

CSE 4321/5321 Homework 1  
Previous Semester

Question 1-3 worth 30 percent each. Question 4 is worth 10 percent. 100 points total

The following are customer descriptions of software systems. For each problem state any assumptions made - but **do not change** the function being described.

1) Arlington Auto pays sales commission as follows. If the sales volume is between \$50,000 and \$200,000 the commission paid is 2.5%. If sales volume is less than \$50,000 the commission paid is 2.1%. If less than \$0 Arlington Auto charges its sales staff a \$300 fee to cover utilities, PC usage, etc. If the sales volume is greater than or equal to \$200,000 it pays 3.05% commission. If the sales volume is greater than \$300,000 it pays 3.75% interest. If the sales volume is greater than \$500,000 it pays 5% commission and he/she will receive an "top seller award" status which means that at Christmas he/she will receive a \$250 Amazon gift card. The software calculates the sales commission to be paid, charges, and awards. Sales status is used to print award plaques.

Develop the minimum set of test cases needed to test all actions and boundary values. List all inputs and expected outputs. Develop the test needed for the valid partitions only. Remember that currency is always truncated - never rounded up.

Answer:

The problem is framed as follows (this is not graded):

Sales Volume	Commission rate	Fee	Status	Gift Card
<\$0	0	-\$300.00	No sales	No
\$0.00	2.10%	\$0.00	Ordinary sales	No
\$49,999.99	2.10%	\$0.00	Ordinary sales	No
\$50,000.00	2.50%	\$0.00	Ordinary sales	No
\$199,999.99	2.50%	\$0.00	Ordinary sales	No
\$200,000.00	3.05%	\$0.00	Ordinary sales	No
\$300,000.00	3.05%	\$0.00	Ordinary sales	No
\$300,000.01	3.75%	\$0.00	Ordinary sales	No
\$500,000.00	3.75%	\$0.00	Ordinary sales	No
>\$500000.00	5%	\$0.00	Top Seller	Yes

The Equivalence Class Partitions with Boundary Values look like the following (Note: \$ and trailing zeroes are omitted to save space):

$-\infty$	-0.01	0	49,999.99	50,000	199,999.99	200,000	300,000	300,000.01	500,000	500,000.01	$\infty$
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The 6 ECPs (and 12 BVs) mean that we need 12 test cases using the BVs.

The required test cases are as follows (this portion is graded).

Test Case	Inputs	Expected outputs		
	Sales Volume	Amount paid	Gift Card	Status
Test Case 1	-\$500.00	-\$300.00	No	No sales
Test Case 2	-\$0.01	-\$300.00	No	No sales
Test Case 3	\$0.00	\$0.00	No	Ordinary sales
Test Case 4	\$49,999.99	\$1,049.99	No	Ordinary sales
Test Case 5	\$50,000.00	\$1,250.00	No	Ordinary sales
Test Case 6	\$199,999.99	\$4,999.99	No	Ordinary sales
Test Case 7	\$200,000.00	\$6,100.00	No	Ordinary sales
Test Case 8	\$300,000.00	\$9,150.00	No	Ordinary sales
Test Case 9	\$300,000.01	\$11,250.00	No	Ordinary sales
Test Case 10	\$500,000.00	\$18,750.00	No	Ordinary sales
Test Case 11	\$500,000.01	\$25,000.00	Yes	Top Seller
Test Case 12	\$1,000,000.00	\$50,000.00	Yes	Top Seller
Grading note: Status for items in yellow above may be any number but must be distinct from "Top Seller". The two extreme values of Sales Volume can be any number in that respective partition.				

#### Notes/assumptions

- 1) Assuming the commission rate for sales volume of less than zero is zero.
- 2) Status must "Top Seller" and something other to successfully test Status.