**INTRODUCTION**

**Xiaomi Corporation** is an electronic company which is its headquater is located in Beijing. Xiaomi produces and invests in smartphone, mobile apps, laptop and any other electronic devices and accessories. Xiaomi was founded in 2010 by serial entrepreneur Lei Jun who believes that high-quality technology does not need to cost a fortune. Xiaomi produce many products such as smartphone which run on their own version of Android MIUI firmware. Xiaomi operates on a vertically-integrated model that enables the company to sell hardware at cost or below in order to attract users and earn money by selling content.

The system that will be developed is an e-Commerce shopping cart system for Xiaomi Corporation. The system will be named as Xiaomi Shopping Cart System. The system can be used by user to buy products. User can choose products from the system, save the product to shopping cart and make a payment through the system. The user also can register as a member and login through the system in order to buy products. The system will be developed by using console application of C# language in Microsoft Visual Studio.

**Produce design specification for data structure explaining the valid operations that can be carried out on the structure (P1.1)**

1. **Identify all the attributes and their data types involved in the system.**

|  |  |  |
| --- | --- | --- |
| **Data Description** | **Type** | **Attributes** |
| Product’s name | String | itemname |
| Product’s code | Int | itemcode |
| Price of products | Double | price |
| Quantity of products | Int | quantity |
| Subtotal of cart | Double | Subtotal |
| Total price | Double | totalprice |

1. **Define all the classes and methods involved in the system.**

|  |  |
| --- | --- |
| **Classes** | **Method** |
| item | None |
| Method | getdata() |
|  | update\_data() |
|  | Sort() |
|  | find\_data() |
|  | deleteData() |

1. **Choose appropriate Data Structure and explain how it could be implemented to the system.**

The data structure that will be implemented in system which is Xiaomi Shopping Cart System is **Arraylist**. Arraylist can be defined as data structure that is used to store the temporary values. Arraylist is a dynamic array which is it can store any data type such as string, int, double and so on because it can accept any values as an object. With Arraylist class, new item can be saved into a list, insert items inside a list, arrange items of a list, check the availability of an items in a list and remove items from the list. Arraylist class is defined in the System.Collections namespace.

As Arraylist is a dynamic array, so it will be implemented in the system. It is because it will be used to add products data into list, sort products into a list by using product code, search products in a list and delete products in a list. There are few methods of Arraylist that will be used in the system which is Add, Sort, Search and Delete.

1. **Add**. There are two method for **Add** that can be used to **add data into arraylist** which is **Arraylist.Add** and **Arraylist.AddRange**. The method that will perform this add function in the system is **Arraylist.Add**. The data that will be added into arraylist are itemname, itemcode, price, quantity, subtotal and totalprice. All of these data will be stored into Arraylist as temporary data.
2. **Sort data**. Arraylist also can be used to sort data in the system. Arraylist has method **Arraylist.Sort** to sort data. However, the system will use other algorithm to sort data which is **Mergesort algorithm**. The data that will be sorted in the system is the products that has been select by customer.
3. **Search data**. Arraylist also will be used to search for the data in the system. Arraylist will allow the system to go through one by one data to access the requested data from the users. Customer that want to find a product in the system, they have to enter product code and then the system will display the product include its details.
4. **Delete data**. Arraylist also will be used to delete data in arraylist. There are two method for delete which **Arraylist.Remove** and **Arraylist.RemoveAt**. The method that will be used in the system to delete the data is **Arraylist.Remove**. The customer can delete the product in the shopping cart by searching for product code.
5. **Produce a complete pseudocode for all the methods in the identified classes.**

**Method Add**

Method getdata

Start

Do

Prompt"-PLEASESELECT CATEGORY PRODUCTS-"

Prompt "A - MI PHONES"

Prompt "B - SMART DEVICES"

Prompt “C - AUDIO"

Prompt "Category code: "

Read input as categoryCode

If categoryCode == “A”

Prompt"-----MI PHONES----"

Prompt "PLEASE SELECT PRODUCT"

Prompt “CODE PRODUCT NAME PRICE"

Prompt “1000 POCOPHONE RM1,199.00"

Prompt “1001 Mi Max 3 RM1,079.00"

Prompt “1002 Mi 8 Lite RM999.90"

Prompt “PRODUCT CODE: "

Read input as itemcode

if itemcode == 1000

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “POCOPHONE”

price = 1199.00

Calculate totalprice = 1199.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 1001

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Mi Max 3”

price = 1079.00

Calculate totalprice = 1079.00 0 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 1002

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Mi 8 Lite”

price = 999.90

Calculate totalprice = 999.90 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else

Prompt “INVALID CODE"

End if

End if

Else If categoryCode == “B”

Prompt"----- SMART DEVICES----"

Prompt "PLEASE SELECT PRODUCT"

Prompt “CODE PRODUCT NAME PRICE"

Prompt “2000 Xiaomi Mi Dashcam RM249.00"

Prompt “2001 VR Play RM256.00"

Prompt “2002 Xiaomi Mi Band 2 RM82.00"

Prompt “2003 Mi Sphere Camera Kit RM1,099.00"

Prompt “PRODUCT CODE: "

Read input as itemcode

if itemcode == 2000

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Xiaomi Mi Dashcam”

price = 249.00

Calculate totalprice = 249.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 2001

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “VR Play”

price = 256.00

Calculate totalprice = 256.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 2002

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Xiaomi Mi Band 2”

price = 82.00

Calculate totalprice = 82.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 2003

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Mi Sphere Camera Kit”

price = 1099.00

Calculate totalprice = 1099.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else

Prompt “INVALID CODE"

End if

End if

Else If categoryCode == “C”

Prompt"----- AUDIO----"

Prompt "PLEASE SELECT PRODUCT"

Prompt “CODE PRODUCT NAME PRICE"

Prompt “3000 Mi Bluetooth Speaker RM80.00"

Prompt “3001 Xiaomi Mi Headphones Comfort RM185.00"

Prompt “3002 Mi Pocket Speaker 2 RM98.00"

Prompt “PRODUCT CODE: "

Read input as itemcode

if itemcode == 3000)

Prompt “Please enter quantity: "

Read input as quantity

Itemname = Mi Bluetooth Speaker”

price = 80.00

Calculate totalprice = 80.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 3001

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Xiaomi Mi Headphones Comfort”

price = 185.00

Calculate totalprice = 185.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else if itemcode == 3002

Prompt “Please enter quantity: "

Read input as quantity

Itemname = “Mi Pocket Speaker”

price = 98.00

Calculate totalprice = 98.00 \* quantity

Prompt Total Price of the products

Calculate Subtotal = Subtotal + totalprice

Save quantity, Itemname, price, totalprice, Subtotal into Arraylist

End if

else

Prompt “INVALID CODE"

End if

End if

Else

Prompt “INVALID CODE"

End if

Prompt “CONTINUE SHOPPING? (Y/N): "

Read choice

If choice == “Y”

Repeat Do

End if

Else

Repeat to Menu

End if

End

**Method Update**

Method update\_data()

Start

Prompt "-UPDATE ITEM QUANTITY-"

Prompt “Item code: "

Read itemcode

if itemcode available in Arraylist

Prompt itemname

Prompt price

Prompt quantity

Prompt “New Quantity:”

Read newquantity

Replace quantity to newquantity

Save newquantity in Arraylist

Calculate totalprice = newquantity \* price

Save totalprice in Arraylist

End if

End

**Method Search**

Method findData()

Start

Prompt “SEARCH ITEM-"

Prompt “Item code: "

Read itemcode

if itemcode available in Arraylist

Prompt itemname

Prompt price

End if

End

**Method Sort**

Method Sort()

Start

Prompt "Shopping Cart”

Prompt itemcode, itemname, price, quantity

Prompt subtotal

End

**Method Remove**

Method deleteData()

Start

Prompt “DELETE ITEM-"

Prompt “Item code: "

Read itemcode

if itemcode available in Arraylist

Prompt itemname

Prompt price

Prompt quantity

Prompt “DELETE ITEM? (Y/N): "

Read choice

If choice == "Y"

Remove data in Arraylist

Prompt “DATA HAVE BEEN REMOVED“

End if

End if

End

**Explain the operation and performance of sorting and search algorithms.(P1.2)**

* **Explain how these basic operations are implemented on the data structures:**

1. **Add**

In Xiaomi Shopping Cart System, the basic operation which is add will be implemented. It will be used to add data into arraylist. The method that will be used is Arraylist.Add(). The system will prompt user to enter code of products that they want and also the quantity of products and then the system will save the data of the products into arraylist. Arraylist for this operation is working as shopping cart where the many items can add to shopping cart and will proceed with payment for all products. The data such as item code, item description, quantity and item price will be stored in arraylist, so that it will be used for other operation.

1. **Delete**

Delete is one of the basic operations that will be implemented in the system. It will be used to delete the data from arraylist. The method that will be used in the system is Arraylist.Remove(). In the system, it will prompt user to enter item code of the products that users want to delete. The system will access the arraylist to look for the data of the product. Then, if the system found the data, the system will remove all the data of the products from arraylist. The data that will be removed are item description, quantity and item price.

1. **Search**

Another basic operation that will be implemented in the system is search. It will be implemented to ease user to search for the data in arraylist. The system will prompt user to enter code of the items. The code must be correct. Then, the system will search the data of the item code in arraylist. The system will access the arraylist one by one to look for the data. If the data has been founded, it will display the all the data such as item description, quantity and item price of the item code that is requested by users.

1. **Sorting**

Sorting is another basic operation that will be implemented in the system. Sorting is used to sort the data in arraylist in correct order whether in ascending order or descending order. In the system, it will sort the products that has been stored in arraylist in ascending order by item code and displayed it in table. The algorithm for sorting that will be used in the system mergesort algorithm.

**Explain the operation of** **recursive algorithms and identify situation when recursions are used. (P1.3)**

* **Identify the situation of recursion used in the system.**

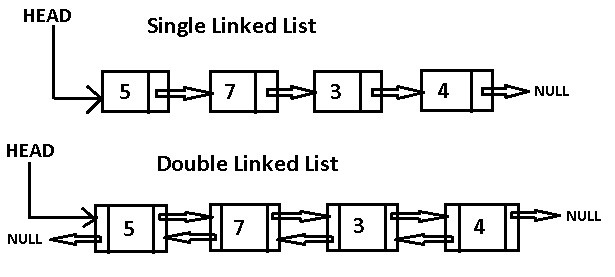
Recursive algorithm is an algorithm that calls itself with smaller input values. Basically, recursive has two specifications which is it calls itself many times until being satisfied. Recursive method also has parameter(s) and calls itself with new parameter values. Recursive is powerful and simple approach for complicated developments. However, it can worsen performance because of using call stack again and again. Recursive algorithm will be used in the Xiaomi Shopping Cart system. It will be used to sort products in the shopping cart of the system. The system will sort the products in the shopping cart by using code of products in ascending order. It is because the code of the product is unique number which it has different kind of code for each product.

* **Explain the operation of identified recursive algorithms in the system.**

The recursive algorithms that will be used in the system is merge sort. Merge sort is classified as a divide and conquer sort. Merge sort breaks the data into small data sets, sorts those small sets and merges the result in sorted list together. Basically, merge sort is usually more efficient than linear sorts because of it break the list in half repeatedly. In the system, merge sort will divide the first items in the two lists and places the lower of the two in the new list. One of the original lists now has a new lowest value and this is again compared with the lowest of the other list and the lower of the two placed next in new list. This process is repeated until one of the lists is exhausted. Then, the remaining values from the other list are placed in order in the new list and merge is completed. It is a divide and conquer algorithm and has a recursive version.

**Suggest the alternative data structure and how it could be implemented to the system. (M1.3)**

The alternative data structure that can be implemented in the Xiaomi Shopping Cart System is **Linked list**. Linked list is a data structure that is used for collecting a sequence of objects. Linked list allows efficient addition, removal and retrieval of elements from any position in the sequence. Each record of a linked list is often referred to an element or node. The field of each node that consist the address of the next node is usually called the next link or next pointer. The head of a list is its first node and the tail is the last node. Linked list can be divided into 2 which is singly Linked list and doubly linked list. In singly linked list, the nodes only link to the next element in the list. A single linked link is null terminating mean that when the pointer is null, the list is finished. For doubly linked list, each node consists a reference to the previous node and the next node except for the head or tail node. Each node in doubly linked list has a value property.

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=2ahUKEwix0ae-6vfgAhVU6XMBHVyMCCEQjRx6BAgBEAU&url=https%3A%2F%2Fmedium.com%2Fjourney-of-one-thousand-apps%2Fdata-structures-in-the-real-world-508f5968545a&psig=AOvVaw02JdBS0KiMUHloamsTydGe&ust=1552316146079646)

**Diagram 1.0**

There are few methods in Linked List that can be applied in the Xiaomi Shopping Cart System. The method is Add to list, Delete from list, Find list and Display linked list. For **Add to list** method, there few types of the method which is Add to First list, b. Add to Last list, Add After and Add before. Add to first will be applied in the system to add data of the product at the first node in the list. The syntax that can be used in the system for this method is **Linkedlist\_name**.AddFirst (**object**).

The other method of Linked list that can be applied in Xiaomi Shopping Cart System is Delete from list. There are few methods of delete from list method which is Delete the First list, Delete to Last list and Delete the any data in list. The method that can be applied in the system is Delete the any data in list because this method allow user to delete any data in the list. User can delete any products in the shopping cart by enter the product code. The syntax of this method that will be used in the system is **Linkedlist\_name**.Remove (object).

The other method that can be used in the system is Find list. This method is used to find data in the list. The system will prompt user to enter product code. If the product code is match to the product code in the list, the system display the data of the products. The syntax that of this method that will be used in in the system is **Linkedlist**.Find(object).

The other method that can be used in the system is Display linked list. This method is used to display all the data in the list. The system will display all the product that has been saved in list. The syntax that will be applied for this method is Display(**Linkedlist\_name**).

**Justify the specification of the classes and methods applied. (M2.5)**

Based on the question of P1.1, there are 2 classes that has been identified. The classes are **item class** and **method class**.

**Item class** is identified to be used to declare the data type of the attributes of the products. The attributes are itemcode, itemname, quantity, price, totalprice and subtotal. All of these attributes are the data of products. It is declared in a class to make it public attributes. As all the data will be used in every method in the system, declare the attributes as public will make it flexible to be used in every method. The data also will be used to be stored in arraylist and easy to be accessed by the system.

Another class in the system is **method class**. Method class is a class that run all the method for the system. This class is very important because all the coding of the calculation in the system is written in this class. In this class also, there are few methods that is implemented in the system to make the system function well. The method will include all the calculation and function of the system. In this class, the item class will be declared as protected arraylist because the attributes in the item class will be used in method class and the data of the attributes will be saved in arraylist in this class. Arraylist will store all the important data of attributes so that the data can be used for any other method in the method class.

The methods that has been applied in the method class are Add, Remove, Sort, Search and Update. The method **Add** will be applied in the system to add and store data of the products in arraylist. This method is applied to store the important data in arraylist. The system will prompt customer to enter the code of product that they want to buy and then, all of the data related to the code such as code of the product, the products’ name, quantity of products, price of the products, the total price of products and grand total will be stored in the arraylist which is shopping cart, so that it can be used and accessed by other method in the system.

The other method that will be applied in method class is **Remove.** This method is used to delete the data in arraylist. The data such as code of the product, the products’ name, quantity of products, price of the products, the total price of products and grand total in arraylist can be removed by the system using this method. This method is used in the system to ease user to delete the product from shopping cart that they do not want to buy. In this method, system will prompt user to enter code of product that they want to delete and the system will delete the products details from the shopping cart in the system.

The other method that will be applied in the method class in the system is **sort**. Sort is a method used to sort data in arraylist. For this system, sort will be used to sort the products in the shopping cart by using code. This system will use mergesort algorithms to sort the data. This method will ease user to look at the shopping cart in correct order of code. All the product will be sorted in ascending order. So, user can look one by one of the products from the lowest code of the product to the highest one.

The other method that will be applied in the system is **search**. Search is method to find data in arraylist. This method will be used to find data that has been added to shopping cart. User have to enter the code of products to search for the product. The product code must be correct to make sure that the system found the right product in arraylist. Then, the system will display the data such as item description, quantity and item price of the related product code if the system found the data. This method help user to check whether the item that they want to buy has been included in the shopping cart or not.

The last method that will be used in the system is **update**. Update method will be implemented in the system to make the system flexible where user can update the quantity of the product. The method will use replace method in order to update the quantity. The system will prompt user to enter code of product that they want to update. The system will display the item description, quantity and item price of the products. Then it will prompt user to enter new quantity of the products and the system will replace the current quantity to the new quantity.

**Demonstrate the design to the client in a visualized form to show the flow of the system and explain the demonstrated design. (M3.3)**

4.

3.

2.

1.

If user

answer Y

repeat the

process

8.

4.

7.

5.

If user

answer Y

repeat the

process

4.

6.

If user

answer Y

repeat the

process

Diagram 2.0: Flow of the system

1. Based on diagram 1.0 above, the system will start with Menu which is it displays option for customers.
2. First of all, customer has to choose option A which is register customer. Customer has to register if they want to buy product. In this option, system will prompt customer to enter their details such as Username, Name, Address and Phone No. After register, the system will automatically back to the Menu.
3. Then, customer can choose option B to buy product. In this option, there are 3 categories of products that customer can choose. The system will prompt customer to enter code of one of the categories.
4. Then, the system will display a list of products that related to the categories. It displays the products’ code, products’ name and products’ price. Then, the system will prompt customer to enter product code and the quantity of the products that they want to buy. Then, the system will display the total price of the product and add the chosen product and quantity into shopping cart. Then, the system will prompt customer whether they want to continue shopping or not. If user enter Y, the system will repeat the process from the categories of products menu. If customer enter N, the system will display the Menu option.
5. Then, the customer can choose option C from the Menu. This option is to search products in shopping cart. In this option, system will prompt customer to enter items code that they want to search. If the code is match to the code in the shopping cart, the system will display the product details such as product description, price of the product and the quantity of the products. Then, the system will go back to the menu and prompt customer to enter another option.
6. The next option that customer can choose is option D. This option is view shopping cart where it will display all the products that customer has choose in option B. it also will display the subtotal of all the products. Then, the system will display back the Menu option.
7. Next, customer can choose option E which is update shopping cart. This option will prompt user to update the quantity of the product in the shopping cart that they want by entering new quantity. After customer enter the new quantity the system will replace the current quantity to the new quantity. Then, the system will display back the Menu option.
8. The other option that customer can choose is option F where customer can remove products from shopping cart. The system will prompt customer to enter the product code that the customer wants to remove. If the code match to the code of products in shopping cart, the system will delete the products and its details from the shopping cart. Then, after the product has been removed, the system will back to the Menu.
9. The last option that customer can choose is option G. If customer enter this option, the system will exit.

**Discuss the benefits of this proposed program and how it can help the company to gain profit. (D1.4)**

There are many benefits of this system that can help the company to gain profit. One of the benefits is **it will ease customer to buy products**. This system is a ecommerce shopping cart system. So, it will be used over the Internet. With the existence of this system toward Xiaomi company, it will make the process of the selling and buying become easier and also will lead the company to gain more profit. It is because the system will ease the company to sell their products through online and at once, it also will ease the customer to buy the product from their company. Customers only have to access the system via Internet to look for the products that the company sell and they can just click on the products they want to buy. This will ease customer because they do not have to go out to the physical store the buy the product and they also can save their time. When the system eases the customer to buy the products, there will be possibilities for the customer to buy again from the system and this will help the company to gain more profits.

The other benefit of this proposed program is **it will enhance the company performance**. Since the system will be used through online, it will help the company to enhance their performance. This is because the system will help the company to handle customer order efficiently. When customer make order through the system, the data of customer’s order will be store in the database which is the company can track all the order and help them to complete the order easily. It is easy because they do not have to meet the customer face to face and make them waiting for workers to look for the product in the inventory. When the order can be completed easily and efficiently, it will enhance the company performance and this will gain customer satisfaction with their services. When customers satisfy, it will lead them to buy more through the system and it can help the company to gain more profits.

The other benefit of this proposed program is it can **save the yearly expenses of the company**. Since the company will used the system to take the order the of customer, it can help the company to save the yearly expenses of the company. It is because by using the system, the company can reduce the cost of hiring employee. Nowadays, the cost to hire an employee is very expensive because the company has to pay salary to the employee. If the company has 20 employees, the company have to pay the salary to the 20 employees and this will take much cost. Compared by using system, the company does not have to expense higher cost to implement the system. The implementation of the system does not as high as paying 20 employee every month. This will cut a lot of cost and can save the company yearly expenses. This will automatically help the company to gain more profits by cutting off the cost of hiring employee because the profit that the company gain does not need to pay to the employee.

The last benefit of this proposed program is **it can enhance the products market all over the world**. Since the system is an ecommerce shopping cart system, it must be accessed through the internet. So, it can be accessed by people all over the world. From this, it shows that the company will automatically sell their product and market their products to all over the world. This will help the company to gain more customers from different country. People from other country can buy the product from the company only through this system which can be accessed via Internet. It will ease them to buy the product as they do not have to look for the physical store and also save their time as they can accessed the system from their country. Thus, from this it will help the company to gain more profits as their product will be market to worldwide via Internet.

**Produce an appropriate project plan to show the activities of the development process from the beginning until the system is endorsed by the client and justify the activity in the project. (D2.3)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Date** | | | | | **Days** |
| 11/02/2019 - 23/02/2019 | 24/02/2019 – 11/03/2019 | 11/03/2019 – 31/03/2019 | 01/04/2019 – 04/04/2019 | 05/04/2019 – 08/04/2019 |
| Requirement Analysis |  |  |  |  |  | 12 |
| Design |  |  |  |  |  | 15 |
| Development |  |  |  |  |  | 20 |
| Testing |  |  |  |  |  | 4 |
| Maintenance |  |  |  |  |  | 3 |

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwi04LHyyfTgAhWb7XMBHU_QCs4QjRx6BAgBEAU&url=https%3A%2F%2Fxbsoftware.com%2Fblog%2Fsoftware-development-life-cycle-waterfall-model%2F&psig=AOvVaw1X3BrELzdbQNl3n0CyxFyt&ust=1552204284468012)The Gantt Chart above is to show the visual view of the schedule on the duration of system development. Gantt Chart shows what task that need to be done on a specific day in schedule form.

1. **Requirement analysis**

The development process of Xiaomi Shopping Cart System will use Waterfall model as the process in order to develop the system. The first phase in order to develop the system is requirement analysis.This phase will be conducted in 12 days from 11th February 2019 until 23rd February 2019. In this phase, developer will conduct analysis to find out the requirement that must be included in the system. The developer will conduct an observation through official website of Xiaomi Corporation to look for the data and function that should be included in the system. Then, the developer also will decide how long the system should be develop and decide the right software and hardware that should be implemented. In this phase also, developer also have to decide the data structure, method and classes that will be implemented in the system. After analyse, the Xiaomi Shopping Cart system will be conducted within 2 months. Then, the software that will be used in order to develop the system is Visual Studio 2005 and hardware that will be used is HP laptop. The data structure that will be used in the system is Arraylist. While the class in system are Item Class and method Class. Then the method in this system Add(), Remove() Sort() Search(), update() and Update().

1. **Design**

The other in this development process is design. This phase will be conducted 15 days from 24tn Feruary 2019 until 11th March 2019. In this phase, developer has to design the flow of the system and the pseudo code. The developer has to design the flow of the system correctly to make sure that the system will be developed perfectly. It also to show flow of the function in the system. The flow of the system will be designed by using Microsoft Visio. Also, pseudo code is created to show the flow of the system and method that will be used to make sure the system functioning well. It also shows the rough coding of the system which will ease developer to develop the system by following the pseudo code during the implementation phase.

1. **Development**

Development is of one the phase in development process of the system. This phase will be conducted 20 days from 11th March 2019 until 31st March 2019. In this phase, the system will be developed. It will be developed by using Microsoft Visual Studio 2005. It will be developed by following all the identified requirement in requirement analysis phase. It also will be developed by following the flow of the system and pseudo code that has been designed in design phase.

1. **Testing**

Then, the other phase in development process is testing phase. This phase will be conducted in 4 days from 1st April 2019 until 4th April 2019. This phase will be conducted after development phase because this phase is used to test the system after the system is fully develop. The purpose of this phase is to test whether the developed system is fully functioning or not. It also to test the calculation in the system whether it is correct or not. It also to see whether the system meet all the requirement that has been analyse or not. The system will be tested to see whether the actual result of the system is same as the expected result. If the system is not meet all the requirement the developer has to repair or add the features in maintenance phase to make sure that the system is complete and meet all the requirement.

1. **Maintenance**

Last phase in development process is maintenance phase. This phase will be conducted in 3 days from 5th April 2019 until 8th April 2019. This phase will be conducted to maintain the system performance and also to enhance the performance of the system. Conducting this phase is to make sure that the system will always function and the performance of the system is always good. It also is conducted to fix the minor defects of the system during the testing phase. If there is problem in the testing phase such the calculation in the system does not meet the correct answer, the developer has to fix the problem in this phase. Other than that, if the client wants to modify or add new features in the system, the developer has to make it in this phase.

**Discuss the** **impacts if** **the data collections and the implementation design is not conducted properly. (D3.2)**

There are few impacts if data collections and implementation design is not conducted properly. One of the impacts is **the** **system may be not completely and perfectly developed**. Data collections and implementation design is the most important thing to do before the system will be produce. Data collection such as interview and observation must be conducted to gain the important information such as requirement regarding the system that will be developed. While implementation design is required before the system will be developed to show the flow of the system and make it easy for the developer to create the system by following the flow of the system. If the data collections and the implementation design is not conducted properly, the system may be will not completely and perfectly develop. It is because the developer does not gain a complete information and requirement of the system from the data collection. Also, the developer cannot develop a complete system as the implementation design does not conducted properly. It is because developer does not know and identify the correct and complete flow of the system. Thus, system may be not completely and perfectly developed if data collections and implementation design is not conducted properly.

The other impact is **the duration to develop the system will be longer than the expected duration**. if the data collections and implementation design is not conducted properly, it may take longer time than the expected duration to develop a complete system. Data collection and implementation design is very important to make sure that the system will be developed in the estimated time. If developer does not conduct data collection such as observation and interview and also implementation design, developer may face many problems. The developer may confuse about the flow of the system and do not know what they need to implement in the system to make sure that the system is developed perfectly. This may take much longer duration for developer to develop the system because developer has to go back and repeat the data collection to collect the correct data and also implementation design to make the correct flow of the system. The developer also may have to repair the system that has been developed to make sure that the system is same as new data collection and flow of the system. Thus, this will take high duration to develop the system compared to the estimated time.

The last impacts if the data collections and the implementation design is not conducted properly is **the developers may face many problems during the implementation of the system**. Data collections and implementation design is very important to make sure that the developer do not have any problem during the implementation of the system and develop the system smoothly. If the developers do not conduct the data collections and implementation design properly, they may face many problems. Data collection is important because from the data collection the developer have to decide the hardware and software that they will use in order to develop the system. If they do not decide the suitable hardware and software, they may face problem such as corruption during the implementation of the system because the software to develop the system may not suitable to develop the system as mostly different system will need different software to develop it. Also, hardware plays the important role in developing the system. If data collection is not conducted properly, the developer may not use suitable hardware that is compatible with the software and this may lead to the serious problem that will faced by the developer. Then, the developer also may face problem where they will confuse with the flow of the system if they do not conduct the implementation design properly. Thus, if the data collections and the implementation design is not conducted properly, it will lead to the problem during the implementation of the system.