

Use Case Foundation and BDD/ATDD

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The Use Case Foundation[1] article defines use cases and the principles behind them and gives an example of use case[2]. This article shows the relationship between a use case and Behavior Driven Development / Acceptance Test-Driven Development (BDD/ATDD) scenarios.

A use case represents the big picture. From the article, “A use case is all the ways of using a system to achieve a goal of a particular user.” “A use case tells the whole story, as a story, from the initial event to the realization of the value it provides or the eventual failure if it can’t be met.” It includes many instances of “flow of events.”

Scenarios

BDD/ATDD scenarios represent testable flows. A scenario can depict an entire flow, but typically each describes a small portion of a flow. Scenarios are more detailed than a use case. They usually include data which is entered, calculated, or output from the flow. The data can be used during testing of the scenarios.

Let’s use the example in the Use Case article as the base for showing how it would be transformed into scenarios. The example is:

Basic Flow / Main Scenario

The use case starts when a Shopper indicates they’d like to find a product

1. Browse Products
2. Select Products for Purchase
3. Provide Payment Details
4. Provide Delivery Details
5. Confirm Purchase

The use case ends.

Scenarios have a Given/When/Then format. A template is:

*Given the current state,
When an event or action occurs,
Then there is a new state, an output, or both.*

Main Flow Scenario

You could translate the main flow of the use into a scenario by applying the preceding template. The following scenario encompasses the entire flow, so it has multiple Whens for the Shopper actions. Scenarios usually have only a single When clause, so this scenario would be broken up into multiple scenarios, as you’ll see shortly.

Scenario: Purchase a Product
Given Shopper wants a product
When Shopper browses for a product
And when Shopper selects a product
And when Shopper provides payment details
And when Shopper provides delivery details
And when Shopper confirms purchase

Then product is scheduled for delivery

One might have a scenario with all the steps as the basis for an end-to-end test. To do so, data could be associated with each step. This data represents an example of the flow. The test checks that the output or state change in the Then step actually occurs.

Scenario: Purchase a Product

Given Shopper wants a product "Widget"

When Shopper browses for a product

Name	Description	Price
Acme Widget	For medium use	\$10.00
Xyz Widget	For light use	\$8.00

And when Shopper selects a product

Acme Widget

And when Shopper provides payment details

Type	Number	Expiration	CVV
Amex	374245455400126	05/2026	1234

And when Shopper provides delivery details

Street Address	City	State	Zip Code
1 Penny Lane	Durham	NC	27701

And when Shopper confirms purchase

Then product is scheduled for delivery

The test could be run using the same data on the internal business logic, and it could be run through the user interface. If the business logic test passed and the user interface test failed, one could start debugging by looking at the plumbing between the two.

Note that we might discover additional events that need to occur when we add the data. Payment information was provided in the flow, but never used. So, this step might be added to the end:

And credit card is charged.

Smaller flow scenarios

Typically, scenarios are for smaller portions of the flow. Each scenario consists of a single When step. The above scenario might be decomposed into steps such as:

Scenario: Determine a product

Given Shopper is browsing for a product

When Shopper selects a product

Then a Product is selected

and:

Scenario: Valid Delivery Details Provided

Given a Product is selected

When Shopper provides delivery details
Then Delivery details are recorded

Alternative Flows

Each of these small scenarios could have alternative ones. For example, there might be a scenario for “Determine a set of products,” which could involve selecting several products. Each of these smaller scenarios could have data associated with the steps, such as:

Scenario: Valid Delivery Details Provided

Given a Product is selected

When Shopper provides delivery details

Street Address	1 Penny Lane	
City	Durham	
State	NC	
Zip Code	27701	

Then Delivery details are recorded

Street Address	City	State	Zip Code	
1 Penny Lane	Durham	NC	27701	

Now the alternatives which are listed in the use case would have their own scenarios. For example, the alternative:

Alt 5 Invalid delivery details

would have one or more scenarios that looked like this:

Scenario: Invalid Delivery Details Provided

Given Order in progress

When Shopper provides delivery details

Street Address	100 Penny Lane	
City	Durham	
State	NC	
Zip Code	27799	

Then error is noted

Street Address does not exist	
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Every alternative would have at least one scenario associated with it. Business rules which may be discovered during use case formulation or scenario expansion could describe these alternatives. For example, for this alternative:

Alt 6 – Product out of stock

There might be a rule that determines how much of a product should be shipped if there were not enough in stock:

Business Rule Deliver Products in Stock

Deliver	Product	Product	Product	Product	Notes
Partial	In Stock	Ordered	Backordered	Shipped	
Order					
No	1	1	1	1	Enough product
No	1	2	0	0	Not enough in stock
Yes	1	2	1	1	Backorder

Summary

A use case which gives a big picture of all the flows forms a cohesive context for the BDD/ATDD scenarios that detail the steps of each of the flows.

[1] <https://ss-usa.s3.amazonaws.com/c/308454236/media/245965ce1f5b9890898305669066035/Use%20Case%20Foundation.pdf>

[2] Use case from the article:

Primary Actor: Shopper	Help the shopper to find the most suitable product to meet their needs and help them to purchase it.	
Basic Flow	Alternate Flows	
The use case starts when a Shopper indicates they'd like to find a product	Alt1 – Keyword search for products	
1. Browse Products	Alt 2 – No products selected	
2. Select Products for Purchase	Alt 3 – Invalid payment details	
3. Provide Payment Details	Alt 4 – Retrieve stored payment and delivery details	
4. Provide Delivery Details	Alt 5 Invalid delivery details	
5. Confirm Purchase	Alt 6 – Product out of stock	
The use case ends.	Alt 7 – No purchase confirmation	
	Alt 9 – Payment system unavailable	
	Alt 10 – Stock control system unavailable	
	Alt 11 – Quit shopping with no purchase	
	Alt 12 – Shopper stops responding	
	Alt 13 – Shopper needs expert advice	