

PRACTICE

Course: Test Case Design Methods - BlackBox

Time: 115 minutes

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1 Requirement

Counter Sales is a system which is installed at XYZ company's branches to sell products to retail & non-retail customers. The following are requirements of the system.

2 Graphical User Interface

2.1 Controls

Control	Description
Product Number	Key-enter a product number.
Customer	Open Customer Search screen for the user to associate an existing customer.
Quantity	Open Product Quantity Change screen for the user to change ordered quantity.
Pricing	Open Product Price Change screen for the user to change product price.
Finish & Pay	Open Finalize Transaction screen for the user to make the payment.
Profit Margin%	When it loses focus, New Price will be recalculated.
Discount%	When it loses focus, New Price will be recalculated.
New Price	The user entered price or calculated price from Profit Margin & Discount.
OK	The product will be updated with new price.
Cancel	Return to parent screen without changes.

2.2 Business Requirements

Products can be sold to retail customer (customer is optional) or non-retail customers (customer is mandatory) within domestic or overseas.

At least one product is required to complete the selling.

Product Number field is masked to accept 10 digits only.

Product number may have leading zeros.

If the product number is not found, message 'Item not found' or similar message should be displayed to the user.

If a product is taxable, its Product Number will be marked with an asterisk.

Similarly if a customer is taxable, Customer Number will be marked with an asterisk.

10% of tax will be charged to the customer if the selling occurs within domestic & both customer & product are taxable.

Price Exc Tax = Extension price excluding tax = QTY * Unit Price

Price Inc Tax = Extension price including tax = Price Exc Tax + Tax

Total

Subtotal: sum of Price Exc Tax of all product lines

Tax: sum of Tax of all product lines

Total = Subtotal + Tax

WAC = weight average cost = trung bình trọng số chi phí vốn.

Profit Margin = lợi nhuận biên sai = lợi nhuận thu được khi bán 1 đơn vị sản phẩm

Profit Margin % = $\left(\frac{\text{New Price}}{\text{WAC}} - 1\right) * 100$

New Price = $\left(\frac{\text{Margin}}{100} + 1\right) * \text{WAC}$

New Price = Current Price - $\left(\text{Current Price} * \frac{\text{Discount}}{100}\right)$

Acceptable range of currency is \$0 - 999,999.99

It's requested that any selling must make at least 30% profit.

2.3 Information Architecture

Product			
Column Name	Data Type		COMMENTS

ProductId	Bigint	Not null	Primary key (identity). This is system generated id for a product.
Active	Boolean	Not null	Indicate if a product is active or not. Valid values: Y/N Default value: Y
Description	String	Not null	Product name or product description
Taxable	Boolean	Not null	Indicate if a product is taxable or not. Valid values: Y/N Default value: N

Location			
Column Name	Data Type		COMMENTS
LocationId	Bigint	Not null	Primary key (identity). This is system generated id for a branch.
Active	Boolean	Not null	Indicate if a branch is active or not. Valid values: Y/N Default value: Y
Name	String	Not null	Branch name
Address Line 1	String	Not Null	Number & street
Address Line 2	String	Null	Apartment or suite or floor
City	String	Not Null	
State	String	Null/ Not Null	Mandatory or optional depends on country

Country	String	Not Null	Country code, in 3 letters Default value: VNM (Vietnam)
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ProductLocation			
Column Name	Data Type		COMMENTS
ProductId	Bigint	Not null	Foreign key
LocationID	Bigint	Not Null	Foreign key The combination of Product ID & Location ID must be unique.
Active	Boolean	Not null	Indicate if a product is currently sold at the location. Valid values: Y/N Default value: Y
Unit Price	Currency	Not Null	Default value: 0
WAC	Currency	Not Null	Default value: 0

Customer			
Column Name	Data Type		COMMENTS
CustomerId	Bigint	Not null	Primary key (identity). This is system generated id for a non-retail customer.
Active	Boolean	Not null	Indicate if a customer is active or not. Valid values: Y/N Default value: Y
Name	String	Not null	Customer name in this format: FirstName<a space>LastName

Address Line 1	String	Null	Number & street
Address Line 2	String	Null	Apartment or suite or floor
City	String	Null	
State	String	Null	
Country	String	Null	Country code, in 3 letters (The validation of country code is handled from graphical user interface.) See the following for valid country code list http://www.worldatlas.com/aatlas/ctycodes.htm

3 Exercises

3.1 Exercise 3

Basic information to solve this exercise (using **Decision Table**)

Products can be sold to retail customer (customer is optional) or non-retail customers (customer is mandatory) within domestic or overseas.

10% of tax will be charged to the customer if the selling occurs within domestic & both customer & product are taxable.

Analysis

1) Identify conditions & their values

Taxable product: Yes, No

Retail customer: Yes, No

Taxable customer: Yes, No

Customer address: Unknown (U), Domestic (D), Overseas (O)

2) Compute max number of rules

$$2 \times 2 \times 2 \times 3 = 24$$

3) Identify possible actions

10% tax: Yes, No

4) Define each of the actions to take given each rule

- Identify 8 rules for Yes/ No conditions
- Combine them with values of Customer Address: U, D, O

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24
Conditions																								
Taxable Product	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y
Retail (unknown) Customer	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Taxable Customer	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Customer Address	U	D	O	U	D	O	U	D	O	U	D	O	U	D	O	U	D	O	U	D	O	U	D	O
Actions																								
10% tax	N	N	N	N	N	N	N	N	N	N	N	N	?	Y	N	N	N	N	?	?	?	?	?	?

- If product is non-taxable, all its combination will be non-taxable → R1 – R9, R16 – R18: non-taxable.
- If customer is retail (unknown), R19 – R24, we do not know the result as the requirement does not mention. Maybe the tax calculation will be based on product only → in real project we need to put question for requirement to clarify this.
- If customer is not retail (known), if customer is not taxable, all its combination will be non-taxable → R10 – R12
- If customer is taxable AND product is taxable AND shipping address is unknown, we do not know the result as the requirement does not mention → put question to clarify.
- If customer is taxable AND product is taxable AND shipping address is domestic → taxable
- If customer is taxable AND product is taxable AND shipping address is overseas → non-taxable

5) Verify that actions given to each rule are correct

Notice that when customer is retail (unknown), this customer may be considered as taxable or non-taxable we do not know yet but Customer Address have some D & O which are incorrect. It must be U(unknown)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24
Conditions																								
Taxable Product	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y
Retail (unknown) Customer	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Taxable Customer	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Customer Address	U	D	O	U	D	O	U	D	O	U	D	0	U	D	O	U	D	O	U	D	O	U	D	O
Actions																								
10% tax	N	N	N	N	N	N	N	N	N	N	N	N	?	Y	N	N	N	N	?	?	?	?	?	?

6) Simplify the table

- Remove R2 – R9 & R16 – R18, replace Retail Customer, Taxable Customer, Customer Address by DC
- Remove R20 – R21, R23 – R24 as they are incorrect
- Remove R11 – R12, replace Customer Address by DC

	R1	R10	R13	R14	R15	R19	R22
Conditions							
Taxable Product	N	Y	Y	Y	Y	Y	Y
Retail (unknown) Customer	DC	N	N	N	N	Y	Y
Taxable Customer	DC	N	Y	Y	Y	N	Y
Customer Address	DC	DC	U	D	O	U	U
Actions							
10% tax	N	N	?	Y	N	?	?