

An-Najah National University
Faculty of Engineering
Computer Engineering Department

Electronic Commerce Via Internet & Mobile

Project Documentation

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Introduction

Project story:

After approval of department family, we started execution of the project in September 2007, after total study of all project needs in the summer course.

Work in the project continued with maximum power during 4 month, this enabled us to deliver our project ready at the start of December 2007.

Why e-commerce?

Electronic commerce or (e-commerce) is not a new name in the world of IT. But still one of the main fields that reserve a good portion of the world of technology, especially World Wide Web. E-commerce is a leading field in IT, simply because it means money, which is everything in the 21st century world.

Why both, Internet & mobile

As we said above, e-commerce is leading, so it is not static. Everyday we can notice an improvement in electronic commerce in many directions; either about objects offered, paying method, or even shopping method.

There are sub-vocabulary under the keyword E-commerce, you can see M-commerce which means mobile phone commerce, or even called u-commerce.

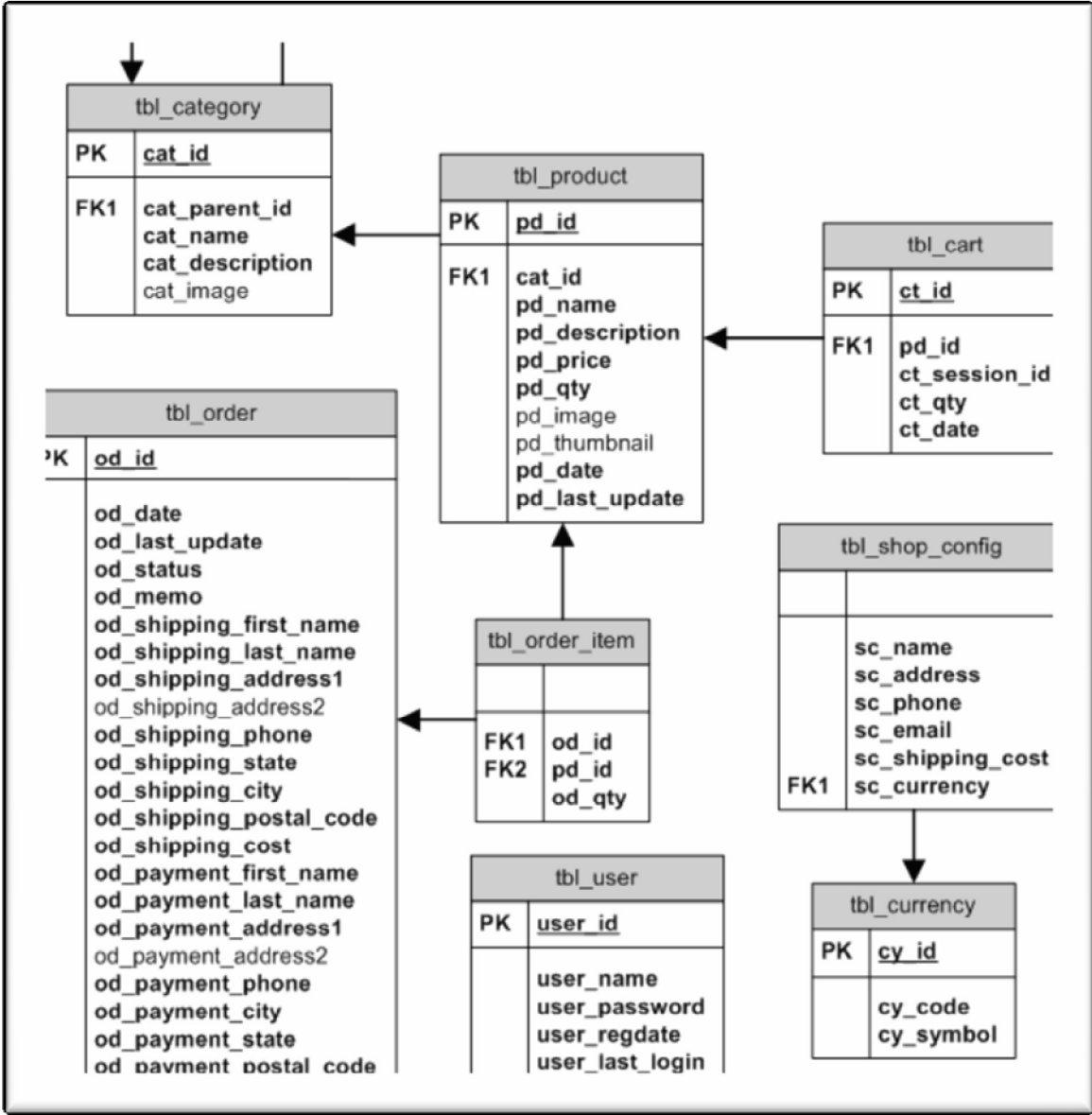
So, we tried to provide a good business solution, that can be applied for a respective company to enable this company to provide best solutions for comfort ability of their customers.

So, if the customer is not using his PC now, easily use that plastic box from your pocket and use it!

What target we aimed before and while

1. To try to provide a complete package of software that is suitable to be applied in our Palestinian life, taking in care ratio of un-learnt people, level of technology available.
2. Applying main topics of software engineering like reliability , security.
3. Get good experience in developing a total package of software.
4. Learn the max we can of programming and development tools that we never used in our studies ,like J2ME, CSS, Ajax and Flash.

Database Design



Main Project Description

J2ME /WAP-GPRS enabled

Internet connected PC

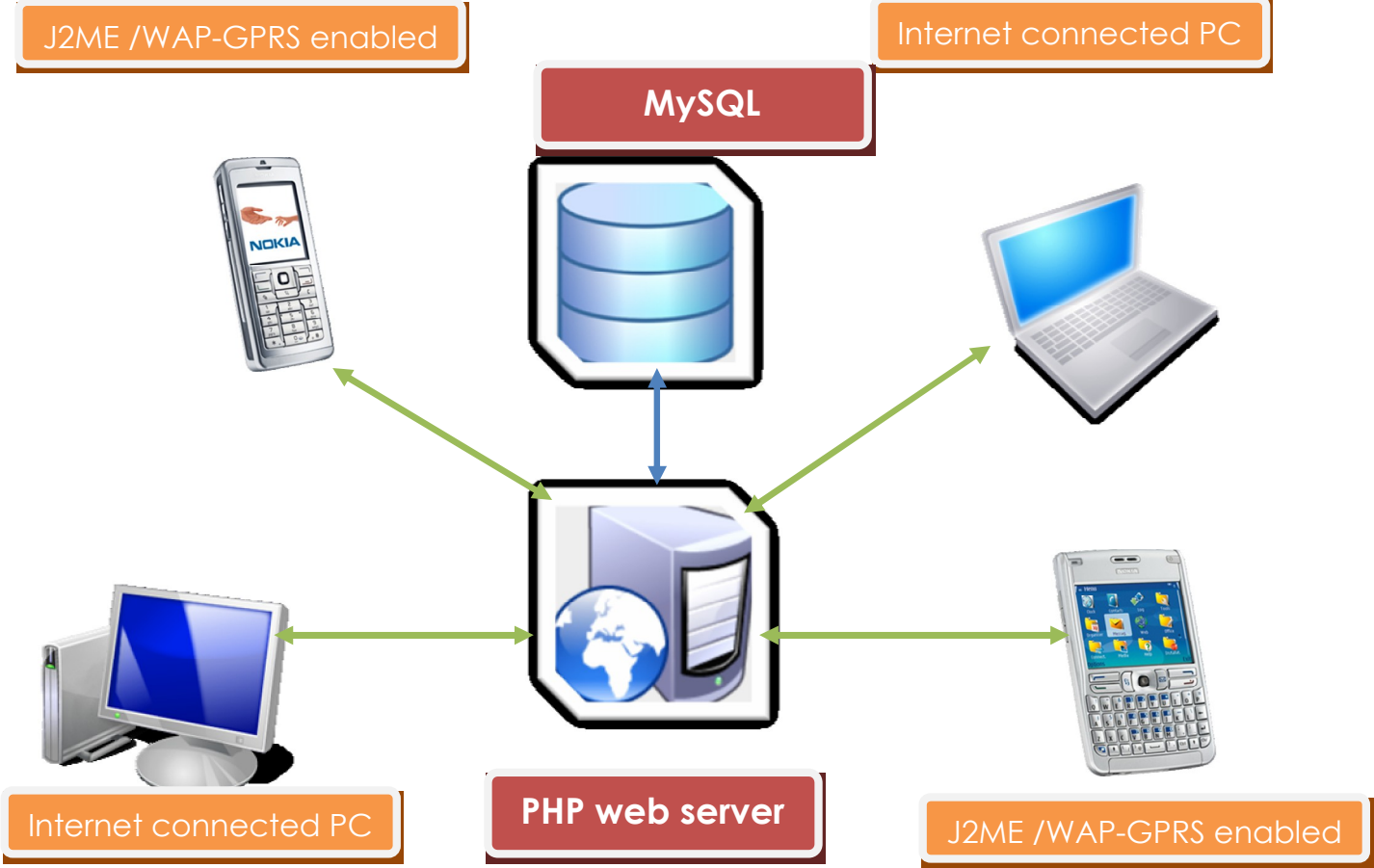
MySQL



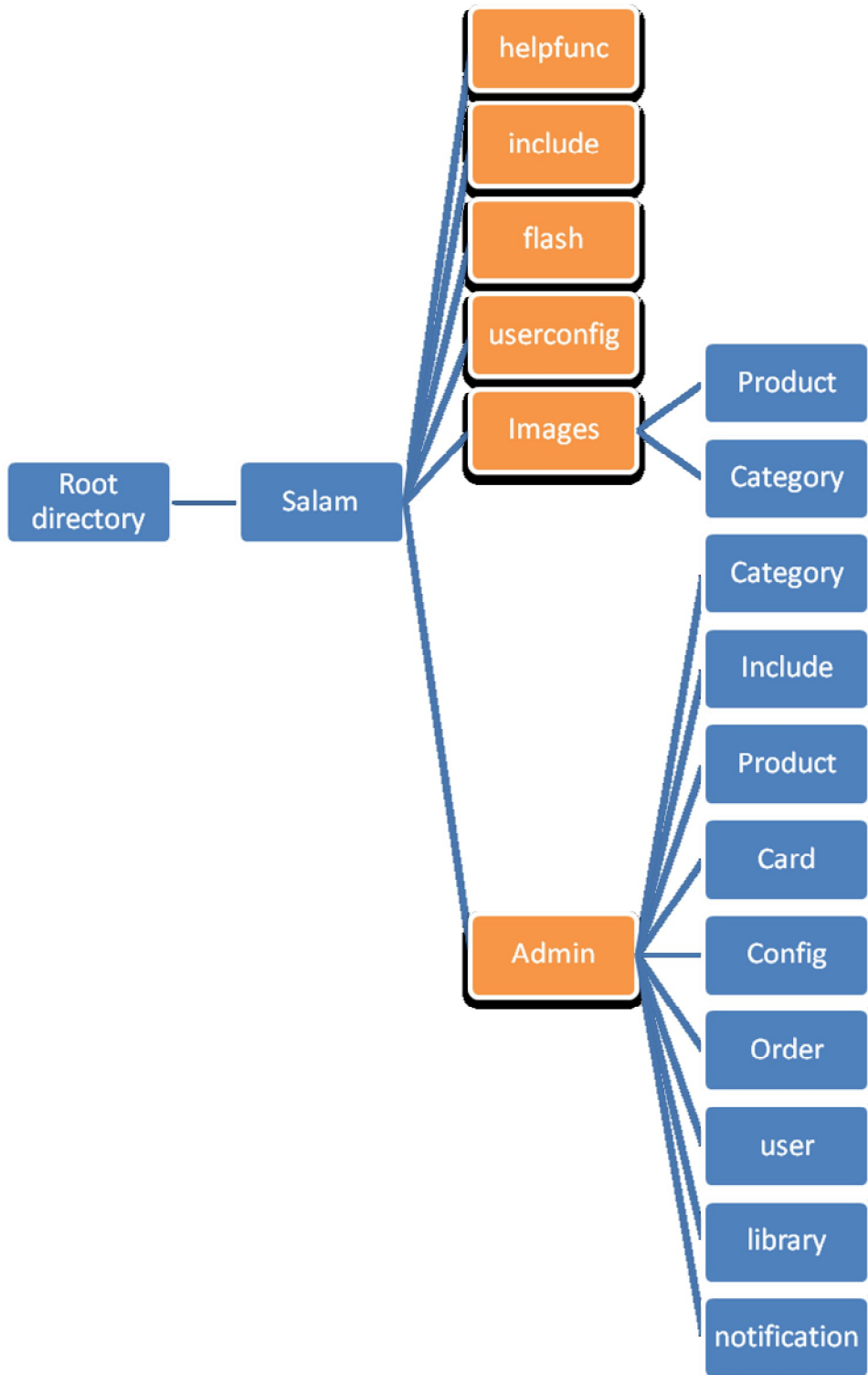
Internet connected PC

PHP web server

J2ME /WAP-GPRS enabled

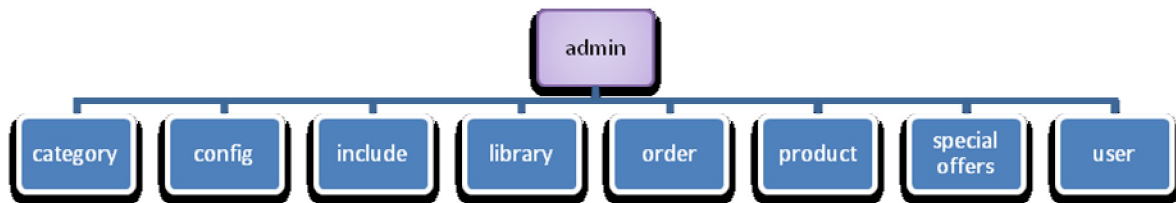


PHP Web Server Contents

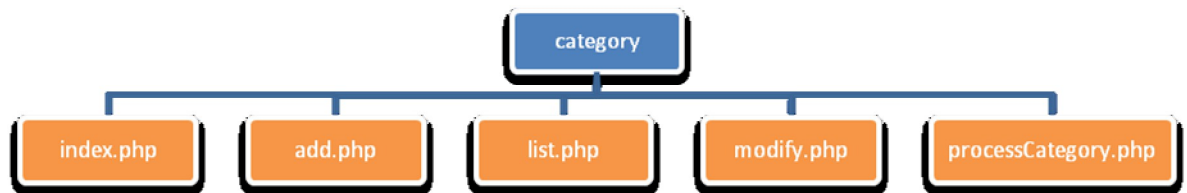


Administrator Website

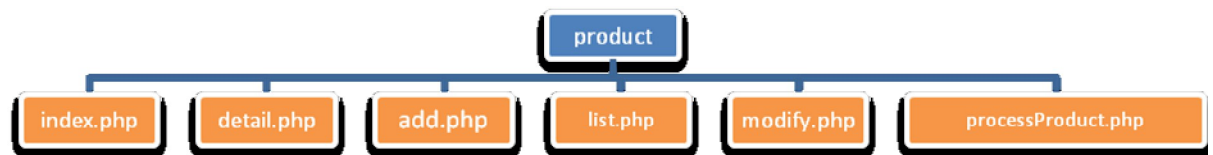
- Contents of this website are available in root\Salam\admin with the following hierarchy



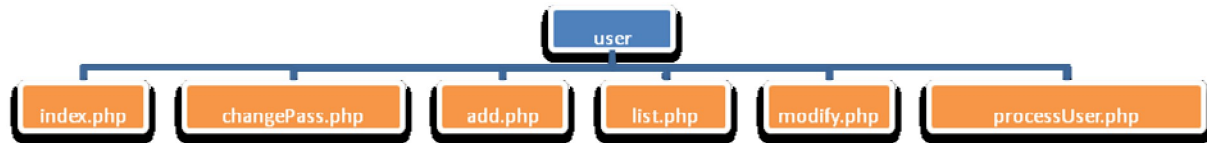
- This website is targeted to the administration of our shopping center.
- In this website, the administrator can perform the following processes:
 - Managing categories of products offered in the shopping center by adding new category, updating or deleting existing category using files existing in category folder :



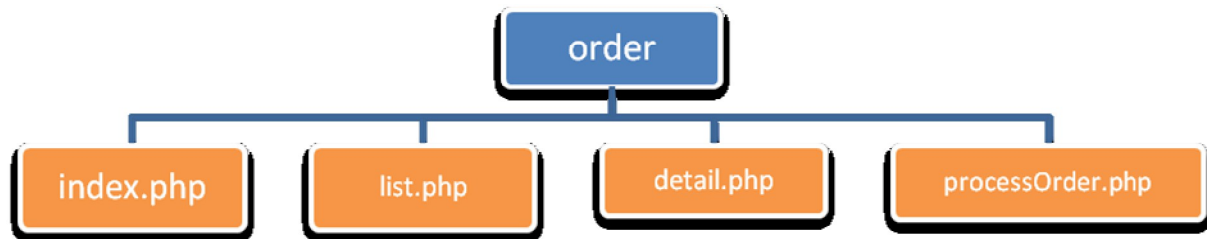
- Managing products offered in the shopping center by adding new product, updating or deleting existing product using files existing in product folder :



- Managing users data, who are allowed to use the administration website by different privileges by adding new users for the highest level user , also this part enables the recent users to change their passwords. Work in this part is done using files in user folder.



- Managing orders and payments in the system using files in order folder by enabling payment methods ,checking the status for all recent and previous orders Work in this part is done using files in user folder.



- Other folders of the admin directory contains basic PHP function to be used in coding to reduce redundancy of code, especially code of working with the MySQL database.

General Description of work:






In this website, we tried to reduce the graphical effects because it s a managerial website targeted to the employees. We used here PHP scripting pages that connect with the MySQL database. For the interface we used Cascaded Style Sheets (CSS) because of their light weighted(they are code not graphics).

While working, the administrator can see the images of products or categories he is dealing with for better accuracy i.e. the user is not asked to remember all products.

Screen shoots:

Home
Category
Product
Order
Shop Config
User
Logout

View products in : All Category

Product Name	Thumbnail	Category	Modify	Delete
Ajax		Floor Cleaning	Modify	Delete
Ajax Lemon		Floor Cleaning	Modify	Delete
Ariel		washing powder	Modify	Delete
bananas		Fruit	Modify	Delete
canned beans		Canned Food	Modify	Delete

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | [Next](#) | [Last](#)

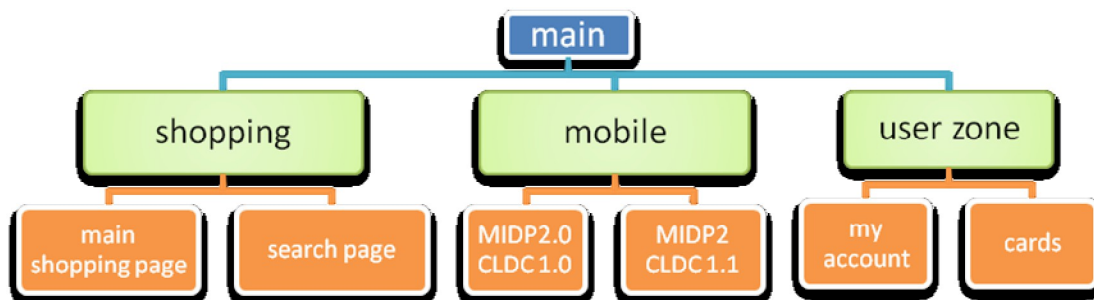
Customer Website

This website is published over the world wide web. The website starts with a flash introduction that enables the customer to choose his direction.

Screen shoot:



Main hierarchy for customers website is:



Main shopping page

This is the heart of our website, customer's main is done in this page.

Here is a screenshot of the page:

In the top part, a flash movie that shows the benefits of using our system.

In the left, there is a hierarchical menu that shows the category classification of products in the website. When he clicks on one of the categories, it shows in the same menu, the sub-categories of that category .

In the middle, we show all the products belong to the chosen category.

In the right part we show the user's cart with all the products he wanted are shown in a table.

The important here that we enabled the user to use the look-and-feel programming principle that when he wants to add an item to his cart, he drags it and drops it to the cart.

This ability is performed using Asynchronous JavaScript And XML technology (AJAX), but here, instead of XML for the server side code, we used PHP.

Shopping Cart Page

After the user finishes choosing his products, now it's the time forwarding to his shopping cart

Our shopping cart is based on SESSIONS. That when the user adds an item to his cart, this is stored in a session variable in PHP, i.e. if the user closes his browser, every thing has gone.

The shopping cart page displays the user all the products he added into his cart, with the ability to remove any product, change the required quantity ,go back to the shopping page or finish deal and forwarding to payment.

When the user wants to finish the deal and pay, he has three different payment methods:

- Paypal.com
- Our Shopping center credit cards
- Cache on Delivery

For paypal.com, Paypal Developer Central provides a PHP package to be integrated with e-commerce developers websites.

So, we have a page that contains a form to be filled with user's data about address, name, credit card type and number. We support Visa card, MasterCard, Amex and America Express.

All the data in addition to price, will be transferred to Paypal through an HTTPS (hyper Text Transfer Protocol Secure) connection, Paypal.com in its turn processes data, if it's true it discounts the price from the customer credit and send us email for payment and returns success to the user's webpage.

For our shop credit cards, they are cards with 14 digit numbers that we generate and produce to the market.

The credit card is not for a specific user, it's working on the same method the public phone cards work, any one can use them.

About generating cards numbers, through our deep research, we discovered that all companies use hardware generators to generate the random numbers, one example of these is a machine connected to the COM port in the PC, and gives TRUE random numbers. the calculation of these numbers is built on the radio wave lengths results from overheating the Cesium element so it radiates.

The cache on delivery service is suitable for our Palestinian life, the customer must visit the shopping center him self, and signs a contact with the center that any order comes through his username and password, he will be forced to pay for it when the delivery employee gets the products to his home.

When the user confirms payment, the quantity of every product he bought is decreased in the database.

Item	Unit Price	Quantity	Total	
 HP Laptop	1,590	<input type="text" value="1"/>	1,590	Delete
 Dell Desktop	900	<input type="text" value="1"/>	900	Delete
 Nokia 1100	300	<input type="text" value="1"/>	300	Delete
 Nokia N95	1,000	<input type="text" value="1"/>	1,000	Delete
Sub-total			3,790	
Shipping			0	
Total			3,790	
				Update Cart

[<< Continue Shopping](#)
[Proceed To Checkout >>](#)

Search Page

This can be reached from the first screen of our website. If the user wants a specific product, and he is lost in the huge number of products and losing categories, he writes any part of the product and the results will be shown for him.

Users accounts page

In this page, each user of the system can enter to modify his password, email and contact information.

Cards Page

In this page, the user enters the credit card number to check the remaining balance in it.

Mobile

In the mobile links in the main page, the user can download the mobile application with version suitable for his mobile phone

Important Notes about website

1. Technologies used :
 - a. Flash: best multimedia solution
 - b. PHP: Free
 - c. MySQL: free
 - d. CSS: simple but produce nice
 - e. AJAX : new technology to learn.
2. Software used for development:
 - a. Macromedia Dreamweaver 8.0 for PHP scripting.
 - b. WAMP server v5.0. (Windows Apache MySQL PHP server)
 - c. Macromedia Flash 8
 - d. Adobe Photoshop CS2 ME.
3. Usability:
 - a. User is not required to sign up in our system , but as he is not registered, he can not use cache on delivery payment service
 - b. User interface is user friendly , an online desktop ! drag and drop in order to achieve look and feel .
 - c. Less pages to move through, pick all your products in a single page.
4. Reliability:
 - a. our system is tested with multiple users work on simultaneously.
 - b. The System is tested under the following browsers:
 - i. Microsoft Internet Explorer 6
 - ii. Windows Internet Explorer 7
 - iii. Mozilla Firefox 2.0.0.8
 - iv. Opera browser
 - v. Avant browser
 - c. About using AJAX, we were asked why not built all the website on AJAX? The reason is the same that prevented Google.com from using its Google suggest service as the main window, it s that the statistics shows that the servers hosting AJAX based website receive requests and load 20 time more than others.
5. Security:
 - a. Session based: if the user closes his browser, all steps are erased, no one can use the computer and use the previous user account because login data are not stored in the session.
 - b. Credit card number (Visa, MasterCard,..) is not stored in our database.

- c. Connection with PayPal is using HTTPS and will be terminated after 30 seconds.

Mobile Phone Application

Our mobile Phone Application is built on Java 2 Micro Edition language supplied by Sun Microsystems.

The mobile application is built from these classes:

1: class LoginPage:

Interface(s):	
	the user laves any field empty it shows an error. The user has the option to login which calls the LoginSender, or if he does not have an account he has the other option to click on Subscribe to call the Subscribe class.
	public void commandAction(Command command, Displayable displayable)

2: class LoginSender:

Interface(s):	
	LoginPage and connects to the page

<http://members.lycos.co.uk/jafarpal/LoginCheck.php>

Which connects to the database to check the username, password and returns the result as true or false, if true it returns if the user is verified to use cache on delivery service.

If result is true, show the class ShoppingMain, if false show an error and back to LoginPage

```
previousDisplay,String username, String password)
public void run() //thread
public void start()//thread
private void sendPost() throws IOException
private String EncodeURL(String URL)
private String replace(String source, char oldChar, String
dest)
```

3: Class Subscribe:

Interface(s):

user, he must subscribe to use the system.
This class is really a form that has 4 fields: username, full name, password and confirm password fields.
If the user clicks subscribe with any of the fields empty or the passwords do not match it shows an error. Else it passes values for NewUserUploader class.

```
displayable)
public void commandAction(Command command,
Displayable displayable)
```

4: class NewUserUploader:



Interface(s):

from Subscribe and connects to the page
<http://members.lycos.co.uk/jafarpal/NewUser2.php>
Which connects to the database to check the username
if used previously, if not it inserts the new user to database
as unverified user and returns true.
If result is true, show the class ShoppingMain, if false show
an error and back to LoginPage

```
previousDisplay,String username, String password, String  
fullName)  
public void run() //thread  
public void start()//thread  
private void sendPost() throws IOException  
private String EncodeURL(String URL)  
private String replace(String source, char oldChar, String  
dest)
```

5: Class ShoppingMain

Interface(s):

GetCategories

multiple options:

- Shopping: go to browse products by calling class GetCategories.
- Manage user s cart by calling CartMain.
- Show a form for search then it calls class SearchUploader
- Access to user s control Panel, which enables the user to change his password, phone number,

```
connection.
```

```
previousDisplay, String username)  
public void commandAction(Command  
command, Displayable displayable)
```

6: Class GetCategories:

Interface(s):

class:

<http://members.lycos.co.uk/jafarpar/MainCategorySender.php>
Which connects to the database to retrieve all categories names and numbers user and returns the categories as one string separated by \$.
Then it splits the categories into an array and pass it to ShowCategories class

```
public void getCats(LoginPage loginPage, Displayable  
displayable)  
public void run() //thread  
public void start()//thread  
public void receiveCat() throws IOException  
private String EncodeURL(String URL)  
private String[] split(String original)  
private String replace(String source, char oldChar, String dest)
```

7: class ShowCategories:

Interface(s):

GetCategories with all names, beside that it gets a Boolean variable sub to show that the list contains main categories or sub categories, if it contains main category, when the user selects a category it calls GetSubcats class to get sub categories of this category, else if the category is a subcategory, it calls GetProducts class

```
previousDisplay, String[] array ,boolean sub)  
public void commandAction(Command  
command,Displayable displayable)
```

8: class GetSubCats:

Interface(s):

ShowCategories and then connects to the page <http://members.lycos.co.uk/jafarpal/GetSubcategories.php> Which connects to the database to retrieve all sub categories names and numbers and returns the categories an one string separated by \$. Then it splits the categories into an array and pass it ti ShowCategories class again

```
displayable, String selected )  
public void run() //thread  
public void start()//thread  
public void connectPHP() throws IOException  
private String EncodeURL(String URL)  
private String[] split(String original)  
private String replace(String source, char oldChar, String  
dest)
```

9: class GetProducts:

Interface(s):

ShowCategories and then connects to the page <http://members.lycos.co.uk/jafarpal/ProductSend7.php> Which connects to the database to retrieve all products names, numbers, quantities and descriptions then returns the categories an one string in the format :
productName%productID%Description%price%quantity
for each product, then combines messages of all users with \$ and send them back.
Then it splits the categories into an array and pass it to ShowProductss class

```
displayable, String category)
public void run() //thread
public void start()//thread
public void receivePro()
private String EncodeURL(String URL)
public String[][] split2(String[] source,String[][]destination)
private String[] split(String original)
public void createRMS(String[ ][ ] array)
```

10: class ShowProducts:

Interface(s):

with all names,numbers,quantity, prices and descriptions, it enables the user to select any product, read its details and add it to cart if he wants.
Error message displayed if quantity is not available .

```
displayable ,String[]namesArray, String[][]table)
public void commandAction (Command command,
Displayable displayable)
```

11: class Filter

Interface(s):

only the matches.

```
public boolean matches(byte[] suspect)
public void filterClose()
```

12: class CartMain:

Interface(s):

- it allowed him to browse the cart and check every item in it by either editing ,browsing, or deleting it.
- It also allows the user to empty his cart
- Supplies user with statistics about prices, most expensive product and sum of prices in his cart.
- Finish deal by forwarding to PaymentMain class

```
previousDisplay,String[] menuItems,String username)
public void commandAction(Command command,
Displayable displayable)
```

13: class CartFilter:

Interface(s):	
	only the matches.
	public boolean matches(byte[] suspect) public void filterClose()

14: class PaymentMain:

Interface(s):	
	Messaging Service
	CacheOnDeliverySender
	the cart to the server then payment through the following payment methods:
	<ul style="list-style-type: none">• Pay from Jawwal Credit Card: this is achieved buy using money transfer service from Jawwal Co. to the phone of administrator.• Pay through Paypal: this class contains a form to be filled with paypal information like name, credit card info and address, then connect via PaypalUploader class• Cache on delivery :check if the user is verified, ask him to login again for more security, if he is verified call cacheOnDeliverySender class

```
displayable ,int price,String username, String password,  
boolean isVerified )  
public void commandAction (Command command,  
Displayable displayable)
```

15: class ProductUploader

Interface(s):

uploaded to page:
<http://members.lycos.co.uk/jafarpal/MobileCartReceiver.php>
if returns true, then all products available, if false notify the user.

```
previousDisplay,String username)  
public String productUpload()  
public void run() Thread  
public void start() Thread  
private void sendPost() throws IOException  
private String EncodeURL(String URL)  
private String replace(String source, char oldChar, String  
dest)
```

16: class CacheOnDeliverySender

Interface(s):

Delivery service or not by ordering him to login again and connect to page:

<http://members.lycos.co.uk/jafarpal/finish.php>

to check, if verified tell him that products are on the way

```
previousDisplay,String orderID)
public void run()
public void start()
private void sendPost() throws IOException
    private String EncodeURL(String URL)
private String replace(String source, char oldChar, String
dest)
```

17:class PaypalUploader:

Interface(s):

PaymentMain and send them to URL

<http://jafarpal2.x10hosting.com/paypal/mobileSuccess.php>

and receive success or failure and tells the user

```
previousDisplay,String firstName, String lastName,String
creditCardType
    ,String creditCardNumber,String
expDateMonth, String expDateYear,String amount,String
currencyCode,
    String username, String password, boolean isVerified,
String orderID)
public void run()
public void start()
private void sendPost() throws IOException
private String EncodeURL(String URL)
```

18:class SearchUploader

Interface(s):

in ShoppingMain class and sends it to URL:
<http://members.lycos.co.uk/jafarpal/Search.php>

```
Displayable displayable, String searchText)
public void run()
public void start()
public void receivePro()
public String[] split(String original)
public String[][] split2(String[] source,String[][]destination)
private String EncodeURL(String URL)
private String replace(String source, char oldChar, String
dest)
public void createRMS(String[][] array)
```

19:class ChangeDataUploader

Interface(s):

and sends it to page:
<http://members.lycos.co.uk/jafarpal/Changedata.php>
and tells the user success or failures

```
Displayable previousDisplay,String subURL,String
username,String password, boolean isVerified)
public void run()
public void start()
private void sendPost() throws IOException
private String EncodeURL(String URL)
```

Mobile Phone Application important

1. Languages used:
 - a. Java 2 Micro Edition supplied from Sun Micro Systems.
 - b. PHP for server side code.
2. Tools Used In Development:
 - a. Java 2 Standard Developer Kit J2SDK 6
 - b. Sun Java 2 Micro Edition Wireless Toolkit 2.2
 - c. Sun Java 2 Micro Edition Wireless Toolkit 2.5
 - d. Netbeans IDE 5.5
 - e. Netbeans Mobility Pack
 - f. Macromedia Dreamweaver 8
 - g. Adobe Photoshop CS2.
3. Mobile Used in Testing: Nokia 6670, Nokia 6610
4. User in Mobile Applications must be subscribed to use the system because here we use username instead of session variable.
5. We tried to use least resources in mobile, but what limits us is the Wireless Messaging API (WMA) for jawwal payment.
6. In J2ME we dealt with the following technologies:
 - a. Connectivity over WAP/GPRS
 - b. Wireless Messaging API (WMA 2.0)
 - c. SMS
 - d. Record Management Systems (RMS)
7. Java is used for better security than WML, better device support than ASP.NET

Problems we faced

1. The need of a real IP Address for mobile application, university could not help, so we moved to free hosting with following problems:
 - a. Servers are down in critical timings.
 - b. Limited usage in PHP extensions for reasons of security
2. For this reasons, we had to divide our files between 2 servers, the main one is <http://tripod.lycos.co.uk/jafarpal>, the other is <http://jafarpal2.x10hosting.com>
3. Closed door from companies who tried to get help from (without names).