Car Insurance Problem – Black Box Testing

Software Quality and Assurance 2019

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Car Insurance Program – Black Box Testing

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Car Insurance Example

Specification: The basic cost of an insurance premium for drivers is €500, however, this premium can increase or decrease depending on three factors: their age, their gender and their marital status.
The input gender is given by the character 'M' for male and 'F' for female.
Drivers that are below the age of 25, male and single face an additional premium increase of €1500. If a driver outside of this bracket is married or female their premium reduces by €200, and if they are aged between 45 and 65 inclusive, their premium goes down by €100.
Drivers below the age of 16 and greater than the age of 65 cannot be insured and will return a value of zero for the premium. Program error checking to prevent an illegal entry for gender will also return a value of zero for the premium.

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Car Insurance Example

- **Specification:**
- Program inputs:
  - age: INT_MIN…15, 16…24; 25…44;45…65; 66…INT_MAX
  - gender: 'M'; 'F'; invalid input
  - married: True; False;
- Program Outputs:
  - Premium: 0, 200, 300, 400, 500, 2000

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Program (2)

```
(1)public int CarIns (int age, char gender, boolean married) {
(2) int premium;
(3) if ((age<16) || (age>65) || (gender!='M' && gender!='F')) {
(4) premium=0;
(5) } else {
(6)    premium=500;
(7)          If ((age<25) && (gender=='M') && (!married)) {
(8)                  premium += 1500;
(9)           } else {
(10)       If (married || gender=='F')
(11)         premium -= 200;
(12)           If ((age>=45) && (age<=65))
(13)                 premium -= 100;
(14)                 }
(15)               }
(16) return premium;
(17) }
```

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Black Box Testing

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Partitions

- **Specification:**
- Program inputs:
  - age: INT_MIN…15, 16…24; 25…44;45…65; 66…INT_MAX
  - gender: 'M'; 'F'; invalid input
  - married: True; False;
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  - Premium: 0, 200, 300, 400, 500, 2000

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Input Partitions

Parameter	Test Case	Partition Range
Age	1*	INT_MIN…15
	2	16…24
	3	25…44
	4	45…65
	5*	66... INT_MAX
gender	6	M
	7	F
	8*	Invalid input
married	9	True
	10	False

Note: * indicates an "error" case. INT_MIN is the minimum possible integer value and INT_MAX is the maximum possible integer value.

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Output Partitions

Parameter	Test Case	Partition Range
premium	11	0
	12	200
	13	300
	14	400
	15	500
	16	2000

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Test Cases

Each partition becomes a test case

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Test Data

Test No.	Test Cases Covered	Inputs			Expected Outputs
		age	*gender*	*married*	*premium*
1	4, 7, 9, 12	50	F	True	200
2	3, 7, 10, 13	30	F	False	300
3	4, 6, 10, 14	50	M	False	400
4	3, 6, 10, 15	30	M	False	500
5	2, 6, 10, 16	20	M	False	2000
6*	1	5	M	False	0
7*	5	70	M	False	0
8*	8	50	G	False	0

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