

Exercise 04a - Data Combinations - Manual Linear Expansion - Lower Levels

Objective

By the end of this exercise, you will be able to combine the Attributes to create Instances at the lower levels of the TestSheet.

Why is this important?

Combining these Attributes reflects the actual data combinations needed to test the Requirement.

Instructions

1. Duplicate the Folder: **"Exercise 3c Instance Structure - Set Character and Position"** and rename it **"Exercise 4a Data Combinations - Manual Linear Expansion - Lower Levels"**.

Context

The lower level Attributes now need to be combined. To start, the Attribute **"Customer"** needs to be combined. For this TestSheet, there is only one type of **"Customer"**, which would be a Registered User with an address that is already available in the system. This customer type will be the **StraightThrough**.

2. Navigate to the Attribute **"Customer"** which is a Sub-Attribute of **"Precondition"**. Right click on the Attribute **"Customer"** and select **"Create Instance"**. Rename this Instance **"Registered | Address Available"**.
3. Navigate to where the **"Registered | Address Available"** Instance Column intersects with the **"Type of user"** Attribute Row. From the drop-down box select the Value **"Registered"**.
4. Navigate to where the **"Registered | Address Available"** Instance Column intersects with the **"Address"** Attribute Row. From the drop-down box select the Value **"Available"**.
5. Expand the Instance Folder underneath the Attribute **"Customer"**, right click on the Instance **"Registered | Address Available"**, in the Ribbon use the Toggle Character button to set this Instance as the **"StraightThrough"**.

Context

The Instances within the Attribute **"Products"** have been created in a previous exercise. This means it is now possible to move up a level to the **"Ordered Products"** Attribute and combine. As **"Product"** is the only Sub-Attribute within the **"Order Products"** Attribute, there is no real combination needed, so the Instances within the Sub-Attribute **"Product"**, including their Characters and Position can be duplicated at the higher level.

Values for the Sub-Attribute **"Product"** can also be added to fit the flow of the **"Ordered Product"** Instance.

6. Focus on the Attribute **"Ordered Product"**. Then, where the Attribute **"Product"** and the following Instances intersect, add the following Values:

Attribute	Instances	Position/Character
Ordered Products	Physical	StraightThrough
	Digital	Inner
	Free Shipping	Inner
	Free Shipping Boundary	Boundary
	Shipping Costs Applied Boundary	Boundary

7. Focus on the Attribute **"Ordered Product"**. Then, where the Attribute **"Product"** and the following Instances intersect, add the following Values:

	Instances				
	Physical	Digital	Free Shipping	Free Shipping Boundary	Shipping Costs Applied Boundary
Attributes					
Product	Physical	Digital	Free Shipping	Free Shipping Boundary	Shipping Costs Applied Boundary

Context

The exercise now focuses onto the "Checkout" Attribute. As before the Sub-Attributes should be combined first, then the main "Checkout" Attribute.

There is only one specific credit card being used in this TestSheet as testing the various payment methods is not the focus of this TestSheet. Therefore, in the "Credit Card Information" Sub-Attribute, there is only one Instance:

- Visa Card
 - ◊ The StraightThrough Instances that you created for the Sub-Attributes can all be selected as Values for this card (for example the type of card and the card number).

"Payment Method" only requires one Instance to be created to reflect the single card we are using to pay in this TestSheet. This will be the StraightThrough:

- Credit Card | Visa

Shipping address is more complex as all the types of shipping need to be taken into account and added as Instances:

- The order requires delivery, and the shipping address is the same as the billing address.
- The order does not require delivery because the physical products will be picked up in the store, therefore no shipping address is required.
- Delivery is not required because the order does not have any physical products, for example a digital download which may simply be downloaded online.
 - ◊ Each Instance needs the relevant Values for the Sub-Attribute selected.

The Attribute "Billing Address" has already had the one Instance needed created in an earlier exercise.

8. Focus on the Attribute **"Credit Card Information"** (Process>>Checkout>>Payment Method>>Credit Card Information), add the Instance **"Visa Card"** with the **"StraightThrough"** Character. Then, where the Instance **"Visa Card"** and the following Attributes intersect, add the following Values:

	Instance
	Visa Card
Attributes	
Card Type	Visa
Card Number	4916637380170906
Expiration Date	Expires in two years
Card Code	123

9. Focus on the Attribute **"Payment Method"** (Process>>Checkout>>Payment Method), add the Instance **"Credit Card | Visa"** with the **"StraightThrough"** character. Then, where the Instance **"Credit Card | Visa"** and the **"Credit Card"** Attribute intersect, add the following Value:

	Instances
	Visa Card
Attributes	
Credit Card Information	Visa Card

10. Focus on the Attribute **"Shipping Address"** (Process>>Checkout>>Shipping Address). Create the Instances:
- **"Equals Billing Address"** (StraightThrough)
 - **"In-Store Pickup"** (valid inner)
 - **"N/A"** (valid inner)
- Where these Instances intersect with the following Attributes, add the following Values:

	Instances		
	Equals Billing Address	In-Store Pickup	N/A
Attributes			
Shipping Address	Equals Billing Address	N/A	N/A
In-Store Pickup	False	True	N/A

Context

The next level now needs to be combined, which is the Attribute **"Checkout"**. This means creating Instances to the Checkout Attribute and assigning Values for Billing Address, Shipping Address, and Payment Method. Since there are multiple Instances for these Attributes, our first Instance will be the StraightThrough which combines all StraightThrough Instances for these Attributes. Then there is one additional Instance combination for each non-StraightThrough Instance. There are two non-StraightThrough Instances, so in total there are 3 combinations:

- **Standard (StraightThrough):** standard checkout process is when an order is placed using the default billing address, delivery is required and is sent to the same shipping address as the billing address, and the payment method is a Visa credit card.
- **In-Store Pickup:** this Instance should be the same as the StraightThrough but we switch out one non-StraightThrough Instance. In this case, shipping is not required so the option for in-store pickup is chosen instead.
- **No shipping:** all Values stay the same as the StraightThrough, except the Instance **"Shipping Address"** which is changed to **"Not Applicable"**.

11. Focus on the Attribute **"Checkout"** (Process>>Checkout). Create the following Instances including their Character and Position:
- **"Standard"** (StraightThrough)
 - **"In-Store Pickup"** (valid inner)
 - **"No Shipping"** (valid inner)
- Where these Instances intersect with the following Attributes, add the following Values:

	Instances		
	Standard	In-Store Pickup	N/A
Attributes			
Billing Address	Default	Default	Default
Shipping Address	Equals Billing Address	In-Store Pickup	N/A
Payment Method	Credit Card Visa	Credit Card Visa	Credit Card Visa

Exercise 04b - Data Combinations - Manual Linear Expansion - TestSheet Level

Objective

By the end of this exercise you will be able to combine the attributes to create instance at the TestSheet Level.

Why is this important?

Combining these Attributes creates the Instances that relate to the actual TestCases that need to be created.

Instructions

1. Duplicate the folder: "**Exercise 4a Data Combinations - Manual Linear Expansion - Lower Levels**" and rename it "**Exercise 4b Data Combinations - Manual Linear Expansion - TestSheet Level**".

Context

The Attributes need to be combined at the TestSheet level. The Attributes to be combined are:

- Customer - Only one StraightThrough Instance
- Ordered Products - 5 Instances
- Checkout - 3 instances

For each of these 3 Attributes, one of the Instances is defined as a StraightThrough and all others are non-StraightThrough Instances. Logically using Linear Expansion, this will result in 7 Instances. However, we have a dependency that if a Digital product is ordered, there will be No Shipping. This combines two of the Instances to create 6. The following Instances should be created:

- ◇ Purchase of a Physical product (StraightThrough): a customer places an order to their registered address. They purchase a physical product and use the standard checkout process.
- ◇ Purchase of a digital product: a customer places an order to their registered address. They purchase a digital product (non-StraightThrough) and therefore no shipping applies.
- ◇ Free shipping: a customer uses their registered address to make a purchase of physical goods worth over \$51, so shipping costs are free, and use the standard checkout process.
- ◇ In-Store Pickup: a customer uses their registered address to make a purchase of physical goods which will be picked up in-store, so no shipping costs should be incurred.
- ◇ Free shipping boundary Value: a customer uses their registered address to make a purchase of physical goods worth exactly \$51, which is the boundary at which no shipping costs apply.
- ◇ Shipping cost applied boundary Value: a customer uses their registered address to make a purchase of physical goods worth exactly \$50, which is the boundary at which shipping costs do apply.

This may appear to be less Instances than you would expect. This is because Using Linear Expansion and StraightThrough, some Instances are duplicated and are not required. For example there is no Instance for Standard Delivery, as it would be identical to the Instance that is created for the purchase of a physical product.

2. Focus at the TestSheet level, expand the Attributes:
 - **Precondition**
 - **Process**
3. Right click on the TestSheet "**Calculate Shipping Costs**" and click the button "**Create Instance**" from the Mini Toolbar. Name this Instance "**Physical**".
4. Select the following Values from the dropdown boxes in the yellow boxes next to the Attributes according to the table below:

Attribute	Value
Customer	Registered Address Available
Ordered Products	Physical
Checkout	Standard

5. Set the Character of the Instance to **"StraightThrough"**.

Create the Instances including the Character and Position:

- **"Free Shipping | Boundary" (valid Boundary)**
 - **"Digital" (valid inner)**
- 6.
- **"Free Shipping" (valid inner)**
 - **"In-Store Pickup" (valid inner)**
 - **"Shipping Costs Applied | Boundary" (valid Boundary)**

Where these Instances intersect with the following Attributes, add the following Values:

	Instances				
	Free Shipping Boundary	Digital	Free Shipping	In-Store Pickup	Shipping Costs Applied Boundary
Attributes					
Customer	Registered Address Available	Registered Address Available	Registered Address Available	Registered Address Available	Registered Address Available
Ordered Products	Free Shipping Boundary	Digital	Free Shipping	Physical	Shipping Costs Applied Boundary
Checkout	Standard	No Shipping	Standard	In-Store Pickup	Standard

7. Arrange the Instances by selecting the TestSheet and choosing **"Arrange Instances"** from the **"Optimize Instances"** button in the Ribbon.

Hints

- » If you want to fill in Values all at once you can make use of the function "Fill empty Values" and then "Specific" from the context menu on the respective Attribute.