

School of Applied Sciences  
Bachelor of Science in Computing

**COMP321 Information System Implementation  
Work Plan**Academic Year 2020/21   
2nd semester

|  |  |
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| Online Shopping Mall Project | |
|  |  |
| Project number: | Group 5 |
| Team members: |  |
|  |  |
|  |  |
| Supervisor: |  |
| Assessor: |  |
|  |  |
| Submission Date: | Feb 8, 2021 |

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# Introduction

The report will describe our work plan for the development of an online shopping website. Our main goal is to build an online shopping system, enabling customers to browse, select and purchase products in the mall, and the v to manage, maintain and process the purchase orders.

This section demonstrates two parts. The first part is an overview report and background investigation of the current Macao market. Secondly, the objectives and plans of the project will be described.

## Overview

The continuous progress of science and technology, mobile phones have become an indispensable technology product in human life. According to The Internet Usage Trends in Macau in 2020 by The Macao Association for Internet Research, the average time spent on The Internet in Macao is 4 hours per day, and the penetration rate of mobile phones is 94%, while the figure was only 46% in 2011 [1], which proves that mobile phones are becoming more and more popular. people tend to change their mobile phones more frequently, to follow the development of technology, users need a new phone to get the most convenient and latest functions.

In addition, shopping on the Internet has also become common because the Internet touches almost every corner around us. Customers can buy products anytime, anywhere through a browser on a PC or smartphone. Suppliers can also process orders or products online. The perfect market environment combined with advanced technology provides great opportunities for the retail industry. Especially in Macao, online sales can greatly reduce the cost of the rent. Therefore, the goal of our project is to establish a shopping platform for selling mobile phones. We provide any functions consumers need. For example, a consumer can add a product to a shopping cart and track its status. Suppliers can also manage orders and check fund transfer

The report is about the ECBuy online shopping center. The first part gives a brief introduction to the whole project. In the second part of this report, we will cover the background of the ECBuy project, as well as some of the rival research. Third, system design, namely data modelling and dynamic modelling. Fourth, the implementation of the system will be mentioned. Lastly, the end of the report will include the results and discussion, by presenting some project results and doing some testing of the system

# Product scope

The section below illustrates the 35 requirements distributed among 8 main function groups.

## Product scope

1. **[T1] Display product list**

We looked at different online shopping sites and found that they all share many of the same features, such as designing a list of products for customers to browse, the ability to search, the ability to filter products by brand or value, and the ability to display product images. Therefore, we also refer to them and their functions to design this website

1. **[T2] Login/register function**

According to requirements, users need to log in to an account when purchasing goods, while users without an account need to fill in basic information for registration (user name, password, email and address), and then can purchase goods after registration.

1. **[T3] Product Page**

When users click on a specific product, they can enter the detailed webpage of the product, where they can view more information about the product, such as pictures, inventory, functions, etc. Users can also purchase products here or add them to their shopping cart.

1. **[T4] Purchase Tracking**

Users can find these orders in the order list. By clicking on an order, Users can enter the order details page to view more status. For example, if an order has been shipped or cancelled, both the supplier and the user have the right to cancel the order.

1. **[T5] Order Processing**

Suppliers can also process orders through the system. The order list provides a record of each order for each customer. Suppliers can filter these orders by order status. By clicking on a record in the order list, the supplier can enter the detailed information page of a particular order. In the detail page, the supplier can ship the cancel order, hold the order, and then cancel the order before shipping.

1. **[T6] Add/delict product features**

The system also provides some functions for suppliers to maintain their products. Suppliers can browse the information of each product, create new products, modify the information and pictures of existing products, and delete certain products.

1. **[T7] Shopping cart**

Users can add favourite products to the shopping cart. In the shopping cart, customers can modify the quantity of each product, delete specific products, and then make a purchase.

1. **[T8] Advanced Function**

In order to improve the user experience, the project has some advanced features. For example, customers can rate and comment on products. For suppliers, they can also easily know which products are hot-selling and out-of-stock products. The notification function allows customers to easily know the status of the order.

## Process scope

Each main function includes one or more user requirements, will be discussed below. The details more detailed of the requirements of each main function

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| --- | --- | --- |
| Main functions | **[T1] Display product list** | |
| Requirements: | A1, A2, A3, A4, A5, A6, A7, C1, C6, B4 | |
| **Function** | **Action Name** | **Description** |
| A1 | Browse products | A customer may browse products in a list of products. The list shows basic information of products, including product name, brand, price and a thumbnail image. Each product belongs to one of the pre-defined brands. |
| A2 | Paging | The product list supports paging. The customer can navigate the product list by ‘page up’, ‘page down’ and jumping to a specific page. Paging works properly after applying a filter or sorting as listed below. |
| A3 | Filter | All products filtering by searching keywords will show on product list. |
| A4 | Searching | The customer may filter the product list by searching keywords in the product name. This function work correctly with the brand filter. |
| A5 | Sort by price | The customer may sort the product list by price. |
| A6 | Product detail page | The customer may select a product in the product list to go to the product detail page. The product detail page shows information for one product, which includes the product name, brand, price and a thumbnail image. In addition, the product detail page also shows detail description as a list of at least two properties. For example, the product detail page for a book may show authors, ISBN, publisher, release date and number of pages. |
| A7 | One or more detailed photographs | The product detail page supports display of one or more detailed photographs of the selected product. |
| C1 | Adds a product | The customer adds a product to his/her shopping cart by clicking a button in the product detail page. The quantity to buy is assumed to be 1. The items in shopping cart are persisted across user sessions. Next time the customer logs in, they can still see the items in the shopping cart. |
| C6 | Duplicate product | If the customer adds a duplicate product to the shopping cart, the application will give a warning message and does not change the content of the shopping cart. |
| B4 | Redirects | If a customer tries to add a product to the shopping cart on the product detail page without first logging in, the system redirects the user to the login page. After successful login, the system redirects the user back to the original product detail page. |

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| Main function | **[T2]Login/register function** | |
| Requirements: | B1, B2, B3, B5 | |
| **Function** | **Action Name** | **Description** |
| B1 | Register a new account | A customer may register a new account. They have to provide full name, email address, password and shipping address. After registration, the user is logged in automatically. |
| B2 | Log in and log out | A customer may log in and log out, and the interface shows the name of the current user. The product list and product detail page are accessible to customers without login. On the other hand, the shopping cart and purchase tracking are only accessible after login. |
| B3 | Change password | The customer can change password. There is strength requirement for password. The password should contain at least 6 characters, in which there must be at least one digit and one capital letter. |
| B5 | Hash values | The server only saves hash values of customers’ passwords. Passwords are never saved in plain text in the server. |

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| Main functions | **[T3] Product Page and [T6] Add/Delite product features** | |
| Requirements: | E1, E2, E3, E4, E5, E6, Z5 | |
| **Function** | **Action Name** | **Description** |
| E1 | Browse the product catalog | The vendor may browse the product catalog in an interface similar to product list for customers.. The vendor is not a customer, and no shopping cart or ‘add to cart’ button should be shown. |
| E2 | Vendor searching | The vendor can find products by searching keywords in product names. They can also find a specific product by entering a unique product ID. |
| E3 | Add a new product | The vendor may add a new product to the catalog. The vendor enters basic information of the product, including product name, brand, price and a thumbnail image. They can enter detail information of the new product as a list of properties. |
| E4 | Upload photographs | In addition to the thumbnail image, the vendor can upload 1 to 4 detailed photographs for a product. These photos are usually of higher resolution and are displayed in the product detail page in a user-friendly interface. (Refer to requirement A7) |
| E5 | edit information | The vendor can edit information of a product in a product detail page. They can change the product name and product brand. They can also change detail information as a list of properties. (Refer to requirement E3). |
| E6 | Add or remove photos | The vendor can change the thumbnail and detail photos for a product. They can add or remove photos |
| Z5 | Price change | Design how to implement price change of products. This is useful, e.g., for promotional price reduction or regular price adjustment. Price change should not affect the price in existing purchase order and other historical records. |

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| Main function | **[T4] Purchase Tracking** | |
| Requirements: | D1, D2, D3, D4, Z3, Z4 | |
| **Function** | **Action Name** | **Description** |
| D1 | Purchase tracking page | The purchase tracking page lists the purchase orders that the customer has placed. This page shows the following for each purchase order: the P.O. number, the purchase date, the total order amount and the purchase order status. The purchase orders are displayed in reverse chronological order of purchase date. When the customer clicks an entry in the list, they can see the detail in a purchase order detail page |
| D2 | Vendor filter | The customer can filter the list of purchase orders in two ways. First, the page only shows ‘current purchases’ with status ‘pending’ and ‘hold’. Second, the page only shows ‘past purchases’ with status ‘shipped’ and ‘cancelled’. |
| D3 | Purchase order detail page | The purchase order detail page shows the P.O. number, the purchase date, the customer name, the shipping address, the total order amount and the purchase order status. If the order is shipped, this page shows the shipment date. If the order is cancelled, the page shows the order cancel date and who (customer or vendor) cancelled the order. The page also includes, for each product in the purchase order, the product name, the quantity, the unit price and the subtotal. |
| D4 | Cancel the order | Before a purchase order is shipped, the customer can cancel the order. This can be done by clicking a button in the purchase order detail page. This action will change the status of the purchase order to ‘cancelled’. Note that this action is only available for purchase orders in the status ‘pending’ or ‘hold’. |
| Z3 | Customer’s rating | A customer can express their satisfaction with a product with customer’s rating. A customer who has purchased a product successfully can rate it on a scale of 1 to 5 stars after the purchase is shipped. The customer can only score the product once, and the product score is obtained by the average customer rating. |
| Z4 | Reviews for products | In addition to star ratings, customers also want to write short reviews for products in the shopping mall. |
| Main function | **[T5] Order Processing** | |
| Requirements: | F1, F2, F3, F4, F5, F6, F7, Z6 | |
| **Function** | **Action Name** | **Description** |
| F1 | Purchase order list page | The purchase order list page lists purchase orders received by the application. It shows the P.O. numbers, purchase dates, customer names, total order amounts and purchase order status. The purchase orders are sorted in descending order of purchase date (i.e. newest first). The vendor can click an entry to open a purchase order processing page. |
| F2 | Status | The vendor can filter the purchase order list in three ways. They can show only the ‘pending orders’ (with status ‘pending’). They can show only the ‘orders on hold’ (with status ‘hold’). Finally, the vendor can select to show ‘past orders’ (with status ‘shipped’ or ‘cancelled’). |
| F3 | Purchase order processing page | The purchase order processing page shows similar information as the purchase order detail page (refer to requirement D3). In addition, the vendor can click a button to ship a purchase order. This action changes the status of the purchase order from ‘pending’ to ‘shipped’ and starts the shipping process. |
| F4 | Purchase Order | The vendor can enter a P.O. number to view and process a specific purchase order. |
| F5 | Hold a purchase order | In the purchase order processing page, the vendor can click a button to hold a purchase order. This is useful, for example, if some product in the purchase order is temporarily out-of-stock. This action is only available when the status of the purchase order is ‘pending’, and this action changes the status to ‘hold’. |
| F6 | Hold and ship a purchase order | In the purchase order processing page, the vendor can click a button to unhold and ship a purchase order. This action changes the status of the purchase order from ‘hold’ to ‘shipped’ and starts the shipping process. |
| F7 | Cancel a purchase order | In the purchase order processing page, the vendor can click a button to cancel a purchase order. This is useful, for example, to inform the customer that the ordered products are no longer available. This action is only available for purchase orders in the status ‘pending’ or ‘hold’. This action changes the status of the purchase order to ‘cancelled’. |
| Z6 | Out-of-stock | Sometimes, a hot-selling product is ‘out-of-stock’. The vendor can mark a product as temporarily out-of-stock and customers can still place orders for such products, but the system should only be able to ship them when the vendor marks the products as in-stock later. |

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| Main function | **[T7] Shopping cart** | |
| Requirements: | C2, C3, C4, C5 | |
| **Function** | **Action Name** | **Description** |
| C2 | List the products | The customer can list the products in his/her shopping cart in a shopping cart page. In this page, the entry for each product shows the product name, price and the quantity to buy. The page also shows the total order amount (i.e. how much the customer has to pay in total) in the shopping cart. The customer can click an item in the shopping cart to go to the product detail page of the entry. |
| C3 | Check out | The customer can press a button in the shopping cart page to check out all items in the shopping cart. This action creates a purchase order with a newly allocated unique P.O. number, and clears the content of the cart. After checkout, the system shows the purchase order detail page of the newly created purchase order. (refer to requirement D3). |
| C4 | Change the quantity | The shopping cart page allows the customer to change the quantity of an item. This allows the customer to order more than one piece of a product (e.g. buy two copies of a book). |
| C5 | Remove an item | The customer can remove an item from the shopping cart. |

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| Main functions | **[T8] Advanced Function** | |
| Requirements: | Z1, Z2, Z6, Z7 | |
| **Function** | **Action Name** | **Description** |
| Z1 | Best-selling products | The vendor needs to analyze the sales of the products and find out the best selling products. The report measures sales by both sales quantities (number of items sold) and sales amount (the dollar amount received in sales). The default reporting period is the last 30 days, but the vendor may also customize the reporting period. |
| Z2 | Notification | Design a notification feature to make it to easier for a customer to track the change of status of purchase orders. For example, when the vendor ships a purchase order, the customer will receive a notification message. The interface should distinguish between read and unread notifications. |
| Z7 | Concurrency control | If the vendor and the customer change the status of a purchase order at almost the same time, the purchase order may result in an inconsistent state. Implement suitable concurrency control to prevent the invalid state change, e.g. pending -> shipped -> cancelled and hold ->cancelled->shipped. You will need to implement transaction in the database system.  Still don’t know |

## work-breakdown structure

|  |  |
| --- | --- |
| Analysis | Background study on the online shopping mall implementation of similar projects. |
| Collect detailed requirements |
| Design | Design the overall architecture. |
| Design database. |
| Design interfaces for web browsers. |
| Implementation | Develop interface templates for the supervisor to review |
| Create a site map or hierarchy chart showing the flow of web pages. |
| Create the individual web pages for the site. |
| Create database for the server-site modules. |
| Sprint for [T1]\* |
| Sprint for [T2]\* |
| Sprint for [T3]\* |
| Sprint for [T4]\* |
| Sprint for [T5]\* |
| Sprint for [T6]\* |
| Sprint for [T7]\* |
| Sprint for [T8]\* |
| Deployment | Install the web site on the internet. |

\* The detailed steps are described in Schedule

# Schedule

Since the date of our meeting is Wednesday, therefor the report that the start date of the week is Wednesday and the end date is Tuesday.

\*\* This table is the basic schedule, and Gantt chart will submit it before the next meeting.

|  |  |  |
| --- | --- | --- |
| Date | Task | Sub Task |
| Week 1  [before 2/10-2/16] | Background study on the online shopping mall implementation of similar projects.[2/10] |  |
|  | Collect detailed requirements.[2/10] |  |
|  | Design the overall architecture.[2/11] |  |
|  | Design database. [2/12-2/14] |  |
|  | Design interfaces for web browsers. [2/15-2/16] |  |
| Week2  [2/17-2/23] | Develop interface templates for the supervisor to review[2/7] |  |
|  | Create a site map or hierarchy chart showing the flow of web pages.[2/19] |  |
|  | Create the individual web pages for the site.[2/20] |  |
|  | Create database for the server-site modules. [2/21] |  |
| Week3  [2/24-3/2] | Sprint for [T1]Display product list\* | A1(Browse products) [2/24] |
|  |  | A2(Paging)[2/24] |
|  |  | A3(Filter)[2/24] |
|  |  | A4(Searching)[2/26] |
|  |  | A5(Sort by price)[2/26] |
|  |  | A6(Product detail page)[2/27] |
|  |  | A7(One or more photographs)[2/27] |
|  |  | C1(Adds a product)[2/28] |
|  |  | C6(Duplicate product)[2/28] |
|  |  | B4(Redirects)[3/1] |
|  |  | Flex time[3/2] |
| Week4  [3/3-3/9] | Sprint for [T2]Login/register function\* | B1(register a new account)[3/3] |
|  |  | B2(log in and log out)[3/4] |
|  |  | B3(change password)[3/5] |
|  |  | B5(hash values)[3/5] |
|  |  | Flex time[3/5-3/9] |
| Week5  [3/10-3/16] | Sprint for [T3]Product Page\* and Sprint for [T6]Add/delict product features\* | E1(browse the product catalog)[3/10] |
|  |  | E2(Vendor searching)[3/10] |
|  |  | E3(Add a new product)[3/12] |
|  |  | E4(hash values)[3/12] |
|  |  | E5(Upload photographs)[3/13] |
|  |  | E6(add or remove photos)[3/13] |
|  |  | Z5(price change)[3/14] |
|  |  | Flex time[3/15-3/16] |
| Week6  [3/17-3/23] | Sprint for [T4]Purchase Tracking\* | D1(Purchase tracking page)[3/17] |
|  |  | D2(Vendor filter)[3/18] |
|  |  | D3(Purchase order detail page)[3/19] |
|  |  | D4(Cancel the order)[3/20] |
|  |  | Z3(Customer’s rating)[3/21] |
|  |  | Z4(reviews for products)[3/22] |
|  |  | Flex time[3/23] |
| Week7  [3/24-3/30] | Sprint for [T5]\* | F1(purchase order list page)[3/24] |
|  |  | F2(Status)[3/24] |
|  |  | F3(purchase order processing page)[3/25] |
|  |  | F4(Purchase Order)[3/26] |
|  |  | F5(hold a purchase order)[3/27] |
|  |  | F6(hold and ship a purchase order)[3/27] |
|  |  | F7(cancel a purchase order)[3/28] |
|  |  | Z6(out-of-stock)[3/28] |
|  |  | Flex time[3/29-3/30] |
| Week8  [3/31-4/6] | Sprint for [T7]\* | C2(List the products)[3/31] |
|  |  | C3(Check out)[3/31] |
|  |  | C4(Change the quantity)[4/2] |
|  |  | C5(Remove an item)[4/2] |
| Week9  [4/7-4/13] | Sprint for [T8]\* | Z1(best selling products)[4/7] |
|  |  | Z2(notification)[4/7] |
|  |  | Z7(concurrency control to )[4/9] |
| Week10 [4/14-4/20] | Writing report[4/14-4/20] |  |
|  | Debuggin[4/14-4/20] |  |
| Week11 [4/21-4/27] | Presentation preparation[4/21-/27] |  |
| Week12 [4/28-5/4] | Flex time[4/28-5/4] |  |
| Week13 [5/4-5/7] | Final report (hard copy), Presentation slides (hard copy) |  |

# Job allocation

Job allocation is expressed by RACI matrix, A RACI chart is a simple matrix used to assign roles and responsibilities for each task, [milestone](https://www.teamgantt.com/blog/the-how-and-why-of-using-milestones-in-your-project-plan), or decision on a project. In this, RACI will express the mission role.

R = Responsible

A = Accountable

C = Consulted

I = Informed

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| --- | --- | --- | --- | --- | --- |
| Task | Sub Task | Ben | Chi | Tony | Responsible |
| Background study on the online shopping mall implementation of similar projects. |  | A,R | I | I | Ben |
| Collect detailed requirements. |  | C | A,R | I | Chi |
| Design the overall architecture. |  | A,C | I | R | Tony |
| Design database. |  | A,R | I | I | Ben |
| Design interfaces for web browsers. |  | R | C | C | Ben |
| Develop interface templates for the supervisor to review |  | R | A | C | Ben |
| Create a site map or hierarchy chart showing the flow of web pages. |  | C | R | A | Chi |
| Create the individual web pages for the site. |  | C,R | C | I | Ben |
| Create database for the server-site modules. |  | C,R | C | I | Ben |
| Sprint for [T1]Display product list |  | C,A | I | R | Tony |
|  | A1(Browse products) |  |  |  |  |
|  | A2(Paging) |  |  |  |  |
|  | A3(Filter) |  |  |  |  |
|  | A4(Searching) |  |  |  |  |
|  | A5(Sort by price) |  |  |  |  |
|  | A6(Product detail page) |  |  |  |  |
|  | A7(One or more photographs) |  |  |  |  |
|  | C1(Adds a product) |  |  |  |  |
|  | C6(Duplicate product) |  |  |  |  |
|  | B4(Redirects) |  |  |  |  |
|  | Flex time |  |  |  |  |
| Sprint for [T2]Login/register function\* |  | A,R | I | I | Ben |
|  | B1(register a new account) |  |  |  |  |
|  | B2(log in and log out) |  |  |  |  |
|  | B3(change password) |  |  |  |  |
|  | B5(hash values) |  |  |  |  |
|  | Flex time |  |  |  |  |
| Sprint for [T3]Product Page\* and Sprint for [T6]Add/delict product features\* |  | A,C | I | R | Tony |
|  | E1(browse the product catalog) |  |  |  |  |
|  | E2(Vendor searching) |  |  |  |  |
|  | E3(Add a new product) |  |  |  |  |
|  | E4(hash values) |  |  |  |  |
|  | E5(Upload photographs) |  |  |  |  |
|  | E6(add or remove photos) |  |  |  |  |
|  | Z5(price change) |  |  |  |  |
|  | Flex time |  |  |  |  |
| Sprint for [T4]Purchase Tracking\* |  | C | I | A,R | Tony |
|  | D1(Purchase tracking page) |  |  |  |  |
|  | D2(Vendor filter) |  |  |  |  |
|  | D3(Purchase order detail page) |  |  |  |  |
|  | D4(Cancel the order) |  |  |  |  |
|  | Z3(Customer’s rating) |  |  |  |  |
|  | Z4(reviews for products) |  |  |  |  |
|  | Flex time |  |  |  |  |
| Sprint for [T5]\* |  | A,R | R | I | Ben and Chi |
|  | F1(purchase order list page) |  |  |  |  |
|  | F2(Status) |  |  |  |  |
|  | F3(purchase order processing page) |  |  |  |  |
|  | F4(Purchase Order) |  |  |  |  |
|  | F5(hold a purchase order) |  |  |  |  |
|  | F6(hold and ship a purchase order) |  |  |  |  |
|  | F7(cancel a purchase order) |  |  |  |  |
|  | Z6(out-of-stock) |  |  |  |  |
|  | Flex time | A,C | R | R | Chi and Tony |
| Sprint for [T7]\* |  | C | A,R | R | Chi and Tony |
|  | C2(List the products) |  |  |  |  |
|  | C3(Check out) |  |  |  |  |
|  | C4(Change the quantity) |  |  |  |  |
|  | C5(Remove an item) |  |  |  |  |
| Sprint for [T8]\* |  | R | A,R | I | Ben |
|  | Z1(best selling products) |  |  |  |  |
|  | Z2(notification) |  |  |  |  |
|  | Z7(concurrency control to ) |  |  |  |  |
| Writing report[4/14-4/20] |  | A,C | R | R | Chi and Tony |
| Debuggin[4/14-4/20] |  | A,R | I | R | Ben and Tony |
| Presentation preparation[4/21-/27] |  | A,R | R | R | Chi and Tony |
| Flex time[4/28-5/4] |  |  |  |  |  |
| Final report (hard copy), Presentation slides (hard copy) |  | A,R | R | R | Chi and Tony |

# Reference

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| --- | --- |
| [1] | T. M. A. f. I. Research, “Internet Usage Trends in Macao,” The Macao Association for Internet Research, Macao, 2020. |