I pledge my honor that I have abided by the Stevens Honor System.

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Assignment Description:

Part 1:

"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 in excess of $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 in excess of $90,000.

Make a decision table to describe the retirement pension policy; be sure to consider the retirement eligibility criteria carefully. What are 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 microwave oven state diagram (follow the link for the diagram).   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?

Summary:

In this assignment I reduced a decision table from 8 results to 4. I also wrote out 63 test cases for a 9 x 7 state table. This helped me think more critically about the possible outcomes when testing. Initially, I only thought that test cases would only be required per state that tied to an action, but realized we should also know, when testing, that any particular state takes no action when that's the intended outcome.

Part 1: Decision Table (reduced)

Inputs	Values	Combinations			
Applied before June 11, 2010	Y,N	Y	Y	Y	N
Age >= 63	Y,N	Y/N	Y	N	Y/N
(Age + Years Teaching) >= 80	Y,N	Y	N	N	Y/N
Results					
Not Eligible				X	X
(1.6% x on salary <= $90,000) + (1.5% x on salary > $90,000)			X		
(1.55% x on salary <= $90,000) + (1.5% x on salary > $90,000)	X				

For this table I made the assumption that if you did not submit the application before the deadline, you are not eligible for either plan regardless of age or years of teaching. The pension began once the teacher met the criteria of either >=63 in age or their age and years of teaching totaled to 80.

Part 2: State Table

		Actions								
		Full Power	**Half Power**	**Timer**	**Number**	**Door Open**	**Door Closed**	**Start**	**Cancel**	**Timeout**
States	**Waiting**	do: set power = 600	do: set power = 300							
	Full Power		do: set power = 300	do: get number exit: set time						
	Half Power	do: set power = 600		do: get number exit: set time						
	Set Time				do: get number	do: display 'Waiting'	do: display 'Ready'			
	Disabled						do: display 'Ready'			
	Enabled							do: operate oven		
	Operation					do: display 'Waiting'			do: display time	do: display time

Minimum Test Cases Needed:

To adequately test this state table I will need 9x7 = **63 test cases** because there are 9 actions and 7 states. Even though some actions are empty for a state, it is important to know exactly how the program will respond to input at those actions and if there is any output at those states when there shouldn't be. The full set of test cases is down below.

Waiting

Test Case #1

Full Power() == do: set power = 600

Test Case #2

Half Power() == do: set power = 300

Test Case #3

Timer() == do: nothing

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: nothing

Test Case #6

Door Closed() == do: nothing

Test Case #7

Start() == do: nothing

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Full Power

Test Case #1

Full Power() == do: nothing

Test Case #2

Half Power() == do: set power = 300

Test Case #3

Timer() == do: get number → exit: set time

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: nothing

Test Case #6

Door Closed() == do: nothing

Test Case #7

Start() == do: nothing

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Half Power

Test Case #1

Full Power() == do: set power = 600

Test Case #2

Half Power() == do: nothing

Test Case #3

Timer() == do: get number → exit: set time

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: nothing

Test Case #6

Door Closed() == do: nothing

Test Case #7

Start() == do: nothing

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Set Time

Test Case #1

Full Power() == do: nothing

Test Case #2

Half Power() == do: nothing

Test Case #3

Timer() == do: nothing

Test Case #4

Number() == do: get number

Test Case #5

Door Open() == do: display 'Waiting'

Test Case #6

Door Closed() == do: display 'Ready'

Test Case #7

Start() == do: nothing

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Disabled

Test Case #1

Full Power() == do: nothing

Test Case #2

Half Power() == do: nothing

Test Case #3

Timer() == do: nothing

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: nothing

Test Case #6

Door Closed() == do: display 'Ready'

Test Case #7

Start() == do: nothing

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Enabled

Test Case #1

Full Power() == do: nothing

Test Case #2

Half Power() == do: nothing

Test Case #3

Timer() == do: nothing

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: nothing

Test Case #6

Door Closed() == do: nothing

Test Case #7

Start() == do: operate oven

Test Case #8

Cancel() == do: nothing

Test Case #9

Timeout() == do: nothing

Operation

Test Case #1

Full Power() == do: nothing

Test Case #2

Half Power() == do: nothing

Test Case #3

Timer() == do: nothing

Test Case #4

Number() == do: nothing

Test Case #5

Door Open() == do: display 'Waiting'

Test Case #6

Door Closed() == do: nothing

Test Case #7

Start() == do: nothing

Test Case #8

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Cancel() == do: display time

Test Case #9

Timeout() == do: display time