Operate Oven	Operation
48	Enabled	Cancel	N/A	Enabled
49	Operation	Half Power	N/A	Operation
50	Operation	Full Power	N/A	Operation
51	Operation	Timer	N/A	Operation
52	Operation	Door Open	Display 'Waiting'	Disabled
53	Operation	Door Closed	N/A	Operation
54	Operation	Number	N/A	Operation
55	Operation	Start	N/A	Operation
56	Operation	Cancel	Display Time	Waiting
57	Operation	Timeout	Display Time	Waiting

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