Object Oriented Methods

Individual Project part 5

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# Abstract

Individual Project for Object Oriented Methods. Covers content including an overall project description, use case diagrams, class diagrams, sequence and collaboration diagrams, state transition and activity diagrams, and change control documentation for an organization payment system.

# Table of Contents

Contents

[Abstract 2](#_Toc74644266)

[Individual Project for Object Oriented Methods 2](#_Toc74644267)

[Table of Contents 3](#_Toc74644268)

[Project Description: 5](#_Toc74644269)

[Use Case Diagrams with Narratives: 6](#_Toc74644270)

[Use Case Diagram: 6](#_Toc74644271)

[CreateOrder: 6](#_Toc74644272)

[CreatePayment: 8](#_Toc74644273)

[UpdatePayment: 10](#_Toc74644274)

[ViewOrder: 11](#_Toc74644275)

[ViewPayment: 13](#_Toc74644276)

[DeleteOrder: 14](#_Toc74644277)

[DeletePayment: 16](#_Toc74644278)

[Class Diagrams: 18](#_Toc74644279)

[Sequence and Collaboration Diagrams: 19](#_Toc74644280)

[CreateOrder: 19](#_Toc74644281)

[CreatePayment: 20](#_Toc74644282)

[UpdatePayment: 21](#_Toc74644283)

[ViewOrder: 22](#_Toc74644284)

[ViewPayment: 23](#_Toc74644285)

[DeleteOrder: 24](#_Toc74644286)

[DeletePayment: 25](#_Toc74644287)

[State Transition and Activity Diagrams: 26](#_Toc74644288)

[CreateOrder & CreatePayment: 26](#_Toc74644289)

[UpdatePayment: 27](#_Toc74644290)

[ViewOrder & ViewPayment: 28](#_Toc74644291)

[DeleteOrder & DeletePayment: 29](#_Toc74644292)

[Follow Up Discussion on OO and design changes: 30](#_Toc74644293)

[Change Control Document: 31](#_Toc74644294)

[Update 1.0.0 31](#_Toc74644295)

[Update 1.0.1 31](#_Toc74644296)

[Update 1.1.1 31](#_Toc74644297)

[Update 1.2.1 31](#_Toc74644298)

[Resources: 33](#_Toc74644299)

# Project Description:

Create an ordering and payment system for a book company. Products sold will be exclusively books and the company will only accept credit card payments. All customers will be already logged into the system and have access to the accounts database where payment methods are stored. This will allow the ordering system to process the inventory already in a cart and use a saved payment method.

# Use Case Diagrams with Narratives:

## Use Case Diagram:

Diagram

Description automatically generated

## CreateOrder:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *CreateOrder* | | **Number:** *101* |
| **Summary** | Create an order | | |
| **Priority** | *4* | | |
| **Preconditions** | Account logged in, inventory in order is available, payment method saved | | |
| **Postconditions - Success** | Order placed; payment method charged | | |
| **Postconditions - Failure** | Payment method failure: order not placed | | |
| **1⁰ Actor(s)** | User | | |
| **2⁰ Actor(s)** | Banking system | | |
| **Trigger** | User Adds item to cart | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User Adds item(s) to cart* | |
| 2 | *System Asks if user is finished Shopping* | |
| 3 | *User Selects Checkout* | |
| 4 | *System asks for Payment Method* | |
| 5 | *User Selects Payment Method* | |
| 6 | *System submits payment charge to banking system* | |
| 7 | *Banking system charges payment method* | |
| 8 | *System shows successful payment and order placed screen* | |
| **Extensions** | **Step** | **Branching Action** | |
| 8.1 | *Insufficient funds on payment method* | |
| 8.2 | *System shows payment failure* | |
| 8.3 | *System returns to step 2.* | |  |
| 2.1 | *User not finished shopping* | |
| 2.2 | *System allows more items to be added* | |
| 2.3 | *System returns to step 1* | |
| **Open Issues** |  | *Add rows as needed.* | |

## CreatePayment:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *CreatePayment* | | **Number:** *102* |
| **Summary** | User Saves Payment Method to System | | |
| **Priority** | *4* | | |
| **Preconditions** | Account logged in | | |
| **Postconditions - Success** | Payment Method Saved | | |
| **Postconditions - Failure** | Payment method not saved: invalid information | | |
| **1⁰ Actor(s)** | User | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | User adds payment method | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User selects payment methods* | |
| 2 | *System asks for card number; System crates entry in Payment()* | |
| 3 | *User Enters Card Number* | |
| 4 | *System saves card number to Payment(); System asks for Expiration date* | |
| 5 | *User Enters Expiration date* | |
| 6 | *System saves Expiration date to Payment(); System asks for CVC Number* | |
| 7 | *User Enters CVC number* | |
| 8 | *System Saves CVC number to Payment(); System displays saved payment method screen* | |
| **Extensions** | **Step** | **Branching Action** | |
| 8.1 | *Invalid information on payment method* | |
| 8.2 | *System shows invalid information given* | |
| 8.3 | *System returns to step 2.* | |
| **Open Issues** | 1 | Expired Payment Method | |

## UpdatePayment:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *Update payment* | | **Number:** *103* |
| **Summary** | *Update payment saved on account* | | |
| **Priority** | *4* | | |
| **Preconditions** | Payment method saved to account | | |
| **Postconditions - Success** | Payment method updated | | |
| **Postconditions - Failure** | Payment methods update failure | | |
| **1⁰ Actor(s)** | Customer | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | Edit saved payment | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User selects payment method to update* | |
| 2 | *System asks for card number* | |
| 3 | *User enters card number* | |
| 4 | *System overrides saved card number within accounts database; system asks for expiration date* | |
| 5 | User enters expiration date | |
| 6 | System overrides saved expiration date within accounts database; system asks for CVC number | |
| 7 | User enters CVC number | |
| 8 | System overrides saved CVC within accounts database; system displays payment method updated. | |
| **Extensions** | **Step** | **Branching Action** | |
| 8.1 | *Invalid information on payment method* | |
| 8.2 | *System displays error for invalid information entered* | |
| 8.3 | System returns to step 2. | |
| **Open Issues** |  | *Add rows as needed.* | |

## ViewOrder:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *view order* | | **Number:** *104* |
| **Summary** | *Users and employees will be able to view the order* | | |
| **Priority** | *3* | | |
| **Preconditions** | Order placed, user account signed in, | | |
| **Postconditions - Success** | Order viewed | | |
| **Postconditions - Failure** | Order unavailable | | |
| **1⁰ Actor(s)** | User, Employee | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | View order history requested | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User requests order history* | |
| 2 | System displays selectable list of orders from Order | |
| 3 | User selects OrderID to view | |
| 4 | System displays order information | |
| **Extensions** | **Step** | **Branching Action** | |
| 4.1 | Order selected deleted | |
| 4.2 | System displays order removed screen | |
| 4.3 | System returns to step 2 | |
| **Open Issues** |  | *Add rows as needed.* | |

## ViewPayment:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *view Payments* | | **Number:** *105* |
| **Summary** | *View saved payment methods* | | |
| **Priority** | *3* | | |
| **Preconditions** | Account signed in; payment method saved | | |
| **Postconditions - Success** | Payment methods viewed | | |
| **Postconditions - Failure** | Payment methods missing | | |
| **1⁰ Actor(s)** | User, Employee | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | View Payment method view | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *Customer requests to view payment* | |
| 2 | *System displays payment method list* | |
| 3 | User selects payment method from list | |
| 4 | System displays payment method information | |
| **Extensions** | **Step** | **Branching Action** | |
| 4.1 | *Payment method selected missing from database* | |
| 4.2 | *System displays payment method missing* | |
| 4.3 | System returns to step 1 | |
| **Open Issues** |  | *Add rows as needed.* | |

## DeleteOrder:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *Delete order* | | **Number:** *106* |
| **Summary** | Users will be able to delete orders from order history | | |
| **Priority** | *1* | | |
| **Preconditions** | Account signed in | | |
| **Postconditions - Success** | Order removed from history | | |
| **Postconditions - Failure** | Order removal failed | | |
| **1⁰ Actor(s)** | User, Manager | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | View Order history request | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User requests order history* | |
| 2 | *System displays order history list from company database* | |
| 3 | *User selects order to view* | |
| 4 | *System displays order details* | |
| 5 | *User requests order to be removed* | |
| 6 | *System removes order from history; system returns to order history list* | |
| **Extensions** | **Step** | **Branching Action** | |
| 6.1 | *Order removal failure: still in progress* | |
| 6.2 | *System displays order removal failure: order still in progress* | |
| 6.3 | System returns to step 2 | |
| **Open Issues** |  | *Add rows as needed.* | |

## DeletePayment:

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Specification** | **Name:** *Delete Payment* | | **Number:** *107* |
| **Summary** | User can remove payment methods | | |
| **Priority** | *2* | | |
| **Preconditions** | Account signed in; payment methods saved to account | | |
| **Postconditions - Success** | Payment method removed | | |
| **Postconditions - Failure** | Payment removal failure | | |
| **1⁰ Actor(s)** | User, Manager | | |
| **2⁰ Actor(s)** | SysData | | |
| **Trigger** | View Payment method request | | |
| **Main Scenario** | **Step** | **Action** | |
| 1 | *User requests payment methods* | |
| 2 | *System displays payment method list from company database* | |
| 3 | *User selects payment method* | |
| 4 | *System displays payment method information* | |
| 5 | *User requests payment method removal* | |
| 6 | System removes payment method; system returns to payment method list display | |
| **Extensions** | **Step** | **Branching Action** | |
| 6.1 | *Payment method removal failure* | |
| 6.2 | *System displays payment method removal failure: active payment processing* | |
| 6.3 | System returns to step 2 | |
| **Open Issues** |  | *Add rows as needed.* | |

# Class Diagrams:

Diagram

Description automatically generated

# Sequence and Collaboration Diagrams:

## CreateOrder:

Diagram

Description automatically generated

Chart, waterfall chart

Description automatically generated

## CreatePayment:

Diagram

Description automatically generated

Chart, waterfall chart

Description automatically generated

## UpdatePayment:

Diagram

Description automatically generated

Chart, waterfall chart

Description automatically generated

## ViewOrder:

Diagram

Description automatically generated

Chart

Description automatically generated

## ViewPayment:

Diagram

Description automatically generated

Chart

Description automatically generated

## DeleteOrder:

Diagram, schematic

Description automatically generated

Chart

Description automatically generated

## DeletePayment:

Diagram

Description automatically generated

Chart, waterfall chart

Description automatically generated

# State Transition and Activity Diagrams:

## CreateOrder & CreatePayment:

Diagram

Description automatically generated

Diagram

Description automatically generated

## UpdatePayment:

Diagram

Description automatically generated

Diagram

Description automatically generated

## ViewOrder & ViewPayment:

Diagram

Description automatically generated

Diagram

Description automatically generated

## DeleteOrder & DeletePayment:

Diagram

Description automatically generated

Diagram

Description automatically generated

# Follow Up Discussion on OO and design changes:

Designing a system utilizing UML diagrams, as we have, did help a lot in figuring out how everything is connected. Utilizing the differing UML diagrams throughout the assignment allowed me to see how everything that is gathered in the requirements turns into the different use cases, which then feeds into how you can break down those use cases to create your classes and your methods. All these things then roll together to create your sequence diagrams and you utilize those to show the states that the system goes through.

To update my system to allow for a third party, in this case a simple class called vendor, was very easy as I just incorporated their access into the user class. As all customers already utilize this class to interact with the system it was trivial to limit the User access and allow customers to do more.

# Change Control Document:

## Update 1.0.0

Updated Design Document to include Use Case Diagram and Use Case Specification sheets. Items placed under proper headings.

## Update 1.0.1

Updated Design Document to include Class Diagram. Diagram placed under Class Diagram heading.

Updated User Case Diagram to Rework Includes. New Diagram placed under Use Case Diagram heading. Change was implemented to show proper includes within software.

Use case for PaymentEntry Renamed to CreatePayment. New Specification sheet placed under PaymentEntry heading. Change implemented due to oversight in Use case name.

Use case steps in CreatePayment updated from using account database to utilizing payment class. Steps updated withing use case specification sheet. Change implemented to simplify classes.

## Update 1.1.1

Updated Design Document to include State and Activity Diagrams. Diagrams placed under State Transition and Activity Diagram heading.

## Update 1.2.1

Updated Design Document to include change log and Follow-up discussion. Portions placed under proper headings.

Updated Class Diagram to include system rework. Class Diagram placed Under Class Diagram Heading. Change implemented to show system class and interactions here-within.

Updated Headings to properly indicate sections following.

Updated steps within Use Case Specification sheets to properly reflect interactions between System, User, and SysData. Each updated specification was placed under proper heading. Changed implemented to show proper interactions with newly reworked class Diagram.

# Resources: