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AN IMPLEMENTATION OF ONLINE CAR PARKING SYSTEM FOR CPX COMPANY, MALAYSIA BY USING PROTOTYPE METHODOLOGY WITH NETBEANS IDE

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ABSTRACT

In Malaysia everyday people face difficult to get car parking place especially in Klang Valley. CPX Company is a car park management company in the Klang Valley. As the vehicle is increased, it will cause people distress due to difficult to find a parking space in a crowded area. As a result, CPX Company has realized no longer depend on its existing manual car parking system to manage the parking operations. The existing manual car parking system is unable to satisfy in a congested and crowded region. With the current car parking system, customers has to spend considerable amount of time searching for find a parking space during the period of peak. Besides that, a paper-based system is easily to lose the information of customer and resulting in human mistakes when customer reserves a parking. It is quite ineffective and inefficiency for the car parking system services. Therefore, CPX Company needs to develop a new online system which can help them to manage the car parking operations effectively and efficiently. With the proposed system, customer is able to reserve parking and make payment in anytime and anywhere through the internet. ***Keywords: Car Parking, Data Warehouse, Prototype, Requirement Analysis,***

I. Introduction

Online car parking system is a reliable system which is implemented and full fill all the requirements. In addition, the administrator of the online parking system is responsible for the implementation of standard administrative function, such as sending receipts and acknowledgement, updating parking lots, replying to enquiries and generating the essential reports. The objective of the proposed system is to manage the car parking operations more efficiently, to improve the services for customer, to allow customers be able to check the status of parking lot, to reduce time when customer finding parking space, to prevent human mistakes such as inaccurate car number plates. Generally an Online parking system Business process is a series of activities that to achieve a specific organizational goal. Business process management (BPM) is a systematic way to improve and enhance those processes. In this proposed system, it is made to manage the records more efficiently to prevent the problems such as inconsistent and incomplete information. Besides, this system also helps to complete the process faster by using computer based system. By using computer based system, the administrator

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is able to update the customer's details and parking lot, generate reports and send receipts to the customers. The process involves a clear inputs and a single outputs. The below explains the business process of the car parking online system.

1. Customers have to reserve car parking in online system in order to reduce time for looking a parking.

2. In order to register a parking space, customers is required to enter the related information included name, contact number, car plate number, email and duration hours, and select the car park lot.

3. Customers is able to check for the availability of the parking space. Besides, the price will be generates and shows automatically based on the duration hours.

4. Administrator is required to login before performs the administrative functions.

5. For the functions of administrator, it is able to update and delete the customer's information, it must to search the customer's name before update or delete.

6. Also, administrator can checks the availability of the parking space and prints receipt to customers. Besides, report will be generated automatically by administrator.

7. It also provides enquiry functionality for administrator to answer the questions from customers.

1.1 Aims & Objectives

To analyze, design and implement an online car parking system for CPX Company, Malaysia.

i. To record all the payments and transaction done by the customers for future reference.
ii. To calculate the daily earnings.
iii. To reduce the time taken to complete a process
iv. To be more convenient for the customers to make booking
v. To secured a car park for every customers

1.2 Functionalities of proposed system

In this system, the administrator is able to edit and update the latest details of the customers and parking lot that have been chosen. When the customers wanted to change their car park lot or edit their personal details, the administrator is able to help the customer to edit their profile and secured a new car park lot for the customer. Therefore, the customers are not necessary to come over the car park center to make changes of their own booking. The details and bookings made by every customer are recorded and saved in our database. Therefore, the administrator able to view the overall earnings of the car park company and generate the overall income earned by the company. After a booking is made by a customer, the customer able to request for a receipt to prove themselves that they have booked the specific parking lot. The administrator is able to send the receipt to the customer through e-mail by searching their name in the system.

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1.3 Overview of Proposed System

In this proposed system, it is made to manage the records more efficiently to prevent the problems such as inconsistent and incomplete information. Besides, this system also helps to complete the process faster by using computer based system. By using computer based system, the administrator is able to update the customer's details and parking lot, generate reports and send receipts to the customers.

1.3.1 Update customer details and parking lot

In this system, the administrator is able to edit and update the latest details of the customers and parking lot that have been chosen. When the customers wanted to change their car park lot or edit their personal details, the administrator is able to help the customer to edit their profile and secured a new car park lot for the customer. Therefore, the customers are not necessary to come over the car park center to make changes of their own booking.

1.3.2 Generate reports

The details and bookings made by every customer are recorded and saved in our database. Therefore, the administrator able to view the overall earnings of the car park company and generate the overall income earned by the company.

1.3.3 Send receipts

After a booking is made by a customer, the customer able to request for a receipt to prove themselves that they have booked the specific parking lot. The administrator is able to send the receipt to the customer through e-mail by searching their name in the system.

II. REQUIREMENT ELICITATION

2.1 Questionnaires

Questionnaires are mainly used in quantitative research during the early stages of requirements elicitation. A questionnaire is a form of containing a series of written questions that are submitted to selected people in order to collect statistical and usable information. A researcher has to design a questionnaire or an observational form in order to collect quantitative primary data. Questionnaire is a standardized way to collect internally consistent and coherent analysis of quantitative data. Therefore, questionnaire can make sure standardization, collect the appropriate data and improve the speed and accuracy of records. Besides, questionnaire also make data comparability and amenability of the across interviewers and facilitates data processing.

The advantages of questionnaires are easy to gather large amounts of information from a large number of respondents in such a short period of time which is also in a relatively cost effective way. According to [1], it can be quickly and easily quantified to obtain the results of the questionnaires by either a reliable researcher or through using a software package. Compared to face-to-face interviews, questionnaires are more cost effective when involves a large sample sizes and demography. In addition, questionnaires are also easy to analyze.

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As mentioned by [2], another advantages of questionnaire is that familiar to most of the people. It is almost everyone had some experience to complete questionnaires and generally do not make people apprehensive and troublesome. Besides that, questionnaires permit answered anonymously means that sensitive and personal questions are much more likely to be answered truthfully. Questionnaires reduce bias in formulating and asking question due to respondents receives the uniform and identical set of questions and no middle-man bias. It is less intrusive than other methodologies. Furthermore, questionnaires allow respondents time to consider their responses carefully without interference from an interviewer.

2.2 Interview

An interview was defined as a planned face-to-face meeting during which you obtain information from other person [3]. Interview was one of the most important fact-finding techniques for a project to gain the requirements and to have a proper communication with the stakeholders. Advantages on carry out interviews are that we can gain and clarify the answers right on the spot. Face- to-face meeting not only can meet the stakeholders of the company, but also to improve the relationship between us and the company. The result of the questions that's been ask during interview can be also inspire with ideas and thoughts that may be discussed immediately with our project group.The interview will be applied to Head of Administration and Administration staffs. Head of Administration is chosen because they know the requirement and the limitation for the existing system well enough. They can provide the information and functions needed in order to make existing system better by replacing it with the new system. Administration staff will be asked about the compatibility of the existing system. This will help to decide on how the interface is design to be user friendly as administration staffs are the ones that use the system much more frequently than Head of Administration.

III. REQUIREMENT ANALYSIS

Requirements analysis also known as requirements engineering which is the process of deciding user's expectations for a new or modified product [4]. It must be quantifiable, actionable, relevant and detailed. Also, it involves communication of the system users in order to determine specific feature expectations and resolution of the conflict in the requirement.

3.1 Data mining

Data mining also known as knowledge discovery, which is the computer-assisted process of analysing enormous sets of data from different perspectives and summarizing it as a meaningful data or useful information. The data mining tools assist an organization to make proactive, look for prediction future trends and behaviours, and shows the information to meet the requirements of wide spectrum of users across the organization. The diagram below displays the steps of data mining process.

3.2 Data Warehousing

Data warehouse is storage which a process of aggregated data management and retrieval, it is a way to optimize data of complex analysis. A data warehouse stores extensive amount of information by particular classifications,

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hence it can be all the more effortlessly retrieved, interpreted, and sorted by users. A data warehouse is a critical resource of organization, in order to ensure and maintain efficiency, profitability and competitive advantage. It allows executives and managers make a vast stores of transactional in order to respond to market quicker and make more business decisions wisely. The "Fig.1" below illustrates all aggregated data of an organization is stored in Data Warehouse

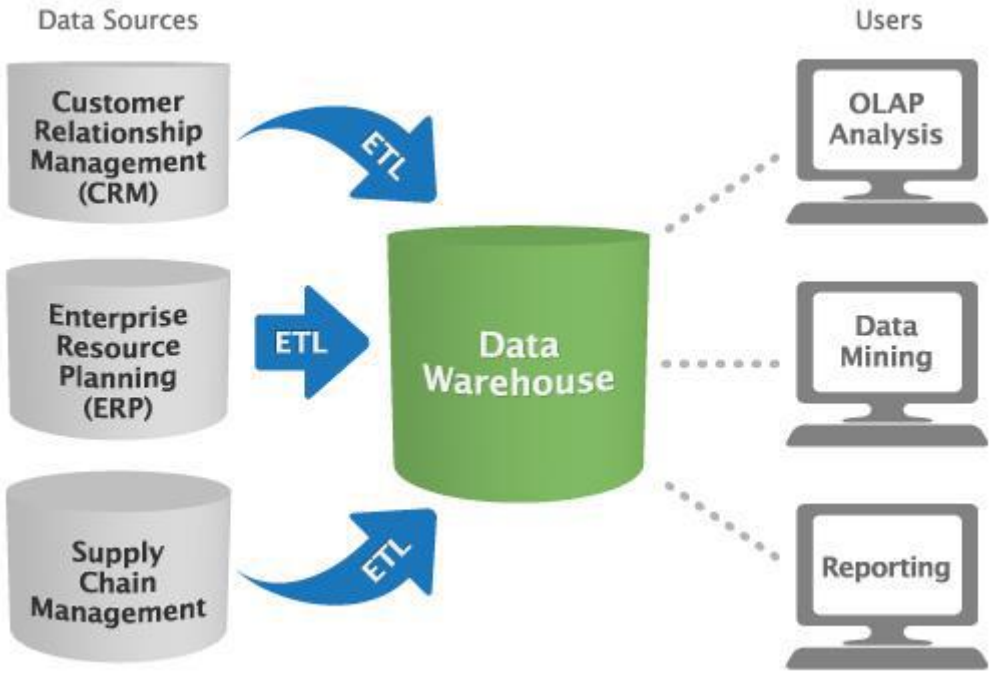

Figure.1 Organization Data Warehouse

It helps to consolidate data from several sources and permanently store a large data and then implement and analyses. Also, it helps to make an informed decision and supports a variety of data required in an organization in order to generate reports. ETL means that is a tools to perform three function included Extract, Transform and Load, which is helps to move data from one place to another. Online analytical processing, short for OLAP, which is critical process that present in almost all of the data warehouse and business intelligence system.

3.3 Descriptive Statistics

Typically, descriptive statistics are numbers used to summarize and describe data of collected from an experiment, a survey, a historical record [5]. Descriptive statistics offer brief summaries of the sample and measures. Descriptive Statistics were utilized in a manageable form for the purpose of represent quantitative descriptions. Besides, we can also measure from a great amounts of people, it helps us in a reasonable way to simplify extensive quantities of data and reduces the amounts of data into a simpler conclusion. Therefore, we use statistical inference, and make inferences from our data is more common situation. Also, we utilize simple descriptive statistics to describe data collected from us. This would help us to determine the factor which was most in need to consider.

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IV. REQUIREMENT SPECIFICATION

4.1 Functional Requirements

Functional Requirements describes the system requirements of features, functions and facility. Functional Requirements essentially specifies something the system should be able to do or provide for users. It contains the description of the required functions, the overview of associated reports or online queries, and details of data to be held in the system.

The functional requirements for CPX Company online car parking system included:

a. Search engine helps to find the exist customers.

b. It has different functions according to users' accessibility.

c. Customers can reserve a parking and make online payments.

d. Administrator can perform a standard administrative function such as sending receipts, updating parking lots, replying to enquiries and generating the essentially reports or outputs.

4.2 Non-functional requirements

Non-functional requirements is a description of a variety of quality factors or attributes, which affect the functionality's effectiveness [2]. It describes how the behavior of the system and a standard or relevant functionality should be provided. Also, Non-functional requirements describe not related implementation with the system, but its evolution with time. It included service hours, service availability, maintainability, extensibility, reliability and documentation.

4.3 Business Requirements

Business Requirements explain the reason of an organizations undertakes the project. It pointed out the benefits of the organization and its customers' expectations receive from undertaking the project [6]. For this CPX Company online car parking system project, the business requirements is convenient to customers for reserve parking with online system that can easily locate and secure a vacant parking space. In addition, it helps to gather information from customers through the implementation of the CPX Company online car parking system. Besides, the profit of the company also may increase due to pricing strategies can be manipulated based on the information obtained.

4.4 User Requirement

The user requirement can be defined as the business needs for what users require from the system (Ofni Systems, n.d.). The user requirements are listed as below:

1. The system should be accessible every working day
2. The staff can access to the system as long as they have their username and password.
3. The system should be easily navigated.
4. The system should allow the admin to print the reports of the customer details.
5. The system should allow customers to book the car park online.
6. Admin should be able to update the information of the customer through the system.

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4.5 System Requirement

According to the book "System Analysis and Design 9th Edition "by Shelly Cashman, system requirement is defined as a characteristic or feature that must be included in an information system to satisfy business requirements and be acceptable by the user. The system requirement is listed below:

1. The customer page and admin page should load not more than 5 seconds after the respective button is clicked
2. Java Programming Language
3. Browser capability in Internet Explorer 10 or higher, Google Chrome or Mozilla Firefox 6.6.

4.6 Technical Requirement

Technical requirements are the requirements that usually refer to the technical needs for the system. It involves in performing a usage analysis to aid in determining the logical architecture of the system, which will be an input to the deployment of the design phase of the system [5].

V. PHYSICAL DESIGN

The user is able to select the options whether the user is admin or customer. The admin is required to log in to access into the system. The customer is able to reserve car park in this system shown in "Fig.2".

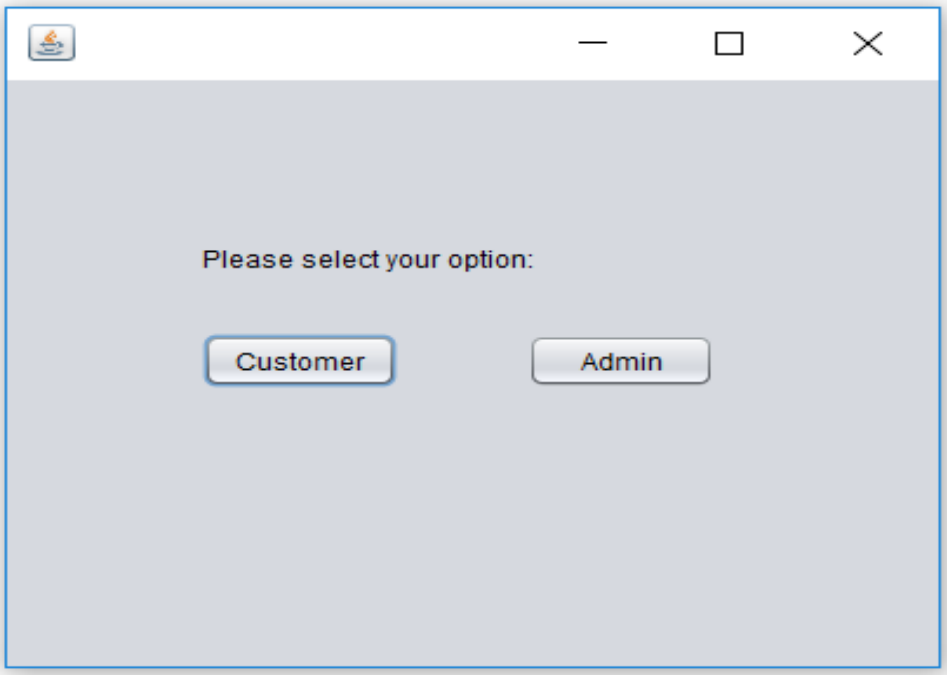

Figure.2 User Option

The customer is able to reserve their car park by filling in their information. The information filled by the customer will save in the system database and view by the admin also shown in "Fig.3".

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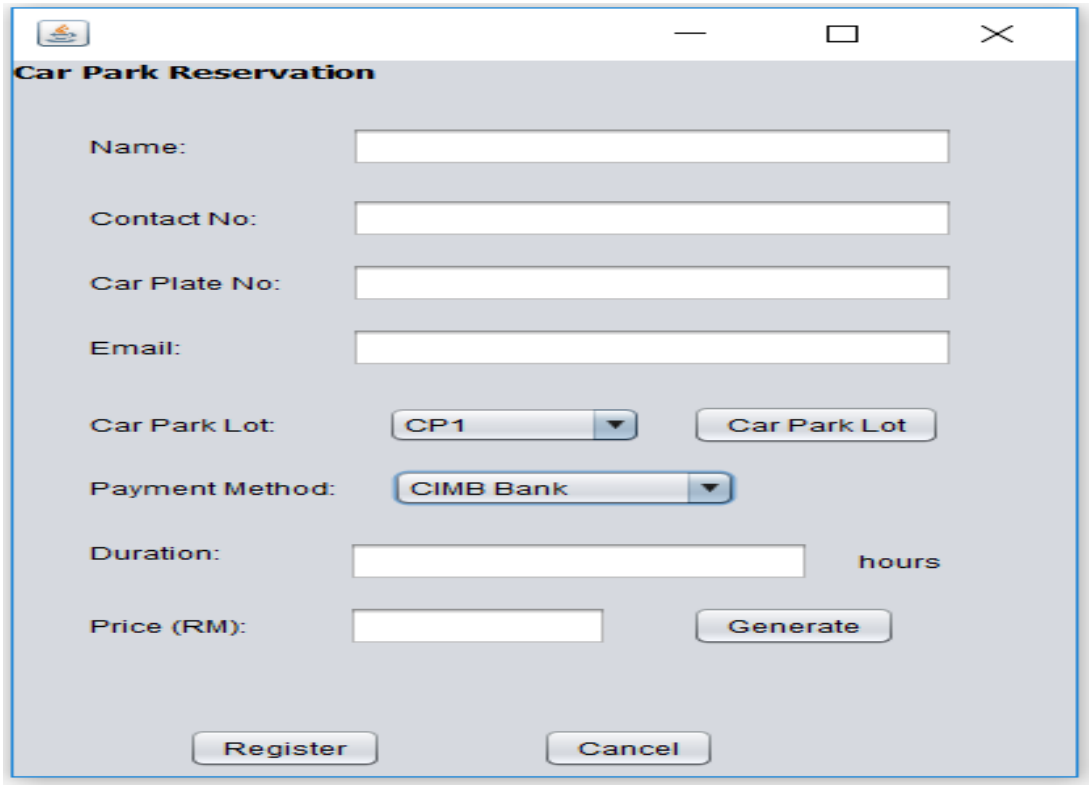

Figure.3 Car Park Reservation form

The admin is required to log in to get access into the system shown in "Fig.4".

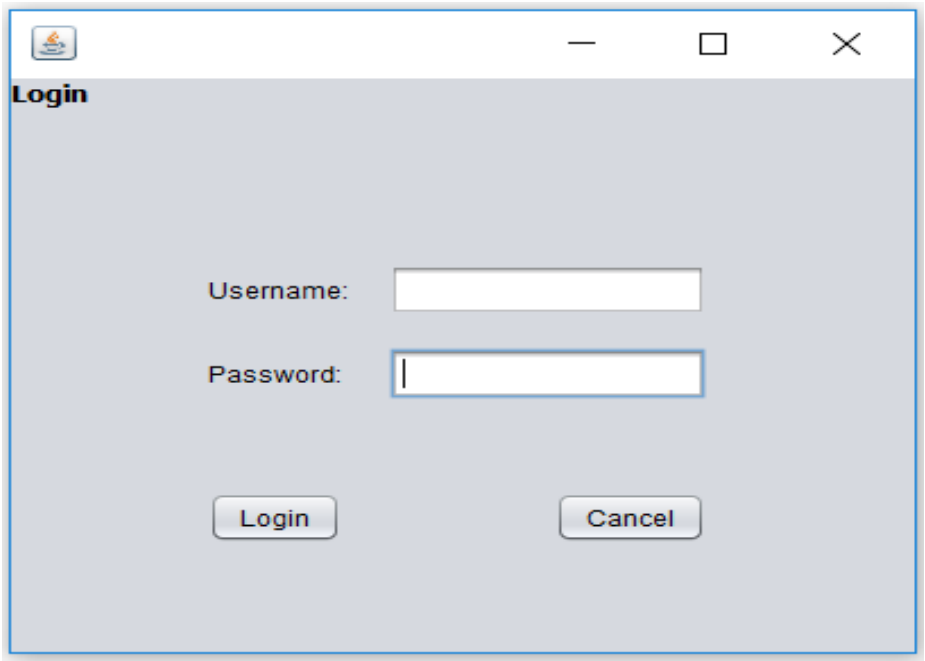

Figure.4 Login Form

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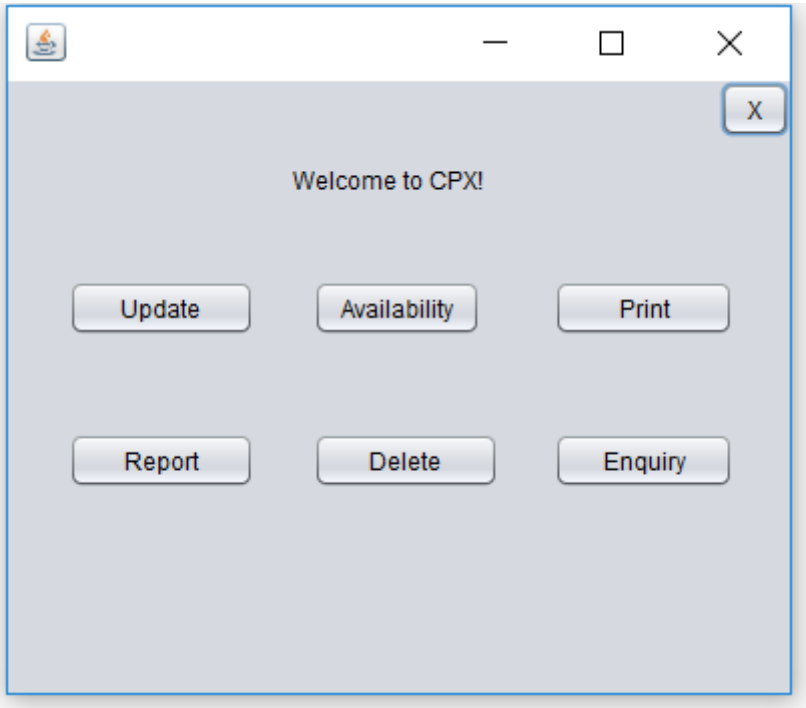

Figure.5 Admin Functions

In admin page, the admin is able to update, view reports, check availability, print receipts, reply enquiries, and delete customer's reservation shown in above "Fig.5".

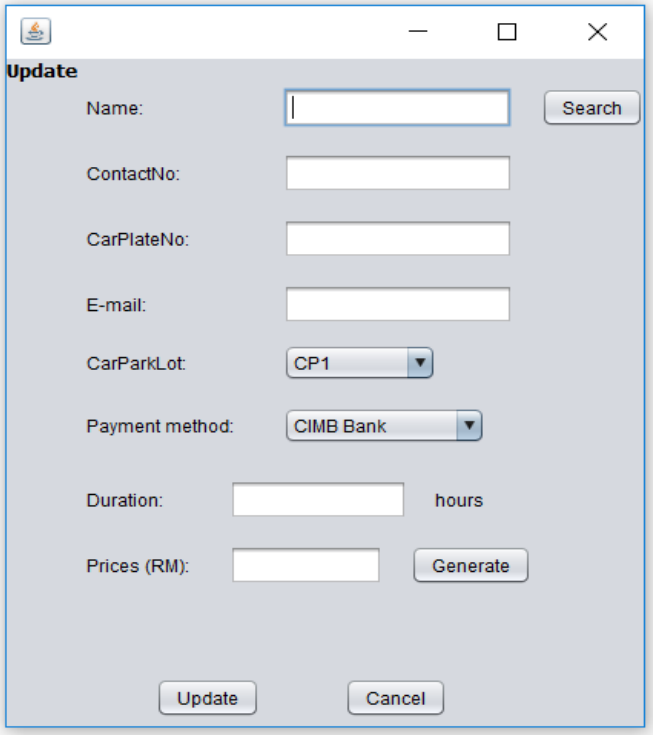

Figure.6 Update form

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Here the admin can able to update the customer details with car details and also the payment method shown in "Fig.6".

The admin is able to edit the information of the specific customer and key in the correct information shown in "Fig.7".

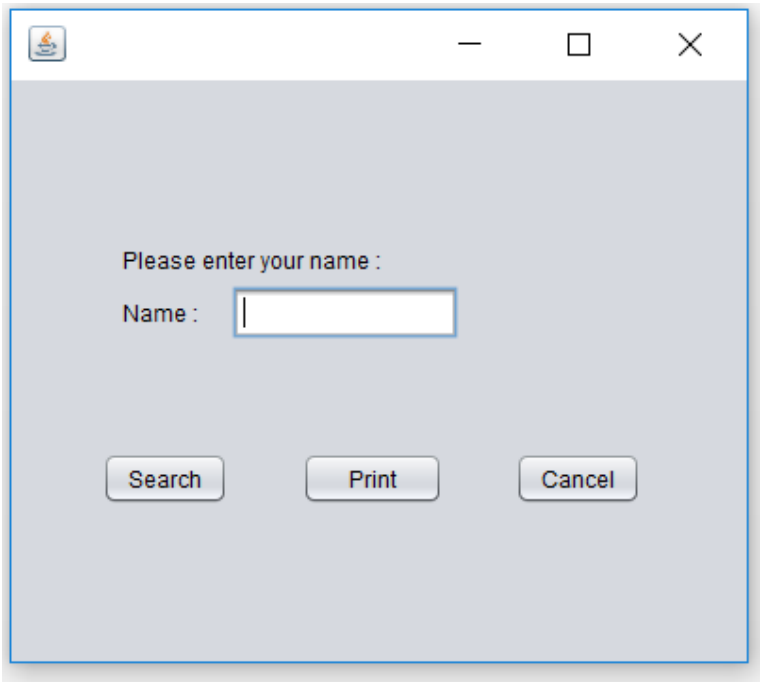

Figure.7 Print details

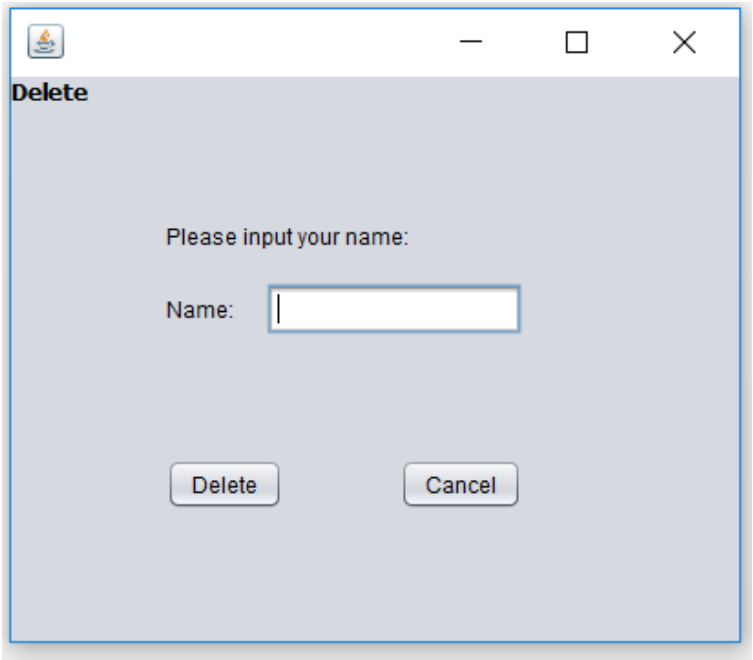

Figure.8 Deletion reservation

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The admin is able to delete the customer's reservation requested by the customer shown in "Fig.8".

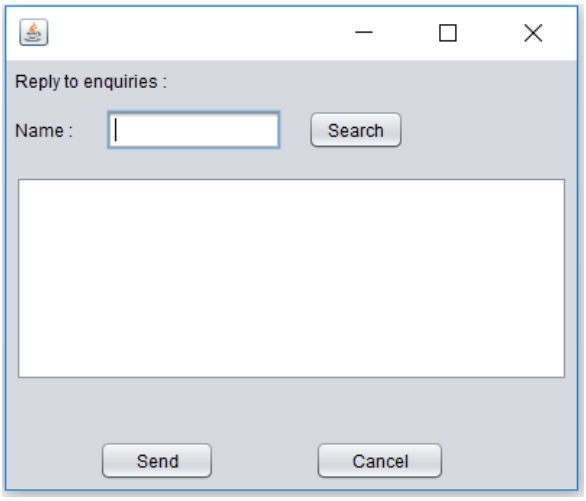
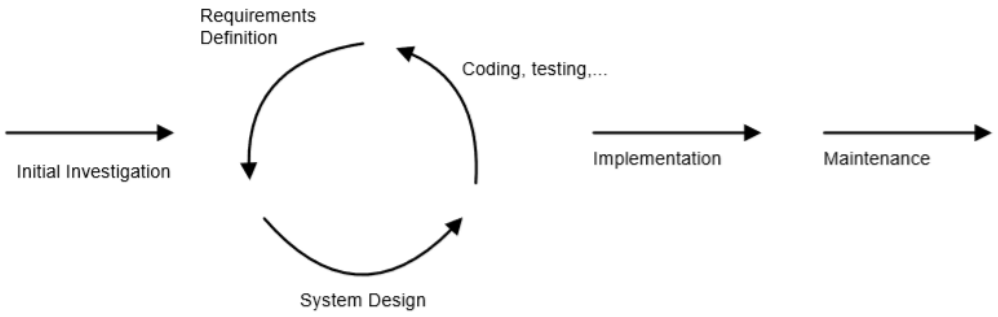


Figure.9 Reply to customer

The admin is able to reply the enquiry to the customer shown above "Fig.9".

VI. PROTOTYPING METHODOLOGY

The word of prototype comes from the Latin words "proto" which means original, and typus, means form or model [4] shown in the following.



Prototyping is a vital process which is a preliminary working model of information system in software development. It must be some initial requirements discussion between developers and users. Although the initial version does not contain all the processing, however it does embody developer's comprehension of the databases, screens and report. Prototyping allows system to build, tested, and reworked until a satisfactory prototype evolve to meet the user's requirement. Thus, it will change when a user and developer start to work with the prototype. Prototyping allows developers explore their ideas and display function of the overall design concept to customers. It provides well thought out requirements both for the user and developer furthermore overcome the incomplete requirements of the proposed system result of poor communication. Based on this model, CPX Company can concluded that the developer's capabilities, therefore reduce the risk of inheriting

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project. Also, prototype methodology reduces risk because of the potential risk can be detected early and take mitigation steps.

Mentioned by [5] prototype methodology is suitable to use for non-IT-literate peoples because they are hard to specify their requirements and not properly inform about their expectations of the system. They can obtain a proper clarity and understanding the functions of the system. Typically, prototyping methodology works well in web-based development systems and high amount of interaction with online transaction systems. Additionally, prototyping is a natural solution which provides the flow of information from screens to overcome difficult visualize in online system.

Moreover, prototype reduce maintenance costs because the early system development process has been complete. Prototype methodology ensures the end users constantly work with the system. Prototype allows developers to collect real-time feedback from users when the system is still planning. From the declaration of Nielsen, he has found that the biggest improvements in user experience come from gathering usability data [6].

In conclusion, prototype methodology is appropriate and has potential benefits to the carpark system.

VII. Conclusion

The implemented car park system will be very useful to CPX car company, Klang Valley, Malaysia in order to achieve all the requirements. By the way this system will provide clear way for the company to follow car parking with the minimized time interval.

VIII. Acknowledgment

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