Department of Electronic Engineering

FINAL YEAR PROJECT REPORT

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Design a tourist guide system using PDA through wireless networks

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Bachelor of Engineering (Honours) in Information Engineering
Student Final Year Project Declaration

I have read the student handbook and I understand the meaning of academic dishonesty, in particular plagiarism and collusion. I declare that the work submitted for the final year project does not involve academic dishonesty. I give permission for my final year project work to be electronically scanned and if found to involve academic dishonesty, I am aware of the consequences as stated in the Student Handbook.

Project Title: Design a tourist guide system using PDA through wireless networks

________________________________________________________________________

Student Name: LAM WAI WA Student ID: 

________________________________________________________________________

Signature: Date: 
Acknowledgements

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# TABLE OF CONTENTS

1. ABSTRACT .......................................................................................................................... 10

2. INTRODUCTION ................................................................................................................ 12
   2.1 BACKGROUND .............................................................................................................. 12
       2.1.1 Wireless trend ...................................................................................................... 12
       2.1.2 Wireless device and application trend ................................................................. 13

3. OBJECTIVE .......................................................................................................................... 16
   3.1 FUNCTIONS IN CLIENT SIDE ..................................................................................... 16
       3.1.1 Shortest path to the destinations displaying with the most up-to-date traffic and situations 16
       3.1.2 General information and new events of shops and the plaza displaying ................. 16
       3.1.3 Cinema ticket booking and restaurant reservation service ................................... 17
       3.1.4 Membership registration service ......................................................................... 17
       3.1.5 Financial benefit .................................................................................................. 17
   3.2 SYSTEM ADMINISTRATION ...................................................................................... 18
       3.2.1 Shop location management ................................................................................ 18
       3.2.2 Paths blocking and paths waiting time management .............................................. 18
       3.2.3 Shop information and new events of shops and plaza management .................... 18
       3.2.4 Cinema ticket and restaurant seats reservation details management ................... 18
       3.2.5 Membership information management ............................................................... 18
   3.3 SECURITY ....................................................................................................................... 19
       3.3.1 System security ..................................................................................................... 19
       3.3.2 Service security .................................................................................................... 19

4. SYSTEM ARCHITECTURE ................................................................................................. 21
   4.1 SYSTEM ARCHITECTURE .......................................................................................... 21
       4.1.1 Service system architecture ................................................................................ 21
       4.1.2 Management system architecture ....................................................................... 23
       4.1.3 Constructing routing table system architecture .................................................... 24
   4.2 UML DIAGRAMS .......................................................................................................... 24
       4.2.1 Use case diagram ............................................................................................... 24

5. IMPLEMENTATION METHODOLOGY .............................................................................. 44
   5.1 REASON FOR CHOOSING MOBILE WEB DEVELOPMENT ....................................... 44
   5.2 PROGRAMMING AND DESIGN TOOLS EVALUATION ............................................ 44
       5.2.1 .NET Framework ............................................................................................... 45
       5.2.2 ASP.NET ............................................................................................................. 46
       5.2.3 ADO.NET ........................................................................................................... 48
       5.2.4 VB.NET ............................................................................................................... 49
       5.2.5 IIS ...................................................................................................................... 50
       5.2.6 SQL Database ..................................................................................................... 50
       5.2.7 Adobe Flash and ActionScript .......................................................................... 51
       5.2.8 ASP .................................................................................................................... 52
   5.3 SQL DATABASE SERVER AUTHENTICATION ............................................................ 52
   5.4 SQL DATABASE ACCESS METHODS WITH ASP.NET ............................................ 53
   5.5 SYSTEM IMPLEMENTATION STRUCTURE ............................................................. 55
   5.6 SHORTEST PATH DISPLAYING FUNCTION STRUCTURE AND FLOW CHART (REGION A IN FIGURE 17) 57
   5.7 INTERACTION BETWEEN FLASH AND SQL DATABASE VIA ASP .......................... 59
   5.8 SHOP INFORMATION SEARCHING FUNCTION (REGION S IN FIGURE 18) .................. 61
   5.9 MEMBERSHIP REGISTRATION FUNCTION (REGION B IN FIGURE 19) ......................... 62
   5.10 CINEMA RESERVATION FUNCTION (REGION C IN FIGURE 5.4C) ............................ 63
   5.11 RESTAURANT RESERVATION FUNCTION (REGION D IN FIGURE 5.4C) ....................... 64
   5.12 ADMINISTRATION/MANAGEMENT STRUCTURE .................................................... 65
   5.13 STRUCTURE AND FLOWCHART OF APPLICATION OF DIJKSTRA’S ALGORITHM .... 66
       5.13.1 Dijkstra’s algorithm [9] .................................................................................... 66
5.13.2 Application of Dijkstra’s algorithm ............................................................... 70
5.14 ADVERTISEMENT ............................................................................................... 72

6. IMPLEMENTATION RESULT ............................................................................. 74

6.1 MOBILE WEB APPLICATION RESULTS ....................................................... 74
   6.1.1 Shortest Path displaying function ............................................................ 74
   6.1.3 Searching shop information function (sorted by category) ...................... 80
   6.1.4 Searching New Events of plaza............................................................... 81
   6.1.5 Searching New Events of shops ............................................................. 81
   6.1.6 Cinema Ticket Reservation ................................................................. 82
   6.1.7 Restaurant Reservation function ......................................................... 84
   6.1.8 Membership Registration function ....................................................... 85

6.2 MOBILE WEB SERVICES MANAGEMENT ................................................ 87
   6.2.1 Shop Information Management ............................................................ 87
   6.2.3 Plaza Events Management ................................................................. 88
   6.2.4 Cinema Reservation Details Management .............................................. 89
   6.2.5 Cinema Status Management .............................................................. 90
   6.2.6 Restaurant Booking Details Management ............................................ 90
   6.2.7 Restaurant Status Management .......................................................... 91
   6.2.8 Membership Management ................................................................. 92
   6.2.9 Shop Location Management .............................................................. 92
   6.2.10 Blocking Path Management .............................................................. 93
   6.2.11 Waiting Time ..................................................................................... 93

6.3 SECURITY ....................................................................................................... 94
   6.3.1 System Security .................................................................................. 94
   6.3.2 Service Security ................................................................................ 95
   6.3.3 Management Security ........................................................................ 95

7. CONCLUSION AND DISCUSSION ................................................................. 97
   7.1 ACHIEVEMENT ...................................................................................... 97
      7.1.1 Project Achievement ......................................................................... 97
      7.1.2 Personal Achievement ...................................................................... 98
   7.2 FUTURE DEVELOPMENT ....................................................................... 98

8. APPENDIX ...................................................................................................... 99
   8.1 RESOURCES LIST: .................................................................................. 99
   8.2 SYSTEM SETUP GUIDELINE ................................................................. 99
      8.2.1 Server Setup .................................................................................... 99
      8.2.2 System Deployment ......................................................................... 102
      8.2.3 System setting ................................................................................ 104

REFERENCES .................................................................................................. 111
List of figures

Figure 1 Layout of normal web page displayed in PC Internet browsers ..................................................15
Figure 2 Layout of normal web pages displayed in web browsers of PDAs and mobile phones ..............15
Figure 3 3-tier architecture for Service system .......................................................................................21
Figure 4 3-tier architecture for Management system ...............................................................................23
Figure 5 Architecture of system to construct a routing table .....................................................................24
Figure 6 Use case of system use ...............................................................................................................25
Figure 7 Use case of Management Platform ............................................................................................26
Figure 8 Entity Relation Diagram ...........................................................................................................41
Figure 9 Layouts of LG2 & LG1 .................................................................................................................42
Figure 10 Layouts of UG & G ....................................................................................................................42
Figure 11 Layouts of LG1 & Layout of LG2 ................................................................................................43
Figure 12 Layout of MTR ..........................................................................................................................43
Figure 13 Architecture of .NET Framework ..............................................................................................45
Figure 14 ASP.NET architecture ..............................................................................................................47
Figure 15 Architecture of ADO.NET .........................................................................................................49
Figure 16 Client-Platform structure (a) ......................................................................................................55
Figure 17 Client-Platform structure (b) ......................................................................................................56
Figure 18 Client-Platform structure (c) ......................................................................................................56
Figure 19 Flow chart of Shortest Path Displaying function .........................................................................58
Figure 20 Interaction between Flash, ASP and the SQL Database [8] .........................................................59
Figure 21 Interactions between Flash, ASP and the SQL Database (for example) ........................................60
Figure 22 ObjectList & DataSet ...............................................................................................................61
Figure 23 Registration Checking logic .....................................................................................................63
Figure 24 Cinema Ticket Reservation Process ..........................................................................................63
Figure 25 Restaurant Reservation Process ...............................................................................................65
Figure 26 Administration platform-server-client platform .........................................................................66
Figure 27 A graph of location of nodes ......................................................................................................68
Figure 28 Flow chart of Application of Dijkstra’s Algorithm ...................................................................72
Figure 29 AdRotator .................................................................................................................................72
Figure 30 Navigation of downing a Mobile Flash Player ...........................................................................74
Figure 31 Selecting source and destination ..............................................................................................75
Figure 32 Selected source and destination ................................................................................................75
Figure 33 Waiting response ......................................................................................................................76
Figure 34 Finishing checking the shortest path .........................................................................................77
Figure 35 Shortest Path A (Single floor displaying) ..................................................................................77
Figure 36 Shortest Path B (Multiple floor displaying) ...............................................................................78
Figure 37 Path before blocked ..................................................................................................................78
Figure 38 Path after blocked .....................................................................................................................78
Figure 39 Short waiting time for the elevator ............................................................................................79
Figure 40 Long waiting time for the elevator .............................................................................................79
Figure 41 Shop List (sorted by alphabet) ....................................................................................................80
Figure 42 General information of shop ...................................................................................................80
Figure 43 Category list ...............................................................................................................................80
Figure 44 Shop list of category ..................................................................................................................80
Figure 45 Information of shop ..................................................................................................................80
Figure 46 List of new Event of plaza ..........................................................................................................81
Figure 47 Plaza Event information ...........................................................................................................81
Figure 48 Shop List .....................................................................................................................................82
Figure 49 Shop event information ............................................................................................................82
Figure 50 Select film ..................................................................................................................................83
Figure 51 Login .........................................................................................................................................83
Figure 52 Identity check .............................................................................................................................83
List of tables

Table 1 Pros and Cons of 3-tier ................................................................. 22
Table 2 Use case description of searching shortest path ........................................ 26
Table 3 Use case description of searching information of shops .......................... 27
Table 4 Use case description of searching information of shops .......................... 28
Table 5 Use case description of viewing details of new events of shops ............... 29
Table 6 Use case description of viewing details of new events of plaza ............... 30
Table 7 Use case description of reserving cinema ticket(s) .................................... 30
Table 8 Use case description of reserving restaurant table ................................... 31
Table 9 Use case description of registering membership ..................................... 32
Table 10 Use case description of viewing advertisement .................................... 33
Table 11 Use case description of managing shop information ............................ 34
Table 12 Use case description of managing new events of shop ........................ 34
Table 13 Use case description of viewing cinema reservation details ................. 35
Table 14 Use case description of managing cinema ........................................... 35
Table 15 Use case description of viewing restaurant reservation details ............ 36
Table 16 Use case description of editing new events of plaza ............................. 37
Table 17 Use case description of managing shop location .................................. 38
Table 18 Use case description of managing advertisement ............................... 38
Table 19 Use case description of managing membership details ....................... 39
Table 20 Manage Blocker Path ...................................................................... 40
Table 21 Manage Waiting Time ...................................................................... 40
1. Abstract

The tourist guide system using PDA by this project is a mobile web providing great interaction service and wide range information of the simulated venue, Festival Walk plaza in Kowloon Tong, to the visitor to the plaza.

With the Dijkstra’s algorithm, the system generates a routing table according to position of the shops and traffic and situation in different time period. The system provides service of displaying the shortest path between the sources and destinations the visitors specify. The system tackled the difficulties of displaying the routes on different floors and many problems in mobile web development. And the system provides general information of shops, newest events of the plaza and shops. On the other hand, the tour guide system provides service of cinema ticket reservations and restaurant reservations. In ticket reservation process, visitors can choose position of the seats with visual help of an interactive platform. Besides, advertisements are addressed on the system, so that the cooperation (Festival Walk Cooperation) can gain financial benefits.

The tourist guide system provides user-friendly administration service. Staff of the plaza can manage the position, blocking path details, general information of shops and plaza, and reservation details via web browser without changing the framework of the system.

On the other hand, the system has good security management. Membership application is required for the reservation services. The passwords of members are encrypted (MD5) so that even the administrators cannot know the password of the members. Also, notification
message via SMS once the reservation is made successfully. No management is allowed without login, no direct access to specific pages of management is allowed as well.
2. Introduction

2.1 Background

2.1.1 Wireless trend

To build Hong Kong into a wireless city, Hong Kong SAR Government is implementing relative measures. Government Wi-Fi Programme (Gov Wifi) is one of the major initiatives under the 2008 Digital 21 Strategy. The Programme aims to provide free wireless Internet access services to all citizens by installing Wi-Fi (IEEE 802.11 b/g) facilities at designated government premises.

The Gov Wifi Programme brings about benefits on all fronts, for the general public, the Government, business sectors, Information and Communications Technology (ICT) Industry and Hong Kong as a whole.

- People can surf the web freely for business, study, leisure or accessing government services whenever visiting the designated Government premises.
- Business organizations can extend their services to wireless platform for reaching and connecting their clients through wireless means.
- ICT industry players can make use of this new wireless platform to develop and provide more Wi-Fi applications, products and supporting services to their clients, and open up more new business opportunities.
- Foreign visitors can enjoy the Internet access at the designated tourist spots.

In Hong Kong, Wi-Fi facilities will be progressively installed from early 2008 to mid 2009 at about 350 government premises in different districts. These premises include
public libraries, Public Enquiry Service Centres, sports centres, cultural and recreational centres, job centres, community halls, large parks and Government joint-user buildings.

To match up with the measure and the future wireless trend, Network providers in Hong Kong are also implementing wireless networks constructions intensely.

Today, a lot of places are WiFi available. Public facilities such as libraries, shopping plazas such as Festival Walk, dwelling residence such as real estates and so on, are now WiFi accessible.

In the near future, Hong Kong will become a fully wireless city; and it will have better securities measures in protecting personal and confidential data being received and sent out.

2.1.2 Wireless device and application trend

With the development of wireless networks in Hong Kong, the use and development of wireless devices and applications are greatly increasing. More and more PDAs and mobile phones with WiFi features are available in Hong Kong. And applications for wireless devices will be more demanding. The success of Hong Kong in being a WiFi City lies in the development of Application. ¹

2.2 Difficulties that tourist encounter

1). Difficult to find the destinations

It is quite common that tourists feel difficult to find the desired destinations in a plaza or

¹ “The success of Hong Kong in being a WiFi City lies in the development of Application “was quoted in the presentation namely “Hong Kong as a WiFi City Are We The Pioneer?” (11th April 2007) from John Chiu – Chairman of Hong Kong Wireless Technology Industry Association
shopping center, especially in the plazas such as Festival Walk where the layout of the floor plan is complicated and shops of same types are scattered. However, leaflets or maps are inconvenient and quite time-consuming to use. They only provide the layout of the plaza but no specific suggested paths are provides from one place to the other.

2). Miss of first hand information of shops and plazas

Many tourists, especially the tourists who are unfamiliar with the plazas, find difficult to choose shops for targeting shopping because they do not know the information including type and service the shops provide. They may search the targeting shops by roaming throughout the plazas. And tourists easily miss the first hand information about new services and new events offered by shops and plazas.

3). Inconvenience provided by normal web pages

Most plazas provide normal web pages (Figure 1) which serve computer Internet browsers to provide information of shops and plazas, but the web pages are not flexible; the web pages do not detect the type of calling devices and respond accordingly. As a result, the layout of the web pages will diffuse for the mobile devices like PDAs and mobile phones (Figure 2). It is very inconvenience for users to user the web pages.
Figure 1 Layout of normal web page displayed in PC Internet browsers

Figure 2 Layout of normal web pages displayed in web browsers of PDAs and mobile phones
3. Objective
Information technology is blooming nowadays. Most activities are implemented with the help of Information technology products; business, medical, education, sports, entertainment, life… all are now unable to live without Information technology. New Information technology products are invented everyday to enhance the quality of our lives. Tourist guide systems for specific buildings are not extensively available in Hong Kong, even in the world. People still need to check the information and routes of the buildings in thick books, annoying leaflets and maps. Aiming to provide convenience for people in the specific buildings with the development of wireless networks, an indoor tourist guide system for PDA using wireless network is invented. The simulated venue is Festival Walk plaza in Kowloon Tong.

The system provides the following functions:

3.1 Functions in client side

3.1.1 Shortest path to the destinations displaying with the most up-to-date traffic and situations.
Visitors are prompted to choose source and destination they required in different floors. The system reacts to the visitors very quickly and displays the path required clearly that includes no matter single floor or multi floor displaying. And path blocking and different waiting time in some paths may affect the path required. The system may adjust the paths required if it is affected by these situations.

3.1.2 General information and new events of shops and the plaza displaying.
The system provides general information including names, locations, telephone numbers
and briefing details of the shops. New events like upcoming exhibitions of the plaza and new events of shops like premium and special offer are available in the system. The shops are sorted by categories and alphabet of names that are for more convenient searching for the user to search.

3.1.3 Cinema ticket booking and restaurant reservation service

In the system, users can book cinema tickets with the help of visual and interactive platform. Users can see which seats are available and then choose as their favours. Users can also reserve tables in restaurants. When the reservation is made successfully, a SMS notification massage will be sent to the registered telephone number.

3.1.4 Membership registration service

To enjoy the booking and the reservation service, for the security and interest reason, users are required to register a membership. The membership application will check whether the user ID, the password the HKID, and other information are valid or not. Guidance for registration is provided to help users to finish the registration.

3.1.5 Financial benefit

The system provides service of casting advertisements. The casting frequency of the advertisements is controlled financially. It is benefit for the companies and customer. Companies benefit by providing advertisement service, while users and customers benefit from receiving useful messages.
3.2 System administration

The system provides powerful and friendly management and administration service. Staffs of the plaza are able to manage the system by using a web browser.

3.2.1 Shop location management

Plaza staffs can edit location of shops in the shop location table that affecting shortest path displaying if facilities of the plaza are reconstructed.

3.2.2 Paths blocking and paths waiting time management

Plaza staffs can add and delete blocked paths and edit waiting time in some paths.

3.2.3 Shop information and new events of shops and plaza management

Plaza and shop staffs can edit shop details and update new events of shops and the plaza.

3.2.4 Cinema ticket and restaurant seats reservation details management

Staffs can view and management details of reservation of cinema ticket and restaurant seat. Staffs can provide service for customers according to the records.

3.2.5 Membership information management

Membership information management is only available for system administrators. The passwords of the members are encrypted so that the system administrator cannot see the
password of the members. Plaza and shop staffs can only view the ID, name, HKID or password and telephone number of the members.

3.3 Security

3.3.1 System security

System security is supported by implementing authentication in server (IIS) so that no resources can be downloaded directly by clients.

3.3.2 Service security

1). Membership

Membership is required to make reservation of cinema ticket and restaurant seats. No authorization to reservation and booking service is permitted for the non-member users.

2). Encryption of passwords of members

The passwords of members are encrypted by MD5 encryption, the administrators cannot get the password of the members, and the passwords are protected in some extent even if the information get stolen. So it secures the safety of the information of the members.

3). Notification message

After restaurant reservation is successfully made, a notification message via SMS will be sent to the telephone number registered.

4). Management security
Management security is supported by session management. No management and no direct access to specific management pages are allowed without login.
4. System design:

4.1 System architecture

4.1.1 Service system architecture

In this system, 3-tier architecture (Figure 4) is used.

```
Figure 3 3-tier architecture for Service system

"3-tier" is a client-server architecture where the user interface (Client workstation), functional process logic (Web server), computer data storage and data retrieve (Database Server) are constructed and maintained as independent modules, most commonly on separate platforms. In this project, web server and database server are in the same machine. SQL server acts as database server in Data tier; IIS acts as web server in Logic tier; web browsers of mobile devices act as client workstation in Presentation tier.

1). Web browsers of mobile devices (Presentation tier) are responsible for translating
```
tasks and results to things the users can understand.

2). IIS (Logic tier) is responsible for coordinating the application, processing commands, making logical decisions and evaluations and performing calculations. And IIS also transfers and processes data between Presentation tier and Data tier.

3). SQL (Data tier) is responsible for storing data to database and processing data retrieve from database. The data is then passed back to the Logic tier for processing and then eventually back to the Presentation tier.


Table 1 Pros and Cons of 3-tier

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development issues:</td>
<td>Development issues:</td>
</tr>
<tr>
<td>- Complex application rules easy to be implemented in application server</td>
<td>- More complex structure</td>
</tr>
<tr>
<td>- Business logic off-loaded from database server and client, which improves performance</td>
<td>- More difficult to setup and maintain</td>
</tr>
<tr>
<td>- Changes to business logic automatically enforced by server – changes require only new application server software to be installed</td>
<td></td>
</tr>
<tr>
<td>- Application server logic is portable to other database server platforms by virtue of the application software</td>
<td></td>
</tr>
</tbody>
</table>
Performance:
- Superior performance for medium to high volume environments

Performance:
- The physical separation of application servers containing business logic functions and database servers containing databases may moderately affect performance

4.1.2 Management system architecture

![3-tier architecture for Management system]

The architecture of Management system is also 3-tier. Management web browser is as Presentation tier here, while the Logic tier and Data Tier are same as those of the Service system architecture.
4.1.3 Constructing routing table system architecture

![Routing Table Example](image)

The constructing routing table system is also through communication in 3-tier architecture mentioned above. A windows application with Dijkstra’s algorithm is constructed as the Presentation tier. It retrieves shop location information from database via IIS; and it sends data of routing table to database via IIS then.

4.2 UML Diagrams

4.2.1 Use case diagram

Use case diagram is kind of behavioral diagram aiming to present a graphical summary of the functionality provided by a system in terms of actors.
Figure 6 Use case of system use
4.2.2 Use case description

Use cases describe interactions between a primary actor and the system in a high level; Use case description is to describe interaction between actor and the system in detail according to the use case diagram which may lack information to further illustrate the process of the interactions.

1). Search shortest path

Table 2 Use case description of searching shortest path

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Search shortest path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user/tourist searches a shortest path</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Shortest path information (routing table) is ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “route search” button</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>1. User/Tourist triggered the function.</td>
</tr>
<tr>
<td></td>
<td>3. User/Tourist choose source and destination</td>
</tr>
<tr>
<td></td>
<td>6. User/Tourist confirms to display the shortest path.</td>
</tr>
<tr>
<td></td>
<td>7. The system displays the shortest path.</td>
</tr>
<tr>
<td>Alternating Courses:</td>
<td>Alt. 2a. If the web browser of the mobile device (PDA) has not installed Flash Player 6 or above, the system prompts user to download appropriate one.</td>
</tr>
<tr>
<td>Results:</td>
<td>User/Tourist views the shortest path, and navigates the floors.</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>Connection with server breaks down.</td>
</tr>
</tbody>
</table>

**2). Search information of shops (sorted by alphabet of name of shops)**

Table 3 Use case description of searching information of shops

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Search information of shops (sorted by alphabet of name of shops)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user searches information of shops</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of shops are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “Shop Information” button</td>
</tr>
</tbody>
</table>

Typical Course of Event: Actor Action System Response

<table>
<thead>
<tr>
<th>Typical Course of Event:</th>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. User/Tourist triggered the function.</td>
<td>2. The system displays a platform for choosing source and destination.</td>
</tr>
<tr>
<td></td>
<td>3. User/Tourist choose source and destination</td>
<td>4. The system displays the selected source and destination; at the same time, the system is finding the path when the user waits.</td>
</tr>
<tr>
<td></td>
<td>6. User/Tourist confirms to display the shortest path.</td>
<td>5. The system prompts user to confirm to display the shortest path.</td>
</tr>
<tr>
<td></td>
<td>7. The system displays the shortest path.</td>
<td></td>
</tr>
<tr>
<td>Alternating Courses:</td>
<td>Alt. 2a. If the web browser of the mobile device (PDA) has not installed Flash Player 6 or above, the system prompts user to download appropriate one.</td>
<td></td>
</tr>
<tr>
<td>Results:</td>
<td>User/Tourist views the shortest path, and navigates the floors.</td>
<td></td>
</tr>
<tr>
<td>Exceptions:</td>
<td>Connection with server breaks down.</td>
<td></td>
</tr>
</tbody>
</table>
Event: 1. User/Tourist triggered the function.
3. User/Tourist choose desired name of shop to search information of the shop.

2. The system shows a list of name of shops sorted by alphabet of name of shops.
4. The system displays the information including name, type, address, telephone number and description of the shop.

Alternating Courses: None

Results: User/Tourist views the information of the shop.

Exceptions: Connection with server breaks down.

3). Search information of shops (sorted by categories of shops)

Table 4 Use case description of searching information of shops

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Search information of shops (sorted by categories of shops)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user searches information of shops</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of shops are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “Shop Category” button</td>
</tr>
<tr>
<td>Typical Course of Actor Action</td>
<td>System Response</td>
</tr>
<tr>
<td>Event:</td>
<td>1. User/Tourist triggered the function.</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td></td>
<td>3. User/Tourist choose desired category of shop.</td>
</tr>
<tr>
<td></td>
<td>5. User/Tourist choose desired name of shop to search information of the shop.</td>
</tr>
<tr>
<td></td>
<td>2. The system shows a list of categories of shops.</td>
</tr>
<tr>
<td></td>
<td>4. The system shows a list of shops belonging to the category selected.</td>
</tr>
<tr>
<td></td>
<td>6. The system displays the information including name, type, address, telephone number and description of the shop.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alternating Courses:</th>
<th>None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Results:</th>
<th>User/Tourist views the information of the shop.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Exceptions:</th>
<th>Connection with server breaks down.</th>
</tr>
</thead>
</table>

### 4). View details of new events of shops

Table 5 Use case description of viewing details of new events of shops

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>View details of new events of shops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user views information of new events of shops</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of new events of shops are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “New Shop Events” button</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td></td>
<td>1. User/Tourist triggered the function.</td>
</tr>
<tr>
<td></td>
<td>3. User/Tourist chooses desired shop.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alternating Courses:</th>
<th>None</th>
</tr>
</thead>
</table>
Results: User/Tourist views the details of new event of the shop.

Exceptions: Connection with server breaks down.

5). View details of new events of plaza

Table 6 Use case description of viewing details of new events of plaza

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>View details of new events of plaza</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user views information of new events of plaza</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of new events of plaza are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “New Plaza Events” button</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typical Course of Event:</th>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. User/Tourist triggered the function.</td>
<td></td>
<td>2. The system shows a list of names events.</td>
</tr>
<tr>
<td>3. User/Tourist chooses desired new event name.</td>
<td></td>
<td>4. The system displays details of selected new event.</td>
</tr>
</tbody>
</table>

Alternating Courses: None

Results: User/Tourist views the details of new event of the plaza.

Exceptions: Connection with server breaks down.

6). Reserve cinema ticket(s)

Table 7 Use case description of reserving cinema ticket(s)

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Reserve cinema ticket(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user reserves/books ticket(s) of cinema.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of reservation of ticket are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “Cinema Ticket Reservation” button</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typical Course of Event:</th>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
</table>

30
Event:  
1. User/Tourist triggered the function.  
2. The system shows a list of provided films with casting time.  
3. User/Tourist chooses a desired film.  
4. The system displays a login page.  
5. User/Tourist logins.  
6. The system displays a visual layout of the cinema and displays the availability of seats.  
8. User/Tourist confirms the reservation.  
9. The system checks availability of seats again for avoiding collision caused by simultaneous reservation.  
10. The system processes successful reservation, displays reservation details on the screen and sends notification message via SMS to the telephone number registered.  

Alternating Courses:  
Alt. 10a. Seat(s) is/are not available, the system displays message of reservation failure, and prompts user to make reservation again.  

Results:  
User/Tourist makes the reservation successfully and receives a SMS notification message.  

Exceptions:  
Connection with server breaks down.  

7). Reserve restaurant table  

Table 8 Use case description of reserving restaurant table  

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Reserve restaurant table(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user reserves/books table(s) of restaurant.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Information of reservation of ticket are ready</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “Restaurant Reservation” button</td>
</tr>
<tr>
<td>Typical Course of Actor Action</td>
<td>System Response</td>
</tr>
</tbody>
</table>


Event: 1. User/Tourist triggered the function.
3. User/Tourist logins.
5. User/Tourist chooses a desired restaurant.
7. User/Tourist fills the reservation form.

2. The system displays a login page.
4. The system shows a list of shops.
6. The system shows a reservation form with prescription.
10. The system processes successful reservation, displays reservation details on the screen and sends notification message via SMS to the telephone number registered.

Alternating Courses: Noun

Results: User/Tourist makes the reservation successfully and receives a SMS notification message.

Exceptions: Connection with server breaks down.

8). Register membership

Table 9 Use case description of registering membership

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Register membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user registers a membership.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Membership registration is permitted.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist selects “Membership Application” button</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td>1. User/Tourist triggered the function.</td>
<td>2. The system shows a registration form with prescription.</td>
</tr>
<tr>
<td>3. User/Tourist fills the registration form and submits.</td>
<td>4. The system checks validation of Login ID, length of password, HKID or Passport and telephone number.</td>
</tr>
</tbody>
</table>
5. Membership registration succeeds.

Alternating Courses: Alt. 5a. Membership registration fails because of invalidity of Login ID, password, HKID or Password, or telephone number.

Results: User/Tourist makes membership registration successfully.

Exceptions: Connection with server breaks down.

9). View advertisement

Table 10 Use case description of viewing advertisement

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>View advertisement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: User/Tourist</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a user views information of advertisement.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>Advertisement information are ready.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>User/Tourist sees and click advertisement on page</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td></td>
<td>1. User/Tourist click advertisement displayed.</td>
</tr>
<tr>
<td>Alternating Courses:</td>
<td>None</td>
</tr>
<tr>
<td>Results:</td>
<td>User/Tourist views the details of the advertisement.</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>Connection with server breaks down or navigation to website or application of the advertisement fails.</td>
</tr>
</tbody>
</table>
10). Manage shop information

Table 11 Use case description of managing shop information

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage shop information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Shop staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a shop staff manages the information of shop.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Edit Shop Info” button in management page</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td></td>
<td>1. Shop staff triggered the function.</td>
</tr>
<tr>
<td></td>
<td>3. Shop staff inserts, edits, or deletes record of information of the shop.</td>
</tr>
<tr>
<td>Alternating Courses:</td>
<td>None</td>
</tr>
<tr>
<td>Results:</td>
<td>Shop information is updated.</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>Connection with server breaks down. Input data type does not match those in database</td>
</tr>
</tbody>
</table>

11). Manage new events of shop

Table 12 Use case description of managing new events of shop

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage new events of shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Shop staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how shop staff manages the information of new events of shop.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Shop Events” button in management page</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td></td>
<td>1. Shop staff triggered the function.</td>
</tr>
</tbody>
</table>
3. Shop staff inserts, edits, or deletes record of information of the new event the shop.

4. The system updates the data in database.

Alternating Courses: None

Results: Information of new event of shop is updated.

Exceptions: Connection with server breaks down. Input data type does not match those in database

12). View cinema reservation details

Table 13 Use case description of viewing cinema reservation details

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>View cinema reservation details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Cinema staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how a cinema staff views the information of shop.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Cinema staff selects “Cinema Booking” button in management page</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td>Actor Action</td>
</tr>
<tr>
<td>1. Cinema staff triggered the function.</td>
<td>2. The system shows a list of reserved detail with information of the registrants.</td>
</tr>
</tbody>
</table>

Alternating Courses: None

Results: Cinema staff views the reservation details

Exceptions: Connection with server breaks down.

13). Manage Cinema

Table 14 use case description of managing cinema
### Manage cinema

**User Case Name:** Manage cinema  
**Actor(s):** Primary: Cinema staff  
**Description:** This use case describes how cinema staff manages the status of seats of cinema.  
**Precondition:** A management platform and a login account are provided to the staff.  
**Trigger:** Cinema staff selects “Edit Cinema” button in management page  
**Typical Course of Event:**  
- 1. Cinema staff triggered the function.  
- 3. Shop staff inserts, edits, or deletes record of status of seats of the cinema.  
- 2. The system shows a list of information of seats of the cinema.  
- 4. The system updates the data in database.  

**Alternating Courses:** None  
**Results:** Information of status of seats of the cinema is updated.  
**Exceptions:** Connection with server breaks down. Input data type does not match those in database

---

### View restaurant reservation details

**User Case Name:** View restaurant reservation details  
**Actor(s):** Primary: restaurant staff  
**Description:** This use case describes how restaurant staff reservation details.  
**Precondition:** A management platform and a login account are provided to the staff.  
**Trigger:** Restaurant staff selects restaurant name in management page  
**Typical Course of Event:**  
- Actor Action  
- System Response

---

### 14). View restaurant reservation details

Table 15 Use case description of viewing restaurant reservation details

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>View restaurant reservation details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: restaurant staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how restaurant staff reservation details.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Restaurant staff selects restaurant name in management page</td>
</tr>
<tr>
<td><strong>Typical Course of Event:</strong></td>
<td></td>
</tr>
<tr>
<td>Actor Action</td>
<td>System Response</td>
</tr>
</tbody>
</table>
15). **Edit new events of plaza**

Table 16 Use case description of editing new events of plaza

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Edit new events of plaza</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Plaza staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how plaza staff manages the information of new events of plaza.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Plaza Events” button in management page</td>
</tr>
<tr>
<td>Typical Course of Event:</td>
<td></td>
</tr>
<tr>
<td>Actor Action</td>
<td>System Response</td>
</tr>
<tr>
<td>1. Shop staff triggered the function.</td>
<td>2. The system shows information of new events of the plaza.</td>
</tr>
<tr>
<td>3. Shop staff inserts, edits, or deletes record of information of the new event the plaza.</td>
<td>4. The system updates the data in database.</td>
</tr>
<tr>
<td>Alternating Courses:</td>
<td>None</td>
</tr>
<tr>
<td>Results:</td>
<td>Information of new event of plaza is updated.</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>Connection with server breaks down. Input data type does not match those in database</td>
</tr>
</tbody>
</table>
### 16). Manage shop location

Table 17 Use case description of managing shop location

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage shop location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Plaza staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how plaza staff manages the location details of shops.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Shop Location Edit” button in management page</td>
</tr>
</tbody>
</table>

**Typical Course of Event:**

1. Shop staff triggered the function.
2. The system shows a list of shop location details.
3. Shop staff inserts, edits, or deletes record of shop location.
4. The system updates the data in database.

**Alternating Courses:** None

**Results:** Information of shop location is updated.

**Exceptions:**
- Connection with server breaks down.
- Input data type does not match those in database.

### 17). Manage advertisement

Table 18 Use case description of managing advertisement

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage advertisement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Plaza staff  Secondary: System engineer</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how plaza staff manages the information of advertisement.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Plaza staff wants to edit advertisement information</td>
</tr>
</tbody>
</table>
### Use case description of managing membership details

**User Case Name:** Manage membership details  
**Actor(s):** Primary: Shop staff  secondary: System engineer  
**Description:** This use case describes how plaza staff manages the details of membership.  
**Precondition:** A management platform and a login account are provided to the staff.  
**Trigger:** Shop staff selects “Membership Edit” button in management page  

<table>
<thead>
<tr>
<th>Typical Course of Event</th>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shop staff triggered the function.</td>
<td>2. The system shows list of details of the membership</td>
<td></td>
</tr>
<tr>
<td>3. Shop staff edits, or deletes record of details of membership.</td>
<td>4. The system updates the data in database.</td>
<td></td>
</tr>
</tbody>
</table>

**Alternating Courses:** None  
**Results:** Details of membership are updated.  
**Exceptions:** Connection with server breaks down. Input data type does not match those in database
19). Manage Blocked Path

Table 20 Manage Blocker Path

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage Blocked Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Plaza staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how plaza staff manages the blocked path.</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Blocking Path Edit” button in management page</td>
</tr>
</tbody>
</table>

Typical Course of Event:

<table>
<thead>
<tr>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shop staff triggered the function.</td>
<td>2. The system shows a list of blocked path(s).</td>
</tr>
<tr>
<td>3. Shop staff inserts, edits, or deletes the blocked path.</td>
<td>4. The system updates the data in database.</td>
</tr>
</tbody>
</table>

Alternating Courses: None

Results: Blocked path(s) information is updated.

Exceptions: Connection with server breaks down. Input data type does not match those in database.

20). Manage Waiting Time

Table 21 Manage Waiting Time

<table>
<thead>
<tr>
<th>User Case Name:</th>
<th>Manage Waiting Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor(s):</td>
<td>Primary: Plaza staff</td>
</tr>
<tr>
<td>Description:</td>
<td>This use case describes how plaza staff manages the waiting time</td>
</tr>
<tr>
<td>Precondition:</td>
<td>A management platform and a login account are provided to the staff.</td>
</tr>
<tr>
<td>Trigger:</td>
<td>Shop staff selects “Waiting Time Edit” button in management page</td>
</tr>
</tbody>
</table>

40
### Typical Course of Event:

<table>
<thead>
<tr>
<th>Event:</th>
<th>Actor Action</th>
<th>System Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Shop staff triggered the function.</td>
<td>2. The system shows a list of waiting time of path(s).</td>
</tr>
<tr>
<td></td>
<td>3. Shop staff inserts, edits, or deletes the information of waiting time.</td>
<td>4. The system updates the data in database.</td>
</tr>
</tbody>
</table>

### Alternating Courses:
None

### Results:
Waiting time of path(s) information is updated.

### Exceptions:
- Connection with server breaks down.
- Input data type does not match those in database.

### 4.3 Database Design

Figure 10 shows tables in the SQL Database, and their relationship with each other.

![Figure 8 Entity Relation Diagram](image)
4.4 Layout of floors

In the project, 7 floors of FestivalWalk are involved. The 7 floors are L2, L1, UG, G, LG1, LG2, MTR. The layouts of the 7 floors are as follow:

Figure 9 Layouts of LG2 & LG1

Figure 10 Layouts of UG & G
Figure 11 Layouts of LG1 & Layout of LG2

Figure 12 Layout of MTR
5. Implementation Methodology

5.1 Reason for choosing mobile web development

Windows Mobile application is a choice for the system. Windows Mobile application is marketed by Microsoft; it is a tailor-made application for Windows Mobile. However, the Windows Mobile application is not a perfect solution for most of kinds of PDA and mobile phone. The Windows Mobile application cannot be used by most of mobile phones and some kinds of PDA like Palm.

Aiming to construct a system that is able to be used in the most sorts of mobile platform, ASP.NET is chosen to construct a mobile web that can be run by common web browsers in different kinds of platforms that is not only PDAs but also mobile phones.

Recent Years, more and dynamic ASP.NET pages are developed instead of static HTML. However, most of the dynamic pages are developed for providing service for the Internet connected PC running a desktop browser. Mobile Web is a Web providing applications catering mini browsers running on mobile devices not only PDAs but also cellular phones. Mini-browsers are different from those of desktop. Mini-browsers does not support HTML well, they support markup standards like HDML, cHTML, WML, WAP, and xHTML well. xHTML is used in this system.

5.2 Programming and design tools evaluation
5.2.1 .NET Framework

Figure 13 Architecture of .NET Framework

Figure 14 illustrates the layout of architecture of .NET Framework. The .NET Framework is a part of Microsoft’s overall .NET platform strategy. .NET Framework is tiered, modular, and hierarchal. Every tier of it is a layer of abstraction. The Framework contains .NET languages which are the top tier and the most abstracted level. The common language runtime is the bottom tier upon the Operating System. The common language runtime works closely with operating environment to manage .NET application.

The .NET Framework is a managed environment. It is made up of the Common Language Runtime environment, Base Class Library and higher-level frameworks such
as ASP.NET, Windows Forms and VB.NET. The Common language runtime is responsible for controlling the execution of .NET applications and providing essential services. And it is also responsible for managing memory, handling exceptions, making the applications to be well behaved, and so on.

.NET Framework has language interoperability. .NET languages share a common runtime, the Framework Class Library (FCL), a common component model and common types. In .NET Framework, the programming language is a lifestyle choice. Except for subtle differences, C#, VB.NET, or Jscript.NET offer a similar experience [3].

5.2.2 ASP.NET

In this system, ASP.NET is used to construct the mobile web. It is most important and most basic technique to implement the system.

ASP.NET is a web application framework marketed by Microsoft; it allows programmers to build dynamic web sites, web applications and XML web services. ASP.NET is built on the Common Language Runtime, programmers are allowed to write ASP.NET code using any Microsoft .NET language such VB.NET and C#.NET, in the project, VB.NET is chosen for the coding.
As shown in Figure 16, the web clients first interact with Internet Information Server (IIS). If the Web clients are accessing HTML pages, IIS will communicate with the underlying operating system to fetch the HTML pages. If the Web clients are accessing an ASP.NET application, the ASP.NET application will be compiled to produce a .NET assembly first.

The Web Form pages are the main display mechanism for ASP.NET applications. They are made up of .aspx files compiled with an associated .NET language class file that contains the code. This is known as code-behind. The Web forms pages are compiled before execution and cached so performance overall should prove to be better than the interpreted Active Server Pages (ASP). NET has server side controls mechanism. The page is created on the server, and pure HTML, xHTML and .etc are rendered back to the client so they can be run on any browser. And, ASP.NET can detect the calling device and respond accordingly so that it supports for all types of browsing devices such internet
browsers, cell phone and PDA [4].

5.2.3 ADO.NET

The system needs data access to database to make most of components work, so a mechanism of connecting database is used, which is ADO.NET.

ADO.NET provides consistent access to data sources like Microsoft SQL Server, as well as data sources through OLE DB and XML. Data-sharing consumer applications can use ADO.NET to connect to these data sources and retrieve, manipulate, and update data.

The ADO.NET architecture (Figure 17) is divided into two logical pieces: command execution and caching. Command execution requires features like connectivity, execution, and reading of results. These features are enabled with .NET data providers. The DataSet handles caching of results.

The provider enables connectivity and command execution to underlying data sources. Note that these data sources do not have to be relational databases. Once a command has been executed the results can be read using a DataReader. A DataReader provides efficient forward-only stream level access to the results. In addition, results can be used to render a DataSet a DataAdapter. This is typically called "filling the DataSet."

The DataSet object represents a disconnected cache of data. This cache is made up of DataTables and DataRelations that represent the results of the command. The DataSet
tracks changes to the underlying data in the cache. Changes can be submitted back to the original data source by using the DataAdapter and applicable Insert, Update, or Delete commands. The DataSet also provides a direct XML view of the underlying data in the cache. This XML can be manipulated with XML standards like XPath and XSLT. [5]

Figure 15 Architecture of ADO.NET

5.2.4 VB.NET

VB.NET is used in system as a behind-code to implement the logical functions for the mobile web applications.

VB.NET is on the top tier in the .NET Framework. VB.NET is an object-oriented language that is viewed as an evolution of Visual Basic. Like all .NET languages, VB.NET uses the Common Language Runtime (CLR) for program execution.
5.2.5 IIS

IIS is a product of Microsoft; it is a set of Internet-based services for servers using Microsoft Windows. IIS has the best adaptability of ASP.NET. Therefore, IIS is the best server as an engine supporting the process of a mobile web constructed by ASP.NET.

Besides, IIS except the early versions provide good security. In IIS 5.1 (used in this system), by default all websites were run in-process and under the System account, a default Windows account with elevated rights. The versions of IIS 6.0 added a feature called "Web Service Extensions" that prevents IIS from launching any program without explicit permission by an administrator. In IIS 7.0, the newest version so far, the components were modularized, so that only the required components have to be installed, thus further reducing the attack surface. In addition, security features such as URLFiltering were added that rejects suspicious URLs based on a user-defined rule set. [6]

5.2.6 SQL Database

Microsoft SQL Database is a component running on SQL Server. Microsoft SQL database is very powerful database; it is the core service for storing, processing and securing data. The Database Engine provides controlled access and rapid transaction processing to meet the requirements of the most demanding data consuming applications within enterprises. The Database Engine also provides rich support for sustaining high availability. In this project, the system is for one or many (if extended) enterprises, the
capacity of the database need to be high enough for storing a large amount of information and providing a higher security. On the other hand, Microsoft SQL Server database is a product of Microsoft; it has a best adaptability with ASP.NET and a best bind with the mobile web.

For the reasons that Microsoft SQL Server database provides higher capacity, higher security and best adaptability with ASP.NET for processing, Microsoft SQL Server database is the best choice for this project.

5.2.7 Adobe Flash and ActionScript

Flash is commonly used to create animation, advertisements, various web page components, to integrate video into web pages, and more recently, to develop rich Internet applications. Flash can manipulate vector and raster graphics and supports bi-directional streaming of audio and video. It contains a scripting language called ActionScript. It is available in most common web browsers and some mobile phones.

Adobe Flash is used in the system for designing Shortest Path displaying and cinema ticket booking interface and animations. Scripting language – ActionScript is used to manipulate the interface displaying, logical process, and communication with database via ASP.
5.2.8 ASP

ASP (Active Server Page) is a Web server technology developed by Microsoft that provides creation of dynamic, interactive sessions with the user. An ASP is a Web page containing HTML and embedded programming code written in VBScript or JavaScript. It was introduced with Version 3.0 of Microsoft's Internet Information Server/Service (IIS). When IIS encounters an ASP page requested by the browser, it executes the embedded program. ASPs are Microsoft's alternative to CGI scripts and JavaServer Pages (JSPs), which allow Web pages to interact with databases and other programs. Third-party products add ASP capability to non-Microsoft Web servers. The Active Server Page technology is an ISAPI (Internet Server Application Programming Interface) program and ASP documents use an .ASP extension. [7]

ASP, in the system, is used as a bridge connecting Flash interface and SQL Database. In the system, the embedded programming language VBScript is mainly used to manipulate access to SQL Database from the Flash interfaces.

5.3 SQL Database Server authentication

SQL Database Server authentication is for control access to SQL Database Server. SQL Database Server supports two authentication modes which are Windows Authentication Only mode and the Mixed mode (Windows Authentication and SQL Server Authentication).

Windows Authentication Only mode validates users to connect to SQL Server Database
by checking user account names and group membership existing in Windows like Windows XP, Windows 2000. This mode is only workable for accessing the SQL Server Database which is set up on the local machine.

Mixed mode has the mechanism of the Windows Authentication Only mode. And Mixed mode validates users to connect to SQL Server Database by checking their login ID and password each time users are going to access remotely. Mixed mode is workable for remote access to the SQL Server Database, and has better security. In this project, Mixed mode is used, because remote access to SQL Database is essential.

5.4 SQL Database access methods with ASP.NET

In this project, mobile web construction using ASP.NET, two methods of access to SQL Database are supported; those are using Data Set and using DataReader of ADO.NET. In this project, Dataset method is mainly used in Shop Information Searching function, Events searching functions. DataSet acts is an in-memory cache of Data-Tables, and with the help of TableAdapter, DataSet acts as a data source for the use for Object lists used in the mentioned functions above. Below is an example:

```
Dim da As New DataSet1TableAdapters.shop_infoTableAdapter
Dim dt As New DataSet1.shop_infoDataTable
da.Fill(dt)

With ObjectList1
 .DataSource = dt
End With
```
In the project, another Database access method Using DataReader is mainly applied in the rest of the functions. Below is an example:

```vbnet
Dim connectionString As String = "Data Source=STEPHENLAM\SQLEXPRESS;Initial Catalog=FESTIVAL;Persist Security Info=True;User ID=sa; Password=stephen"

Dim sql As String = "select * from CustomerAccount where ID = " & Me.TextBoxLoginID.Text & " and password =" & getMd5Hash(Me.TextBoxLoginPwd.Text) & ""

Dim sqlConn As New SqlConnection(connectionString)
sqlConn.Open()

Dim sqlComm As New SqlCommand(sql, sqlConn)

Dim r As SqlDataReader = sqlComm.ExecuteReader()
```

5.5 System implementation structure

The system not only provides web applications (Client platform) for tourists/users, but also provides management platform for the system. The system implementation structure includes Client-Platform structure, Administration/Management-Platform structure and Application structures.

Client-Platform structure:

![Client-Platform structure](image)

Figure 16 Client-Platform structure (a)
The Client-Platform structures (a,b and c) illustrate the whole structure of the Mobile Web providing services to tourists. The whole structure is well designed that preventing dead lock and collision in any function. The macro view of structure of the entire Mobile
Web system is easily understandable and simple. Some micro views of some functions will be illustrated below. **Region A** represents the structure of Shortest Path Displaying function; **Region S** represents the structure of Shop Information Searching function (The theory and structure of Shop Category Searching function, Shop Events Searching function, Plaza Events Searching function); **Region B** represents the Membership Registration function; **Region C** represents the Cinema Reservation function; while **Region D** represents the Restaurant Reservation function.

### 5.6 Shortest Path Displaying function structure and flow chart

**(Region A in Figure 17)**

The Shortest Path Displaying function is an application run on the Mobile Web. To implement a application to be run on the mobile web, there are many constraints. Mobile Web is not as powerful as the PC Internet browser, mobile Web does not support many techniques and most of the latest techniques. For example, later techniques like Flex and Silverlight are not supported by the Internet Explorer of PDAs. As a result, it restricts the choice of techniques to implement this application. To implement this application, Adobe Flash technique is chosen. Of course, the Internet Explorer must be installed with Flash Player (Mobile Version). Today, the latest Flash Player for mobile web browser is Flash Player 7 while PC Internet browser’s is Flash Player 9.

The flow chart of the Shortest Path Displaying function is as below:
The Adobe Flash technique is not only used to design the interface of the Shortest Path Displaying function, but also to manipulate the logical control of the function by applying ActionScript. And Flash interface needs to access data in the SQL Database. Flash interface cannot access the Database directly; the data access process must be supported by a third party application. In this project, the Adobe Flash interface access data in the SQL Database via ASP (the third party application) (to be mentioned in 5.1.5).
5.7 Interaction between Flash and SQL Database via ASP

As shown in the figure 22, Flash communicates with the database via an ASP (Active Server Page); the same cycle is followed for both sending data to and receiving data from the database.

**Role of Flash:**

i. Uses POST to call the ASP page to retrieve data from the SQL Database, update or insert data into it.

ii. Displays and manipulates the data sent to it from the SQL Database via the ASP Page

iii. Collects and sends data from the user to the SQL Database via the ASP Page

**Role of ASP:**

i. Retrieves data requested by the Flash interface from the SQL Database and outputs it in the Variable-Value format with or without changing it.

ii. Takes data sent from the Flash interface and stores it in the database with or without changing it.
iii. From data sent from the Flash interface it carries out operations like cookie setting, validation, etc.

iv. Sends back gotten results of its operations with SQL Database to the Flash interface.

**Example of Interaction between Flash and SQL Database via ASP**

![Diagram showing interactions between Flash, ASP, and the SQL Database](image)

The Flash interface has two variables “Source = Na1” and “Destination = Ng2”, the Flash interface calls the ASP Page by using POST, and sends to two variables to the ASP Page, the code used to call the ASP Page is “loadVariables(“GetDetails.asp?”,“”,“POST”);”, where “GetDetails.asp” is the name the ASP Page to be called.

The ASP Page receives the call from Flash interface, and receives the two variables, “Source” and “Destination” through Request(): (StrSource = Request("Source"), StrDest = Request("Destination")). Then, the ASP Page forms a query to retrieve data from Routing Table in the SQL Database. ("select * from RoutingTable where Source_ID = "&source& " and Dest_ID = "&dest& ")
The SQL Database, at this time, sends the required path according to the Query to the ASP Page. The path is: (Path:a*Sa1, Sa2, Na1#b*Nb1, Nb2, Nb4#c*Nc4, Sc4, Sc3, Sc2, Nc1 #f*Sf1, Nf1, Nf3, Sf4, Nf5#g*Ng2).

The ASP Page receives the Path from SQL Database, and then it handles the Path before sending them to the Flash interface using Response.Write.

The Flash interface now receives handled strings representing the path that lies on different floors as shown in Figure 5.7. Finally, the Flash interface displays the path on different floors according the received data.

5.8 Shop Information Searching function (Region S in Figure 18)

This function is mainly implemented using an ObjectList and a DataSet. The ObjectList displays the data from database by data binding with DataSet through DataTable Object.

![Figure 22 ObjectList & DataSet](image)

Dim da As New DataSet1TableAdapters.shop_infoTableAdapter
Dim dt As New DataSet1.shop_infoDataTable

da.Fill(dt)

With ObjectList1
  .DataSource = dt
  .DataBind()
End With

The Shop Events Displaying function, Plaza Events function and Shop Category function are implemented similarly, with the same method.

5.9 Membership Registration function (Region B in Figure 19)

The Membership Registration function is with error and duplication checking logic. With the logic (Figure 25), input login ID is checked first according its length and the existing login IDs from the Database. Only login ID is valid, can the following checking steps go ahead. If the login ID is valid, then length of input password is checked, and compared with password re-entered. Also, lengths of HKID or Password and telephone number are checked. If all elements are valid, the membership information is updated to the Customer Account Table in Database. And message is returned. Whenever an element is invalid, a relative message is returned and user is prompted to fill in again.
5.10 Cinema Reservation function (Region C in Figure 5.4c)
Figure 26 illustrates detailed running flow of Cinema Reservation function. This function is also implemented by Adobe Flash. The interface-database interaction is implemented via ASP Page.

In the Login logic, the system tries to retrieve data from the Database according to input Login ID and Password. If the record exists, that means it is a valid account, a Cinema Platform is shown after the statuses of seats are checked. Then, without selecting any seat, confirmation cannot be triggered. When seat(s) is/are selected, and confirmation is made, the statuses of seats are checked also for the reason of avoiding collision of simultaneous reservation. If selected seat(s) is/are available, Success message is displayed and a notification message via SMS is sent to the registered telephone number, while the reservation details are updated to the database. If selected seat(s) is/are unavailable, a Fail message is displayed.

5.11 Restaurant Reservation function (Region D in Figure 5.4c)

This function is implemented using VB.NET. Figure 26 illustrates the process of Restaurant Reservation function. Login checking mechanism is similar to that of Cinema Reservation function mentioned above. Reservation details are also displayed and SMS notification is sent while the reservation details are updated to the database.
5.12 Administration/Management structure

The Administration/Management structure is to illustrate the overview of the administration platform and its functionality. Administration and management of the system is to be done in a web browser. Figure 28 shows that the data in the database are updated by the using administration/management platform so that the client platform can use the latest data. With the Administration/Management platform, shop information management, shop events management, plaza events management, cinema booking details management, cinema seat status edition, restaurant reservation management and edition, membership management, shop location management and blocking path management and so on, can be done easily.
5.13 Structure and flowchart of Application of Dijkstra’s algorithm

5.13.1 Dijkstra’s algorithm [9]

Dijkstra’s algorithm is a graph search algorithm that solves the single-source the shortest path problem for a graph with non-negative edge path costs, outputting a shortest path tree. It was named after its discoverer, Dutch computer scientist Edsger Dijkstra. This algorithm is often used in routing.

For the source vertex (node) in the graph, the algorithm finds the path with lowest cost (i.e. the shortest path) between that vertex and every other node. It can also be used for finding costs of shortest paths from a single vertex to a single destination node by stopping the algorithm once the shortest path to the destination vertex has been determined. For example, if the vertices of the graph represent cities and edge path costs
represent driving distances between pairs of cities connected by a direct road, Dijkstra’s algorithm can be used to find the shortest route between one city and all other cities.

The algorithm is as below:

1). Create a distance list, a previous node list, a visited node list, and a current vertex.

2). All the values in the distance list are set to infinity except the starting vertex which is set to zero.

3). All values in visited node list are set to false.

4). All values in the previous node list are set to a special value (Nothing) indicating that they are undefined.

5). Current node is set to be the starting vertex.

6). Mark the current vertex as visited.

7). Update distance and previous node lists based on those vertices (neighbors) which can be immediately reached from the current node.

8). Update the current node to the unvisited nodes that can be reached by the shortest path from the starting vertex.

9). Repeat (from step 6) until all nodes are visited.

An example illustrating the result of Dijkstra’s algorithm
Figure 27 A graph of location of nodes

Figure 29 shows the location nodes. Through the Dijkstra’s algorithm, the shortest paths to each other node of each node are generated as bellow (Table 5.1):

Table 5.1 routing table (example)

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>A,B</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
<td>A,C</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>A,B,D</td>
</tr>
<tr>
<td>A</td>
<td>E</td>
<td>A,C,E</td>
</tr>
<tr>
<td>A</td>
<td>F</td>
<td>A,B,D,F</td>
</tr>
<tr>
<td>A</td>
<td>G</td>
<td>A,B,D,F,G</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>B</td>
<td>A</td>
<td>B,A</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>B,A,C</td>
</tr>
<tr>
<td>B</td>
<td>D</td>
<td>B,D</td>
</tr>
<tr>
<td>B</td>
<td>E</td>
<td>B,E</td>
</tr>
<tr>
<td>B</td>
<td>F</td>
<td>B,D,F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
<td>B,D,F,G</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>C</td>
<td>A</td>
<td>C,A</td>
</tr>
<tr>
<td>C</td>
<td>B</td>
<td>C,A,B</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>C,A,B,D</td>
</tr>
<tr>
<td>C</td>
<td>E</td>
<td>C,E</td>
</tr>
<tr>
<td>C</td>
<td>F</td>
<td>C,E,F</td>
</tr>
<tr>
<td>C</td>
<td>G</td>
<td>C,E,F,G</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>D</td>
<td>A</td>
<td>D,B,A</td>
</tr>
<tr>
<td>D</td>
<td>B</td>
<td>D,B</td>
</tr>
<tr>
<td>D</td>
<td>C</td>
<td>D,B,A,C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>D,B,E</td>
</tr>
<tr>
<td>D</td>
<td>F</td>
<td>D,F</td>
</tr>
<tr>
<td>D</td>
<td>G</td>
<td>D,F,G</td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>E,C,A</td>
</tr>
<tr>
<td>E</td>
<td>B</td>
<td>E,B</td>
</tr>
<tr>
<td>E</td>
<td>C</td>
<td>E,C</td>
</tr>
<tr>
<td>E</td>
<td>D</td>
<td>E,F,D</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>E,F</td>
</tr>
<tr>
<td>E</td>
<td>G</td>
<td>E,F,G</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>
5.13.2 Application of Dijkstra’s algorithm

To generate a Routing Table to be used by the Shortest Path Displaying function, Dijkstra’s algorithm is used in this project. As shown in Figure 5.8, an application with Dijkstra’s algorithm is set up.

The flow chart of the running process of Application of Dijkstra’s algorithm is shown in Figure 30. The application is a standalone application, when it is initiated, a GUI platform is shown. A button of Start Process and a Timer button are shown on the
interface. When the Start Process button is pressed, the process starts immediately. When the Timer button is pressed, time is being counted. Alternatively, in period 4:00pm to 7:59pm, and period 8:00pm to 3:59pm, the same effect as that of pressing Start Process button is triggered automatically.

When the process starts, location information of shops in Shop Location Table in the SQL Database is first retrieved. If data retrieve fails, an exception occurs. If data retrieve succeeds, the following steps are going to be run. First, the information in old Routing Table is deleted, followed by the Dijkstra’s algorithm. The Dijkstra’s algorithm generates the shortest paths to each node (shop) for each vertex (shop), and inserts the shortest paths of each vertex (shop) to form a new Routing Table. The process is halted when every vertex is done, and it waits for resumption by being triggered by the Timer automatically or being triggered by the Start Process button pressed.
Figure 28 Flow chart of Application of Dijkstra’s Algorithm

5.14 Advertisement

Figure 29 AdRotator

The advertisement function is implemented by using an AdRotator with an XML file.
which stores data of advertisements. The AdRotator controls the frequency of displaying advertisements, start and end date of advertisements according to the data of the xml file. Higher *Impression* of an advertisement will have a high frequency to be displayed.

An example data of an advertisement of an xml file:

```xml
<Ad>
  <ImageUrl>~/image/MusicDrama.gif</ImageUrl>
  <NavigateUrl>http://www.hkapa.edu/</NavigateUrl>
  <AlternateText>Drama</AlternateText>
  <KeywordFilter>music</KeywordFilter>
  <Impressions>100</Impressions>
  <StartDate>3/21/08</StartDate>
  <EndDate>3/22/08</EndDate>
</Ad>
```
6. Implementation Result

The system of this project is implemented successfully. The system is well structured with great-Mobile-Web (Client Platform), user-friendly Management Platform and comprehensive Security supported. Below are the results of each field:

6.1 Mobile Web Application results

6.1.1 Shortest Path displaying function

1). General services

This function is implemented by using Flash, so web browser mobile devices (PDAs) must have embedded a Flash Player. To run this function, a Flash Player of version 6 or above is required. If the web browser did not install one, the system will prompt the user to download an appropriate one by showing Mobile Flash Player downing navigation shown in Figure 32.

![Figure 30 Navigation of downing a Mobile Flash Player](image-url)
When a user successfully runs the function, he or she is prompted to select a source (Shop/Facility) with the floor it locates and a destination with the floor it locates (shown in Figure 33).

![Figure 31 Selecting source and destination](image)

A user selects the Floor field first, and then a list of shops locating on that floor is available for selection in the Shop drop-down list. After selecting the source and the destination, the user selects Summit. The screen shown in Figure 34 is displayed.

![Figure 32 Selected source and destination](image)

The screen shown in Figure 35 is a platform for waiting response of shortest path.
checking in the database according to the input source and destination. It means the shortest path checking process is in progress. At this stage, button “Find” is unavailable. It won’t trigger the next step even it is pressed. Worst, the waiting time in this process is about 5 second. Normally, the waiting time is about half a second. Of course, network throughput is a factor affecting the waiting time of the response.

![Image of the interface showing selected shops, source, and destination, and the option to check for the shortest path.]

Figure 33 Waiting response

Quickly, the shortest path is retrieved from the Routing Table in database. The Checking process finishes. An indicator “OK” is displayed to indicate this status as shown in Figure 36. At this stage, button of “Find” is available. When the “Find” button is pressed, the shortest path is going to be shown.
When the shortest path displaying process is triggered, the first screen (Figure 35) to be shown is the floor which the source shop locates. No matter the path the user required is on a single floor or on multiple floors, all are clearly shown. Figure 36 shows the path on a single floor. Figure 37 shows a path on multiple floors.
2). Service when Path(s) is/are blocked

Sometimes, some path(s) is/are blocked; the system will cleverly avoid the blocked path(s). Below is example: Before a path is blocked, the whole path is shown as Figure 37; after a path represented by a red line is blocked, the blocked path is avoided, the whole path changes to another one shown as Figure 38.
3). Service for different waiting time

In different time slots, the traffic and the situation may be different; the system will adjust the paths according to the factors like the waiting time for elevators and lifts in different periods. For example, the waiting time for the elevator in the red circle is short in the period between 8:00pm and 3:59pm, so a path presented in Figure 39 is chosen; in the period between 4:00pm and 7:59pm, the waiting time for this elevator is long, the path is adjusted to the one presented in Figure 40.

Figure 39 Short waiting time for the elevator

Figure 40 Long waiting time for the elevator
6.1.2 Searching shop information function (sorted by alphabet)
In the system, a user can check general information of shops. A list of shops (Figure 41) sorted by alphabet is shown for choosing. The user choose a shop, information including Name, Address, Telephone Number and Information are displayed (Figure 42).

![Figure 41 Shop List (sorted by alphabet)](image)
![Figure 42 General information of shop](image)

6.1.3 Searching shop information function (sorted by category)
In the function, a list of shop categories is shown first (Figure 43), the user chooses a category; a list of shops belonging to that category is shown (Figure 44); the user then choose a shop in the list, the general information (Figure 45) is displayed.

![Figure 43 Category list](image)
![Figure 44 Shop list of category](image)
![Figure 45 Information of shop](image)
6.1.4 Searching New Events of plaza

In this function, a list of new events of the plaza is shown as Figure 46; the user chooses an event, the information of the selected event is shown like Figure 47. Event name, event detail, location and holding time are displayed.

Figure 46 List of new Event of plaza

Figure 47 Plaza Event information

6.1.5 Searching New Events of shops

In this function, a list of shops is shown as Figure 48; the user chooses a shop, the information of event of the selected shop is shown like Figure 48. Shop name, event name, event detail, location and holding time are displayed.
6.1.6 Cinema Ticket Reservation

1). General Service

In the system, a user can book cinema tickets with the help of visual and interactive platform. First, user can choose a film (one film is simulated in this project) in the stage shown in Figure 50; then the user is asked to login by filling the form shown in Figure 6.51; identity checking result is shown in the next step shown in Figure 6.52; Selecting seat(s) step (Figure 6.52) is shown only for the valid users. In this stage, a visual and interactive platform indicates status of seats (seats with seat number labels are available, without the seat number are unavailable, the blue one is that being selected by the user) and reacts to the operation of user dynamically. Unavailable seat(s) does/do not change even user tries to press it/them. When no seat is selected, Submit is unavailable, that means stage represented by Figure 53 cannot be reached. When seat(s) is/are selected, and Submit it is made, status of seats is checked again for avoiding collision (to be
mention in point 2), a message of Success or Failure details (Figure 54) is shown after checking. A SMS notification (Figure 55) will be soon sent to the registered telephone number if the reservation goes successful.

Figure 50 Select film  
Figure 51 Login  
Figure 52 Identity check

Figure 53 Selecting seat(s)  
Figure 54 return reservation  
Figure 55 SMS message

---

2 The SMS message shown is Figure 6.25 is a free trial message provided by Clickatell, a paid SMS message is not like this, and it will attach the reservation details.
2). Collision Avoidance

Collision avoidance is to avoid collision and duplicated reservation on the same seat(s) by more than one user. Collision avoidance is done in the stage of checking statuses again after the user selected and submitted the action. The following is an example:

Two users select a “B2” seat at the same time when “B2” is still available (Figure 56), and then they submit almost at the same time. The one whose reservation is successfully processed will get the seat reserved, a success message is returned, and the SMS message will be sent to the registered telephone number. The other one, whose reservation must be failed at this situation because “B2” is now unavailable, will get a failure message returned. The collision and duplicated reservation on “B2” are avoided.

6.1.7 Restaurant Reservation function

In the system, a user can reserve a table in restaurants. First, the user is asked to login
(Figure 59); then valid users can select restaurants in the stage shown in Figure 60; After selecting a restaurant, a reservation form is displayed (Figure 61) for filling in. By filling in and submitting the reservation form, a message is displayed and a notification message with reservation details via SMS is sent to the registered telephone number.

6.1.8 Membership Registration function

To enjoy the booking and the reservation service, for security and interest reasons, users are required to register a membership. This needs a membership application function. The membership application will check whether the validation of user ID and length of the password, the HKID or Passport NO, telephone number. The Registration Form is shown in Figure 62; prescriptions are available to guild users to register. Success message (Figure 63) is shown for successful registration, while kinds of failure messages are shown for the failed registration (Figure 64).
6.1.9 Advertisement

The system provides service of casting advertisements (Figure 65). The casting frequency of the advertisements is controlled financially. It is benefit for the companies and users. Companies can promote their products or services while users can get more first-hand information.
6.2 Mobile Web Services Management

Information provided for Mobile Web Services are able to be managed by using a user friendly web browser.

6.2.1 Shop Information Management

Staffs can insert, edit and delete information of shops at the page shown in Figure 66.

![Figure 66 Shop information management](image)
6.2.2 Shop Events Management

Staffs can insert, edit and delete information of new events of shops at the page shown in Figure 67.

![Figure 67 Shop Events Management](image1)

6.2.3 Plaza Events Management

Staffs can insert, edit and delete information of new events of plaza at the page shown in Figure 68.

![Figure 68 Plaza Events Management](image2)
6.2.4 Cinema Reservation Details Management

Staffs can view details of reservation at the page shown in Figure 69. This table is formed by joining Cinema Status table and User Account table illustrated by Figure 70.

<table>
<thead>
<tr>
<th>BookerID</th>
<th>Name</th>
<th>HKID</th>
<th>Tel</th>
<th>BookedSeatID</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>50692468</td>
<td>lam wai</td>
<td>8099999999</td>
<td>98050359</td>
<td>C1</td>
<td>2008/3/30 02:48:58</td>
</tr>
<tr>
<td>50692468</td>
<td>lam wai</td>
<td>8099999999</td>
<td>98050359</td>
<td>C3</td>
<td>2008/3/29 05:47:08</td>
</tr>
</tbody>
</table>

Figure 69 Cinema Reservation Details

Figure 70 Joining Tables
6.2.5 Cinema Status Management

Staffs use this page (Figure 71) to edit status of seats of cinema.

![Figure 71 Cinema Status Management](image)

6.2.6 Restaurant Booking Details Management

Staffs can view details of reservation of restaurants at the page shown in Figure 72. This table is formed by joining Restaurant Status Table and User Account Table illustrated by Figure 73.

![Figure 72 Restaurant Reservation Details](image)
6.2.7 Restaurant Status Management

Staffs can insert, edit and delete information of status of seats of restaurant at the page shown in Figure 74.
6.2.8 Membership Management

Staffs can insert, edit and delete information of membership at the page shown in Figure 75.

Figure 75 Membership management

6.2.9 Shop Location Management

Staffs can add, edit and delete information of Shop Location at the page shown in Figure 72.

Figure 76 Shop Location Management
6.2.10 Blocking Path Management

Staffs can add, edit and delete information of Blocked Path at the page shown in Figure 77.

![Add a Blocking Path](image)

![Edit Blocking Path](image)

Figure 77 Blocking Path management

6.2.11 Waiting Time

Staffs can add, edit and delete information of Waiting Time between nodes at the page shown in Figure 78.
6.3 Security


6.3.1 System Security

In the system, the Integrated Windows Authentication Mode (Figure 79) is used in IIS, and IIS is allowed to control password, so that no directory of server will be exposed to the outside world. So resources in the server are protected.

Figure 79 Integrated Windows Authentication Mode
6.3.2 Service Security

1). Membership
Cinema ticket and restaurant reservation are only available to the valid members. For these two reservation services, users are required to login. It prevents dishonest reservation by someone.

2). Encryption of password
The passwords of members are encrypted using MD5, the administrators cannot understand the password of the members; and the passwords are protected in some extent even that the information gets stolen. So it secures the safety of the information of the members.

3). Notification message
After a reservation or booking service is successfully made, a notification message (Figure 55) via SMS is sent to the phone number registered. It notifies the account owner like asking “Are you using your account?”

6.3.3 Management Security
Management security is implemented to restrict the authority to manage the system.
Login ID and password is required to log in to the management page. And in the project, Session Management is implemented too. Firstly, Session Management requires the user to re-login if the session has expired or logged out already. Secondly, Session Management prevents direct access to specific management page without logging in.
7. Conclusion and Discussion

7.1 Achievement

7.1.1 Project Achievement

This project is implemented successfully. The implemented system provides an interactive and user-friendly “One stop” type platform which guides tourist to destinations in FestivalWalk plaza, provides them most updated information of shops, new events of shops and FestivalWalk, enables tourists to reserve cinema ticket(s) and restaurant table(s), and offers companies and tourists financial benefits. And the information of the system is well and easily managed. And the system is supported by comprehensive security.

The system of this project is a pioneering indoor tourist guide system for PDA. The indoor shortest path displaying function implemented in the system is an innovative idea carried out in mobile device even in computer. This kind of function will bloom in near future while the era of “Wireless Anywhere” is coming. The shortest path displaying function may become a precedence of this kind of functions.

In the shortest path displaying function, the difficulties of displaying on multiple floors are tackled, and data formats, data handling methods and the displaying mechanism are all originated.
7.1.2 Personal Achievement

In the project, I have learnt a lot. Firstly, I learnt several system construction techniques. Frankly, ASP.NET, VB.NET, Adobe Flash, ASP, SQL Database Server and kinds of skills, in fact, almost all techniques are new for me. I spent very long time to study them through reading a lot of books, surfing Internet references and analysing problems with friends. Through implementing the project, I grasped those techniques.

Secondly, in the project, I learnt spirit of indefatigability and dauntlessness. There are a lot of difficulties encountered in the project; some are frustrating and very influential to the project. But those difficulties are defeated by me.

Generally, the project makes me well equipped.

7.2 Future Development

This system is very easy to be extended. Extension does not require changes of framework of the system. For example, to increase more shops information, more shop and plaza events to be displayed, inserting the information of shops to the database is the only thing needed to do. To extend the Shortest Path Displaying function and Cinema Ticket Reservation function, most modifications are implemented in the standalone Flash file and database, the framework of the Mobile Web and the whole system is seldom affected. So, this system can be extended and optimized to be as large scale as a business model, and to be widely used in the society in the future.
8. Appendix

8.1 Resources list:

1). A folder “festivalwalk” containing the client service system files

2). A folder “Admin2” containing the management system files

3). A folder “data” containing the backup database “FESTIVAL”

4). A folder “Dijkstra2” containing the application with Dijkstra’s algorithm

8.2 System Setup Guideline

8.2.1 Server Setup

IIS Server

Steps:

1). Set up an IIS as a web server for running of Mobile Web. IIS installation steps are available at: http://www.startvbdotnet.com/aspsite/editors/iis.aspx

2). After setting up the IIS, by default, IIS creates a folder on the server's hard drive with the name Inetpub. The Inetpub folder contains a subfolder called wwwroot. The wwwroot folder is the root for the Web site. All the ASP.NET applications are saved in this wwwroot folder.
3). To enable .aspx file to be run. The following steps is going to be taken:

Right click on the server name on the left hand side of the screen and click on “Properties” on the menu that drops down.

Input “Default.aspx” in “Document”.

![Internet Information Services](image1)

![Default Web Site Properties](image2)
Click “Edit” in “Document Security”.

Enable “Anonymous access” and “Integrated Windows authentication”.

[Image of Default Web Site Properties dialog showing options for anonymous access and Integrated Windows authentication]

[Image of Authentication Methods dialog showing options for anonymous and Integrated Windows authentication]
SQL Database Server

Steps:


2). Configuration to allow remote connections: refer to: http://support.microsoft.com/?scid=kb%3Ben-us%3B914277&x=11&y=9

3). Restore back-up database (The target database to restore is “FESTIVAL”): refer to: http://msdn2.microsoft.com/en-us/library/ms177429.aspx

8.2.2 System Deployment

Client service system:

Steps:

1). Copy the folder “festivalwalk” to wwwroot folder under Inetpub folder of the Web Server (IIS).

2). Open the IIS; double click “Default Web Site”; right click on the folder name “festivalwalk” on the right hand side of the screen and click on “Properties” on the menu that drops down.
Select “Directory” in the “Properties”; let “Read”, “Log visits” and “Index this resource” enabled; and then click “Create” button; then click “Apply”.

![Internet Information Services screenshot](image-url)
Management system:

Steps:

1). Copy the folder “Admin2” to wwwroot folder under Inetpub folder of the Web Server (IIS).

2). Follow step 2 of Configuration of Client Service system above. The target folder is “Admin2”.

8.2.3 System setting

Client Service System:

Steps:

1). Change database URL: Change URL connecting to database in all system codes to the new URL connecting to the present database. Make sure the SQL Database is remotely accessible with login ID and Password.

At this stage, functions except “Shop Information”, “Shop Category”, “Shop Events”, “Plaza Events” are available now.

2). Change setting of DataSet with Visual Studio: affected functions are “Shop Information”, “Shop Category”, “Shop Events”, and “Plaza Events”.
An example:

i). Open the Mobile with Visual Studio.

ii). Double Click DataSet1.xsd on the right hand side; a .xsd table is shown.

Right click on the field name “Fill,GetData()” on the table and click on “Configure” on the menu that drops down.
Click “Query Builder” on the interface shown.

Enable “All Columns”, and then click “OK”.

Click “Next”.

Click “Next”, then click “Finish”.

Close the table and save. (this step must be done before taking next steps).
Now, Shop Information is available.

And follow the example to enable “Shop Category”, “Shop Events” and “Plaza Events” functions.

**Management System:**

Most management functions need to change their Data Sources, because the Data Sources are changed. The following steps are needed to taken:

Open the “Admin2” with Visual Studio and open a specific management Web Site. Click the triangle of SqlDataSource; select “Configure Data Source”; choose a right Database (if no Database available, press “New Connection” to choose a new Database); then press “Next”. 

108
Select a suitable table; select needed attribute(s), then press “Advanced” and enable all field in “Advance”; after that, press “Next” and “Finish”.

Finally, set the Data Source of DetailView component and GridView component as the DataSource set above. Interface of DetailView and GridView can be edit as well.

SqlDataSource which involve “Join” relation need to be set using SQL Statement.
And input SQL statement.
References


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