HW 03 - Decision Table and State Diagram

1. **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?"*

**Part 2:** Create a complete set of test cases for the [microwave oven state diagram](https://sit.instructure.com/courses/64673/modules/items/1719813) (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?

2. **Author**: Jiayin Huang

3. **Summary**:

Part 1:

Decision Table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | values | 1 | 2 | 3 | 4 | 5 | 6 |
| age >= 63 years | Y,N | Y | Y | Y | Y | Y | N |
| Before June 11, 2010 | Y,N | Y | Y | Y | Y | N | - |
| the 80 total years of age plus years of teaching | Y,N | N | Y | N | Y | - | - |
| Salary | <=$90k  >$90k | <=90K | >90K | >90K | <=90k | - | - |
| **RESULTS** | | | | | | | |
| Not eligible |  |  |  |  |  | Y | Y |
| 1.5% |  |  | >90K | >90K |  |  |  |
| 1.55% |  |  | <=90k |  | Y |  |  |
| 1.6% |  | Y |  | <=90K |  |  |  |

QA: 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?

Total year is 64 + 20 = 84 years, so:

1.55% of the average of their last 3 years of teaching salary, up to a maximum of $90,000

1.5% of any amount of their salary that exceeds $90,000

Part 2:

State Tables:

|  |  |  |  |
| --- | --- | --- | --- |
| States/Inputs | Command: Half | Command: Full | Set Time: Number |
| Waiting | Half Power | Full Power |  |
| Half Power |  | Full Power |  |
| Full Power | Half Power |  |  |
| Set time |  |  | Set time |

Set time state table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| States/Inputs | Command: Door Open | Command: Door Closed | Command: Start | Command: Timeout | Command: Cancel |
| Set Time | Disabled | Enabled |  |  |  |
| Enabled |  | Enabled | Operation |  |  |
| Disabled |  |  |  |  |  |
| Operation | Disabled |  |  | waiting | waiting |

Test Cases:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case ID | Current State | Power/Command | Action | Next State |
| T-101 | waiting | Half Power | Do: set power =300 | Half Power |
| T-102 | waiting | Full Power | Do: set power  = 600 | Full Power |
| T-103 | Full Power | Half Power | Do: set power =300 | Half Power |
| T-104 | Full Power | Timer | Do: get number, exit, set time | Set time |
| T-105 | Set time | Number | Do: get number, exit, set time | Set time |
| T-106 | Set time | Door open | Do: display ‘waiting’ | Disabled |
| T-107 | Set time | Door closed | Do: display ‘Ready’ | Enabled |
| T-108 | Set time | Start | Error | Set time?? |
| T-109 | Set time | Cancel | Error | Waiting?? |
| T-110 | Set time | Time out | Error | Waiting?? |
| T-111 | Half Power | Full Power | Do: Set power  = 600 | Full Power |
| T-112 | Half Power | Timer | Do: get number, exit, set time | Set time |
| T-113 | Enabled | Start | Do: operate oven | Operation |
| T-114 | Enabled | Cancel | Error | Waiting?? |
| T-115 | Enabled | Time out | Error | Waiting?? |
| T-116 | Disabled | Door closed | Do: display ‘Ready’ | Enabled |
| T-117 | Disabled | Cancel | Error | Waiting?? |
| T-118 | Disabled | Time out | Error | Waiting?? |
| T-119 | Operation | Cancel | Do: display time | Waiting |
| T-120 | Operation | Timeout | Do: display time | Waiting |
| T-121 | Operation | Door open | Do: display ‘Waiting’ | Disabled |

4. Reflection: I learned how to draw decision table and how to draw state tables. But it is not that easy to totally understand state diagram though, it takes time.

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