Group Assignment

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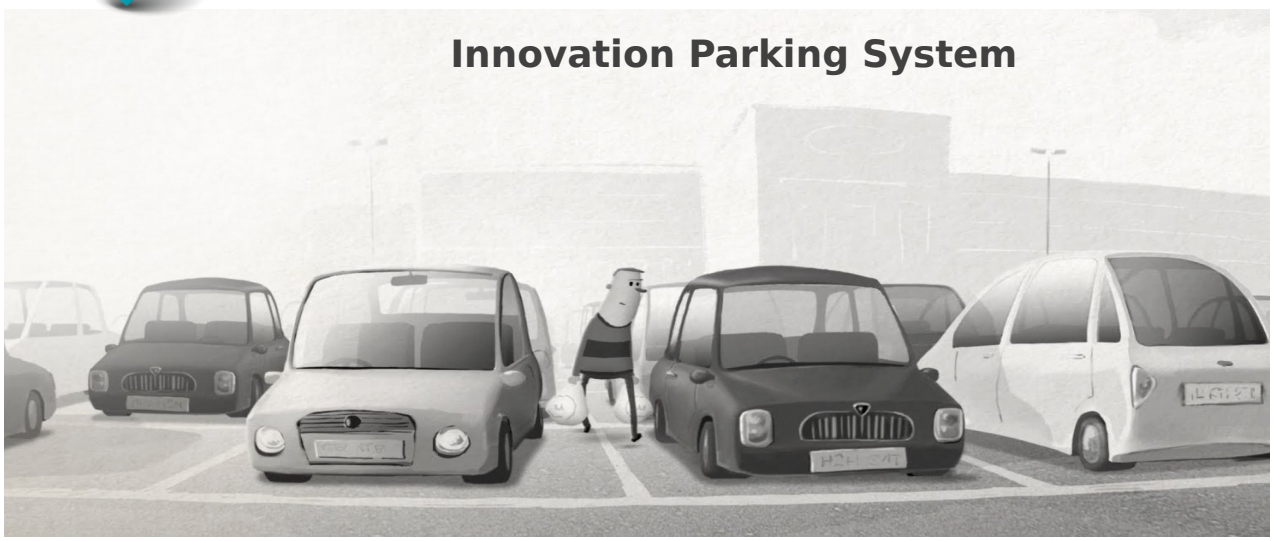
Part-A-Group Component:

1.0. Project Planning:

C.CAR



1.1. Introduction

In this project we are operators of a car park management company. Our company name is C.Car. We manage a number of indoor and outdoor parking spots in the Klang Valley. We have internet based system that makes our company to a better management of parking system. Our car park management system Malaysia specializes in design, install and maintaining expert car parking systems including ticket dispenser, barrier gate, auto pay station and parking guidance system (PGS) in commercial, corporate and government buildings around Kuala Lumpur, Klang Valley and Selangor areas. Our car park management system Malaysia also provides excellent car park operation and management systems for our clients, which cover feasibility studies, operation and management, design consultancy, repair and maintenance services. Our car park management system Malaysia car parking system equipment are capable of providing clearness and security to airport, corporate office, hotels, shopping malls , educational institutions, government buildings and so on in Malaysia.

1.2. Business Process

C.CAR has installed many Parking Solutions throughout Klang and will provide you with a genuinely valuable car parking investment supported by an experienced, qualified and passionate Team. As the leading Supplier and Service provider to the Car Park Industry in Klang, and sole supplier of C.CAR manufactured systems, our Team are passionate about parking and we are confident our quality solutions will meet your parking needs. We have executed large scale parking management system project in the region with over 15000 parking slots in total.

C.CAR will supply and install your parking system, configuring it to your specific requirements. With advice, support and maintenance services available C.CAR works with you to ensure you get the most out of your parking system. Our friendly, helpful and professional Control Centre Team will provide your customers exemplary support and services as agreed with you.

We believe that each car park id unique and require customized management system. We take a systems approach in design entries and exits, traffic flow, guidance system, payment system, and access management of every parking project. Our aim is to be your parking solution.

C.Car are following some items:

- License agreement
- Display the contractual warning signs
- Parking permit
- Parking charge ticket
- Provide parking permit
- Reserve parking
- Make payment
- sending receipts and acknowledgement
- updating parking lots
- replying to enquiries and generating the necessary reports or outputs

Our office

Head Office 27, Jalan Tiara 3, Bandar Baru **Klang**, 41150 **Klang**, Selangor.
Ph: 660055500
c.car@mail.my

Location of Company:

1.3. Problem Definition

Now a days we can see different kinds of problem with parking are an everyday occurrence. Lace of accessible parking system can hurt local business decrease the quality of life for residence.

Common parking issue

- Unauthorized use of disabled bays
- Illegal parking
- Vehicles remaining in car park overnight
- Insufficient use of existing parking capacity
- Economic, environmental and aesthetic impact of parking facility
- Parking space that are an inconvenience
- Impact for additional parking space
- Out of town parking
- Inconvenient parking option
- Inadequate pricing method
- Confusing parking policies
- Difficulties with parking regulation and pricing
- Low parking turnover rate

1.4. Scope and the objectives of proposed system

- Complete parking management system design with comprehensive parking facility assessment and recommendation.
- System integration including recommendation of appropriate technologies.
- Installation and commissioning.
- Operation and maintenance.

1.5. Objectives

- To minimize the effects of on street parking upon road safety and congestion.
- To reduce dependence on the car, particularly in town centers.
- To reduce, where possible, environmental damage caused by cars and car ownership, particularly in residential areas.
- To keep the implementation of controlled parking zones and application for special parking area status under review, in association with the highway authority and the police.
- To ensure that in areas with existing Traffic Regulation Orders, the consolidation orders include footways and verges.
- Provides residents and visitors with a viable system that is safe and easy to use.
- To review the number of long stay parking spaces in Council car parks to ensure that the long/short stay allocation is appropriate to the area.
- Supports a range of travel choices including more sustainable transport modes.
- To review the operation and enforcement of the Council's car parks to ensure they operate in support of the Council's objectives, generic enforcement policy, and social inclusion and equalities policies.

1.6. Proposed Solution

Given the problems we are experiencing with the misuse of parking bays and other problem. So we are propose to manage these issues through an established and experience company “C.Car”.

The following recommendations of parking solution can solving these problems.

- Car park equipment and management system.
- Parking guidance system.
- Valet parking system.
- On-street parking system.
- Traffic barriers.
- Electro mechanical bollards.
- Signage of parking area.
- Implement and control the daily management of an automatic number plate recognition system.
- Enforcement of the correct use of the car park.
- Increase the range of parking convenience and price levels.
- Parking space comparison.
- Ensure sufficient handicapped parking to meet existing needs and regulations.

1.7. Feasibility Study

After observing the problems in the given project, feasibility study is necessary to analyze about success, time constrains and budget for project by looking at the requirements. The aims of feasibility study is objectively uncover the strengths and weaknesses of the proposed project environment. To determine whether the car park management system is successful or not, description of products, economic statement, detail of the operation and management and legal requirements and tax obligations, following feasibility studies are as follows.

1.8. Economic Feasibility:

To introduce new system in this project, Analyzation of economic feasibility is necessary. We have to ensure that the benefits is more than development and maintenance cost of this project.

To develop a new system, some amount of money is required to buy new features such as web-designer to design the specific website for users.

Direct cost should be calculated to develop this specific projects such as software and hardware purchase. Hardware cost is implementation of Automatic pay station, Ticket dispenser, Barrier

gate, new computer system to run all these features. Hardware costs are fixed costs because they merely change. Two main analysis are done in this feasibility.

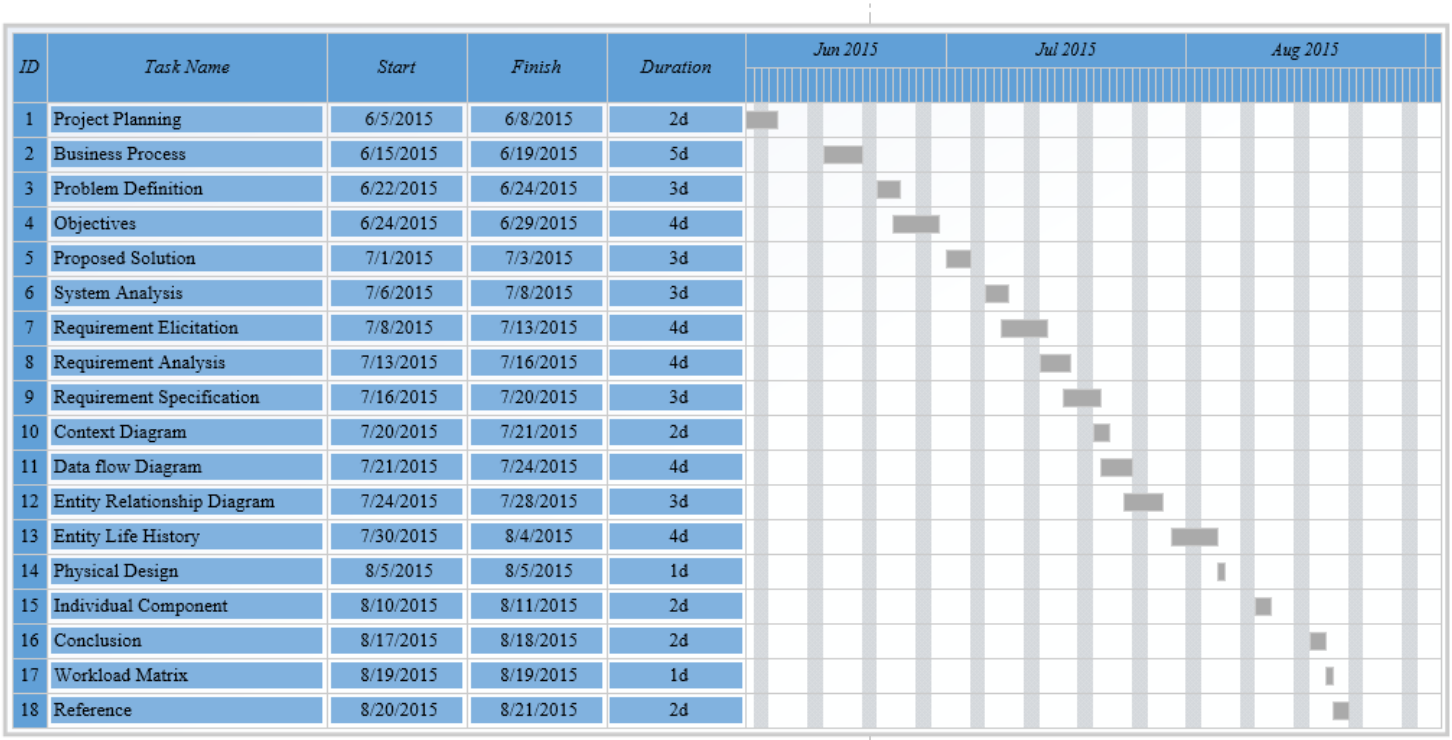
- Economic benefits analysis from this project
- Economic cost analysis from this project

1.9. System development cost:

Automatic pay station	**$500(each one)**
Ticket dispenser	$280(each one)
Barrier gate	$450(each one)
AMANO **Car Parking Management Software**	$236.99
Fee Computer X-PARC	$12500
Total	$13966.99

1.10. Scheduling

Gantt chart



ID	Task Name	Start	Finish	Duration
1	Project Planning	6/5/2015	6/8/2015	2d
2	Business Process	6/15/2015	6/19/2015	5d
3	Problem Definition	6/22/2015	6/24/2015	3d
4	Objectives	6/24/2015	6/29/2015	4d
5	Proposed Solution	7/1/2015	7/3/2015	3d
6	System Analysis	7/6/2015	7/8/2015	3d
7	Requirement Elicitation	7/8/2015	7/13/2015	4d
8	Requirement Analysis	7/13/2015	7/16/2015	4d
9	Requirement Specification	7/16/2015	7/20/2015	3d
10	Context Diagram	7/20/2015	7/21/2015	2d
11	Data flow Diagram	7/21/2015	7/24/2015	4d
12	Entity Relationship Diagram	7/24/2015	7/28/2015	3d
13	Entity Life History	7/30/2015	8/4/2015	4d
14	Physical Design	8/5/2015	8/5/2015	1d
15	Individual Component	8/10/2015	8/11/2015	2d
16	Conclusion	8/17/2015	8/18/2015	2d
17	Workload Matrix	8/19/2015	8/19/2015	1d
18	Reference	8/20/2015	8/21/2015	2d

2.0. System Analysis:

2.1. Requirement Elicitation:

Requirement Elicitation is an active effort to extract information from stakeholders and subject matter expert, elicitation is not a step or task you do at a certain point. It is a set of techniques you apply, appropriately, during the requirements phase.

Before requirements can be analyzed, modeled, or specified they must be gathered through an elicitation process. Requirements elicitation is a part of the requirements engineering process, usually followed by analysis and specification of the requirements.

Requirements gathering	Requirement Elicitation
example ; like collecting sea shells	Like archeology
Take what you see	planned , deliberate search
More reactive , less proactive	more proactive, less reactive

- Sources of information

  Documents about the application domain Manual and technical documents of the current system.

- User Participation Interviews
  - Closed interviews: user answer a predefined set of questions
  - Open interviews: no predefined agenda
  - Gain concrete info about work practice
- User observation

2.2. Interview:

Probably the most common technique of requirements elicitation. Interviewers must be open-minded and should not approach the interview with pre-conceived notions about what is required

- Stakeholders must be given a starting point for discussion a question a requirements proposal an existing system(car parking management system)
- Interviewers must be aware of organizational politics Some requirements may not be discussed because of their political implications
- Interviews with different stakeholders Different perspectives & global understanding of their requirements

2.3. Questions:

1) Do you think it would be useful to have an online car parking reservation to assist the customers to easily find parking slot at a particular organizations \ specific places?

☐ *Agree* ☐ *strongly agree* ☐ *Disagree*

2) There is always problem to find a parking slots and it takes much time, if you are able to find and book online, it would be much better and save time?

☐ *Agree* ☐ *Strongly agree* ☐ *Disagree*

3) What are the most important things to have in car parking system and must be provided*?*

☐ *safety* ☐ *affordable price* ☐ *nearby location* ☐ *other things*

4) Other comments or suggestions?

…….....

2.4. Observation:

People often find it hard to describe what they do because it is so natural to them.

- Actual work processes often differ from formal, prescribed processes
- Sometimes the best way to understand it is to observe them at work
- Approach: adopt methods e.g. from the social sciences which has proved to be valuable in understanding actual work processes.

2.5. Requirements analysis:

Requirements analysis can be defined as the particular procedure of choosing customer goals for another or balanced thing. In fact, these requirements must be quantifiable, material furthermore ordered. All things considered, necessities investigation incorporates consistent association with framework customers, at the plan to convey a few capacities, for example, to center specific framework wishes, determination of conflict in prerequisites as asked for by the diverse clients, avoidance of framework web blanket and documentation of all parts of the undertaking progression process from the earliest starting point to the end. To arrange, dissect and present information.

2.6. Requirements Specifications:

Requirements specifications are a set of structured information that consolidates the requirements of a system. It is used to help identify the problems that the current system encountered and propose a viable solution. Thus, it can serve as a guideline while developing a new system. Among the necessary requirements, they can be classified into several requirements such as functional requirements, non-functional requirements.

2.7. Functional requirements

The functional requirements identify tasks or actions that have to be accomplished by the system. In our proposed system, online car parking system provide for the user some options such as choosing date and the ability to change with the update option (2015. ParkMe), with the following points show what the system provide:

- The system shall be able to collect and store information about every parking space on the university campus at 30-second intervals for no less than one year.
- The system shall automatically remove the user information and reservation if the user has not made the payment required within the period of 72 hours from the reservation time.
- The system shall be able to collect information concerning fire lanes and loading zones and sends notices of this information to parking authorities through email.
- The system shall be able to allow the user to set up dates and times for the system to transmit space availability information to their phone or email account.
- The system shall provide the customer the ability to auto find the best spaces available for them based on their course schedule for that specific time and day.

- The system shall provide the operator with the ability to print daily, weekly, monthly, and annual reports of the parking spaces usage, and allow the operator to customize the type of output that is desired. This output would include certain lot usage, usage between certain times of the day, amount of visitors requesting information from the system. (2015. ParkMe)

2.8. Non-functional requirements:

Non-functional requirements encompass criteria such as performance and reliability of the system (Debono, 2012). Usability is one area which our system has looked into. The proposed system is designed in such manner that it is simple to use to make it user-friendly while capable of fulfilling and performing all the tasks required. Using a web-based system, it is also able to be used from anywhere with internet access.

Reliability refers to the security of the system, as our web-based system involves online transaction, it is important to look into this aspect. In order to maintain the security of the system, the WebPages are encrypted using Security Socket Layer (SSL) to prevent breach personal details especially during transactions.

In the first step, the users have to enter details about the car. The details could be car number, car name, drivers name, driver's license number etc.

User chooses his own likely parking spot to reserve in a web page. User chooses his slot with respect to its status. Hence the empty slot is notified by the system with red color. The occupied slot is notified by green color. If a slot under reservation but not occupied then we get light green color notification. However we are getting different color notification for users understand.

User has to accept confirmation order within a fixed time period. After confirmation user gets orange color notification. If user does not accept the confirmation order then process will expired.

User has to provide initial payment with a time period to reserve the parking slot. The payment process should be done through net banking. After successive payment process user gets purple color notification. The reservation will expire if the user does not pay money with in a period.

User has conform his payment details within a period. The payment will not accept without confirmation. After confirmation user gets yellow color notification.

Next step, user will get his username and password to enter into the security system. The security system of barrier gate is fixed into the parking area. The username and password will enter into the keypad along with the barrier gate.

Final step, user has to occupy his corresponding slot within a period of time. If user does not occupy his slot at correct time then he will lose corresponding slot. But he can able to reserve any other slot with previous payment. Instead of late arrival user has to follow from second step. After successive occupation of the slot web page shows green color notification. If user reservation is canceled then web page shows red color notification. By the way it is intimate that

particular slot as empty. By keep following above seven step user will achieve peaceful car parking reservation in the car parking area. Each and every step will be achieved only on the web page specially designed for corresponding car parking area. This reservation process only achieved through the internet accessible devices.

On every reservation process there is continue communication between web server and the system management. The system stores every action happen in a web server. This information is helps to checking every action of web server. In case any of illegal access happened in the parking area we can able to avoid them with this information. For the anti-theft action we can use this information. If any misbehavior happen in a car parking area we can able identify vehicle theft in car parking area.

2.9. Car Checkout Process:

The checkout procedure for all users in car parking area. Every user compulsory should make checkout procedures before checking out their car from parking slot. Without follow checkout procedure user cannot able to takes their car from parking slot. The checkout procedure is explained below.

User has to select their car parked slot in a webpage. Hence every user has to make this only by an internet access. This will help to improve quality of security system.

User has to enter his username and password in the webpage. By this the unauthorized person cannot able to theft a car. If time expires before entering username and password then user has to follow the procedure from first step.

User has to make his final payment for his parking. If time expired during final payment then user has to follow from first step. After final payment user has to checkout his car immediately within short time duration or else the username and password will be locked. So he has to make checkout procedure from first step.

User has to enter his new username and password into the barrier gate to checkout his car from the parking slot. The barrier gate will not open if time expires to enter the username and password. After barrier gate opened if the user takes long duration to checkout his car from slot then the gate will automatically closed. At this stage user has to make procedure from first step.

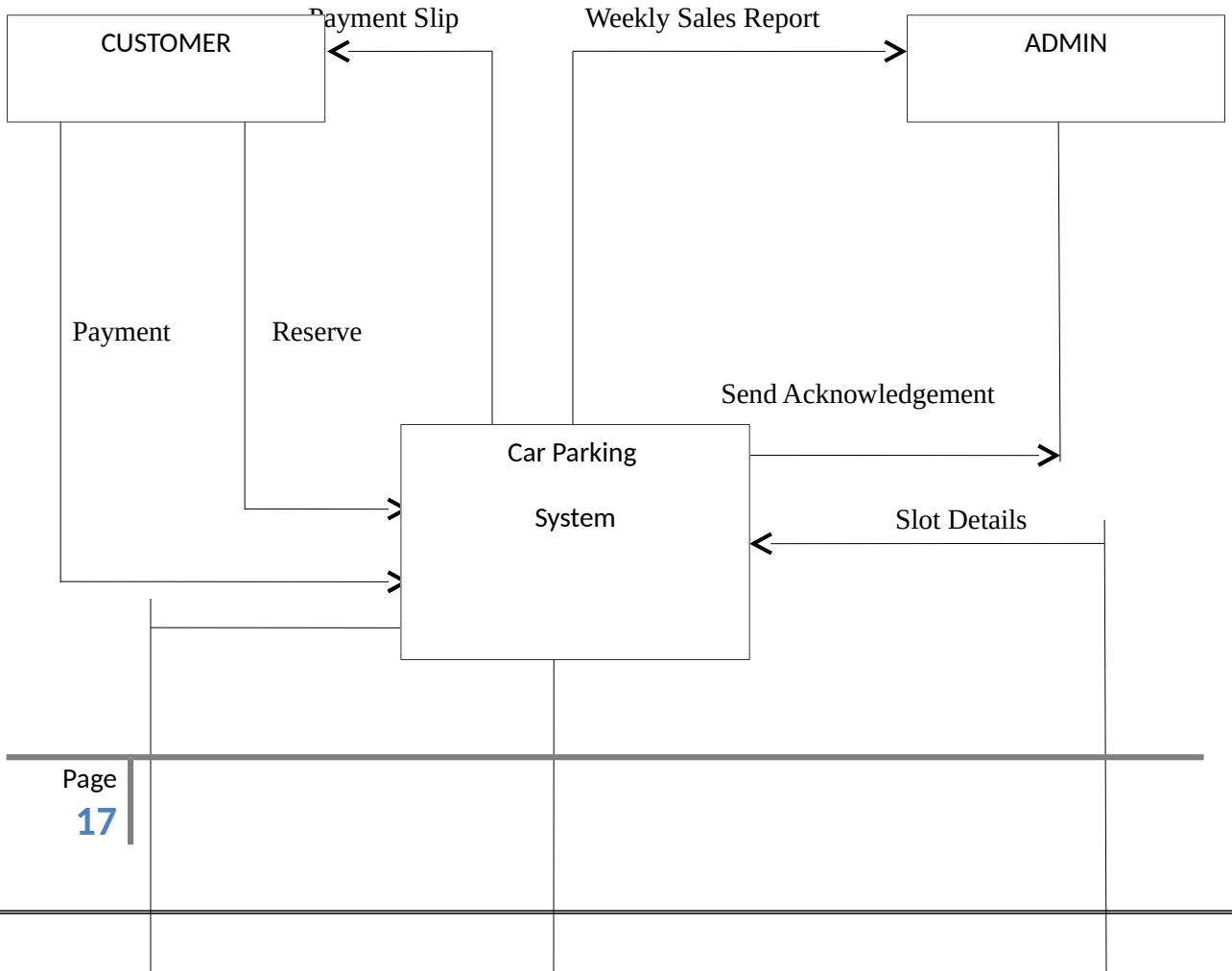
Final step if the slot is really become empty then system changes the slot status as empty by provides red color notification.

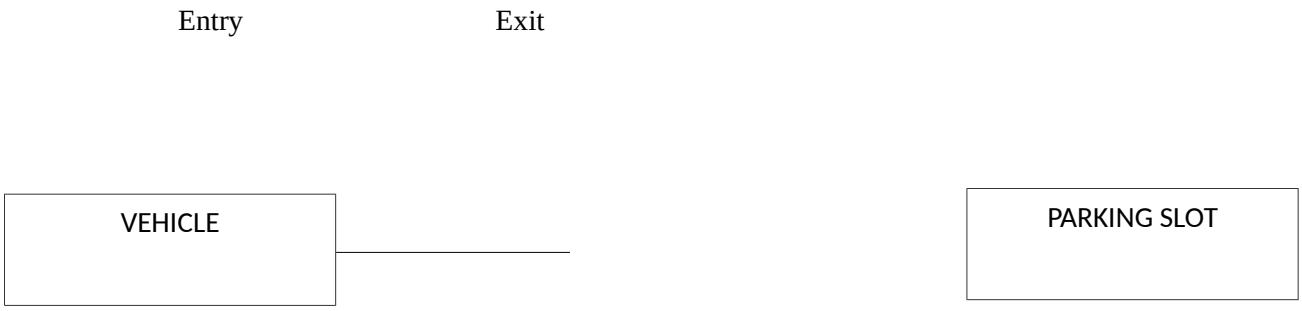
3.0. Logical Design:

A logical design is a conceptual and abstract design of the system. The process of logical design consisted on arranging logical data into a series of entities and attributes (Docs.oracle.com, 2000). There are many tools and techniques to represent and demonstrate the logical design of the system.

- Context diagram
- Data flow diagram Level 0
- Entity Relationship Diagram
- Entity Life History

3.1. Context Diagram:





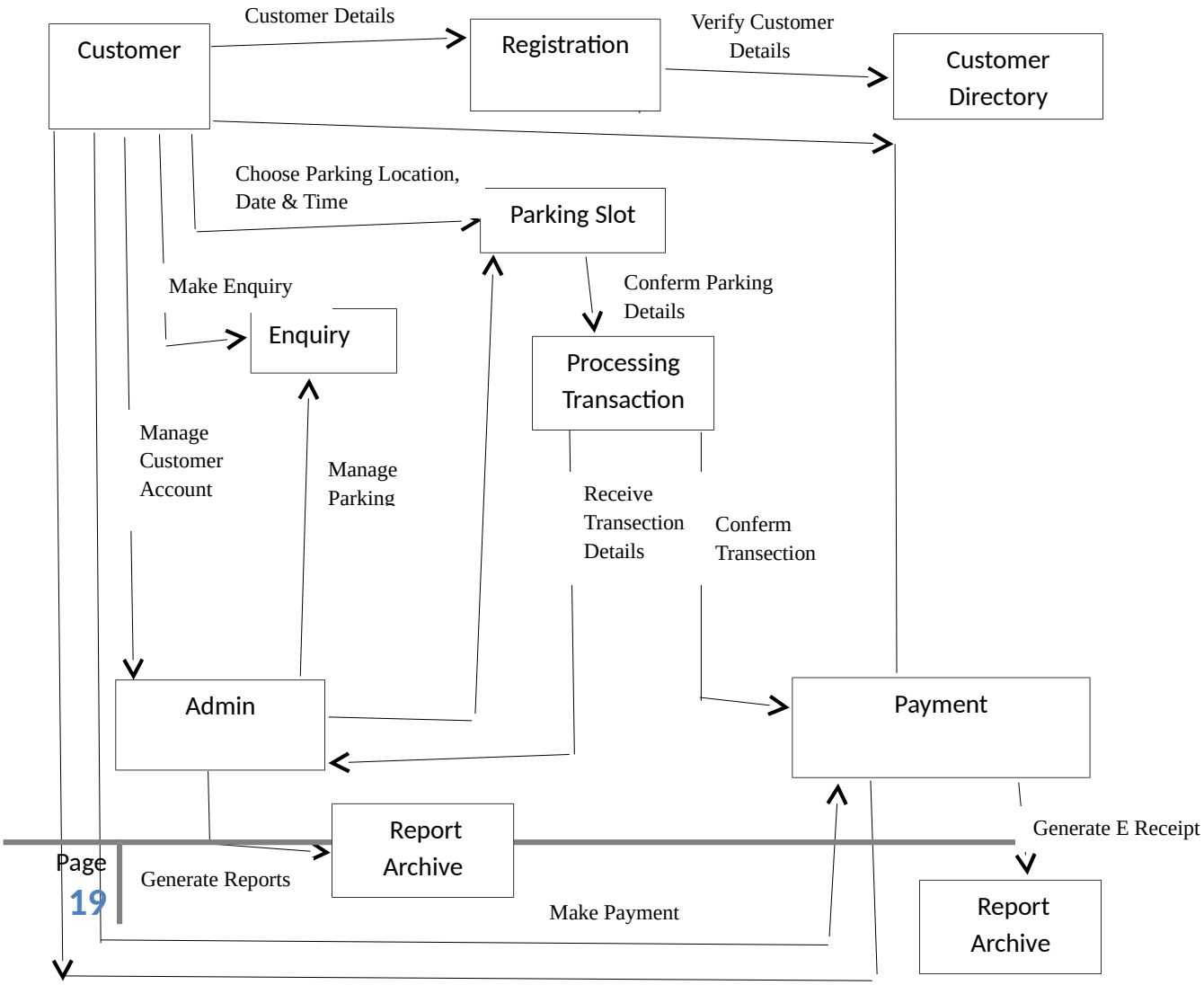
A context diagram is top level data flow diagram. It has mainly one function node which is called process-0 that generalize the functions and relations of the entire system with external entities. A data flow diagram is a graphical representation of the flow of data through information system. The data flow diagram lets visualize the designer, how the system operates. It is also used by system analyst to design the information processing system

The circular shape is the main process of the system while customer, admin, vehicle and payment are the external entities. The data flow is shown by arrows. Data flow diagram shows in this figure, how process of Klang Valley and customer interact with external entities. Customers will reserve parking and make payment by booking. If the parking slot is available, they will get parking slot details otherwise, if the parking slot is not available and order is rejected. Apart from reservation, Klang Valley will send weekly statement payment and weekly report to admin.

3.2. Data Flow Diagram Level 0

Data flow diagrams are the logical diagrams that gives the brief about the process and system functionality, the data flows between different components and how information is received and stored. Data flow diagram uses external entities, data flows as in context diagram. The main difference of context diagram is, single process represents the entire information system. DFD level 0 goes deeper to elaborate all the major processes (Shelly Cashman, 1996)

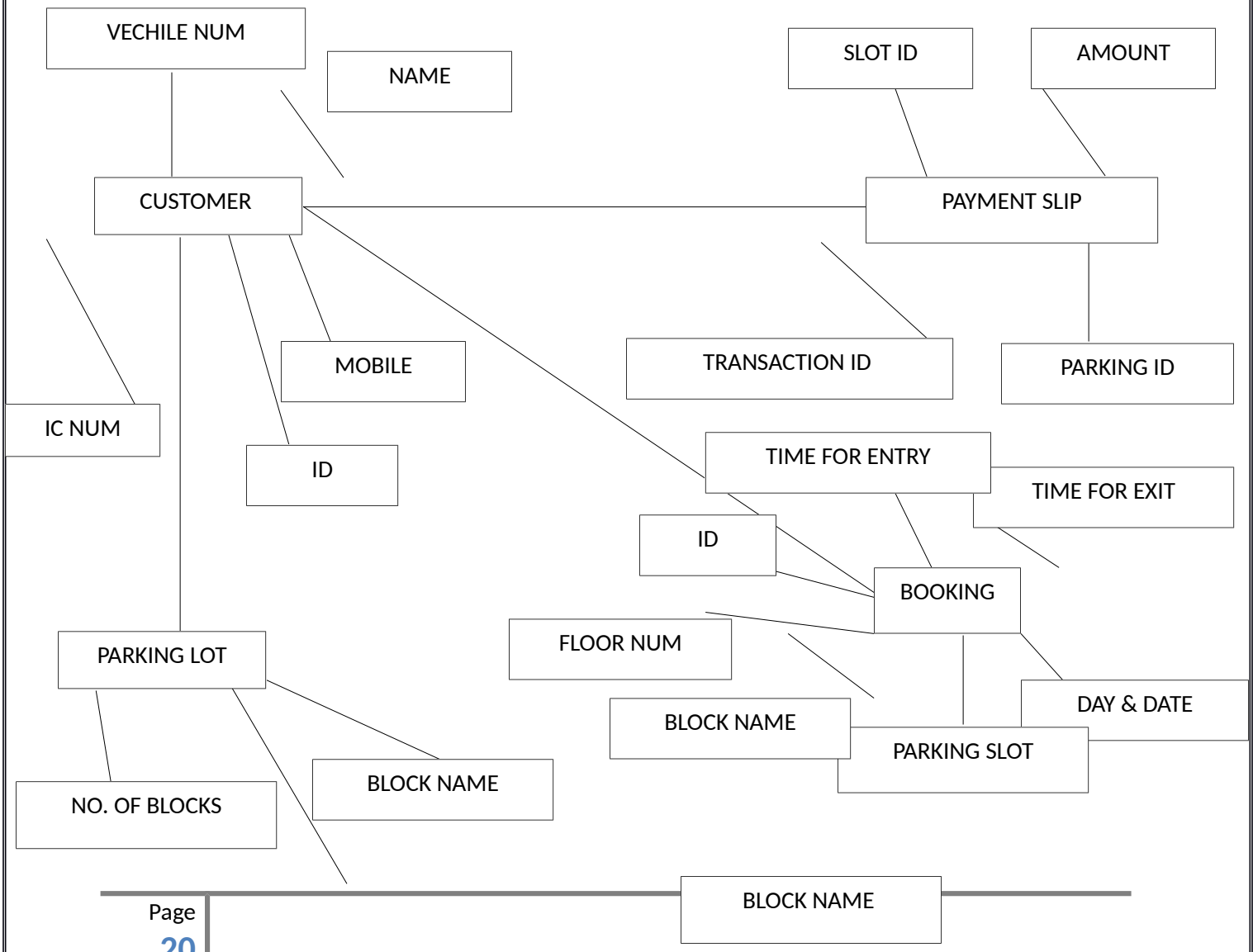
DFD Level 0

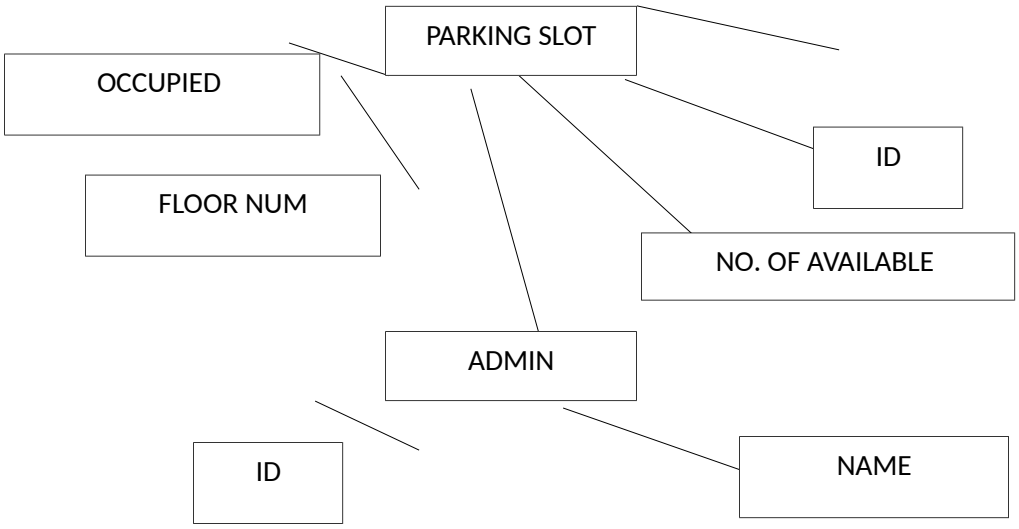

Customer
Customer Details
Registration
Verify Customer Details
Customer Directory
Choose Parking Location, Date & Time
Parking Slot
Make Enquiry
Enquiry
Conferm Parking Details
Processing Transaction
Manage Customer Account
Manage Parking
Receive Transection Details
Conferm Transection
Admin
Payment
Report Archive
Generate E Receipt
Generate Reports
Make Payment
Report Archive
Send E Receipt

3.3. Entity Relationship Diagram:

An entity relationship diagram (ERD) is a graphical representation of an information system that shows the relationship between people, objects, places, concepts or events within that system. An ERD is a data modeling technique that can help define business processes and can be used as the foundation for a relational database. [CITATION sea15 \l 1033]

ERD:

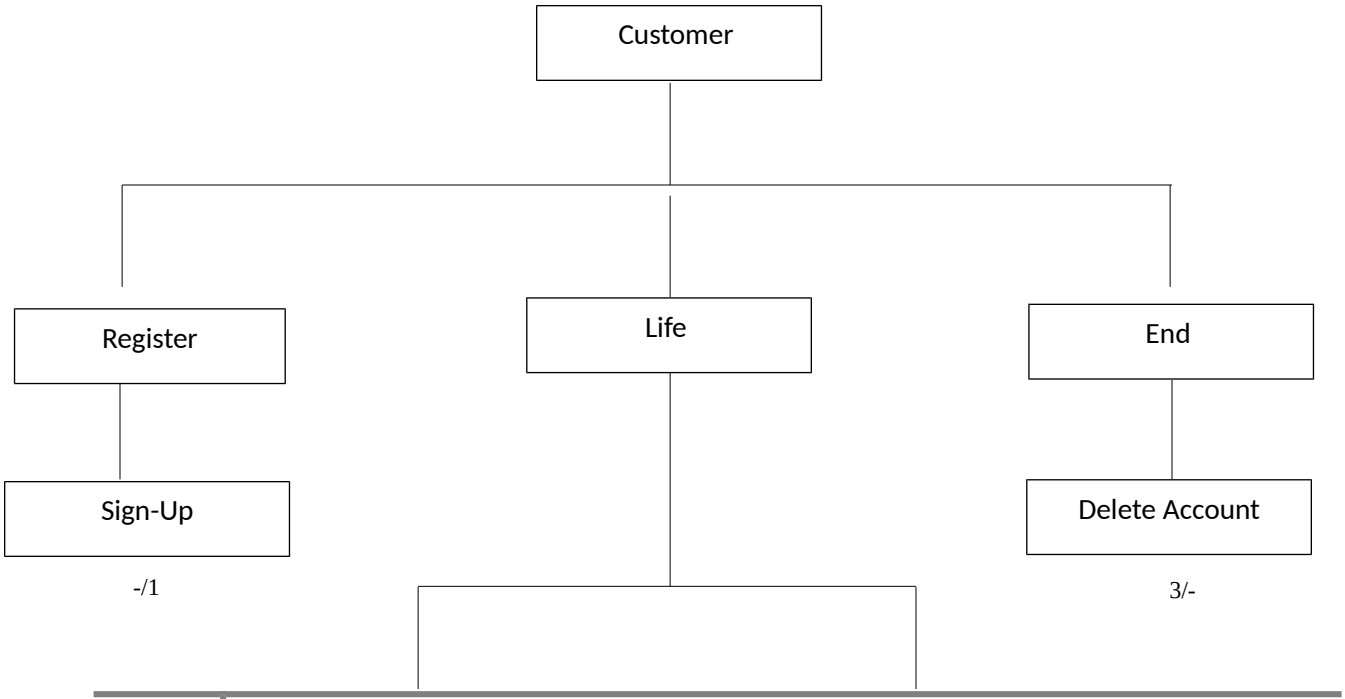




3.4. Entity Life History

ELHs provide us with the third view of the system, the dynamic sequence or time-based view. It shows the processing cycle of an entity from creation to deletion. It models all possible changes to the values of the attributes (or data items) of the entity during its life and the sequence in which the updates take place.

ELH:

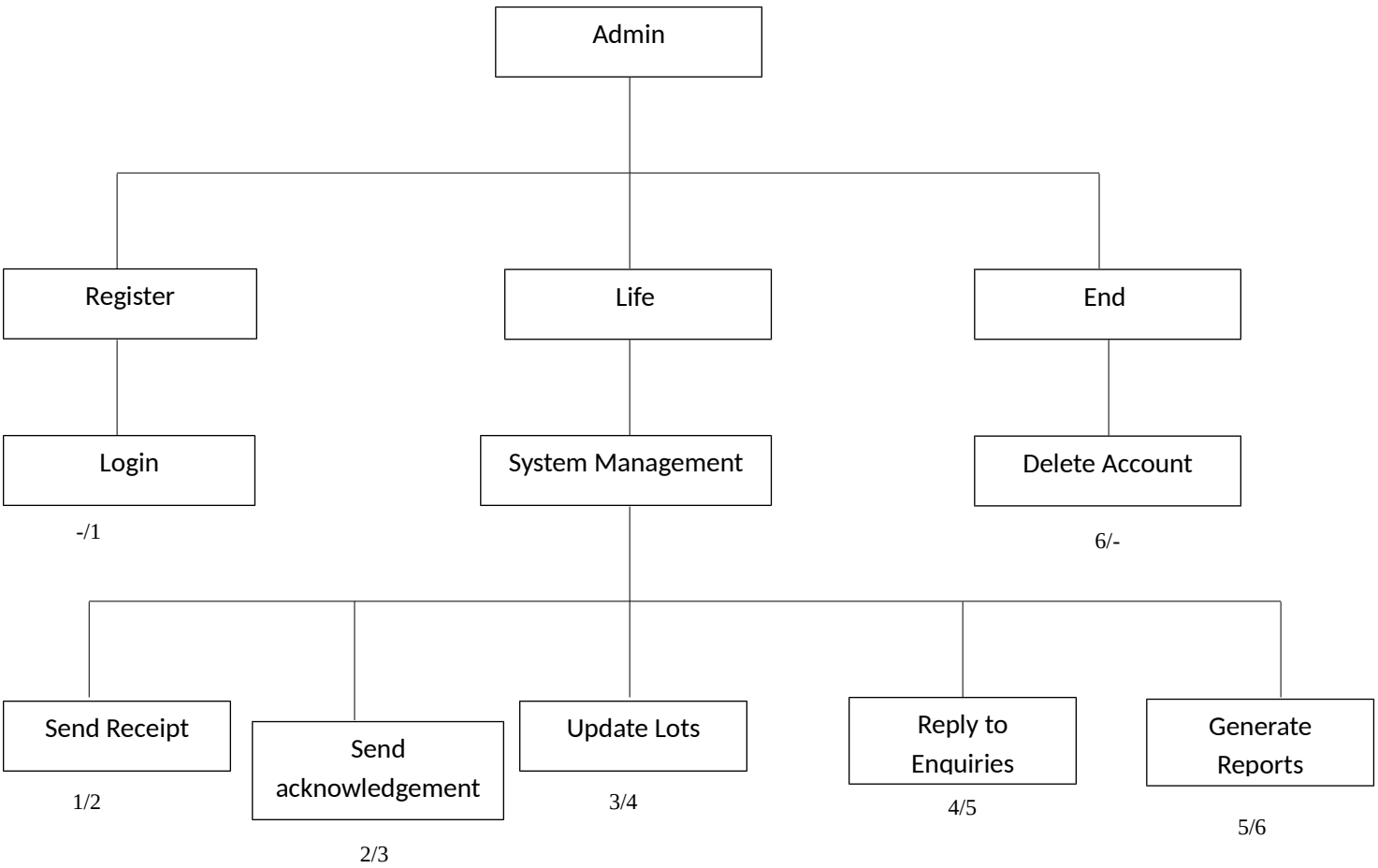


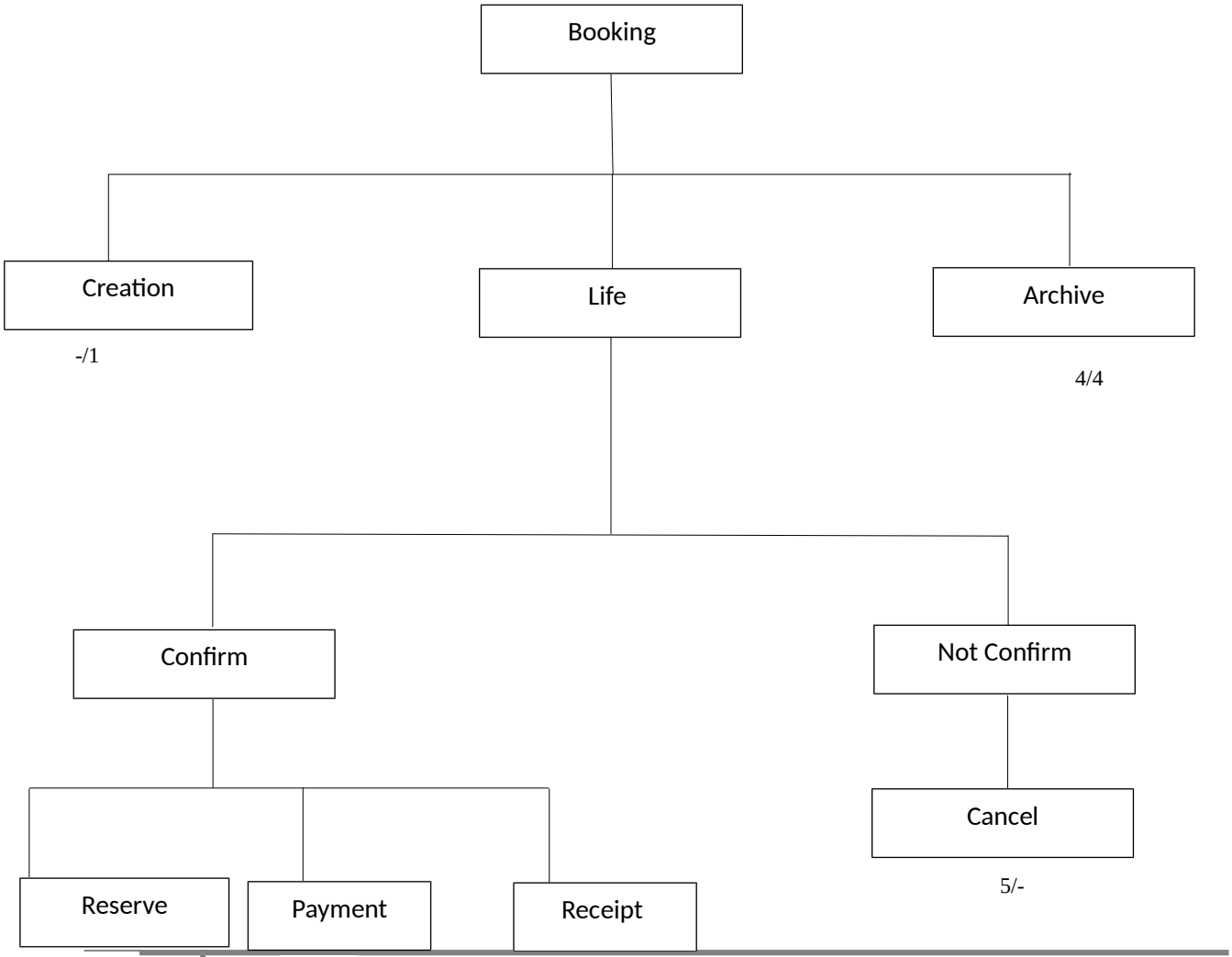
Reserve

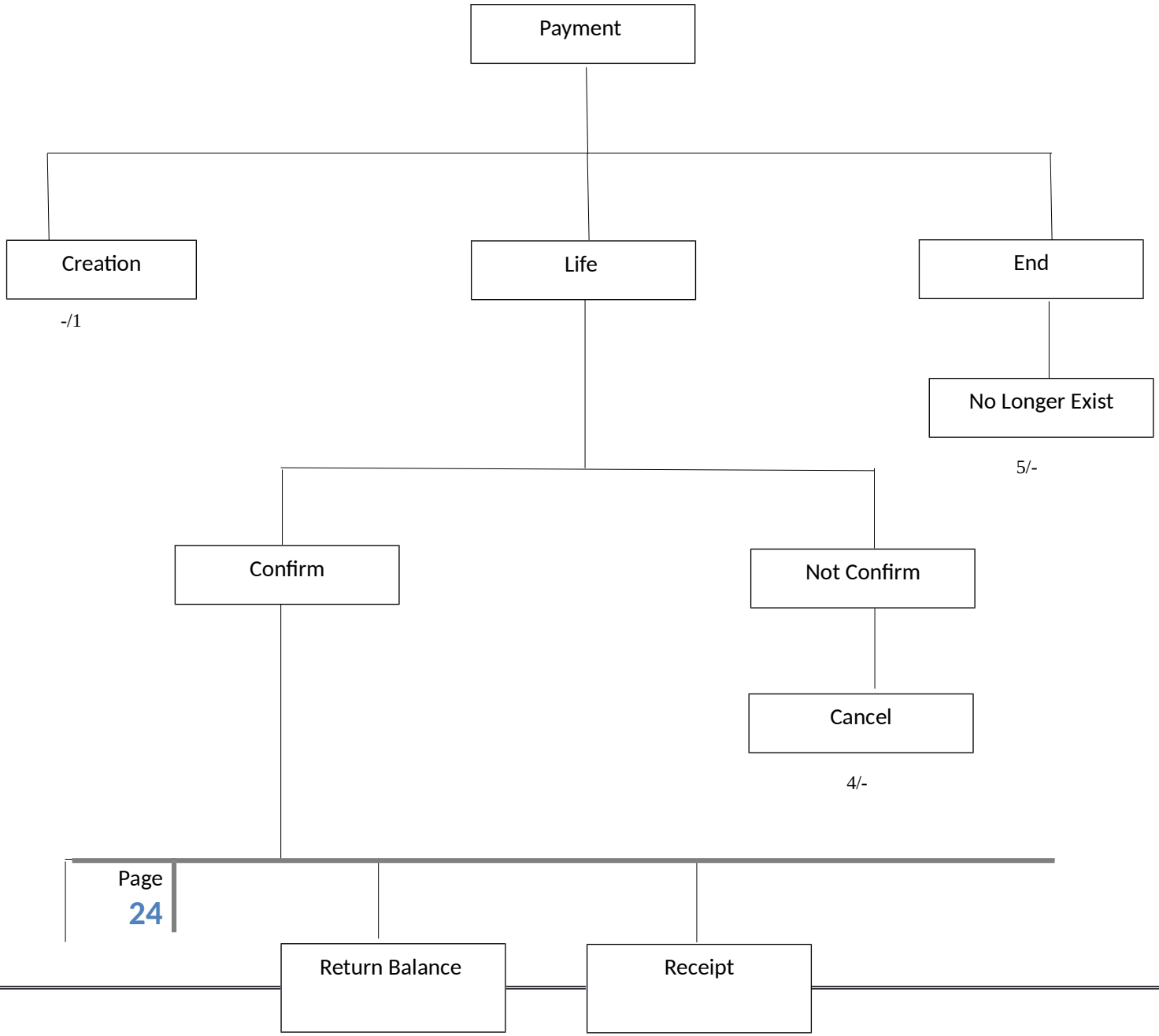
1/2

Make Payment

2/3



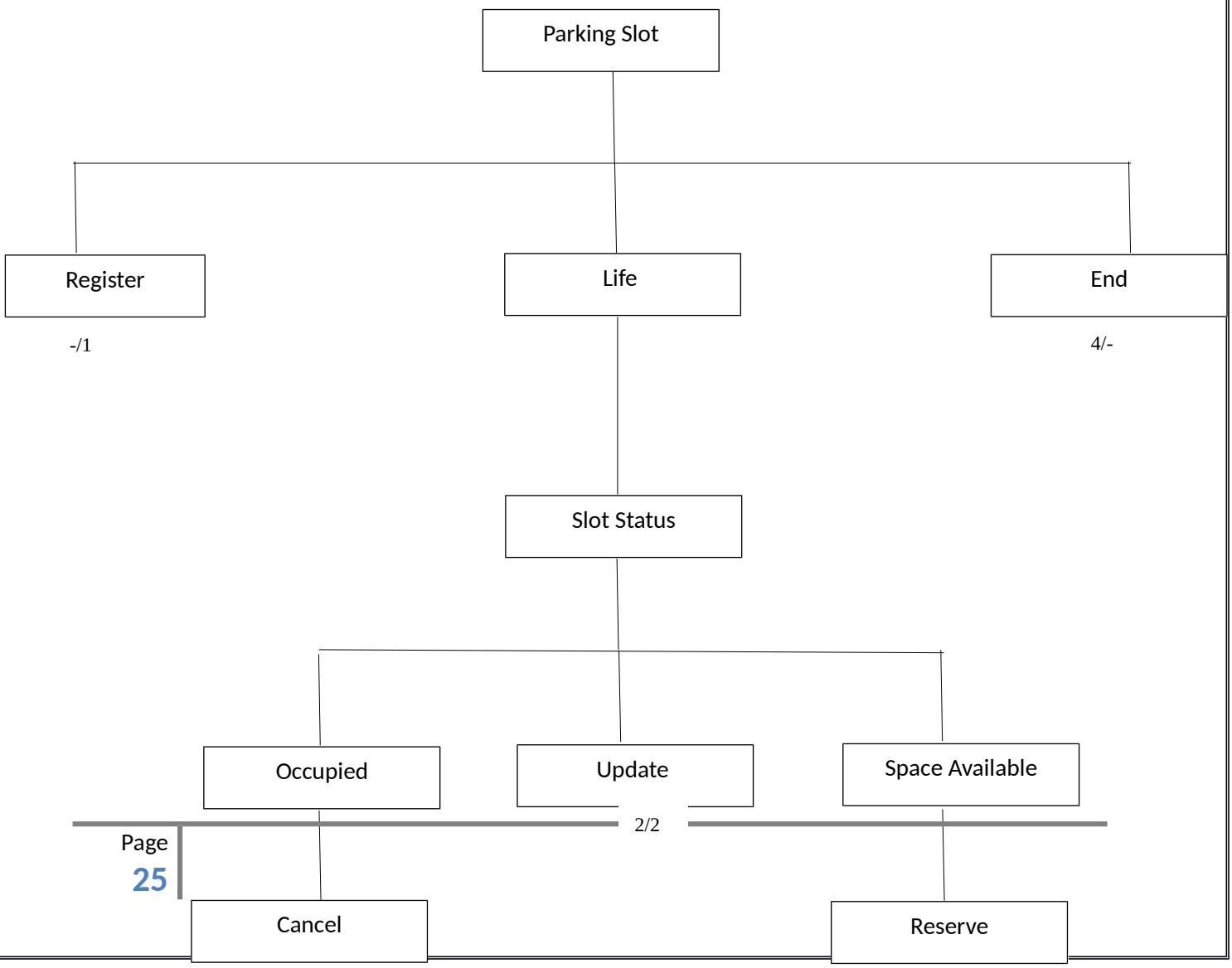

Booking
Creation
-/1
Life
Archive
4/4
Confirm
Not Confirm
Cancel
5/-
Reserve
1/2
Payment
2/3
Receipt
2/3


Payment
Creation
-/1
Life
End
No Longer Exist
5/-
Confirm
Not Confirm
Cancel
4/-
Return Balance
Receipt

Payment that paid by customer

1/2 2/3 3/4

1/2



1/- 3/3

Data Dictionary

Data dictionary is the store house of data that gives information about data. It contains description, definition about data structure, data elements, their interrelationship and other characteristics of a system. It is used to keep the information about the database of the system itself. A data dictionary is also knowns as data repository. It is used in documenting, collecting and organizing specific evidence and facts about the system including the contents of data flows, data stores, entities and process. Significant relationships exist among the items in a data dictionary.

Components of Data Dictionary:

External Entity-1:

This entity contains a person outside from the organization who exchanges the information as input and output from the system. It is represented by rectangular 3D shape.

Entity Name	**Customer**
Description	Customer place the order by telephone & vi website
Input data flow	Receives the order & bills from admin
Output data flows	Provide order details

External Entity-2:

Entity Name	**Admin**
Description	Process the received order and create Receipt
Input data flow	Receives orders from customer
Output data flows	Prepare Receipt and confirmed order

4.0. Physical Design:

4.1. User Interfaces.

The images below shows the Main menu of the webpage. This interfaces is easy for the customer to see and click because it's clearly stated.

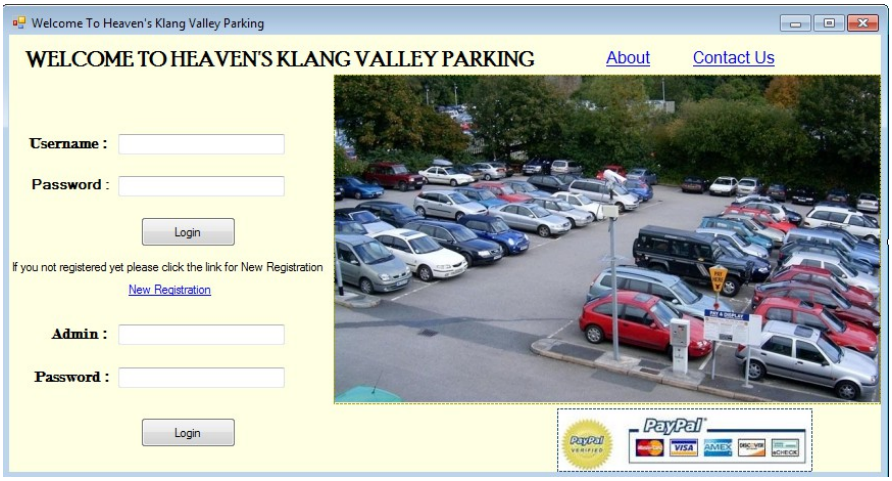


Figure 1 mainmenu

The images below shows the Main menu of the webpage. This interfaces is easy for the customer to see and click because it's clearly stated.

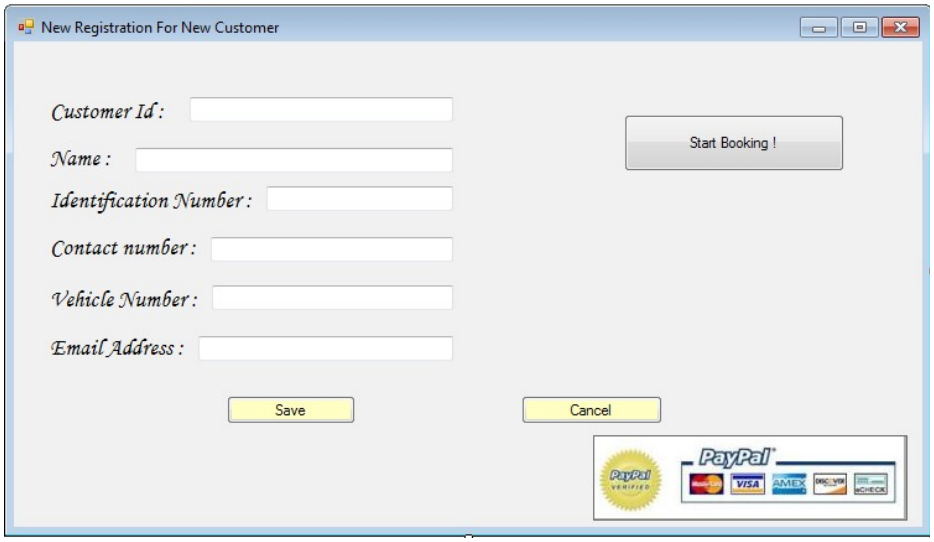


Figure 2 New registration

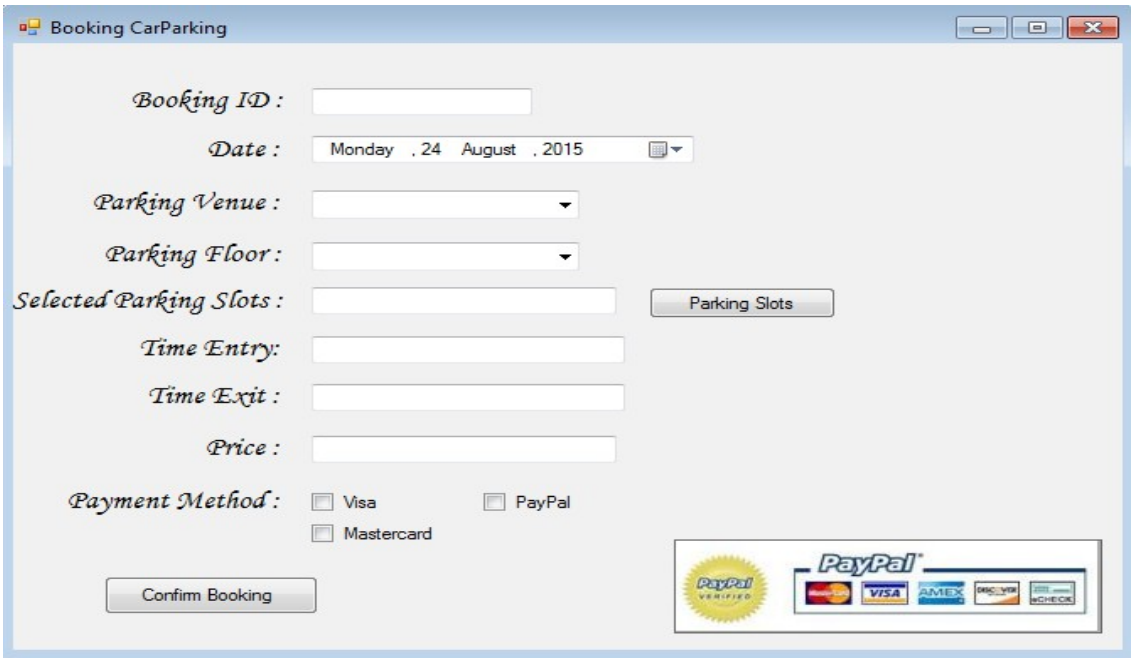


Figure 3 Book Carpark

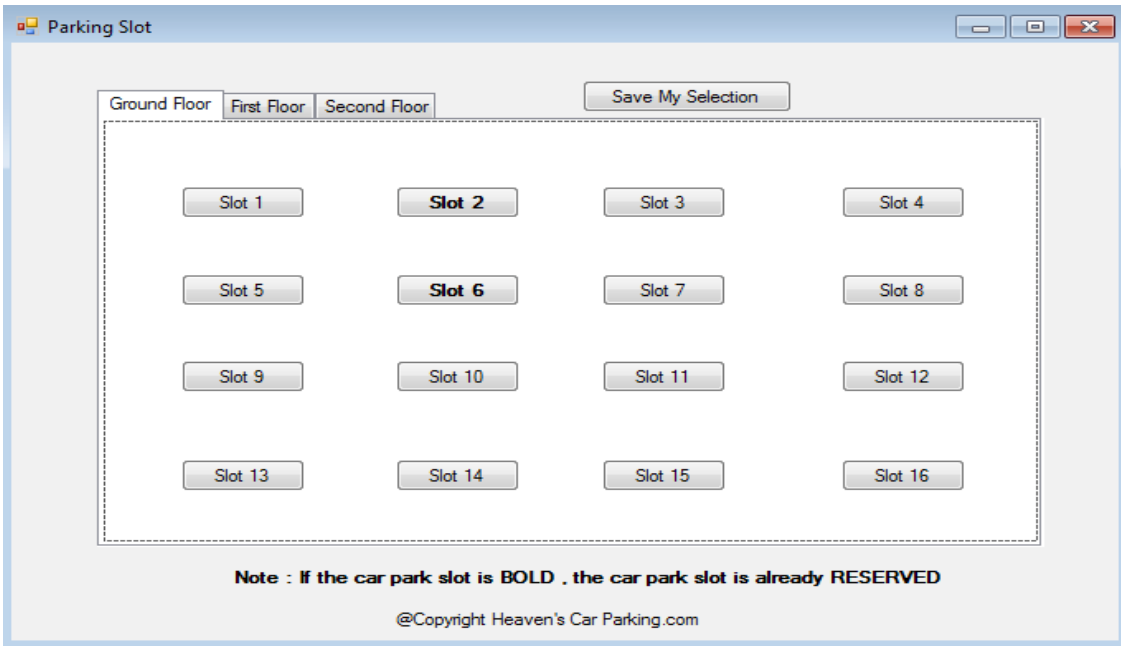


Figure 4 Parking slot

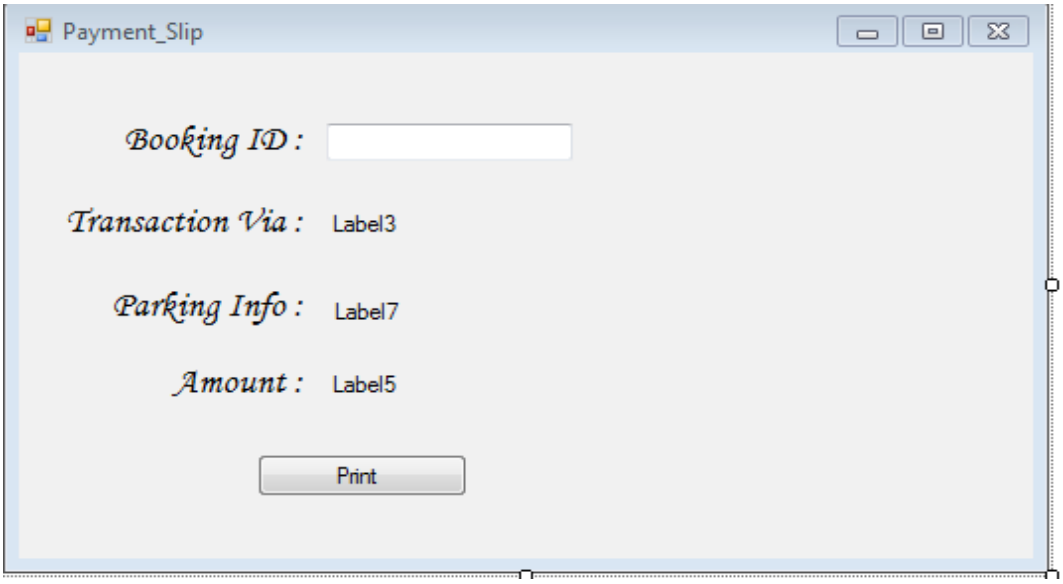


Figure 5 Payment Slip

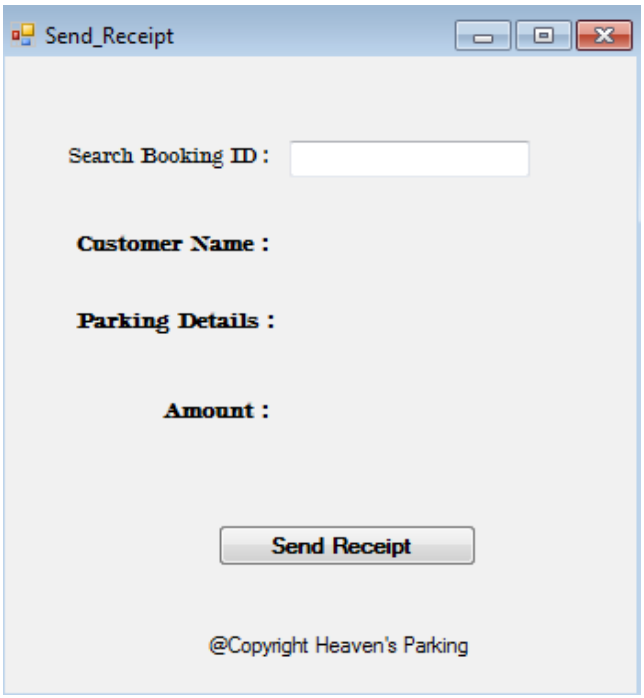


Figure 6 Send Recepit by admin

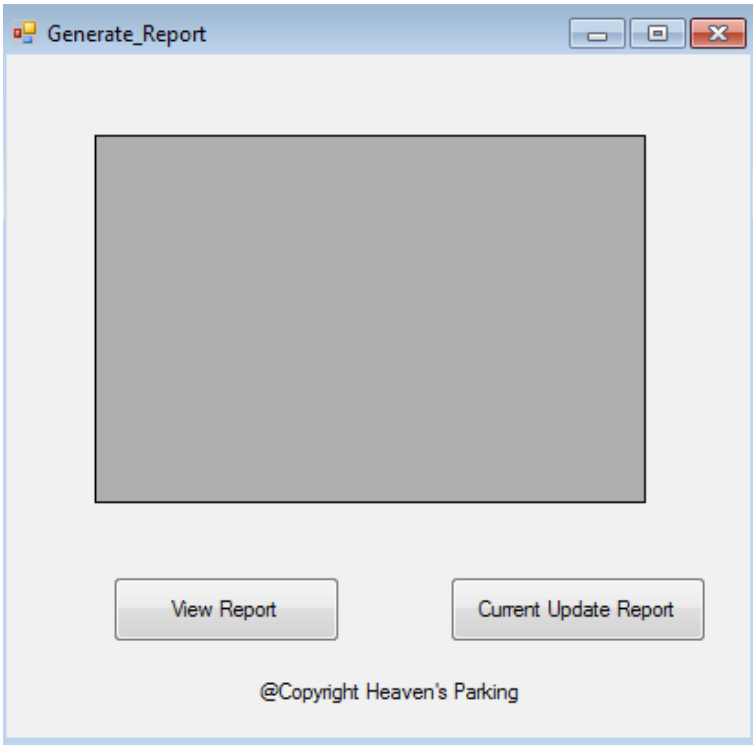


Figure 7 Generate report

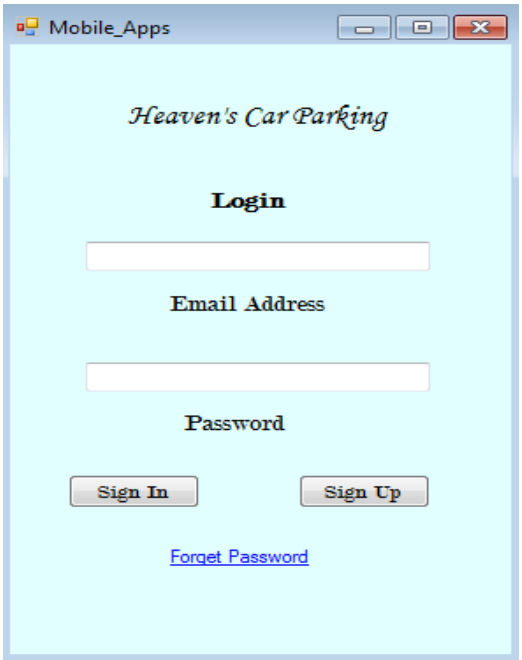


Figure 8Mobile apps

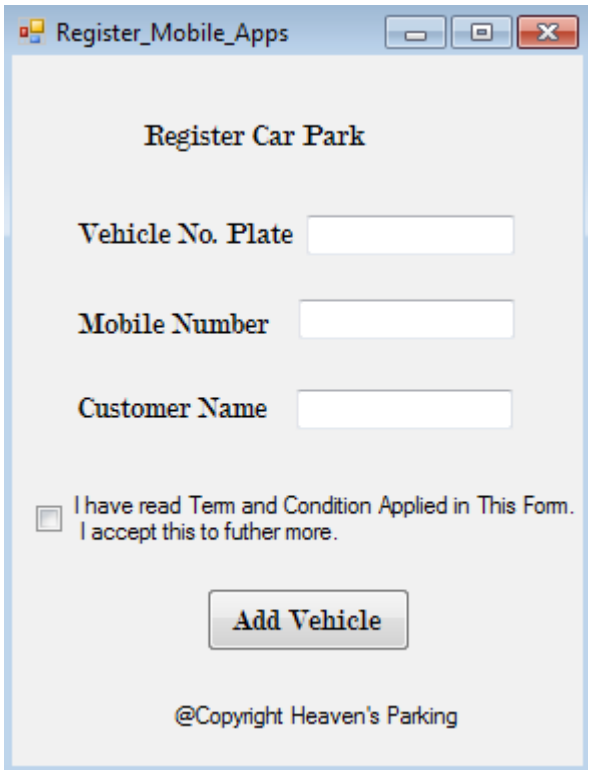


Figure 9 mobile regestration

Part-B-Individual Component:

Soaib Rahman

TP036464

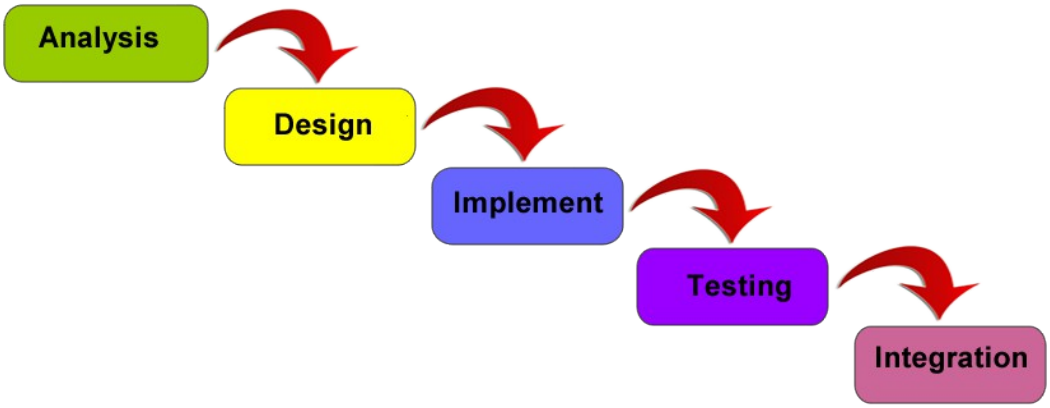
5.0. Selection of Methodologies:

5.1. Waterfall Model:

The waterfall model is a sequential design process, used in software development processes, in which progress is seen as flowing steadily downwards through the phases of conception, initiation, analysis, design, construction, testing, implementation and maintenance.

- Highly structured

- Mandatory to complete each stage before proceeding to next
- Discouraged to turn back
- Complete methodology
- Close to SDLC stages

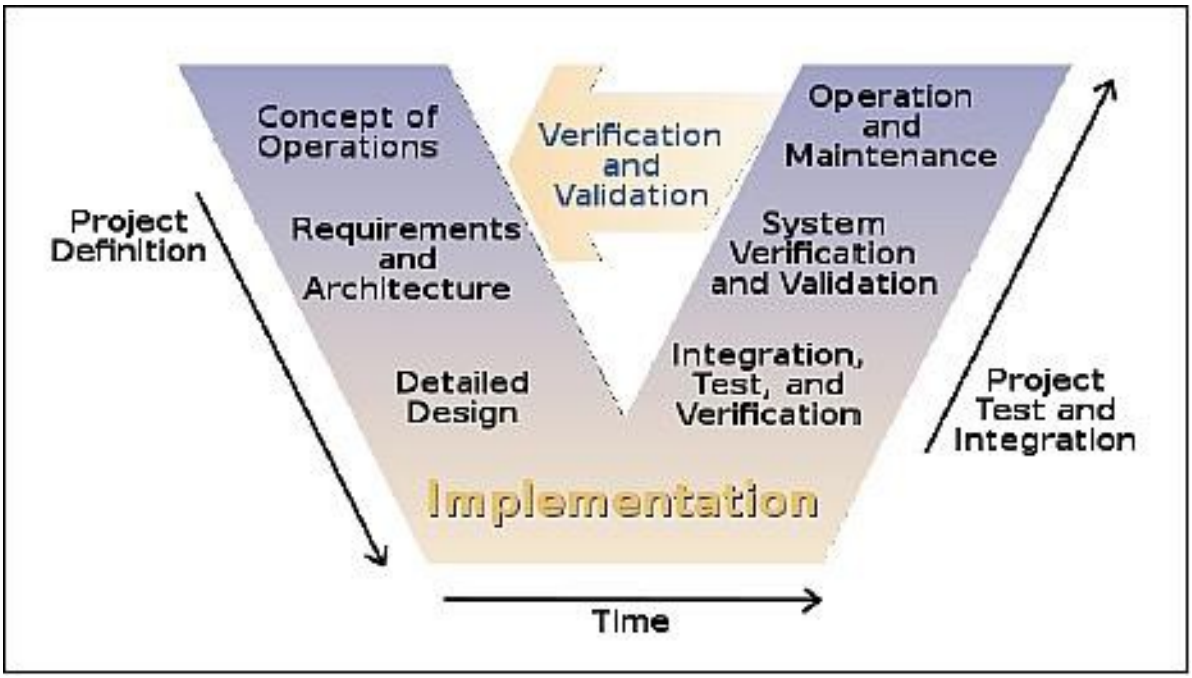


Waterfall Model

5.2. V-Model:

The V-model represents a software development process (also applicable to hardware development) which may be considered an extension of the waterfall model. Instead of moving down in a linear way, the process steps are bent upwards after the coding phase, to form the typical **V** shape.

- Simple and easy to use.
- Save time.
- Avoids the downward flow of the defects.
- Works well for small projects where requirements are easily understood.

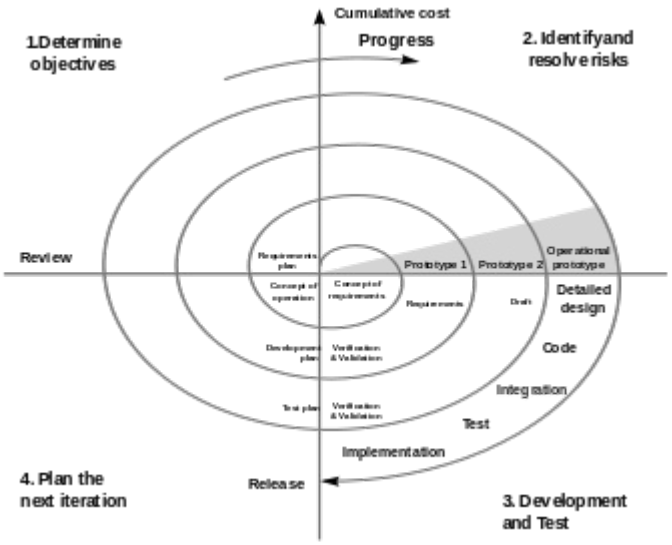


V- Model

5.3. Spiral:

The spiral model is a risk-driven process model generator for software projects. Based on the unique risk patterns of a given project, the spiral model guides a team to adopt elements of one or more process models, such as incremental, waterfall, or evolutionary prototyping.

- High amount of risk analysis hence, avoidance of Risk is enhanced.
- Good for large and mission-critical projects.
- Strong approval and documentation control.
- Additional Functionality can be added at a later date.
- Software is produced early in the software life cycle.



5.4. Chosen Methodology

5.5. Waterfall Model

For this project I choose waterfall methodology. Because it is a highly structured model and close to SDLC stages. The waterfall development model originates in the manufacturing and construction industries: highly structured physical environments in which after-the-fact changes are prohibitively costly, if not impossible. Since no formal software development methodologies existed at the time, this hardware-oriented model was simply adapted for software development.

5.6. Advantages of waterfall model:

- This model is simple and easy to understand and use.
- It is easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.
- In this model phases are processed and completed one at a time. Phases do not overlap.
- Waterfall model works well for smaller projects where requirements are very well understood.

5.7. Disadvantages of waterfall model:

- When an application is in the testing stage, it is very difficult to go back and change something that was not well-thought out in the concept stage.
- No working software is produced until late during the life cycle.
- High amounts of risk and uncertainty.
- Not a good model for complex and object-oriented projects.
- Poor model for long and ongoing projects.
- Not suitable for the projects where requirements are at a moderate to high risk of changing.

5.8. When to use the waterfall model:

- This model is used only when the requirements are very well known, clear and fixed.
- Product definition is stable.
- Technology is understood.
- There are no ambiguous requirements
- Ample resources with required expertise are available freely
- The project is short.

5.9. Waterfall development:

Waterfall model follow some steps.

1. System and software requirements: captured in a product requirements document
2. Analysis: resulting in models, schema, and business rules
3. Design: resulting in the software architecture
4. Coding: the development, proving, and integration of software
5. Testing: the systematic discovery and debugging of defects
6. Operations: the installation, migration, support, and maintenance of complete systems

5.10. Comparison of Methodologies:

Why V-Model methodology is not suitable for this project?

This methodology is not suitable for this project, there is no strategic planning stage where system designer, System database communication Analyst can estimate the consuming time. This methodology is more time consuming than Waterfall. The methodology is also not useful because, it doesn't compare the overall system facilities and performance to original activities.

High confidence of customer is required for choosing the V-Shaped model approach. Since, no prototypes are produced, there is a very high risk involved in meeting customer expectations.

There are some disadvantages of V-model methodologies:

- Very rigid and least flexible.
- Software is developed during the implementation phase, so no early prototypes of the software are produced.
- If any changes happen in midway, then the test documents along with requirement documents has to be updated.

Why Spiral model is not used for this model?

Spiral methodology is not appropriate for this project, because the spiral model has four phases:

1. Planning
2. Risk Analysis
3. Engineering and
4. Evaluation.

There are some disadvantages of Spiral methodology:

- Can be a costly model to use.
- Risk analysis requires highly specific expertise.
- Project's success is highly dependent on the risk analysis phase.
- Doesn't work well for smaller projects.

Nuradeen A,M alkabilawi

TP034539

6.0. Methodology Comparison:

Based on respective direction of the development of system concerned, several methodologies had been taken into consideration to allow the best approach. Several approaches that are deemed viable for development of the system and will be discussed in comparison with one to another.

	AGILE	**WATERFALL**	**SSADM**
Speed of Project	Fast	Slow	Slow
Cost	Low	High	High
Project Focus	Customer Satisfaction	Quality of output	Documentation of Project
Suitable Project Size	Intermediate and large Project	Intermediate and large project	Intermediate and large project
Advantages	High customer satisfaction Reduced risk High flexibility	User-friendly due its simple model and easy to understand Project phases are clear and well defined	Thorough guideline for project Hard to go off track Project are well documented
Disadvantages	Required experience and knowledge Cost may increase - prolonged project	Difficult to make alteration once into testing phase High cost	High cost Lack user interaction Highly time consuming – too

			much documentation

6.1. Table of Comparison for Suitable Methodologies

Waterfall development methodology main characteristic is that it consists of sequential, non-overlapping phases during development which means it comprises of several stage that are will move on gradually after the completion of prior stages(Anon., 2006).

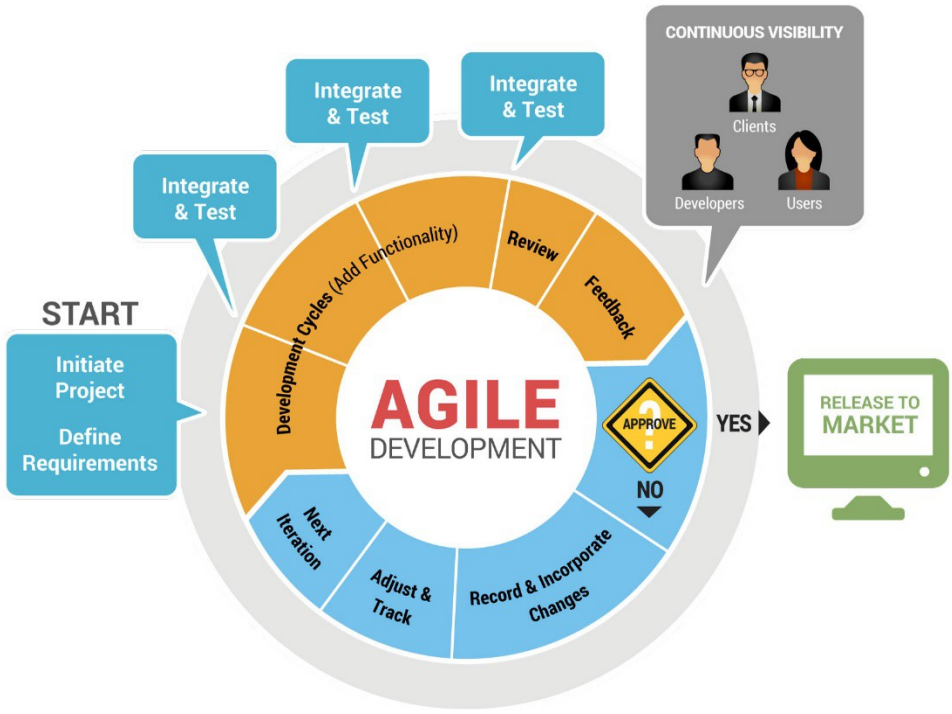
It is simple to use and easy to manage due to such rigidity therefore, providing high level of usability to the users. Other than that, its development phases are also well defined, giving users a clear view on the progress, allowing customers to know what to expect when using the system. However, each phase has to be followed sequentially which causes it to be a little too rigid, making it difficult to make alteration and improvements. This also suggests certain customer needs are to be assumed as during development once a step has completed, developers cannot go back to previous stages and conduct any changes (Sparrow, 2015).

Agile software development methodology is based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams (Paj Singh, 2013). The main characteristic of the agile software development methodology is customer oriented thus, containing the need to be interactive. This fulfils the requirement of this project where certain level of interaction between customers and the health food company website are intended. Continuous input from customers via feedback also allows a direct approach for a desired end project, avoiding guessing customer needs. This feature works well along with another characteristic of agile methodology that is easy to make alteration. Thus, constant upgrades and improvements can be made in order to accommodate the customers' needs, leading to higher level of customer satisfaction which is coherent to the aim of our system (C. Layton, 2015). However, in order to implement this methodology, certain level of experience and skills are required. Thus, it results in a certain level of dependency on high level team members. Inexperience team members might find it difficult to integrate into the team without guidance from experienced members (Haunts, 2014)

SSADM methodology is a methodology that put a lot of emphasis on documentation and producing diagram. The main techniques concerned with SSADM are logical, entity behavior and data flow modeling. Through these techniques, clear analysis can be made on the phases of the project. Combining with its well documentation, the guidelines for the project are very thorough, making it hard to go off track of the progress (Rouse, 2015). However, excessive documentation of SSADM methodology may also increase cost as well as time consumed for the project, due to extra effort needed for documentation. Furthermore, it lacks interactions with the customers, hindering it a lack of knowledge in customers' needs.

6.2. Selected Methodology

The current project developed for the health food company, this car parking system is considered as an intermediate project, assuming certain level of interaction required to be accommodated from local customers. The platform offered by agile methodology as well as its flexibility to adapt to customer needs and update proves agile to be the most suitable methodology to be use for development of this project.



In stage 1, it involves defining the requirements and analysis upon the system. Sufficient feasibility studies have to be conducted to determine whether the investment in the project is necessary. All information available including the constraints are collected to make accurate estimation.

In stage 2, serving as the warming up iteration, it marks the initiation of project. All available resources are garnered for funding the project and the team is formed at this stage. An initial architecture model of the system is developed at this stage. Methods designing the model will also be determined.

In stage 3, this phase is the construction iteration phase where involves actual development of the system. Functionality of the system is implemented according the priority order. Further analysis and design are conducted to ensure all requirements is fulfilled. Collaboration between the team and the users undergo closely to reduce risk via feedback from the users and the system can be updated to overcome the risk. Testing is conducted repeatedly for a significant amount at this stage to minimize error (Ambler, 2012).

In stage 4, a final testing will be performed and the system will be ready for deployment. The users will be trained to use the system and final documentation of the system is also done in this stage. In future, the system will still be under monitored for future maintenance and update.

6.3. Tools and Techniques

Certain tools and techniques are required to be implemented in the system development. Web development tools are an example of tools that are applicable in this project development. Other than that, CASE tools are also suitable to be used. As a set of software application programs, it can be used to automate SDLC activities. Generally, integrated CASE tools are the set that are recommended to be used in this project as its applicable throughout any stage of the SDLC.

Sivacharanya Sukumaran

TP039299

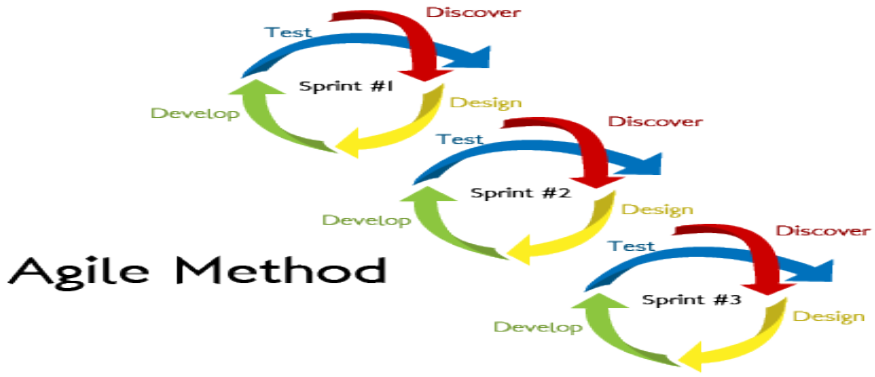
7.0) Selection of Methodologies:

7.1. Agile Methodology

Agile methodology is an alternative to traditional project management, typically used in software development. It helps teams respond to unpredictability through incremental, iterative work cadences, known as sprints. Agile methodologies are an alternative to waterfall, or traditional sequential development.

Agile Methodology also

- ✓ Aim to reduce cost
- ✓ Depend or adaptable to changes
- ✓ Non-Sequential, iterative
- ✓ High users involvement, because system can adapt to the users
- ✓ Agile use prototyping tools
- ✓ Use extreme programming
- ✓ Scrum is the most popular way of introducing Agility due to its simplicity and flexibility.
- ✓ Steps can be repeated



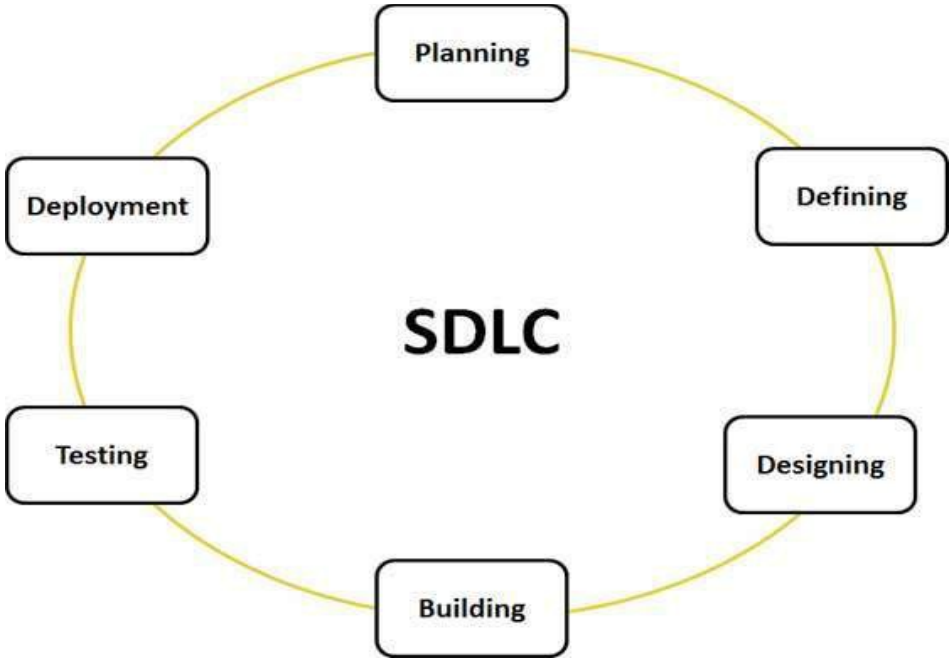
Agile Model

7.2. SDLC Methodology

SDLC is a process followed for a software project, within a software organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software. The life cycle defines a methodology for improving the quality of software and the overall development process.

SDLC also

- The formal review established at the end of each stage, allowing maximum control management.
- This approach creates significant systemic documentation.
- This documentation ensures that the system requirements can be traced to the established business requirements.
- Then produces many intermediate products that can be examined to see whether they meet the user's needs and standards. They can be further worked on if they require settings to be made, ensuring that the business gets exactly what it needs.

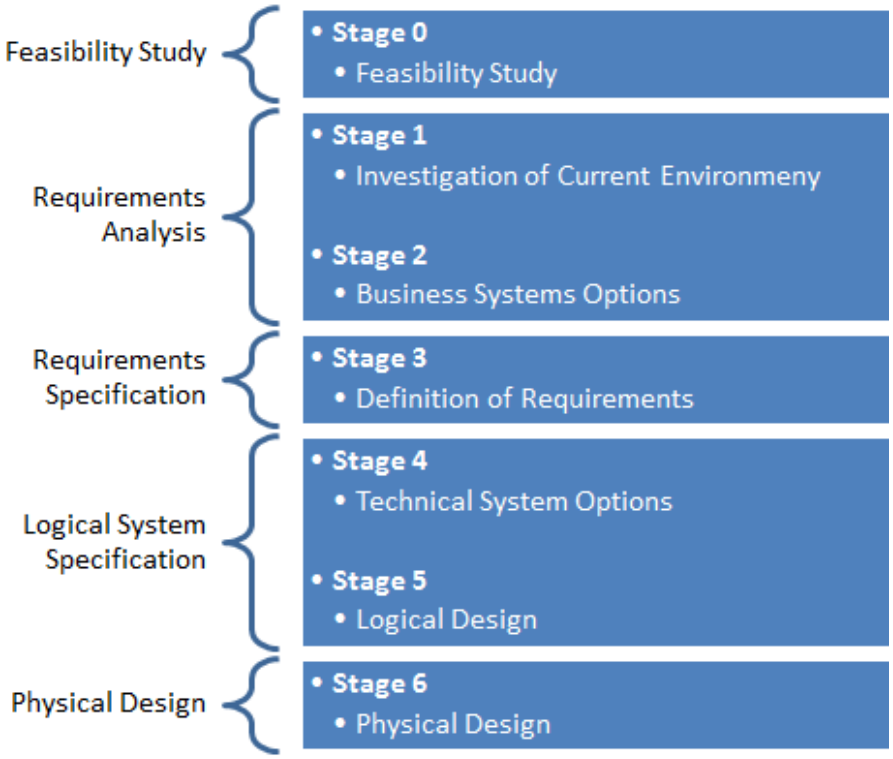


7.3. SSADM

SSADM is a widely-used computer application development method, where its use is often specified as a requirement for computing projects. SSADM divides an application development project into modules, stages, steps, and tasks, and provides a framework for describing projects in a fashion suited to managing the project.

SSADM also

- Improve project management & control
- Make better use of experienced and inexperienced staff development
- Development of improved quality systems
- Make sustainable projects in the loss of staff
- Include projects that will be supported by computer tools such as computer-aided software engineering systems
- Laying the foundation for proper communication between the participants in the project



SSADM Model

7.4. Chosen Methodology

7.5. SSADM Methodology

For Klang Valley car park management system, I would like to choose SSADM Methodology because it's a large-scale information systems with high volume. SSADM manage large systems for billing, salaries and other applications requiring huge databases.

7.6. Benefits of SSADM

- ✓ Reduces costs: SSADM separates the logical and physical design system. Thus, the system should not be implemented again with a new hard or software.
- ✓ Best quality: SSADM reduces frequency errors information system by identifying certain level of quality in early and continuously checking system.

- ✓ Terms: SSADM allows you to plan, manage and monitor the project as well. These points are necessary to deliver the product on time.
- ✓ Usability: SSADM emphasis on analysis of user needs. At the same time, the model system developed and implemented a comprehensive demand analysis. Both tried to see if they are good for each other.
- ✓ The effective use of skills: SSADM requires no special skills and can be very easy to teach staff. Typically, diagrams and general modeling tools used. Commercial tools case also suggested to be able to adjust SSADM easily.

7.8. Disadvantages of SSADM

- ✓ Costs maybe higher
- ✓ Sequential process, cannot go back
- ✓ Step by step
- ✓ Highly structured development
- ✓ Low users involvement, very difficult to change system
- ✓ Users' needs to adapt to the system
- ✓ Too much documentation time consuming. Overly bureaucratic. Not everything needs documenting. This can be a full time job in itself.

7.9. Stages of SSADM

- ✓ Analysis of the existing system or assessing feasibility. It includes an analysis of the existing system and the creation of DFD for visualizing known problems and system description. If the system is designed from the start than the speakers starts from defining the new system requirements.
- ✓ The definition of technical requirements and equipment cost device. Determination of the expected revenue from the introduction of new functions.
- ✓ Development of the logical data model. The specification list of functional requirements. After developing the project logical Adding new requirements on SSADM prohibited. Only correction of existing requirements, their description and specification allowed.
- ✓ The physical design. The physical model information and specifications for software elements developed and optimized. Technical characteristics of program elements and documentation set is.
- ✓ Requirements definition. On the basis of available data about the system new functions, which the system must execute are defined. Also boundaries of the future system and data

which will be processed by the system are defined. Info logical model of requirements is constructed.

- ✓ Projecting of logical requirements. Specification of requirements

7.10. Techniques of SSADM

- ✓ Logical Data Modeling - The process of identifying, modeling and documenting the data requirements of the system being designed. The data is separated into and relationships
- ✓ Data Flow Modeling - The process of identifying, modeling and documenting how data moves around an information system. Data Flow Modeling examines processes, data stores and external entities
- ✓ Entity Behavior Modeling - The process of identifying, modeling and documenting the events that affect each entity and the sequence in which these events occur.

7.11. Comparison of Methodologies:

Why agile methodology is not suitable for this project?

Agile model rapidly delivers a working product and is considered a very realistic approach development. The model produces current releases, each of small, gradual changes from the previous release. At each iteration, the product is tested .This model emphasizes interaction as customers, developers and testers work together throughout the project. But since this model largely depends on the interaction with customers, the project may lead the wrong way, if the customer is not clear on the direction he or she wants to go.

Why SDLC methodology is not used for this car park system?

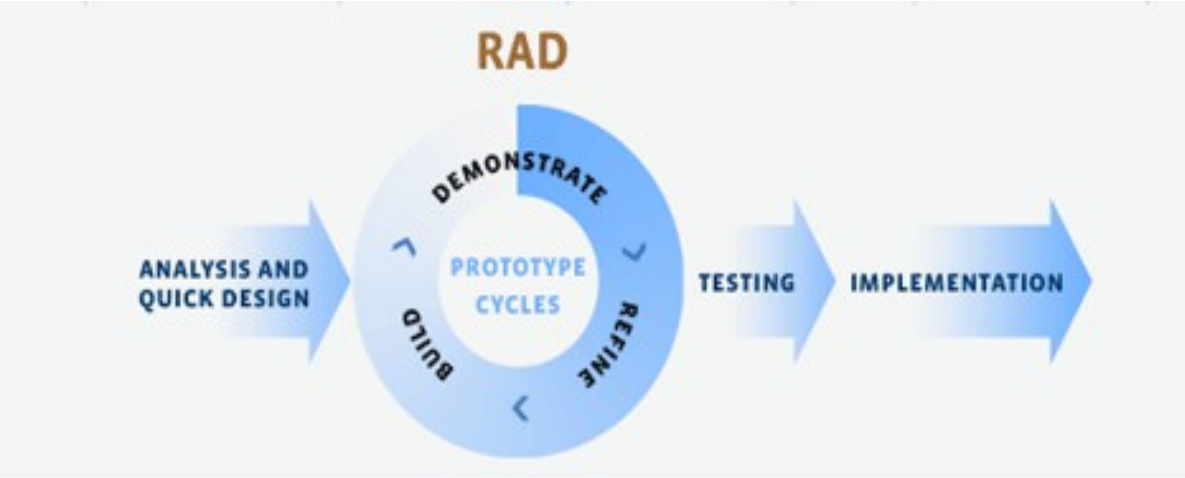
By using SDLC, major problem is end-user does not see the solution until the system is nearly complete. Users get a system that meets the need as understood by the developer, this may not be what was really needed. Documentation is expensive and time-consuming to create. It is also difficult to keep current. Often, user needs go unstated or are misunderstood. Users cannot easily review intermediate products and evaluate whether a particular product (e.g., data flow diagram).

Logan.v

TP028426

8.0. Rapid Application Development

RAD ways to programming advancement put less emphasis on planning tasks and more emphasis on improvement. Rad is a model based concept that higher grade product can be developed faster with more processes such prototyping, reusing software components and less team communication. RAD is uses on model functions are developed if they were mini project. This model can give something to customer to see and gather some information regarding their requirement. (Itinfo.am)



The advantages of RAD model is :-

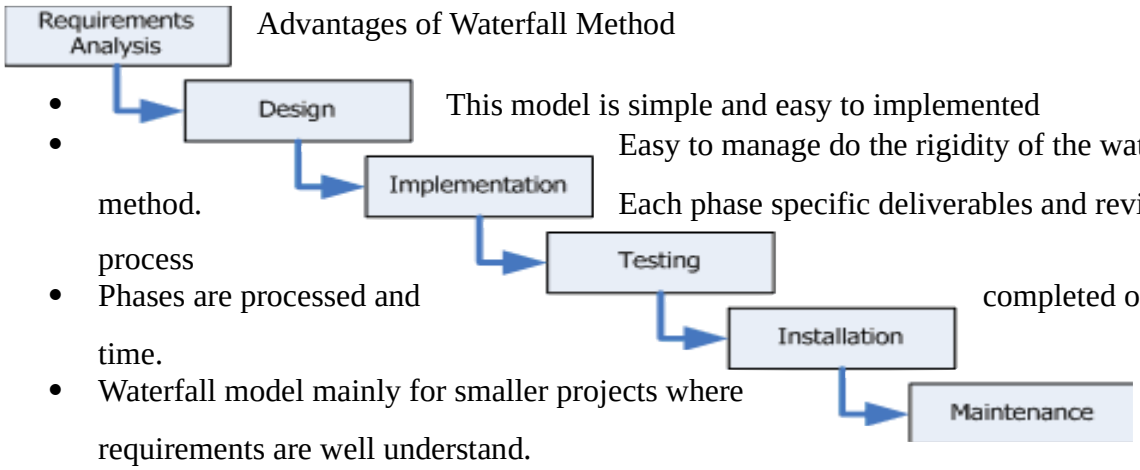
- Can reduced development time
- Quick review from customer
- Customers feedback

The Disadvantages of RAD model is :-

- Required high skilled developers
- High on modelling skills
- Inapplicable to cheaper projects as cost for modelling and automated generation is very high

8.1. Waterfall Traditional Methodology

Waterfall Model is a very popular of the systems development life cycle model. A schedule classic approach to the system development life cycle, the waterfall model describes rigid and linear. Waterfall development has its goals that need to complete all the phases first before they move on to other before completed that and there is not turning back. This waterfall method got some benefits also. For example a business team is forced to gather all of their requirement before production begins and that can be a fantastic incentive to get the business stakeholders to prioritize the effort and complete the document. (Itinfo.am)



Advantages of Waterfall Method

- This model is simple and easy to implemented
- Easy to manage do the rigidity of the waterfall method. Each phase specific deliverables and review process
- Phases are processed and completed one at time.
- Waterfall model mainly for smaller projects where requirements are well understand.

(Istqbexamcertification.com)

Disadvantage of Waterfall Method

- When application in testing stage, it is very difficult to go back and change something that was not well thought.
- No working software produced
- High amount of risk
- This model not good for complex and object oriented model.
- Its poor model for long term projects. (Istqbexamcertification.com)

8.2. Lean Development (LD) Methodology

Lean Development focuses on the creation of change-tolerant software. This methodology embodies the nation of dynamic stability which can be thought of as similar to scrum methodologies. The goal of Lean development is to build software with one-third the human effort, one-third the development hours and one third for investment as compared. There 12 principle of lean development (LD). (Itinfo.am)

1. Satisfy the customer to highest priority
2. Provide best value of budget
3. Success depends on active customer
4. This model is always with team effort
5. Changeable
6. Domain. Not point , solution
7. Complete
8. 80% solution today and 20% solution tomorrow
9. Determine technology
10. Product growth is feature growth

11. Never push lean development beyond the limit
12. Minimalism is essential.

8.3. Advantages of Lean Development

1. Eliminate of waste lead to the overall efficiency of the development process. This make to speed up process of development and reduce project time and cost
2. Delivering the product early as possible. Development team can deliver more functionality in shorter period of time. This will please financial department and end customer.
3. Developing decision making ability of team members to create more motivated team. Result of the software will much and better end product.

8.4. Disadvantage of the Lean Development

1. The project is highly dependent on cohesiveness of the team and the individual commitments of team member.
2. Success in the project depends on how they work discipline. If you don't have a team of individual with good skills which complement each other then you have immediate problem.
3. In lean software development these decision to implement but using waterfall methodologies will be advantages.

8.5. Choosing the right Methodologies

After comparing Rad, lean and waterfall development methodologies. I decided to choose RAD. The reason I choose RAD model because the development are time boxed , delivered and assembled into working prototype before go more further to deliveries the project. The customer can also can review how the project going on and can give requirement. This model of development give reduced the development time. This will make customer believe on the developer because the developer will show them what the update of the project is every single time to encourage them give feedback what want to improve in their project.

The feedback is very important for developer because they can make changes whenever the customer update them. This make the project more usable without any errors. Its much easier for a project manager to be accurate in estimating project costs which of course means that easir to implement and manage well. This also can satisfy the end user level when the end result is produced. The project is already tested and hence not tested. This help saving time. Project budget as well as project time and cost will use back with prototypes.

9.0. Conclusion:

The purpose of this assignment was to enable students to analyze and design a new system based on the given case study on “Car Park Management System” a company that plays the role of bridge between customers and system. In this project, we demonstrated logical design and physical design for the better understanding administrator and customers.

The project has been discussed about feasibility study, which shows economical and technological criteria required for the new features and enhancement of the system. Different methodologies analyzed and chosen the appropriate one foe this project.

Last but not least, the goal of this project has been accomplished successfully because the problem statements of this project have been evaluated critically.

10.0. Workload Matrix:

ASIA PACIFIC UNIVERSITY

CE00046-3-2 SDM – SYSTEM DEVELOPMENT METHODS

Student Coursework Workload Matrics - Grades and Feedback Attachment

INTAKE: UC2F1505-IT-

PROJECT TITLE
Car Park Management System

STUDENT NAME	**Soaib**	**Nuradeen**	Sivacharanya Sukumaran	Logan.v
TP NO.	TP036464	TP034539	TP039299	TP028426

A. Group Component

NO	ASSINMENT COMPONENT	ALLOCATED MARKS	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	CONTRIBUTION PERCENTAGE	TOTAL %
1	Project Planning	15	40	20	20	20	100
2	System Analysis	14	20	40	20	20	100
3	Logical Design	23	20	20	40	20	100

4	Physical Design	13	20	20	20	40	100
A.	Overall Documentation	5	25	25	25	25	100
	Total Marks and Contribution	70	0%	0%	0%	0%	
		Signature	SR	N	SS	L	

11.0. Reference:

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