Information Systems Concepts

Tutorial: Online Shopping

Roman Kontchakov

Birkbeck, University of London

Based on Chapter 10 of Maciaszek, L.A.:
Outline

- Use Case Modelling
- Activity Modelling
- Class Modelling
- Interaction Modelling
Online Shopping: Background

- Buying computers over the Internet using the manufacturer’s web page
- Computers classified into servers, desktops and laptops
- Customer can select standard configuration or can configure their own configuration
  - For each new configuration, the system can calculate its price
- To place an order, the customer must fill in shipment and payment information
Online Shopping: Background (2)

- The system sends a confirmation e-mail message to the customer with details of the order.
- Customer can check the order status online at any time.
- Moreover, the system needs to:
  - verify the customer’s credentials and payment methods.
  - request the ordered configuration from the warehouse.
  - print an invoice.
  - request the warehouse to ship the computer to the customer.
Use Case Modelling
1. The customer uses the manufacturers online shopping web page to view the standard configuration of the chosen server, desktop or laptop. The price is also shown.

2. The customer chooses to view the details of the configuration, perhaps with the intention of buying it as is or to build a more suitable configuration. The price for each configuration can be computed on customers request.

3. The customer may choose to order a computer online or request a salesperson to contact them to explain details of the order, negotiate the price and so on before the order is actually placed.

4. To place an order, the customer must fill in the online form with shipment and invoice address and payment details (credit card or cheque).

5. After the customers order has been entered into the system, the salesperson sends an electronic request to the warehouse with details of the configuration ordered.

6. The details of the transaction, including the order number and the customer account number, are e-mailed to the customer so that they can check the status of the order online.

7. The warehouse obtains the invoice from the salesperson and ships the computer to the customer.
3. The customer may choose to order a computer online or may request a salesperson to contact them to explain order details, negotiate the price, etc. before the order is actually placed.

7. The warehouse obtains the invoice from the salesperson and ships the computer to the customer.
3. The **customer** may choose to order a computer online or may request a **salesperson** to contact them to explain order details, negotiate the price, etc. before the order is actually placed.

7. The **warehouse** obtains the invoice from the **salesperson** and ships the computer to the **customer**.

**NB:** The shipment process is **not** part of our system.
Step 2: Use Cases in the Requirements

3. The customer may choose to **order a computer** online or may **request a salesperson to contact** them to explain order details, negotiate the price, etc. before the order is actually placed.

7. The warehouse **obtains the invoice** from the salesperson and ships the computer to the customer.
Step 2: Full List of Use Cases in the Requirements

<table>
<thead>
<tr>
<th>no</th>
<th>actor</th>
<th>use case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Customer</td>
<td>Display Standard Configuration</td>
</tr>
<tr>
<td>2</td>
<td>Customer</td>
<td>Build Configuration</td>
</tr>
<tr>
<td>3</td>
<td>Customer, Salesperson</td>
<td>Order Computer Request Contact</td>
</tr>
<tr>
<td>4</td>
<td>Customer</td>
<td>Order Computer Verify &amp; Accept Payment</td>
</tr>
<tr>
<td>5</td>
<td>Salesperson, Warehouse</td>
<td>Inform Warehouse about Order</td>
</tr>
<tr>
<td>6</td>
<td>Salesperson, Customer</td>
<td>Order Computer Display Order Status</td>
</tr>
<tr>
<td>7</td>
<td>Salesperson, Warehouse</td>
<td>Print Invoice</td>
</tr>
</tbody>
</table>
Step 3: Use Case Diagram

- Display Standard Configuration
- Verify & Accept Payment
- Build Configuration
- Order Computer
- Request Contact
- Print Invoice
- Display Order Status
- Inform Warehouse about Order

Customer ➔ Warehouse ➔ Salesperson
### Use Case Description (1)

**Step 4:**

**Use Case Description**

see p. 3 of OnlineShoppingBackground.pdf

<table>
<thead>
<tr>
<th>Use case</th>
<th><strong>Order Computer</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief description</td>
<td>This use case allows a Customer to enter a purchase order. This includes providing a shipment and invoice address as well as payment details.</td>
</tr>
<tr>
<td>Actors</td>
<td>Customer</td>
</tr>
<tr>
<td>Preconditions</td>
<td>Customer points an Internet browser to the computer manufacturer’s order entry web page. The page displays the details of a configured computer together with its price.</td>
</tr>
</tbody>
</table>
| Main flow        | (1) The use case begins when the Customer decides to order . . .  
|                 | (2) The system requests the Customer to enter . . .  
|                 | (3) The Customer chooses the Purchase . . .  
|                 | (4) The system assigns a unique order number . . .  
|                 | (5) The system e-mails the order number and . . .  
| Alternative flows | (6) The Customer activates the Purchase function before providing all mandatory . . .  
|                 | (7) The Customer chooses the Reset function . . .  
| Postconditions  | If the use case is successful, the purchase order will be recorded in the system’s database. Otherwise, the system state remains unchanged.  

Activity Modelling

Order Computer
The use case begins when the Customer decides to order the configured computer by choosing the Continue (or similarly named) function when order details are displayed on the screen.

The system requests the Customer to enter purchase details, including name of the salesperson (if known), shipment details (customer name and address), invoice details (if different from shipment details), a payment method (credit card or cheque) and any comments.

The Customer chooses the Purchase (or similarly named) function to send the order to the manufacturer.

The system assigns a unique order number and a customer account number to the purchase order and stores the order information in the database.

The system e-mails the order number and customer number to the Customer, together with all the order details, as confirmation of acceptance of the order.

The Customer activates the Purchase function before providing all mandatory information. The system displays an error message and requests that the missing information be supplied.

The Customer chooses the Reset (or similarly named) function to revert to an empty purchase form. The system allows the Customer to enter the information again.
Step 5: Actions from Use Case Description

(3) The Customer chooses the Purchase (or similarly named) function to send the order to the manufacturer.

(4) The system assigns a unique order number and a customer account number to the purchase order and it stores the order information in the database.

(5) The system e-mails the order number and the customer number to the Customer, together with all order details, as the confirmation of the order’s acceptance.
Actions for the Use Case

(1) Display Current Configuration
(2) Display Purchase Form
(3) Store Order
(4) Display Purchase Form
(5) Display Purchase Form
(6) Display Purchase Form
(7) Display Purchase Form

- Get Order Request
- Get Purchase Details
- E-mail Order Details
- Get Purchase Details
Step 6: Activity Diagram for the Use Case

1. Display Current Configuration
2. Get Order Request
3. Display Purchase Form
4. Get Purchase Details
5. E-mail Order Details
6. Store Order

[complete]

[Incomplete]
Class Modelling
1. The customer uses the manufacturers online shopping web page to view the standard configuration of the chosen server, desktop or laptop. The price is also shown.

2. The customer chooses to view the details of the configuration, perhaps with the intention of buying it as is or to build a more suitable configuration. The price for each configuration can be computed on customers request.

3. The customer may choose to order a computer online or request a salesperson to contact them to explain details of the order, negotiate the price and so on before the order is actually placed.

4. To place an order, the customer must fill in the online form with shipment and invoice address and payment details (credit card or cheque).

5. After the customers order has been entered into the system, the salesperson sends an electronic request to the warehouse with details of the configuration ordered.

6. The details of the transaction, including the order number and the customer account number, are e-mailed to the customer so that they can check the status of the order online.

7. The warehouse obtains the invoice from the salesperson and ships the computer to the customer.
6. The details of the transaction, including the order number and the customer account number, are e-mailed to the customer, so that the customer can check the status of the order online.

7. The warehouse obtains the invoice from the salesperson and ships the computer to the customer.
Step 7: 
Entity Classes from Requirements

6. The details of the transaction, including the order number and the customer account number, are e-mailed to the customer, so that the customer can check the status of the order online.

7. The warehouse obtains the invoice from the salesperson and ships the computer to the customer.
Do we need the Shipment class if we know that the shipment is the warehouse responsibility and it is therefore out of the scope?

Is OrderStatus a class or an attribute of Order or Invoice?

Is Salesperson a class or an attribute of Order or Invoice?
## Entity Classes from Requirements

<table>
<thead>
<tr>
<th>no</th>
<th>entity classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Customer, Computer, (Standard Configuration)</td>
</tr>
<tr>
<td>2</td>
<td>Customer, ConfiguredComputer, ConfigurationItem</td>
</tr>
<tr>
<td>3</td>
<td>Customer, ConfiguredComputer, Order, (Salesperson)</td>
</tr>
<tr>
<td>4</td>
<td>Customer, Order, (Shipment), Invoice, Payment</td>
</tr>
<tr>
<td>5</td>
<td>Customer, Order, (SalesPerson), ConfiguredComputer</td>
</tr>
<tr>
<td>6</td>
<td>Order, Customer, (OrderStatus)</td>
</tr>
<tr>
<td>7</td>
<td>Invoice, (Salesperson), (Shipment), Computer, Customer</td>
</tr>
</tbody>
</table>
### Step 8: Attributes

#### Customer
- `customerName`: String
- `customerAddress`: String
- `phoneNumber`: String
- `emailAddress`: String

#### Order
- `orderNumber`: String
- `orderDate`: Date
- `shipAddress`: String
- `orderTotal`: double
- `orderStatus`: String
- `salespersonName`: String

#### Invoice
- `invoiceNumber`: String
- `invoiceDate`: Date
- `invoiceTotal`: double

#### Computer
- `computerName`: String
- `standardPrice`: double
Steps 9, 10: Associations

Customer

Order

Payment

Invoice

Computer

ConfigurationItem

ConfiguredComputer

1 0..*

1 1

1 1

1 1

0..1

0..1

0..*

0..*

1..*

1..*

0..*
Steps 11, 12: Class Diagram

- **Customer**
  - customerName: String
  - customerAddress: String
  - phoneNumber: String
  - emailAddress: String

- **Order**
  - orderNumber: String
  - orderDate: Date
  - shipAddress: String
  - orderTotal: double
  - orderStatus: String
  - salespersonName: String

- **Invoice**
  - invoiceNumber: String
  - invoiceDate: Date
  - invoiceTotal: double

- **Payment**
  - paymentMethod: String
  - dateReceived: Date
  - amountReceived: double

- **ConfigurationItem**
  - itemType: String
  - itemDescr: String

- **Computer**
  - computerName: String

- **StandardComputer**
  - standardPrice: double

- **ConfiguredComputer**
  - configuredPrice: double
Interaction Modelling

Display Current Configuration
VAIO® Desktops > RZ Series > Customized RZ40C

PCV-RZ40C Series

Price as configured:
$2997.99

Sony Recommends Microsoft® Windows® XP Professional.

Operating System

- Microsoft® Windows® XP Professional
- Microsoft® Windows® XP Home Edition [subtract $75.00]

Processor

- Intel® Pentium® 4 Processor 3.20 GHz with HT Technology - Maximum performance!
- Intel® Pentium® 4 Processor 3.0 GHz with HT Technology - Great value vs performance! [subtract $24.00]

Memory

- 2 GB
- 1 GB [subtract $190.00]
Operating System:
Microsoft® Windows® XP Professional

Processor:
Intel® Pentium® 4 Processor 3.20 GHz with HT Technology

Memory:
2 GB DDR-SDRAM (DDR400)

Hard Drive:
200GB UltraATA/100 Hard Drive (7200 rpm)

Additional Hard Drive:
No Additional Hard Drive

Graphics Card:
ATI RADEON™ 9800 (128MB VRAM)

Optical Drive:
DVD±RW Drive with Click to DVD™
Step 13: Sequence Diagram

Customer: CustomConfiguration

submit()

:getCurrentConf()

:getComputerName()

[For all items]

:Configuration

getDescr()

getPrice()

:ConfigurationSummary

display()
Step 14: Communication Diagram

Customer

1: submit

:CustomConfiguration

1.1: getCurrentConf

1.1.1: getComputerName
1.1.3: getPrice

1.2: new
1.3: display

:ConfigurationSummary

1.1: getCurrentConf

:Computer

1.1.2 *[For all items]: getItemDescr

:ConfigurationItem
Step 15: Operations

- CustomConfiguration
  - submit()

- ConfigurationSummary
  - display()

- Computer
  - computerName: String
  - getCurrentConf()
  - getPrice()

- ConfigurationItem
  - itemType: String
  - itemDescr: String
  - getItemDescr()
  - 0..*
  - 1..*

- ConfiguredComputer
  - configuredPrice: double

- StandardComputer
  - standardPrice: double
Take Home Messages

- Use Case Modelling
- Activity Modelling
- Class Modelling
- Interaction Modelling