

Use Cases for the Rational Unified Process

Written by:



13 Stonebriar Road
Columbia, SC 29212
(803) 781-7628
www.evanetics.com

Review Sample

Student Manual

Copyright © 2007-2009 Evanetics, Inc. All rights reserved. Companies, names and data used in examples and exercises herein are fictitious unless otherwise noted. No part of these materials may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of Evanetics, Inc.

Product and company names mentioned herein are the trademarks or registered trademarks of their respective owners. Note: all quotations in this course are from the Rational Unified Process version 7.0.1, Copyright IBM Corporation, 1987, 2006, unless otherwise indicated.

Evanetics, Inc. is an Endorsed Education Provider with the International Institute of Business Analysis. This course has been approved to carry the IIBA logo.



The IIBA logo is a trademark belonging to the International Institute of Business Analysis.

This course was produced by:

Gary K. Evans
Evanetics, Inc.
13 Stonebriar Road
Columbia, SC 29212
(voice) 803-781-7628
www.evanetics.com

Review Sample

Table of Contents

Course Introduction (pg. 5)

- Value in this Course
- Course Objectives

Use Case Introduction (13)

- What is a Use Case?
- Where Do Use Cases Fit in RUP?
- What Will You Deliver in RUP?

Use Case Examples (17)

- Business: Apply for Life Insurance Policy
- System: Withdraw Funds from ATM
- *Group Discussion: Use Case Production*

Use Case Writing “Miniature” (21)

- The Writing Process in 5 slides

Course Case Studies (27)

- Example Case Study
- Student Exercise Case Study
- Example: Identify Stakeholders & User Goals
- *Exercise: Identify Stakeholders & User Goals*

Use Case Structure in RUP (33)

- Basic Flow
- Alternate Flows
- *Group Discussion: Use Case Structure*
- *Exercise: Write a First Use Case*

Use Case Scope in RUP (41)

- Business Use Cases
- System Use Cases

Business Use Cases (45)

- RUP Business Modeling Discipline
- Business Use Case Model
- Business Actors
- Example Business Use Case

System Use Cases (53)

- RUP Requirements Discipline
- System Use Case Model
- System Actors
- Example System Use Case
- *Group Discussion: Use Case Scope*

Use Case Style Topics (61)

- Essential Use Cases
- Design-detail Use Cases
- Style Guidelines for Use Cases
- Audience for Use Cases
- *Group Discussion: Use Case Style*

Discovering Actors & Use Cases (69)

- Primary and Secondary Actors
- Business Actors and Use Cases
- System Actors and Use Cases
- *Group Discussion: Actors & Use Cases*

Review Sample

Table of Contents

The Use Case Diagram (79)

- Anatomy of the Use Case Diagram
- <<include>> Relationship
- <<extend>> Relationship
- *Group Discussion: The Use Case Diagram*

The Process for Writing Use Cases (89)

- Identify Candidates & Scope
- Write the Basic Flow
- Identify the Alternate Flows
- Write the Behavior of each Alternate Flow

Identify Candidate Use Cases (93)

- Example Case Study
- *Student Case Study Exercise*

Identify Use Case Scope (97)

- Example Case Study
- *Student Case Study Exercise*

Identify Actors (101)

- Example Case Study
- *Student Case Study Exercise*

Write the Basic Flow (105)

- Example Case Study
- *Student Case Study Exercise*

Identify the Alternate Flows (109)

- Example Case Study
- *Student Case Study Exercise*

Write the Alternate Flows (113)

- Example Case Study
- *Student Case Study Exercise*
- *Group Peer-Review*

Automated Actors (119)

Pre- and Post-Conditions (123)

Use Cases with Similar Steps (127)

Writing Use Cases – Doing It All Together (133)

- *Student Exercise: Write a Complete Use Case*

Use Case Pitfalls (137)

- CRUD-based Use Cases
- Use Case Normalization
- Steps as Use Cases

Who Should Write Use Cases? (159)

Wrapup (165)

Appendix A (171)

- Top 10 Mistakes with Use Cases

Appendix B (177)

- Use Cases for Enhancement Projects
- Use Cases for System-to-System Interaction
- Use Cases for System Ports
- Use Cases in Outsourced and Offshore Projects

Review Sample

Use Case Examples

Review Sample

Use Case Examples

Before we discuss the details of use cases, let's see some examples of

- What they look like
- What content they contain
- What they do not contain

Your instructor will direct you to these examples in your course materials

- Apply for Life Insurance Policy (A business use case)
- Withdraw Funds from ATM (A system use case)



Turn to page Ex-1 and Ex-2 to see these examples.

Use Case Examples

From these examples we can see that

- A use case is a textual form – not a diagram
- It should not include
 - » User Interface (UI) design elements
 - » UI navigation (clicks, drag-'n-drop, ...)
 - » Data formats
 - » Specification of internal algorithms or components
- It separates the scenarios where the sequence executes without deviation (basic flow), from those scenarios (alternate flows) where the system or business must attempt recovery, and may fail to recover
- It should describe what the system, or business, does to satisfy the users' goals
 - » It should not describe “how” these goals are met – that is for design
- It should be written in brief, readable steps that make very clear who is acting – i.e., the user, or the system or business

Review Sample

Group Discussion – Use Case Production

Organize into small groups of 2-3 people

Discuss together these questions:

- Who is writing the use cases on your projects?
- How long are your use cases?
- Who is reading, or using, the use cases on your projects?
- Who validates your use cases?
- Do your use cases contain design or implementation content?
- How do your use cases differ from the examples we just reviewed?
- Is anyone willing to bring in some of your use cases for review?



Review Sample

Be prepared to share your answers with the entire class



Estimate: 10 mins.

Use Case Writing “Miniature”

Review Sample

Use Case Writing Miniature

Before we start, let's see the whole use case writing process

We will select a single use case from our example case study

- A vehicle rental system

We will quickly show all four (4) steps of writing a selected use case

- Identify the primary actor(s) and the use case scope
- Write the basic flow (aka, the “happy path”)
- Identify the alternate flows and the conditions that cause a deviation from the happy path
- Write the behavior of the actor(s) and system to attempt recovery from the alternate flow back to the basic flow

Review Sample

Miniature – Actors and Use Case Scope

Use Case (for a Vehicle Rental system)

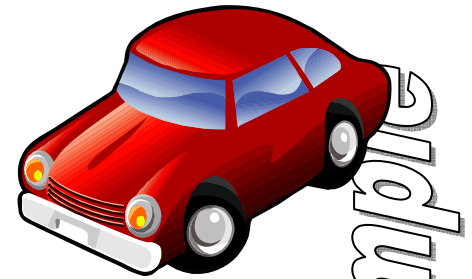
- Receive Vehicle from Customer

Primary actor(s)

- Garage Representative

Use Case Scope

- System use case



Review Sample

Questions:

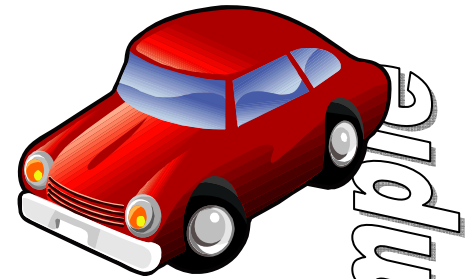
- Does this seem like a reasonable use case?
- Do you think there is significant interaction between the primary actor and the system?
- What steps do you think will be performed in this use case?

Miniature – Basic Flow

Use Case: Receive Vehicle from Customer
Scope: System
Primary actor: Garage Representative (GR)

Basic Flow

1. GR informs system of vehicle being returned.
2. System presents vehicle rental information for verification by GR.
3. GR informs system that no vehicle issues (damage, mechanical problems) are observed, or reported by customer.
4. GR informs system of gasoline level in vehicle. System calculates re-fueling charge based on current level and any pre-payment agreement.
5. GR informs system to apply rental charge to credit card used on vehicle reservation.
6. System prints itemized receipt of rental charges.



Questions:

- Will we have deviations, or "alternate" behavior at any of these steps?
- Can you name some alternates?

Review Sample

Miniature – Alternate Flow Names

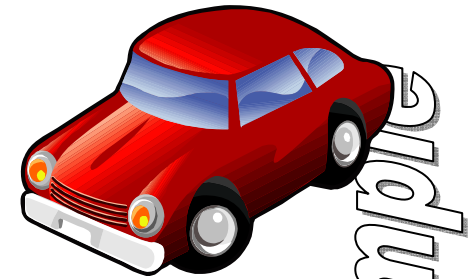
Use Case: Receive Vehicle from Customer
Scope: System
Primary actor: Garage Representative (GR)

Basic Flow

1. GR informs system of vehicle being returned.
2. System presents vehicle rental information for verification by GR.
3. GR informs system that no vehicle issues (damage, mechanical problems) are observed, or reported by customer.
4. GR informs system of gasoline level in vehicle. System calculates re-fueling charge based on current level and any pre-payment agreement.
5. GR informs system to apply rental charge to credit card used on vehicle reservation.
6. System prints itemized receipt of rental charges.

Alternate Flows

- 2a. Not our vehicle
- 3a. Vehicle issues found
- 5a. Apply charges to different credit card



Review Sample

Question:

- What behavior do you think the system should exhibit when it encounters each of these alternates?

Miniature – Alternate Flow Behavior

Use Case: Receive Vehicle from Customer
Scope: System
Primary actor: Garage Representative (GR)

Basic Flow

1. GR informs system of vehicle being returned.
2. System presents vehicle rental information for verification by GR.
3. GR informs system that no vehicle issues (damage, mechanical problems) are observed, or reported by customer.
4. GR informs system of gasoline level in vehicle. System calculates re-fueling charge based on current level and any pre-payment agreement.
5. GR informs system to apply rental charge to credit card used on vehicle reservation.
6. System prints itemized receipt of rental charges.

Alternate Flows

2a. Not our vehicle

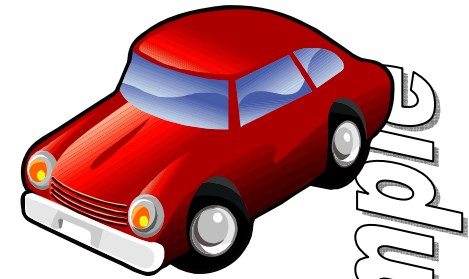
- 2a.1 GR informs customer this vehicle is not property of this rental company. This use case ends.

3a. Vehicle issues found

- 3a.1 GR informs system of problems reported by customer, or that damage is present.
- 3a.2 When damage is found, GR directs customer to branch Customer Service Representative to obtain details on damage.

5a. Apply charges to different credit card

- 5a.1 GR directs customer to branch Customer Service Representative to validate different credit card and transfer rental charges to that card.



Review Sample

We now have a complete use case, for review by our customer or end-users.

This is the process you will follow in this course to write your use cases.

Use Case Structure in RUP

Review Sample

Use Case Structure

Use case descriptions consist of 4 types of content:

1. Header, or preamble
2. A description of successful traversal of the use case
3. Identification of things that could go wrong
4. A description of the system's behavior in each situation where something goes wrong

①

Use Case:	Withdraw Funds
Scope:	System
Primary Actor:	Bank Customer

Basic Flow

②

1. Bank Customer indicates request to withdraw money.
2. System prompts for the account money will be withdrawn from. System validates account is ATM-accessible.
3. System prompts for withdrawal amount, indicating constraints on denomination allowed (e.g., \$5, \$10, \$20).
4. Bank Customer enters amount.
5. System notifies central bank system, which approves amount and returns updated account balance.
6. System dispenses money.
7. System asks Bank Customer if it should print a receipt.
8. Bank Customer indicates "yes" and system prints receipt.
9. System returns to state to accept next Bank Customer request.

Alternate Flows

③

2.a	Account is not ATM-accessible (balance too low, locked, ...)
-----	--

④

1.	System informs Bank Customer account is not accessible, and reason why.
2.	Bank Customer selects another account.

2.b Bank Customer cancels.

1. System returns to state to accept next Bank Customer request.

Example

Use Case Structure

In RUP these 4 parts of the use case description are called:

1. Header, or Brief Description, of the use case
2. Basic Flow (aka the “happy path”)
3. Alternate Flows and Subflows
 - Includes
 - » How the system behaves when something goes wrong
 - » How the system behaves when a variation in behavior is required

Review Sample

Use Case Structure

The Header, or Brief Description

- Conveys the purpose of the use case
- May contain project-specific information

What does it look like?

- RUP does not define the header structure
- A single paragraph, or even one sentence, may be all you need
- Some organizations elect to use very elaborate header sections

What your header contains will be a reflection of your

- Development process, and your
- Company culture and its expectations for detailed specification

Recommendation of minimum content

- Use case name (in verb-object form)
- Scope (Is it a *business* or *system* use case?)
- Primary actor
- Abstract, or goal, of the use case, if the use case name is not sufficient

Review Sample

Use Case Structure

The Basic Flow

- Describes the behavior seen by a primary actor (user) when everything goes as it should

Basic Flow

Use Case:	Reserve a Vehicle
Scope:	System level
Primary actor:	Customer

Basic Flow

1. System prompts the customer for the pickup and return locations of the reservation, and the pickup and return dates and times.
2. Customer indicates vehicle selection criteria. The default is to search for all categories of vehicles.
3. System returns matching vehicles, with their base rates.
4. Customer selects a vehicle.
5. System prompts for customer's Frequent Renter identification number.
6. System obtains the customer's rental profile, which the system retains to pre-populate any required information.
7. System prompts for desired protection product coverages, and other amenities (car seats, GPS device, etc).
8. System presents estimated total cost of reservation.
9. Customer approves cost.
10. Customer provides payment information and system obtains payment satisfaction.
11. System presents confirmation number to customer.

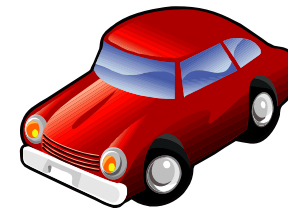
Alternate Flows

3a. No matching vehicles
This alternate occurs if no vehicle matches the location and dates provided by the Customer.

- 3a.1 System informs customer no vehicles found matching the location and dates provided by customer.
- 3a.2 Go to Step 2.

5a. Customer does not provide Frequent Renter number
This occurs if the customer either does not have a Frequent Renter number, or just does not provide her number.

- 5a.1 System prompts for required customer information (e.g., name, address, birth date, license number, license state, etc.).
- 5a.2 Go to Step 7.



view Sample

Turn to page Ex-7 to see this example.

Use Case Structure

The Alternate Flows

- Describes the behavior seen by a user (primary actor) when errors, exceptions, deviations, or variations occur

Use Case:	Reserve a Vehicle
Scope:	System level
Primary actor:	Customer

Basic Flow

1. System prompts the customer for the pickup and return locations of the reservation, and the pickup and return dates and times.
2. Customer indicates vehicle selection criteria. The default is to search for all categories of vehicles.
3. System returns matching vehicles, with their base rates.
4. Customer selects a vehicle.
5. System prompts for customer's Frequent Renter identification number.
6. System obtains the customer's rental profile, which the system retains to pre-populate any required information.
7. System prompts for desired protection product coverages, and other amenities (car seats, GPS device, etc).
8. System presents estimated total cost of reservation.
9. Customer approves cost.
10. Customer provides payment information and system obtains payment satisfaction.
11. System presents confirmation number to customer.

Alternate Flows

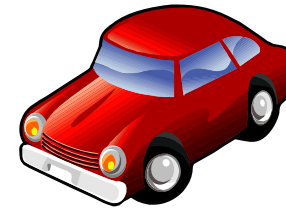
3a. No matching vehicles
This alternate occurs if no vehicle matches the location and dates provided by the Customer.

- 3a.1 System informs customer no vehicles found matching the location and dates provided by customer.
- 3a.2 Go to Step 2.

5a. Customer does not provide Frequent Renter number
This occurs if the customer either does not have a Frequent Renter number, or just does not provide her number.

- 5a.1 System prompts for required customer information (e.g., name, address, birth date, license number, license state, etc.).
- 5a.2 Go to Step 7.

Alternate Flows



Turn to page Ex-7 to see this example.

view Sample

Group Discussion – Use Case Structure

Organize into small groups of 2-3 people

Discuss together these questions:

- What structure are you following in your use cases?
 - » Is anyone willing to bring in some project use cases for review?
- Do you have a standardized use case template in your company?
 - » Is anyone willing to bring in your template for review?
- Does everyone use the standardized use case template, or does each project choose its own presentation format?
- Do you use a template when you first write the use case, or do you only follow the template structure when the use case is starting to mature?



Review Sample

Be prepared to share your answers with the entire class



Estimate: 10 mins.

The Process for Writing Use Cases

Review Sample

Use Case Writing Process

There are many approaches to writing a use case

The following sections illustrate a process that is

- Simple, with
- Stepwise enhancement

This process “drills down” in several steps from

- Identifying candidate use cases, to
- Completing the whole use case

The next slide identifies the 6 steps in this process . . .

Review Sample

Use Case Writing Process

1. Identify and describe your candidate use cases
2. Identify the scope of each use case
 - Business use case
 - System use case §
3. Identify the primary and secondary actors
 - Construct a use case diagram

For each candidate use case

4. Write the Basic Flow of the use case
5. Identify the conditions, and names, of the Alternate Flows that could occur
6. Write the behavior of each Alternate Flow

§ Note: the overwhelming majority of use cases you see in books and magazines are system use cases.

