CONTENTS

Part - A (Group Component - 70%)

1. Project Planning

1.1 Introduction

Various modern technologies have been playing some indispensable roles in flourishing business. Assisting activities within the business organization enhance swiftly, innovative technologies are trusted to be effective, advantageous as well as methodical.

Figure 1 : Mantra Rental Company Logo

The **Mantra Rental Company** has been offering car rental services since last 2 decades. The company offers car rentals of various models, which is further stated by its manufacturers, name of model, daily rental costs, registration number and odometer reading as well.

Currently, there are two genuine options available to book a car from Mantra Rental Company: company visit and phone call booking. A client has to pay a visit to the rental company in order to check appearance and operational quality of desired cars. Likewise, if a client wants to book a car via phone call, the company will provide a handful of basic information about the inquired cars. To finalize the booking of a car, information of clients such as their name, address, mobile numbers, driving license and also the odometer of car is recorded in Microsoft Excel Spreadsheet. Few of the crucial stuffs used during this business process are given below :

- Odometer Reading
- Rental Agreement
- Customer's Details (Name, address, mobile number, driving license number)
- Job Title & Company Name (for Corporate Customers)

Additional Company Details :

Location :

Office : Pokhara - 6, Lakeside Road, Street No. 17

1.1.1 Problem Statement

As mentioned before, possible ways of renting cars from Mantra Rental Company are, company visit and phone booking. However, with the technology advancing and people probing for ease alternatives, these available options seemed insufficient. To book a car physically (eye to eye), clients need to visit the company in office hours (i.e, in between 10 AM and 5 PM). The company also informed with feedbacks to make office hours more flexible. On the other hand, information provided via audio couldn't satisfy customers to hire cars. Customers seem hesitant to confirm booking of cars without actually watching how it looks and operates. With new system, customers can study every details of cars and reserve it without any hurdles. The new online system also allows clients to book cars from anywhere and at anytime. This means, there is no more worrying about reaching to the company within limited hours to book a car.

Likewise, pointing the database system being used currently, the company is storing data using Microsoft Spreadsheet, which according to Forbes(Leung, 2014) contains about 90% of fallacy. Furthermore, this also consumes plenty of time as staffs need to scroll in and out of spreadsheet, in order to find old records. With new system, errors in database can be plummeted and details of old customers will be automatically shown, when their ID number or name is entered.

1.2 Scope, Aim and Objectives

Scope :

The scope of this project is to plan, analyze, and design a simple prototype system for Mantra Car Rental Company (MCRC). We are required to perform different researches to be able to achieve the aim and objectives of the system. This system will be usable by both general customers and staff of the company. It is a web passed platform that means system will be accessible 24/7 with the exception of minimum server outage. The system will have online payment system to deal with payment made by customers (Overview Of Online Car Rental Systems Information Technology Essay, n.d.).

Aim :

The main aim of this research is to design the system which allows customers to register account themselves and reserve the car based on their model and price. Besides, it will deliver a high quality product and friendly service and good value that convinces customer to make the best choices according to their budget. (Li, 2013). An online car rental system will be implemented for the company which will aid the high demand for rent of cars and eases the staff task.

Objectives :

The objectives of the report are mentioned below:

a. To computerize and automate the system (online) in order to make it scalable in the future.
b. To eases the employees for recording and managing information of cars, car booking and rental agreement between company and customers.
c. To send customized recommendation and special offers to customers based on their browsing history of car or content.
d. To provide sales report monthly and a report on total number of customers and staffs in different categories.

2. Agile Principles and IS Methodologies

2.1 Agile Methodology

Agile methodology is software development approach, based on the concept of iterative and incremental imitation of software development. Instigated against the background of laboriously regulated models, the methodology concentrates on team participation and satisfactory result. Continual cooperation with stakeholders and welcoming improvements at any phase is what makes this approach different to traditional methodologies (McCormick, 2012).

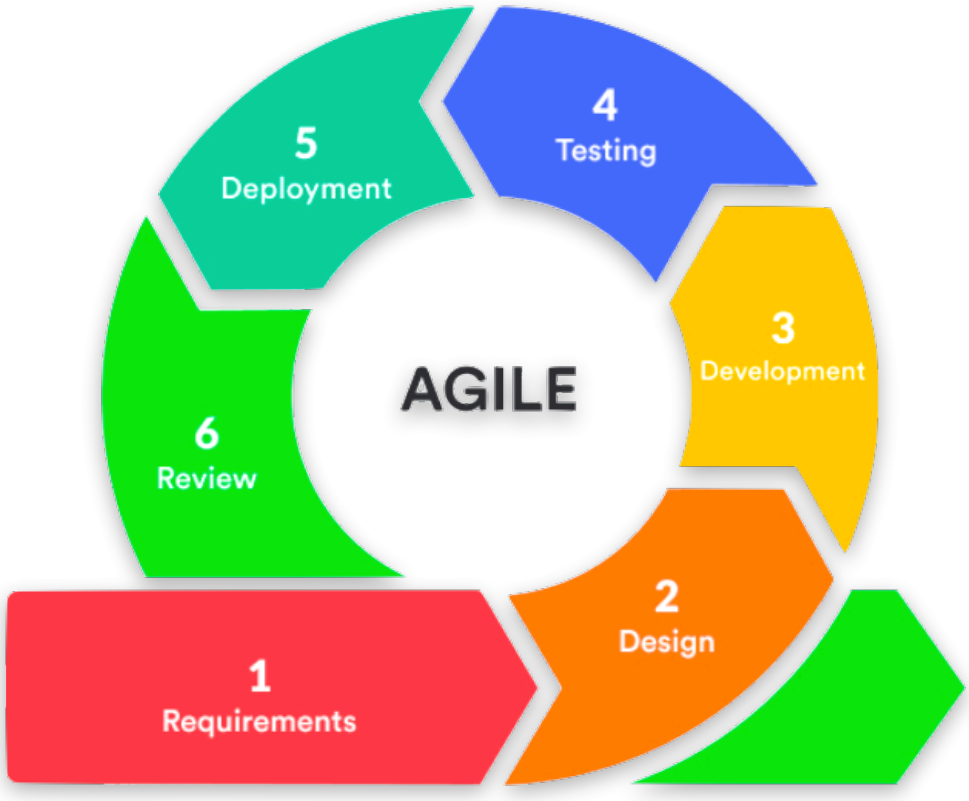


Figure 2: Life Cycle of Agile Methodology (Pawar, 2019)

2.1.1 Ways of achieving agility

The agile methodology is based on **Agile Manifesto** that comprise of 4 values and 12 principles. Propositions behind this manifesto is what it requires, in order to attain project agility. With the implementation of appropriate principles at correct project situation, the project becomes more agile. The project can be directed in development rather than documentation. Furthermore, flexibility and superiority in product's quality can be achieved with agility. From frequent customer's feedbacks to mutual understanding between working parties, the agile manifesto comprise handful of fundamental principles.

Some of the principles of agile methodologies accustomed in our project to enhance agility are specified below:

Agile Principle 1 : Customer satisfaction through early and continuous delivery of valuable software

Creating a software consumes a lot of time as well as effort. However, that time and effort is not worth unless clients are satisfied with the product they receive. Therefore, this principle behind agile manifesto focuses on iterative delivery of products so that the clients get engaged with the software prior to its completion.

Figure 3: Agile Principle 1 - Customer Satisfaction through early and continuous software delivery

For the software creation in Mantra Rental Company, delivering working software regularly in between short intervals would make project flexible and engaging. Firstly, stakeholders should not wait long until the product is entirely built. Secondly, with continuous delivery, end users get accustomed to the product operation and hence, with appropriate feedbacks, satisfactory result is expected.

Agile Principle 2: Welcome changing requirements, even late in development

Experience enhances knowledge, skills and other characteristics like confidence and maturity. When a project is instigated, the regular procedure continues until any changes are made for new experimentation. With changes, new experiences are appended and knowledge enhances. Our customers acknowledge their competitive needs more clearly and with this proposition, customer gets what they actually need for their competitive advantage.

In case of Mantra Rental Company, welcoming required changed in the project would be crucial, understanding their customer's demands and current market instability. This can certainly help the company to stay ambitious in business and make obligatory upgrade in company's services. With changes, the company can follow the strategies they desire and accomplish what they actually aimed for.

Agile Principle 5: Build projects around motivated individuals

This principle of agile methodology centralize the concept of encircling the project task with motivated and enthusiastic members. Having motivated individuals who are eager to explore and do hardships, productive as well as cost-efficient outcomes can be produced. Furthermore, this also prosper faith, support, satisfaction and self empowerment in between team members.

For the development project of Mantra Rental Company, all the members associated with the project are keen, cooperative and passionate for their task. The self-organized individuals are expected to bring out the end result of topmost standard (Platinum Edge, 2013). Having a healthy working environment and with mutual collaboration between everyone, admirable products are likely to be produced.

Agile Principle 6: The most efficient and effective method of conveying information is to and within a development team is face-to-face conversation

Nearly all the communication in a project is about project operation(i.e, schemes, techniques and uncertainties) or about project content(i.e, necessities). In order to put together a high standard software with high acceptance rate on the end user side, it is pivotal for development team to clearly understand every details of the project. For this, face-to-face communication is required, as it avoids ambiguity and confusions.

Face-to-face communication between stakeholders of Mantra Rental Company and our team members will be crucial. With everyone being engaged, our team can observe and understand their requirements without any distraction or barriers. Additionally, having a face-to-face meeting also develops mutual relationship between both parties.

Agile Principle 7 : Working software is the primary measure of progress

When we observe the project from client's point of view, the most precious thing is a proper functional software. In between all the processes from planning to deployment and review, the key is to build a properly operating software. If a satisfying software is not handed at the end, everything done during the project is considered as failure: both by clients and project team. Therefore, delivery of a trustworthy operating software is the eventual factor to compute project progression.

Our project team believes that providing clients with a proper functioning system will let them see how progressive and effectively the project is going on. Rather than heaps of documentation, we will provide Mantra Car Rental with a decently working software, that meets every possible requirements they asked for. Along with advancement, this also inaugurate trust in between both parties and result in satisfaction with the project done.

2.2. Methodologies - Compare and Contrast

1. Incremental Methodology

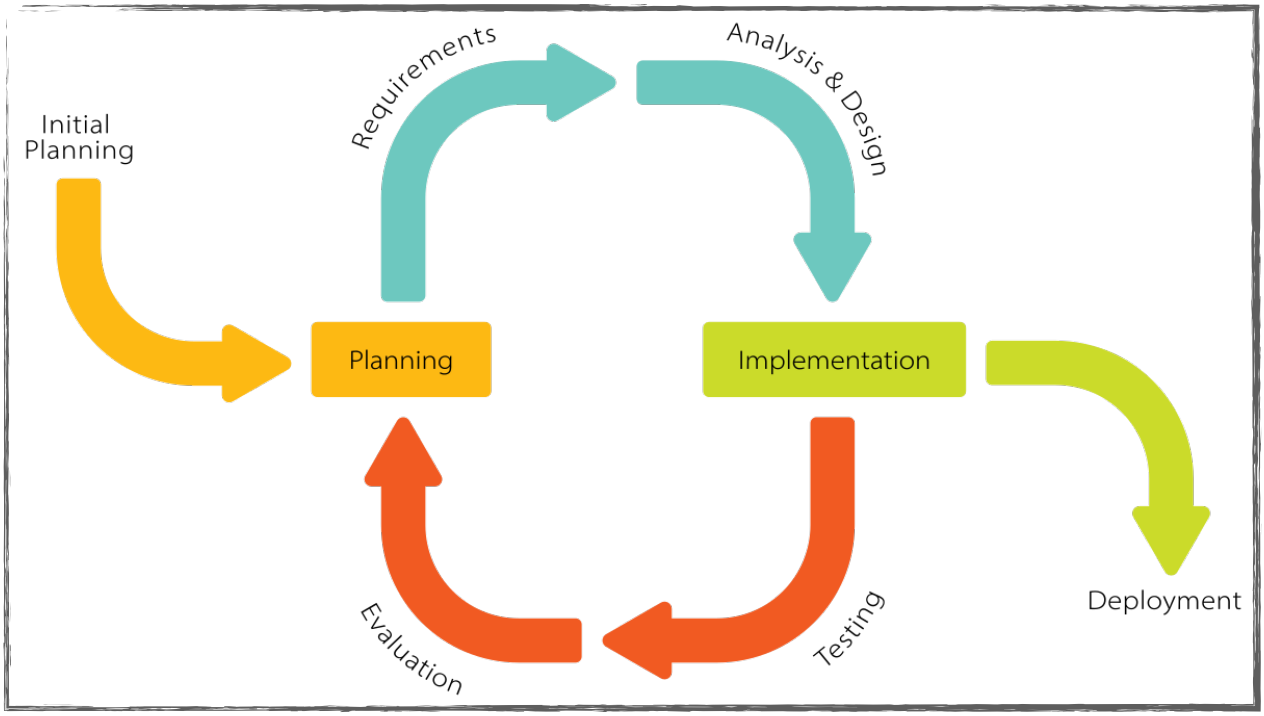


Figure : Incremental Model (Wikipedia contributors, 2021)

Incremental model is a system development methodology where the system needs some requirements which are further broken down into multiple independent modules of software development cycle. This methodology flows through some phases beginning with analysis as a starting phase, followed by design, implementation, verification and maintenance sequentially.

2. Rapid Application Development (RAD) Methodology

Rapid Application Development (RAD) is a process of software development that consumes less time span on planning and provides high priority for task growth and development. This process is based on prototyping method which allocates the time and resource for introducing the project.

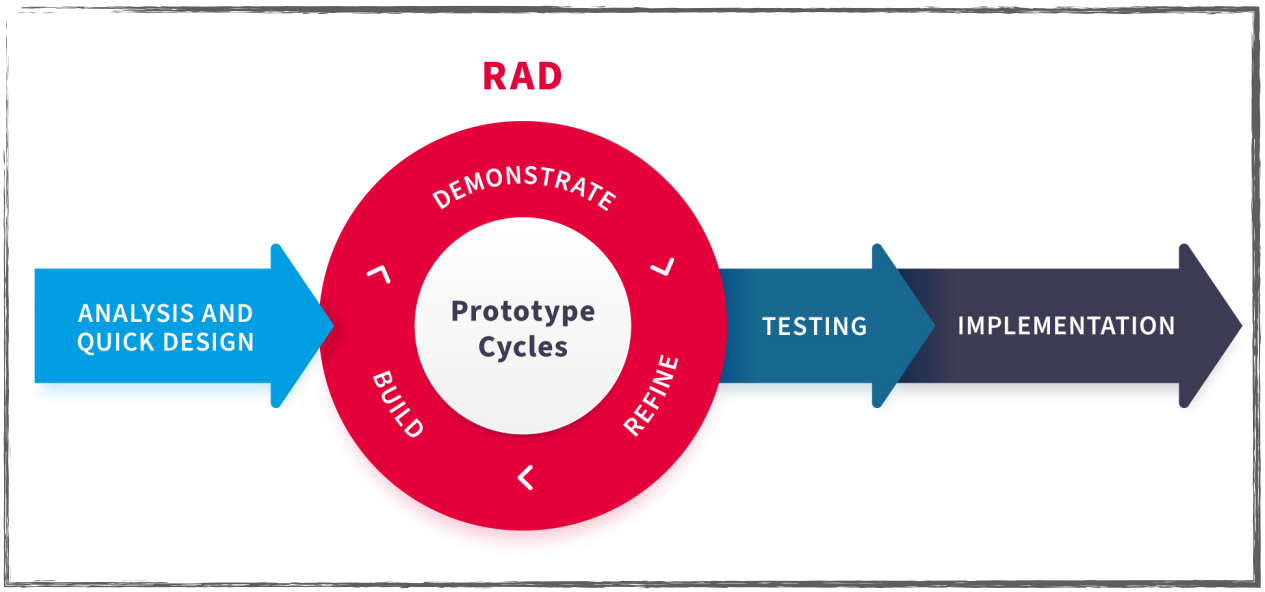


Figure : Rapid Application Development (RAD) Model

(The Ultimate Guide to Rapid Application Development, 2021)

The main aim of this system is to provide high quality system in a short period time, with entire focus on development instead of detailed documentation. RAD modeling has some main features such as, focusing on code, prototyping, user involvement and reuse of templates or tools.

3. Scrum Methodology

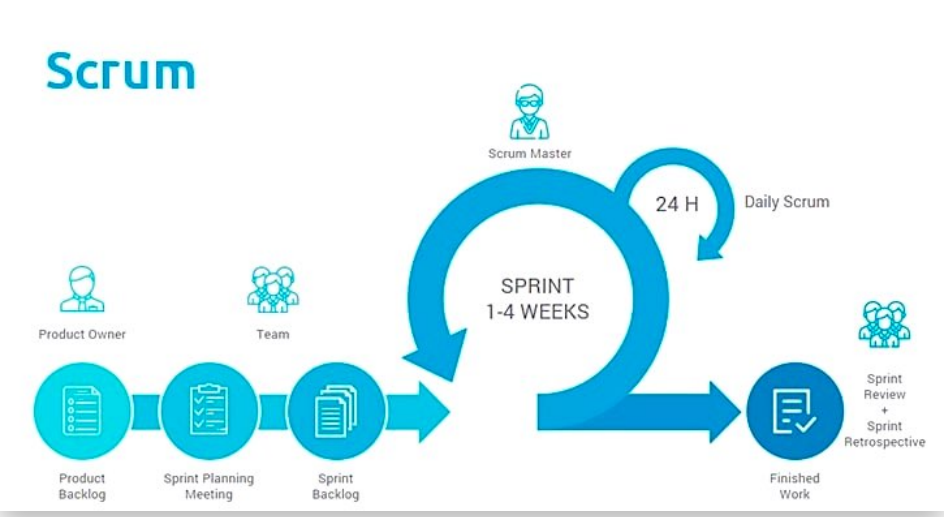


Figure : Scrum Model (Pisuwala, 2019)

Scrum model is a type of agile development methodology that is generally used for developing software with incremental and iterative processes. This methodology is considered to be rapid, effective, adaptable as well as flexible agile framework to design deliver value for customers. The prime aim of scrum methodology is to fulfill or satisfy the needs and demands of customers with continuous random progress, combined responsibilities, and communication as transparent environment.

4. Spiral Methodology

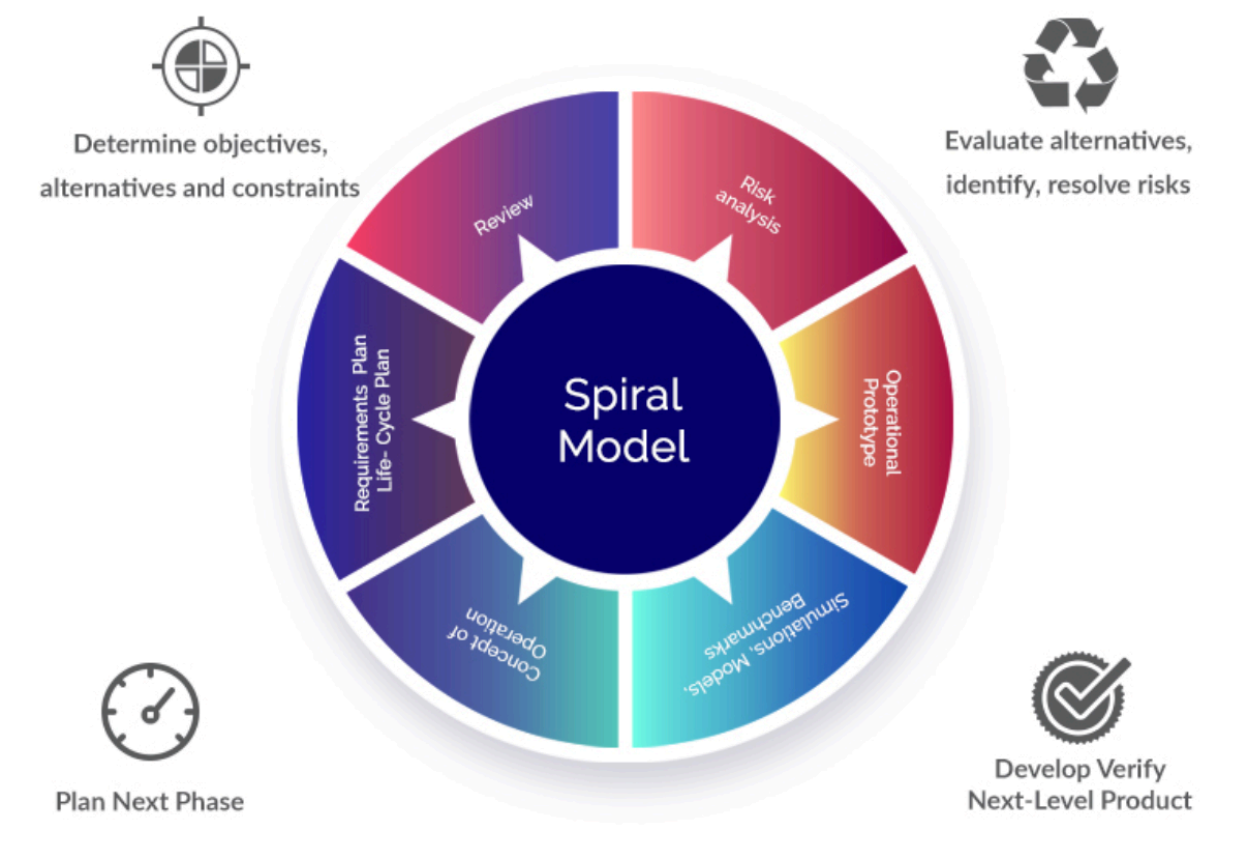


Figure : Spiral Model (Kumar, 2021)

The spiral methodology is often renowned as one of the most essential software development life cycle model that assists or support as Risk – driven. With the high emphasis on risk analysis, the spiral model is made with the combination of sequential linear development model i.e., waterfall

and iterative model. Within spiral model, there are several distinctive phases which begins with the construction of product design and ends with progress from clients that is to be achieved in the project.

5. Waterfall Methodology

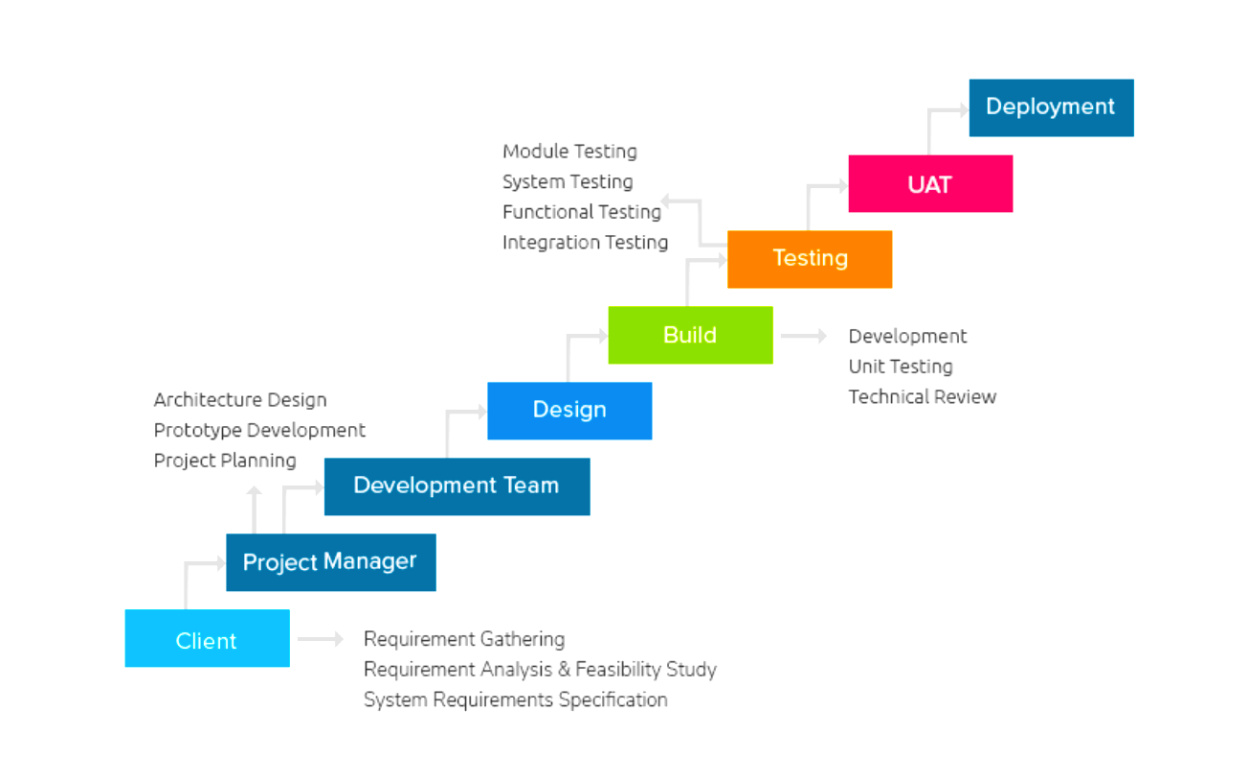


Figure : Waterfall Model (Kumar, 2021)

The waterfall model is the first introduced model among all the process model. It is also recognized as a linear – sequential life cycle model, which means that it demonstrates the process of software development in linear – sequential flow. This is the methodology where there is no phase reverse i.e, returning to the previous phase in between the project development is not feasible. This is a traditional method that avoids involvement of users in between development process. This model is mostly used for project involved with software engineering.

	Incremental Methodology	RAD Methodology	Scrum Methodology	Spiral Methodology	Waterfall Methodology
Planning	Planning is done in preliminary stage.	Planning is done in preliminary stage.	Planning is done in preliminary stage.	Planning is done in preliminary stage.	Planning is done in preliminary stage.
Project Handling	Not appropriate for large projects.	Not appropriate for large projects.	Appropriate for large projects.	Appropriate for large projects.	Appropriate for large projects.
Documentation and Details	Comprehensive documentation is required.	Does not focus and relies on comprehensive documentation.	Does not focus and relies on comprehensive documentation.	Comprehensive documentation is preferred.	Comprehensive documentation is considered significant.
Cost	Low Cost	Low Cost	Low Cost	Expensive	Low Cost
Identification of Need	Necessary requirements are gathered at the beginning phase.	Time box release is used for gathering necessities.	Necessary requirements are gathered at the beginning phase.	Necessary requirements are gathered at the beginning phase.	Necessary requirements are gathered at the beginning phase.
Flexibility	Flexible and easily adaptable.	Flexible and easily adaptable.	Flexible and easily adaptable.	Flexible and easily adaptable.	Change and adaptability is complicated.
User Involvement	User involvement is done in-between.	User involvement is high and considered essential.	User involvement is high and considered essential.	User involvement is considered essential.	User involvement occurs only in the beginning.
Duration	Lengthy development period.	Swift and short development period.	Duration depends on changes during retrospective ceremony.	Lengthy development period.	Lengthy development period.
Risk Involvement	Might experience less amount of risk.	Might experience less amount of risk.	Might experience high amount of risk.	Might experience medium level of risk.	Might experience high amount of risk.
Testing	Testing is done after iteration.	Testing is done following the construction phase.	Testing is usually performed with unit test.	Testing is done after the end of engineering stages.	Testing is done following the coding phase.

	Incremental Methodology	RAD Methodology	Scrum Methodology	Spiral Methodology	Waterfall Methodology
Framework	Linear and iterative framework	Linear sequential framework	Linear Framework	Linear and iterative framework	Linear Framework
Re-usability	Reusability is prioritized up to a certain extent.	Reusability is prioritized in this model.	Reusability is prioritized in this model.	Reusability is prioritized up to a certain extent.	Reusability is prioritized up to a certain extent.
Returning Earlier Phases	It is feasible to return to earlier phases.	It is feasible to return to earlier phases.	It is feasible to return to earlier phases.	It is feasible to return to earlier stages.	It is not feasible to return to earlier phases.
Working System Availability	Conclusion of life cycle.	Conclusion of life cycle	Conclusion of life cycle	Conclusion of life cycle.	Conclusion of life cycle.
Team Size	Focus on small or medium team size.	Focus on small team size.	Focus on small team size.	Requires large team size.	Requires large team size.
Client Control over Developer	Prominent control of clients	Prominent control of clients	Prominent control of clients	Prominent control of clients	Only slightest control of clients

Table : Comparison and Contrast between Methodologies (Rungta, 2021)

3. System Analysis

Although four different methodologies were recommended for the development of our project, we have carried out our project under RAD (Rapid Application Development) methodology. Requirement analysis is the first step that carried out in this methodology. There are various techniques of gathering requirements but in case of our project we have gathered requirement through questionnaire and interviewing stakeholders and end users of ‘Mantra Car Rental System’ and SWOT analysts is performed.

3.1 SWOT Analysis

SWOT analysis stands for strengths, weaknesses, opportunities, and threats which are the technique used for specific projects. This analysis is used for both professional and personal purposes. For examine organization growth properly or orderly the above factors are important. Likewise, our project is required SWOT analysis for developing car rental company.

1. **Strengths**

   Majority of people in this globe love to travel. Though, they use various means for travel, they might use vehicles or travel by walking. Mostly, people use vehicle for travel. And, they order vehicle on rent. In this way, business will peak up for car rental company. For, our team, the goal is to seriously focus in it and provide better facilities. In such case, our developing team provide good online renting facilities with a good price which depends on respective location. The price for renting vehicles is totally different with other agencies and provide good facilities that customer need while traveling. This strategy helps our client as competitive benefits in the market and there is almost difficult for other car rental company to run in same market (Car Rental Agency SWOT Analysis - TheFinanceResource.Com, n.d.).

2. **Weaknesses**

   Though we provided a better facility, but there have not employee to facilities their services. In addition, there is problem for large family which required more space in vehicle but our client only serve with an only by car. So family have to hire car for getting our facilities. In other word, our client company works as small scale agency. Actually, our client does not contain large number car for service. And, large scale agency has their own large number employee and service for facilities and help for large family. This kind of weakness assist other companies to deal with customer easily and can run their company as a competitor in same market.

3. **Opportunities:**

   This is one of the best solution of the company to merge with other company to expand the operation into the next level. Relationship with national recognizable company assists run the brand without any difficulties. This indicate the usage of vehicles will be providing by car rental agency might be high. This kind of relationship helps to grow up the number of travels due to merge of both brand facilities. This leads to assist the brand operation to expend by opening tertiary location. This kind of opportunities increase the number of vehicles for public services which will be ready for everyday public service. On the other hand, it could provide the job opportunities for employee while increasing the vehicle after merge. These opportunities will be provided, if the company merge with national recognizable brand.

4. **Threats:**

   There are a handful car rental agencies that they face threats in their own business. The common risk faced by our client company like faced by other related brands is that in urban areas or major cities. In major cities, due to having heavy traffic and business person or any normal employee have their own hectic schedule, they prefer to ride bicycle rather than hiring car for rent. Our client company, provide service for both cities and rural area, but they get order for long tour rather than in short distance. And, this type of order is occasionally get by our client company. This type of threats will face by our client company.

Overall, we conclude that, our company have lots of strength and some weaknesses to run the company in same market with other companies. They have a strength to facility their clients with good price for location and provide good service. Likewise, our client car rental company have some weaknesses while running the company. I got some problem with renown company for large family. Moreover, they can get more opportunities while they merge with national renown franchise brands in order to extend up their company. But, they have some threats while they focus in major city areas. This kind of gathering information displayed in design phase.

4. Design

There are various modeling techniques under RAD methodology but we would like to adopt business, process and data modeling techniques. Business process modeling is represented by use case and activity diagram which shows the flow of information between various business channels. Similarly, data modeling technique is represented by ERD or class diagram which helps to identify the data sets and shows relationship between those data. These diagrams are also called conceptual or logical design.

The diagrams that represent all this three modeling techniques are described below:

4.1 Use Case Diagram

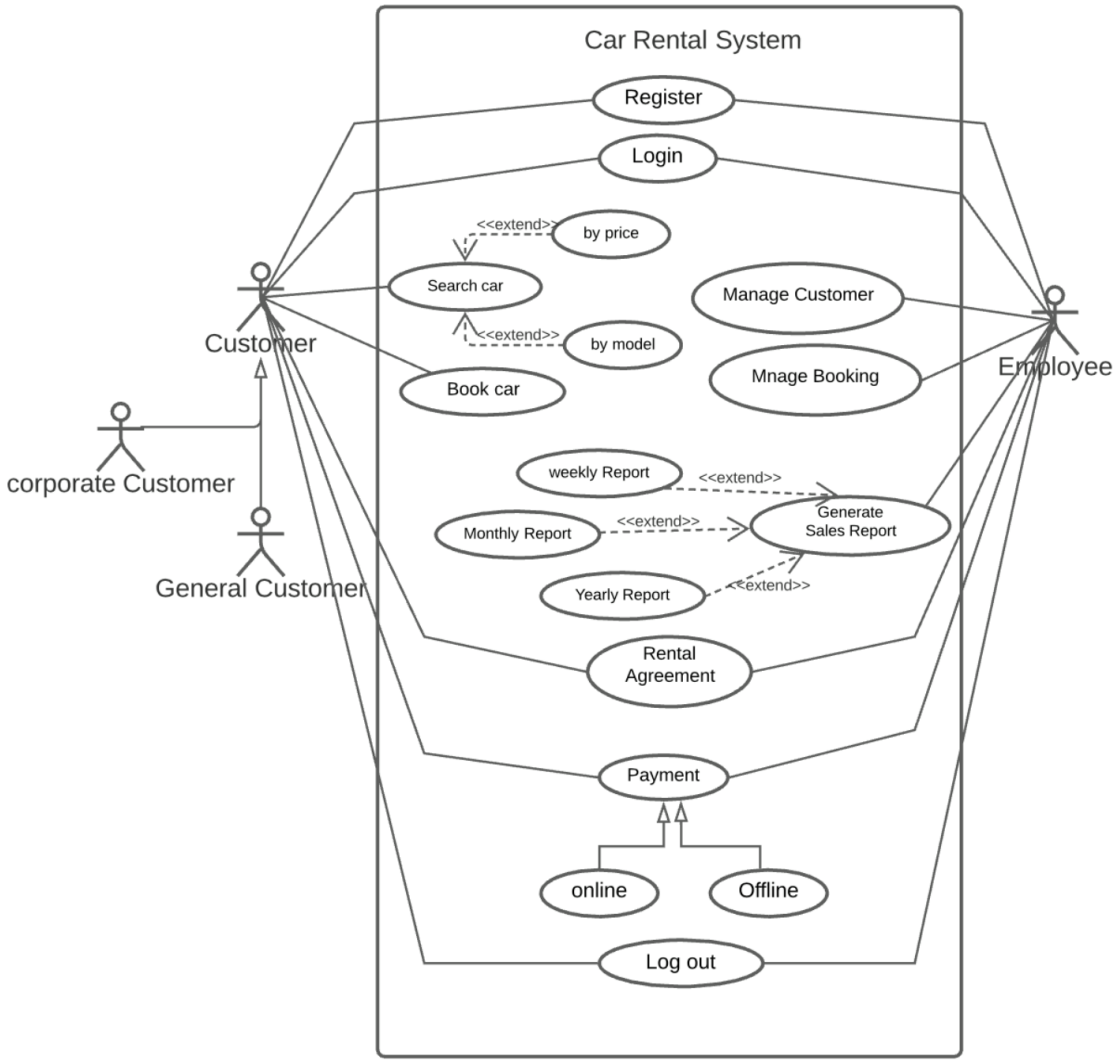


Fig : Use case diagram of ‘Mantra Car Rental System’

In case of our system, 'Car Rental System' is represented by rectangular shape. Similarly, there are two actors that is customer and employee. Since, the actor are external object, they are placed outside the rectangular shape. Here customer is primary actor where as employee is secondary actor who is going to act after the primary actor does something on the system. So, according to the rules, customer is placed on the left Side and employee on the right side of the system. Moreover, the task that can be performed by each actor are connected using connector. Also, there are two types of customer which are connected to the customer actor using generalization arrow. Similarly, the functions or operation that customer and employee can access are bounded by oval shape inside the rectangular shape.

4.2 Class Diagram

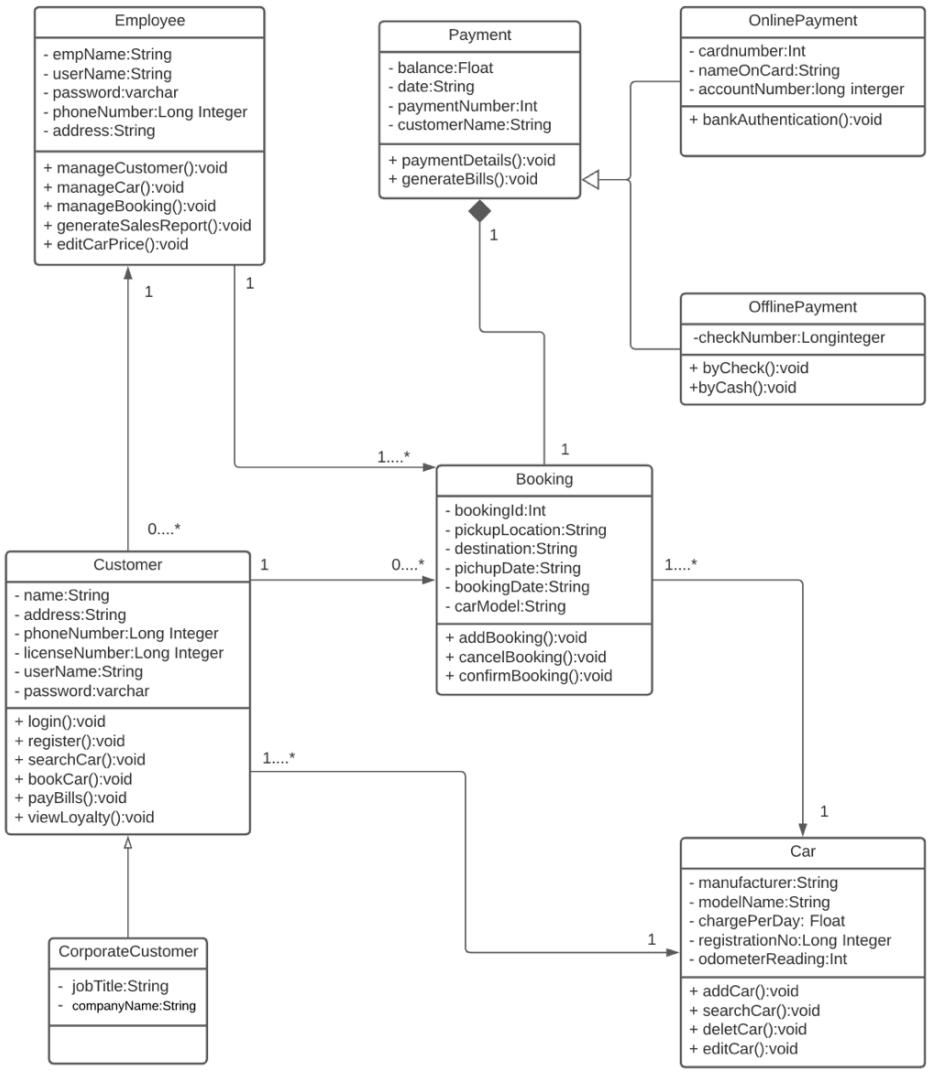


Fig : Class Diagram of Mantra Car Rental System

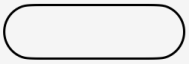
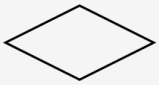
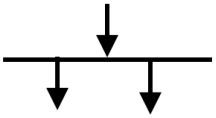
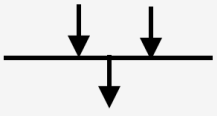
Above given figure is the class diagram of Mantra Car Rental Company where class is denoted by rectangular shape with three partition. Class name, attributes and methods are placed at top, middle and bottom portion respectively. Similarly, classes are connected by arrow called association and dependencies are shown using aggregation and composition. In addition to this, inheritance is shown by generalization sign.

From the case study provided to use, the classes of car rental system are customer, employee, payment, car, and booking.there are two types of customer that is general and corporate customer which are inherit to the customer class. So, they are connected with customer class using generalization sign . Same thing is applied to payment .Similarly, composition symbol is used between customer and payment because, in order to do booking customer need to do payment compulsorily.

4.3 Activity Diagram

Activity Diagram

The major symbols that are used in activity diagram are :

Name	Symbol
	Start node
	Action state
	Control Flow
	Decision Node
	Fork
	Join
	End Nodes

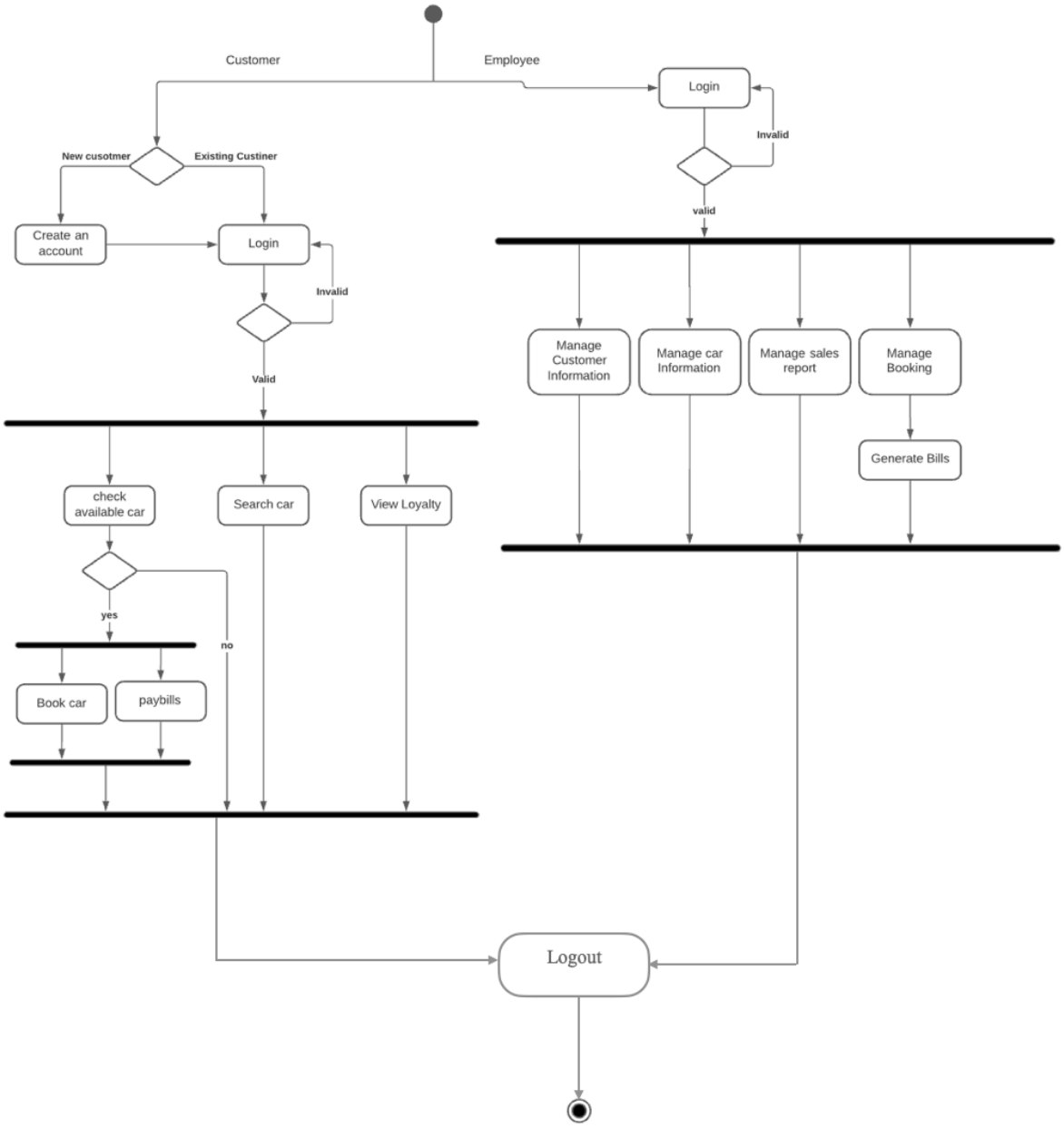


Fig: Activity Diagram ‘Mantra Car Rental System’.

The activity diagram is used to demonstrate the flow of control of the activity within the system. This diagram describes the dynamic behavior of the system. The main purpose of drawing this diagram is to make client understand their system in more detail.So, above diagram shows how the messages gets flow from one activity to another .

So, the activities that can be performed by the users are represented by rounded rectangle. Similarly, the lines shows the flow control among the activities. Decisions like login verification are represented by diamond shape. In addition to this, the activities that can be performed simultaneously like booking and payment are included inside fork and join. As a whole this diagram describes the process modeling of the system.

4.4 Interface Diagram

Interface design is the graphical layout of the system. Good interface design helps users to easily interact with the system. So, designing user interface is important part of system development life cycle. Even RAD methodology also mainly focus on designing UI than planning and requirement analysis. So, we have also designed the User Interface of car rental system and delivered to the customer repeatedly to gather feed back and refine the interface designs according to the feed back provided to us. So, the final user interface design of 'Mantra Car Rental System' that we have designed are listed below :

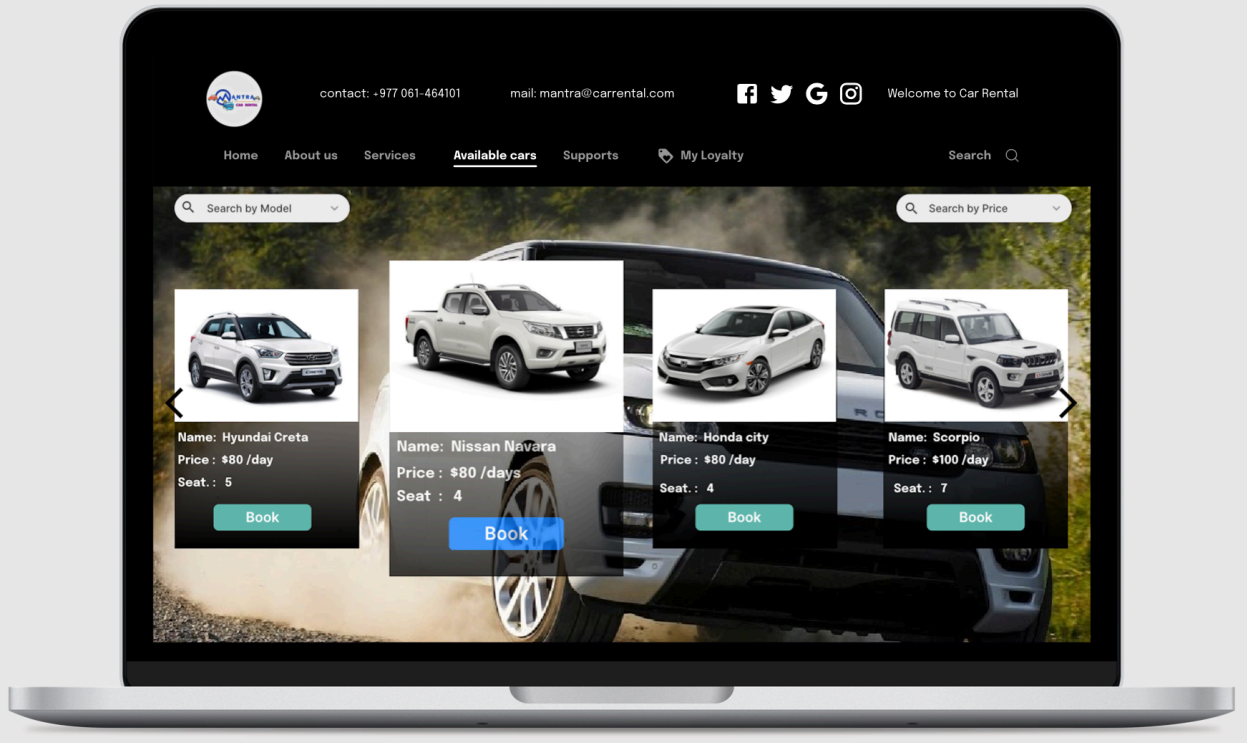


Fig : Available car

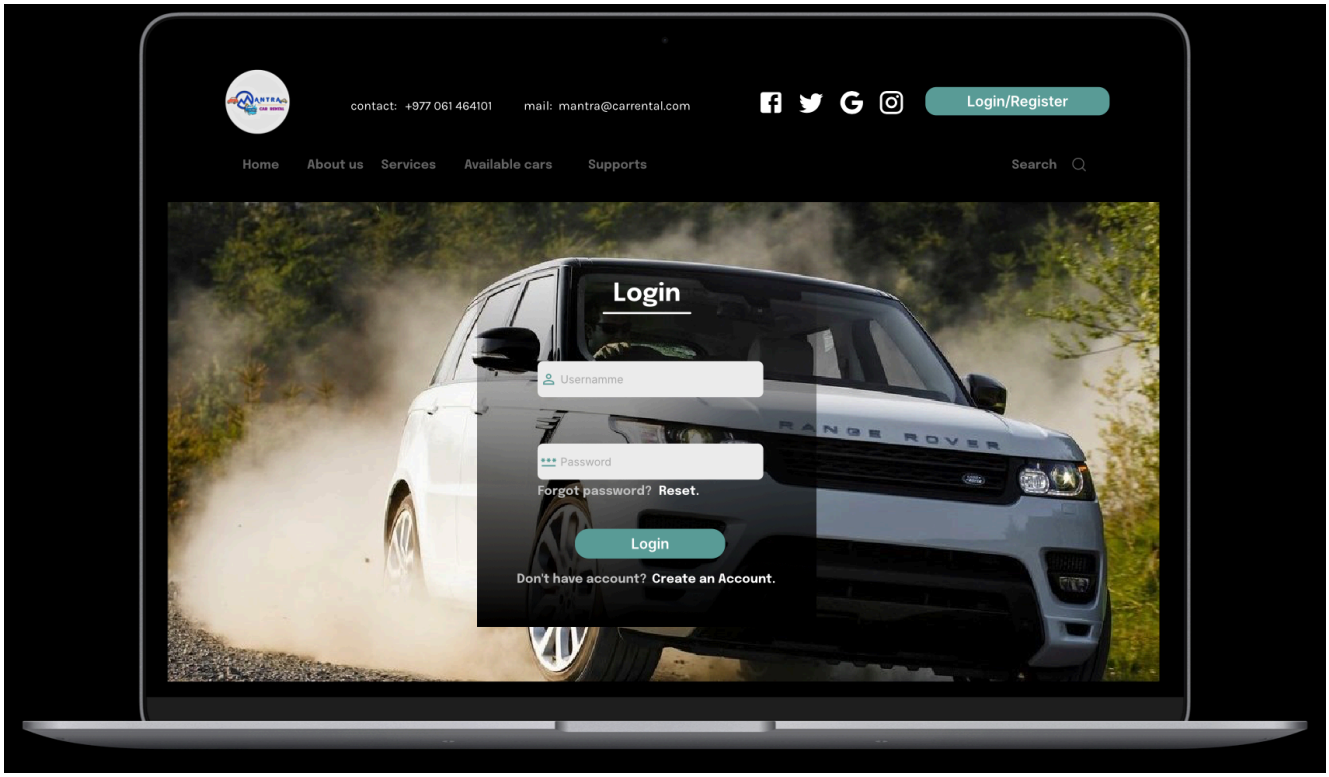


Fig: Login form

This is the interface design of the login form . If customer enters his/her username and password then they are able to book a car. Similarly, if employee enters his/her username or password they enters into the panel where employee are able to perform the task like manage customer, manage booking, manage car and so on.

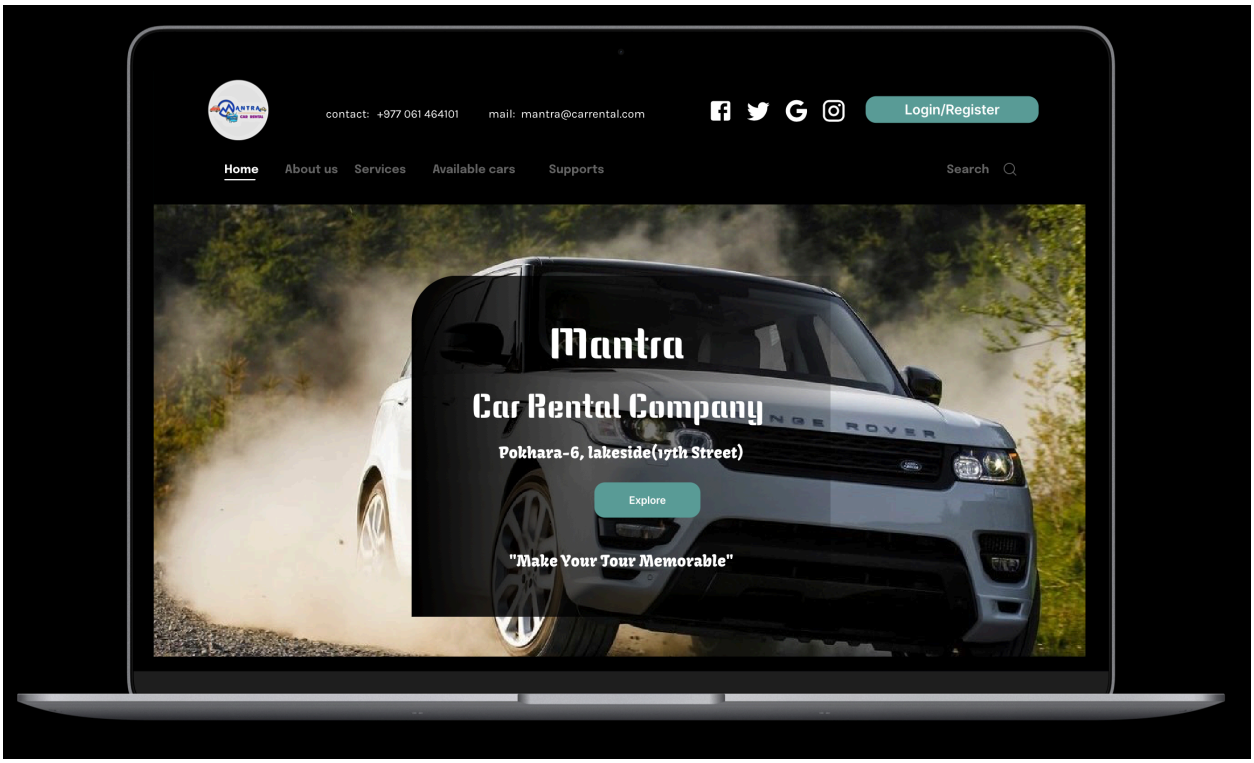


Fig Home Page of Website

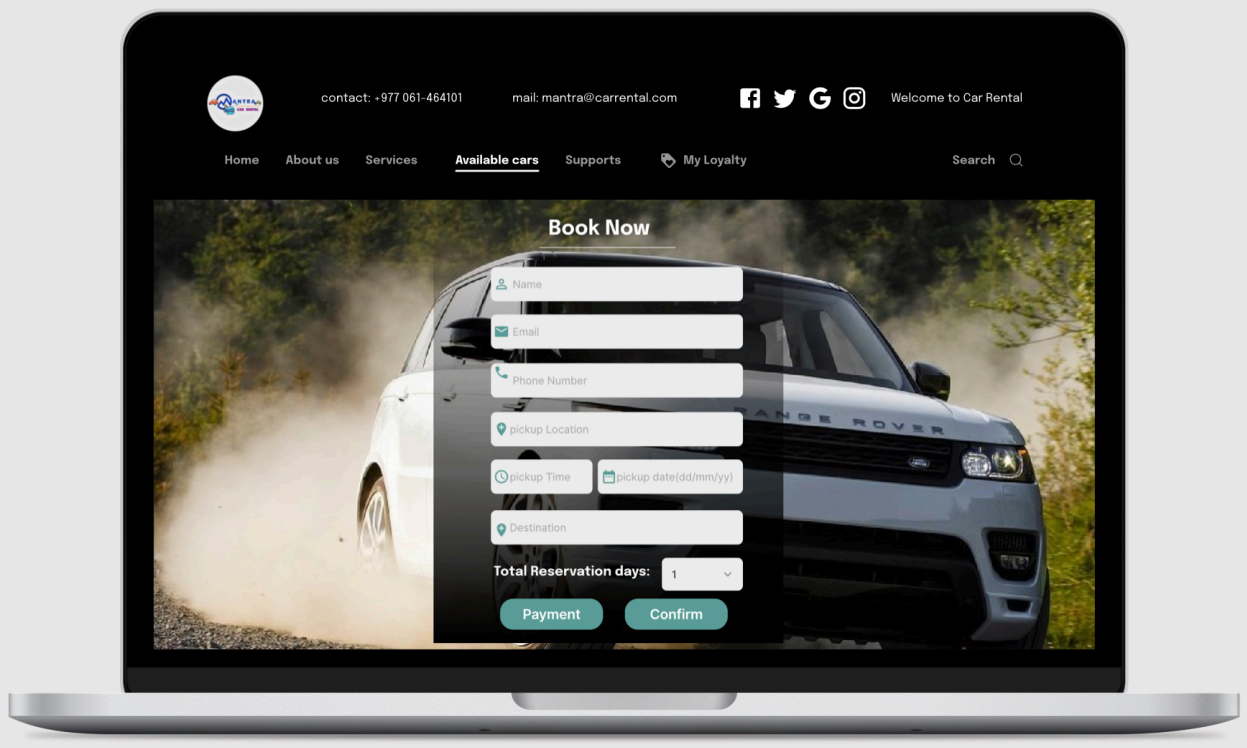


Fig : Car Booking Form

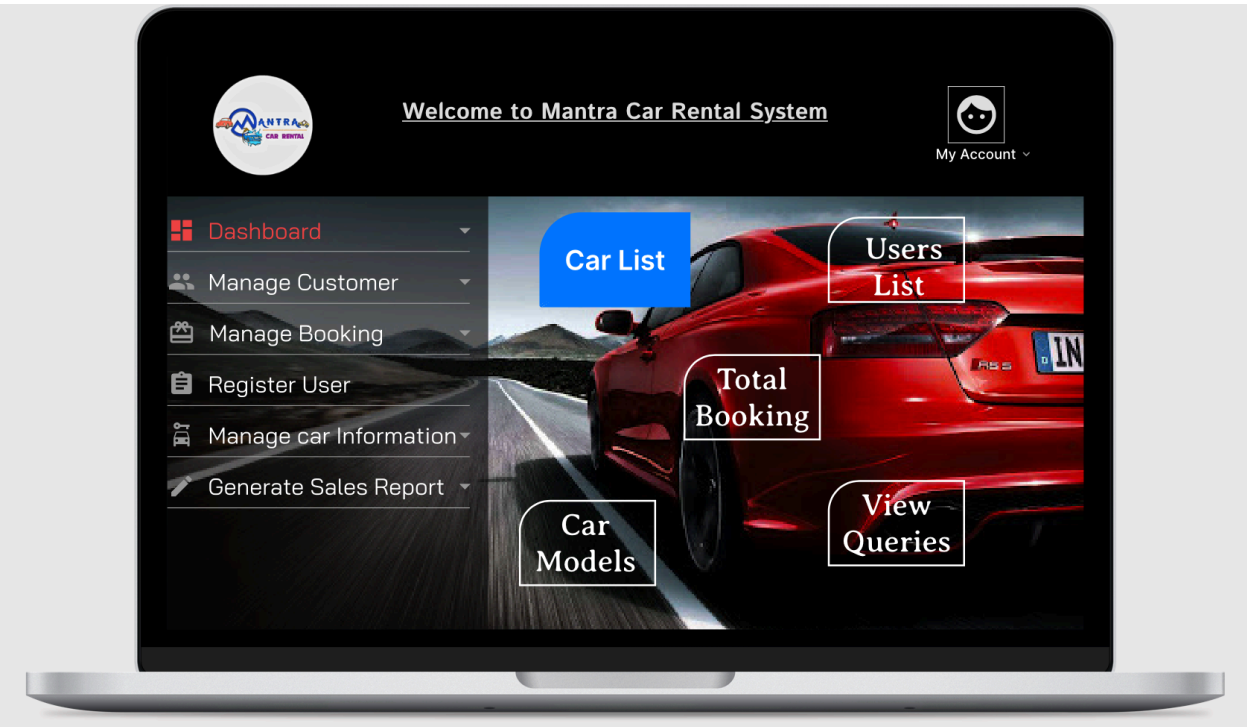


Fig Admin panel

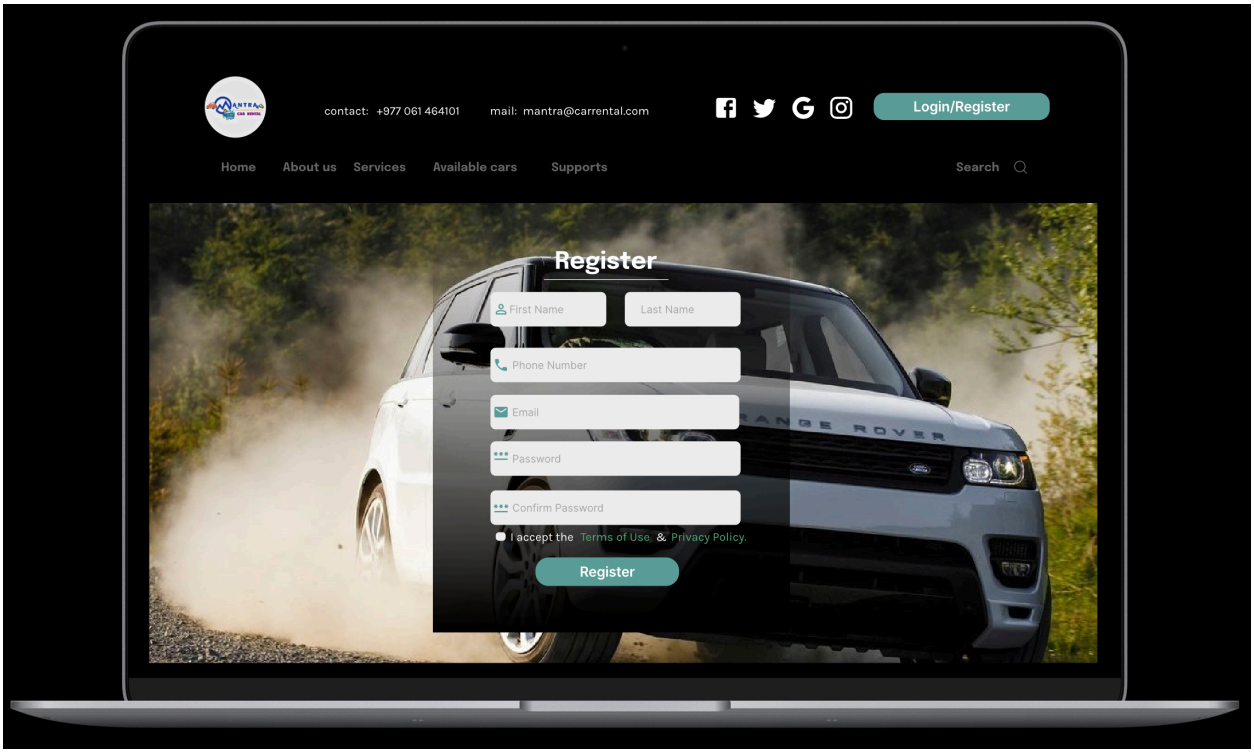


Fig :Registration Form

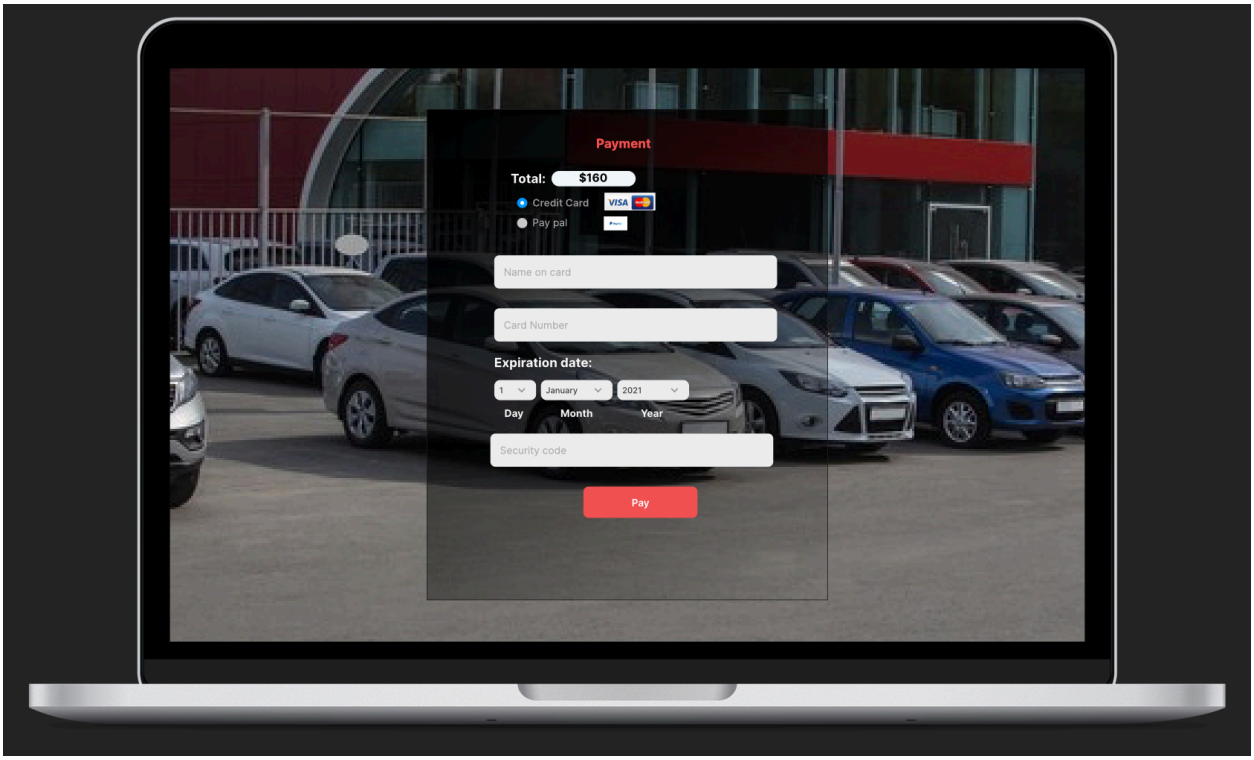


Fig : Payment Form

5. Implementation and Deployment

5.1 Construction

Construction is the phase where the complete system is built by using several software and programming languages on a dedicated system. It begins from getting approval from the owner of the company on suggested prototype. The system development team will prepare for different resources like software development and interface designing tools. Our system is web based so it is necessary to work on many web browsers like chrome and safari. Following are the programming languages and software tools which will be used for website development for our system.

i. **HTML, CSS3 and JavaScript:**

HTML is the key programming language which is standard language for web development (Vodnik & Anderson, 2021). It can be used to make front-end design for our system where user will interconnect with the system. CSS is a language which provides easy control for the display of web pages and easily customize the layout ("The Importance of CSS in Web Development", 2015). For our online rental system, JavaScript can be used for colors hovering the mouse and other attractive designs.

ii. **MySQL :**

It is a standard language for storing, modifying and retrieving data from the database. MySQL can be used in online car rental system, to store the data of many customers and staff of a company which will make it easier than keeping record in paper.

iii. **SSL Certification (Security Feature):**

The car rental website can also use SSL Certification which ensures that user's confidential information is protected safely. Our system will have a URL web with HTTPS which will be safe to input user information in the system.

iv. **Amazon web services:**

It provides services for backup cloud storage. The car rental system can store their data and information in cloud storage which also helps in green computing.

v. **Abode Dreamweaver:**

Abode Dreamweaver is a versatile web development tool which supports many languages such as HTML, CSS and JavaScript. It helps to design websites which uses virtual aids to minimize errors and speed up in development of sites ("Website design software | Adobe Dreamweaver", 2021).

vi. **Framer:**

Framer is an interface designing and prototyping tools. Our team will use framer for designing website prototypes using real data. This tool is more convenient and easier to use.

vii. **Microsoft Office:**

It is a product of Microsoft Corporation consisting of Word, Excel, Visio and other different Microsoft products. We can mainly use Microsoft Word, Visio and PowerPoint for the system.

5.2 Testing

Testing is the process which is done to ensure that if the system meets the requirement received from stakeholder. For Mantra Car Rental Company, we will be using dynamic testing method which is divided into several layers such as Unit testing, Integration testing, System and Acceptance testing (Guru99, 2019). We have described below the most recommended testing for the software which is required for Mantra Car Rental Company.

TEST DATE : 6/15/2021		**PROJECT ID: 22890**	
TIME: 9:00 a.m.		**ONLINE CAR RENTAL SYSTEM**	

TEST CASE	TEST TYPE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	REMARKS
1. User Sign-in in online car rental system	Unit Test	1. Open website 2. Enter User Name as "X" and …….	User successfully signed-in into the system, welcome page displayed.	Error – does not show error when 'space' is used in ID	Correction made to code to check ID validity.

Fig: Sample of test case

i. Unit testing:

The unit testing is conducted by using white box method which permits the modification of system to become effective and efficient if any error is found (Guru, 2019). In our system, it will be used for testing of input text field, password field, functional button on screen, validation, and constraints. It is performed just before delivering system to tester for formal testing.

ii. Integration testing:

Integration testing is performed by gathering individual unit that interlink together. Among several types, Big Bang integration system is considered effective and efficient. For Mantra Car Rental Company, it will be done to find interface defects between original objectives and the system, and to find system functions and modules. The main goal of this testing is to evaluate if communication between individual component of system work as expected.

iii. System testing:

This is the final test which is done after the system is completely designed and completed. It will be done by black box method (independent tester test the system) to check the overall conduction of system. In our system, it can be used to find all the possible design errors, spelling and grammatical mistakes.

5.3) System Deployment:

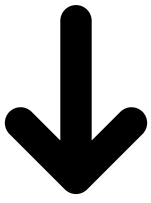
It is the last phase of System Development Life Cycle. When the system is tested and fully functional it is ready to be delivered to customer. So, during the deployment period there arise various questions regarding system deployment but how to deploy the system is our main concern. It's important to select the suitable technique for faster and effective option which is easy for employee and organization to adapt (Banerjee, 2021).

Features	**Direct Changeover**	**Phased Changeover**	**Parallel Changeover**	**Pilot Changeover**
Methods	Old system is removed and replaced by new system.	New system is started slowly and implemented one phase at one time.	Both new and old systems are run parallel at same time.	New system is first started to one department and expanded to other department.
Cost	Cheap	Cheap	Expensive	Cheap
Risks	High risk	Low risk	Low risk	Low risk
Changeover Duration	Long changeover period	Longest changeover period	Medium changeover period	Short changeover period

Unfamiliarity to system might cause issues to end users. So, to make users familiar with new system, we have to plan about implementing the parallel running system change over strategy. Despite being expensive, as old system need to be operated alongside new system for certain period of time thinking that the data are more important than cost, the company also agreed with our idea. So, this method can be best suited for the deployment of the car rental system. In addition to this, changeover will be best option in term of data integrity as well. Beside this, if the new system get failure, old system can be reverted which helps to give continuity to the work without any obstruction.

END OF GROUP COMPONENT

INDIVIDUAL COMPONENT



Part - B (Individual Component - 30%)

6. Selection of Methodology

A. Rapid Application Development (RAD) - Sandesh Subedi 'A' (NPI000040)

RAD (Rapid Application Development) is a software development methodology, designed for high standard systems along and swift development. Derived from rapid prototyping approximation, the chief objective of this methodology is to provide an upgraded level of system as well as to enhance development proficiency. RAD is one of the highly favored methodology centralized more on tasks and user involvements but less on detailed planning and analysis. It is a form of Agile methodology that gives precedence to iterations. The development phases of this methodology are also gathered as concise, iterative evolution patterns as iterative approach emphasize productivity and flexibility to correction (Kaur & Verma, 2014).

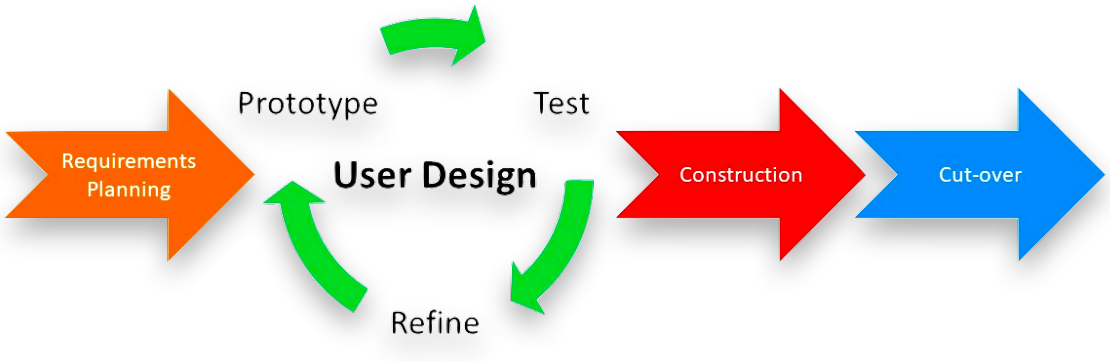


Figure : Rapid Application Development (RAD)
(*Forget about Waterfall ! Let's Do Rapid Application Development*, 2019)

As shown in the figure above, Rapid Application Development consist of four distinct phases.

1. **Requirements Planning**

This is the first stage of Rapid Application Development (RAD) model. In this phase, a comprehensive understanding of business complications is initiated, along with goals, scopes and functionalities (Kikama Jr, 2010). Required number of meetings are conducted between administration and Information System (IS) management with the motive of reaching a mutual cooperation and to initiate the development process. If necessary, end users and IS staffs will take part in Joint Requirement Planning (JRP) workshops and a lucid visualization of the project is built for further progress.

2. **User Design**

In this phase, a circumstantial analysis of business details related to the approached system is done. Meetings are conducted between senior stakeholders where implementation planning about system parts and their functionalities are done. Participants of Joint Requirement Planning (JRP) workshops carry during earlier phase carry out analysis of the system. Then, a comprehensive outline blueprint of the system and its area model is constructed ("AN INTRODUCTION TO RAPID APPLICATION DEVELOPMENT," 2009).

3. **Construction**

During construction phase, the detailed design is studied and transformed into a functional application. The blueprint and area model constructed during earlier phase is accustomed to build the application accordingly. Coding as well as documentation also falls under this phase which is further tested in order to produce a feasible application software.

4. **Cut-over**

This is the final phase of Rapid Application Development (RAD). In this phase, the system is installed in user's device and final user testing is done.In necessities, training sessions are also organized to assist users learn about the device and its functionalities. Also, files and

information are transformed from the old system to the new one according to client's demands. Once the system is demonstrated, client's feedbacks are noted and the decision about system launch is made (Kikama Jr, 2010).

Selection of Rapid Application Development (RAD) for Car Rental Company (CRC) system can be appropriate as well as advantageous. For a smoothly running company such as Mantra Car Rental, it is strenuous to wait long for a system that is developed for customer's welfare. With agility, RAD methodology can assist in building a high quality system in short time period so that the CRC can operate their daily business operation swiftly. In this methodology users and executives can participate together throughout the whole project, with the purpose of achieving business requirements. Clients or stakeholders can see substantial proof of system development during planning and designing stages, as the process is completely navigable. Staffs from CRC can stretch out their doubts straight away and reconsider anything which doesn't convince them. This helps in establishing a mutual understanding and build a matured relationship with clients.

Case tools in RAD can be crucial to bring out maximum productivity and construct a satisfactory outcome. The CRC system can be constructed with uniformity and high standards so that users can find system easy and compatible to use. Along with tools, RAD model has more key ingredients which can help us complete CRC system swiftly. Crucial ingredients that will be heavily involved in the project are :

- Methodology
- Tools
- People
- Management

Figure : Essential Ingredients of RAD

For Mantra Car Rental Company, this is their introductory step in software systems and digital marketing. So, when meetings for requirement planning are conducted, there are high odds that clients or executives fail to recall each and every requirements. In other case, they might even come up with new concepts to make some distinctive alteration in the system. In these sort of conditions, modifications are required. Unlike traditional methodologies, the RAD model focuses on iteration which emphasize on redoing a certain task unless customers are satisfied with the result. In case of CRC, using RAD model will allow clients and project team to make necessary changes at anytime so that the company can stay ambitious following their objectives.

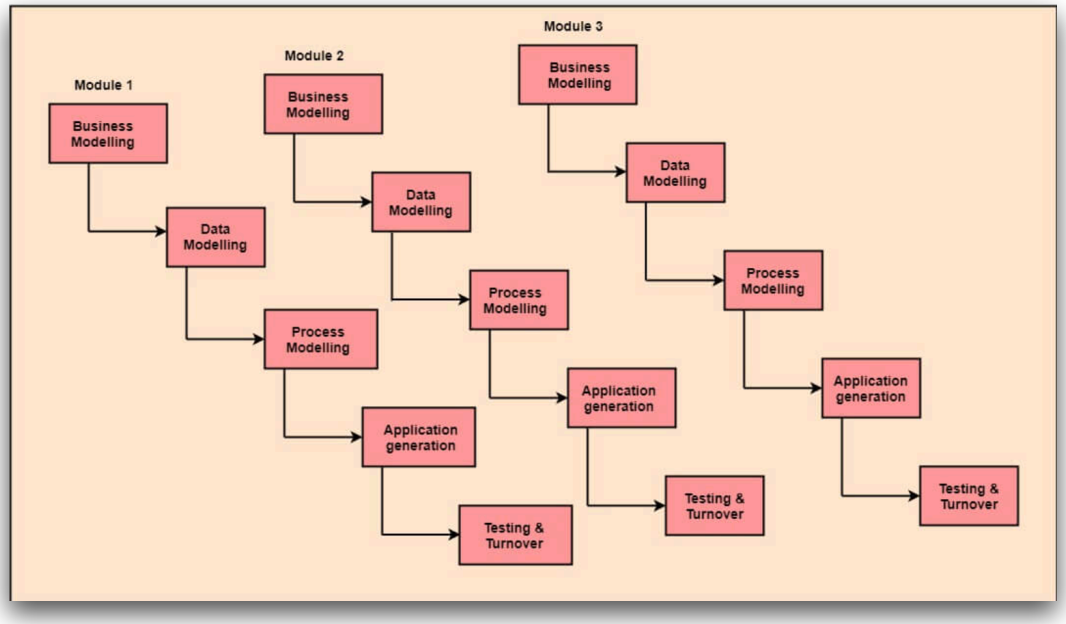


Figure : Working functionality of RAD Model

(Rapid Application Development Model | RAD Model - Javatpoint, n.d.)

During the construction phase, RAD model is considered to be trustworthy while transforming user design into a functional software. The reusable code in RAD model lessens manual coding and space for bugs. The use of prototype and less risky method allows users and developers to have a close look on the project and to avoid obstructions within the CRC system. Moreover, with RAD, the CRC system can be built by focusing on functionalities rather than taking excessive risks by adding unnecessary complex features.

Once the construction phase is done, the CRC system is in final stage where system is installed and closing testings will be done. Since the development time period is significantly reduced, delivery time between iteration and prototype also minimized. The early integration from the project's foundation can assist developers recognize bugs easily (Softermii, 2021). Early deliveries are provided to clients so that they can continue their business and find complications within the system. With RAD model, investors and users who will be operating the system in CRC will be asked for feedbacks so that necessary iterations can be done in order to enhance the software.

Gantt chart (Rapid Application Development Model)

Sandesh Subedi 'A' - NPI000040

ID	Task Name	Duration	Commencement	Completion
1	**Requirement Planning**	**9 days**	**16/05/021, Sunday**	**24/05/021, Monday**
2	Meetings	2 days	16/05/021, Sunday	17/05/021, Monday
3	JRP Workshops	3 days	18/05/021, Tuesday	20/05/021, Thursday
4	Project Analysis	4 days	21/05/021, Friday	24/05/021, Monday
5	**User Design**	**10 days**	**25/05/021, Tuesday**	**03/06/021, Thursday**
6	Logical Modeling	4 days	25/05/021, Tuesday	28/05/021, Friday
7	Prototype Design	4 days	29/05/021, Saturday	01/06/021, Tuesday
8	Documentation	2 days	2/06/021, Wednesday	03/06/021, Thursday
9	**Construction**	**18 days**	**04/06/021, Friday**	**21/06/021, Monday**
10	Prototype Conversion & Coding	7 days	04/06/021, Friday	10/06/021, Thursday
11	System Functionalities	5 days	11/06/021, Friday	15/06/021, Tuesday
12	Testing	2 days	16/06/021, Wednesday	17/06/021, Thursday
13	Feedback	1 day	18/06/021, Friday	18/06/021, Friday
14	Iteration	3 days	19/06/021, Saturday	21/06/021, Monday
15	**Cutover**	**8 days**	**22/06/021, Tuesday**	**29/06/021, Tuesday**
16	System Testing	2 days	22/06/021, Tuesday	23/06/021, Wednesday
17	End-User Testing	2 days	24/06/021, Thursday	25/06/021, Friday
18	Feedback	1 day	26/06/021, Saturday	26/06/021,Saturday
19	Iteration	2 day	27/06/021,Sunday	28/06/021, Monday
20	System Publication	1 day	29/06/021, Tuesday	29/06/021, Tuesday
	Overall Calculations	Total : 45 days	16/05/021, Sunday	29/06/021, Tuesday

Gantt Chart

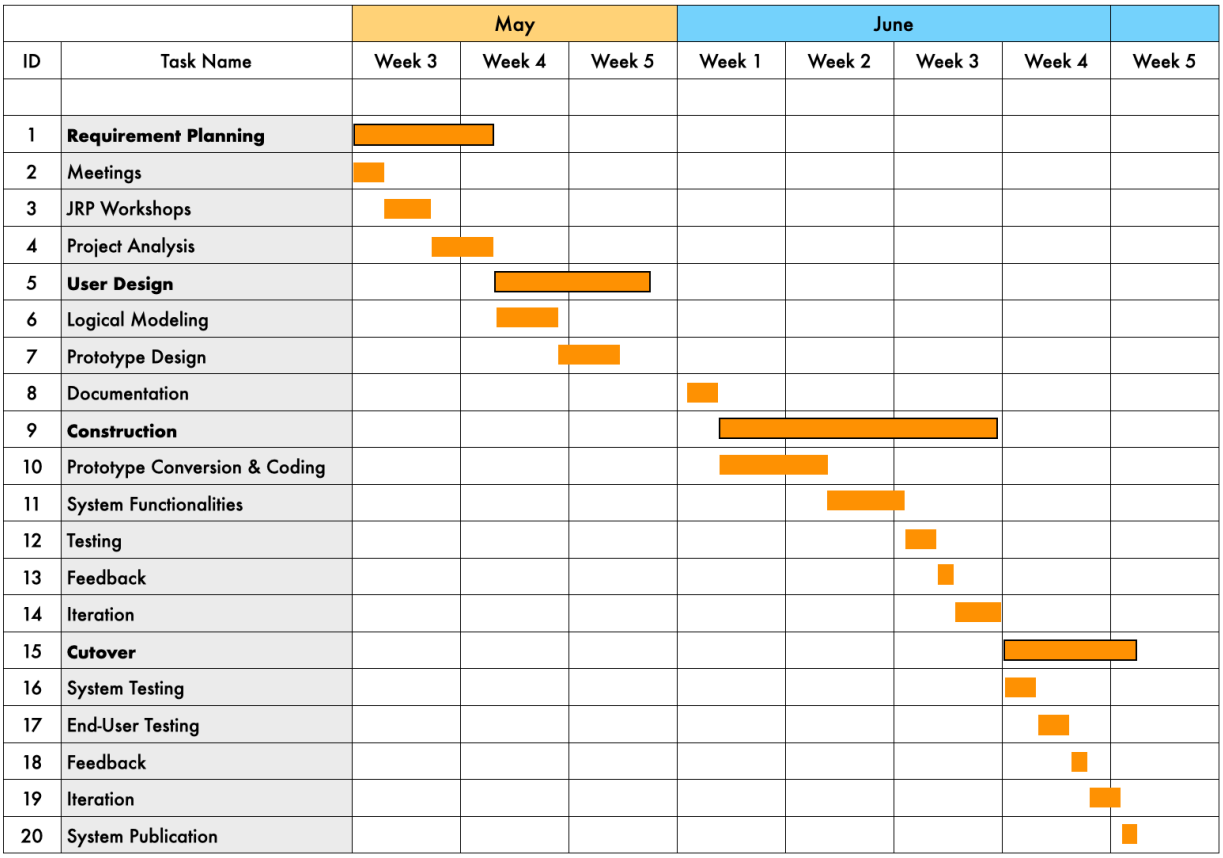


Figure : Gantt chart of CRC project with RAD model

B. Spiral Methodology - Nabin Chhetri (NPI000032)

Spiral methodology is the combination of ideas created from development of iterative used with systematic and waterfall model with peak level of emphasis on risk analysis. This methodology is almost similar with incremental development of the product. This method is well – recognize and best to handle for large level of project which take part in continuous improvement. One of the specific activities where small prototype comes as output in large software project are

completed in spiral. And, these kind of activities are repeated until whole software is built and these activities accept for all spiral. The advantage of using spiral methodology is its capability to control risk which might come in different stages or unknown for software development. This method is auspicious method for project like complex, expensive and large.

The spiral methodology has four different phases to complete the life cycle of system development. Development process should be passed through given stages: planning, analyzing risk, development of engineering and evaluation throughout the entire spiral development. These stages are known as spiral.

1. Planning :

Planning is the beginning phase of the spiral methodology. In this stage, the team member conducts a program to communicate and listen customer and their needs. After that, member conducts an interview program with manager and team member of car rental company to concern about the problems. First of all, for the interview, meeting will be conduct face to face through different media or physical appearance and meeting is between two people i.e., interviewer which control the interview and interviewee who communicate with interviewer to provide answer of question that asked by interviewer. The team members gather an information about problems, scope, objective and aim of car rental company. For this entire information, their group members gather requirement as System Requirement Specification(SRS) and Business Requirement Specification(BRS). According to Business Requirement Specification, it is document about business facilities that Car Rental Company wants to brings and make aim for this project. Likewise, System Requirement Specification is the document that collect requirements of user and implement the requirement of system. In System Requirement Specification, it demonstrate the strategic that implement by Car Rental Company and includes all mentioned requirement in documents. In addition, it describes about machinery and tools required to design and developed Car Rental Company project. At the end of this phase, the team member addresses the alternative solution to rid out from issues faced by company and implement the gather solution.

2. Risk Analysis :

First of all, the teams are able to identify the solution in planning phase to overcome the problems. After all, members choose the promising solution which will be best effective for project in risk analysis. Moreover, they connect the auspicious solution with risk to solve it. A development team might face some risk during the developing project which can prevent from progressing. After providing priority to risk that identified by development team are coming up with best strategies to overcome the risk. The strategy can be known as risk mitigation strategies. Using best strategies to choose and finalized for resolving risk is the best strategy. At end of risk analysis, prototype is created. If prototype address the risk, alternative solution is implement to face it.

3. Engineering Phase :

At this phase, development team starts work on developing system without testing. At beginning of spiral, lots of documents are showed which are unclear called Proof of Concept(PoF) that is used to get feedback of client's. In this process, system of working version or build is created in order to send clients for gain some promising information and details about feedback. At end of this phase, testing is used after build is finally made. Development team used testing for integration testing, unit test or system test. Defect report, coding, and summary report or testing are delivered in this Engineering phase.

4. Evaluation Phase :

Testing is completed in engineering phase and conclusion report of testing is made, next phase is done in spiral methodology is evaluation. In this evaluation phase, car rental company and user used it as sample and received their feedback to complete the project as suggestion given by CRC and user. In this phase, risk analysis is identified and observed. Risk analysis is solved with providing more priority and use some alternative solution to develop the project. The risk analysis is identified as a cost overrun and schedule slippage. Schedule slippage indicates the task required time which is delayed while comparing with finish date. In this phase, the

development team may use their leisure time as an overtime in order to make productive resource as a most critical projects. Likewise, cost overrun is increase the actual project budget that has been planned. Whenever project manager identified the cost overrun, plan has been reset for development in order to make project by providing more priority. At the end of this phase, new spiral model of planning is conducted.

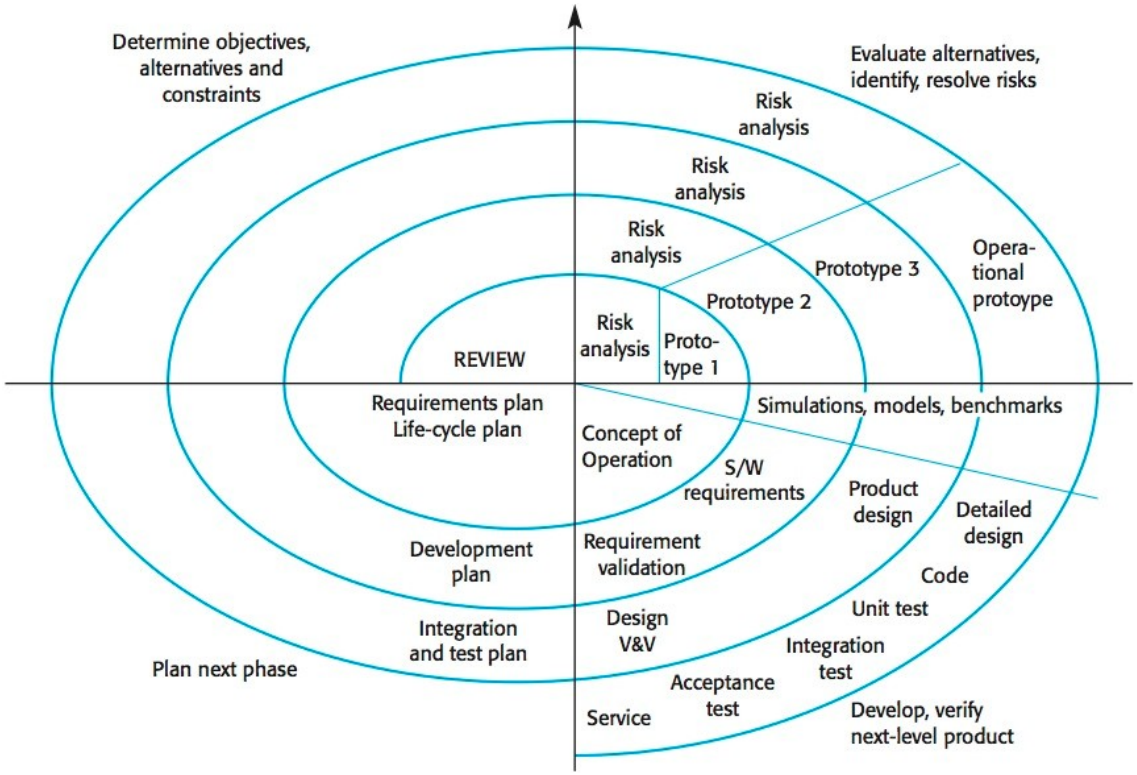


Figure : Spiral Methodology

Conclusion

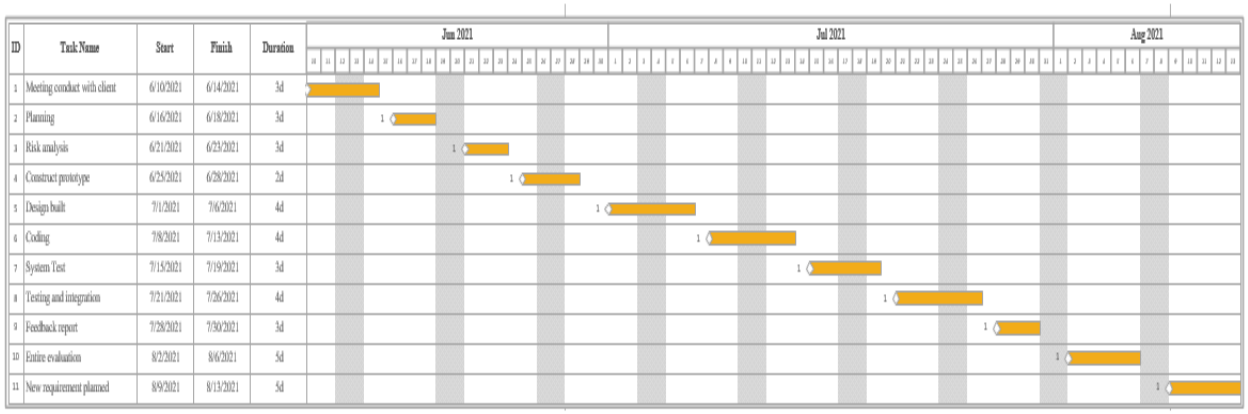
Car rental company is a well renown and well growing company which means its project need to be completed in time and that would be large and complex. For this kind of project, spiral

methodology is pretend for this kind of development and large project. Because of cost effective and provide solution to handle risk as it includes risk analysis phase in project development, spiral model is best. This analysis assists to remove the potential risk. This permit to modify and change that might face during the project documentation. This model gathers the details feedback from user to involve develop the code which play significant role to complete the project. Due to the use of prototype, customer can use the system in order to get opportunities for review it as useful feedback and input. There are several model for fits this project, but in my opinion, spiral model suit for this project.

Gantt chart (Spiral Model)

Nabin Chhetri - NPI000032

Tasks	Duration	Beginning Date	Due Date
Meeting conduct with client	**3**	**10 June 2021**	**14 June 2021**
Planning	**3**	**16 June 2021**	**18 June 2021**
Risk analysis	**3**	**21 June 2021**	**23 June 2021**
Construct prototype	**2**	**25 June 2021**	**28 June 2021**
Design built	**4**	**1 July 2021**	**6 July 2021**
Coding	**4**	**8 July 2021**	**13 July 2021**
System Test	**3**	**15 July 2021**	**19 July 2021**
Testing and integration	**4**	**21 July 2021**	**26 July 2021**
Feedback Report	**3**	**28 July 2021**	**30 July 2021**
Entire evaluation	**5**	**2 August 2021**	**6 August 2021**
New requirement are planned	**5**	**9 August 2021**	**13 August 2021**



ID	Task Name	Start	Finish	Duration
1	Meeting conduct with client	6/10/2021	6/14/2021	3d
2	Planning	6/16/2021	6/18/2021	3d
3	Risk analysis	6/21/2021	6/23/2021	3d
4	Construct prototype	6/25/2021	6/28/2021	2d
5	Design built	7/1/2021	7/6/2021	4d
6	Coding	7/8/2021	7/13/2021	4d
7	System Test	7/15/2021	7/19/2021	3d
8	Testing and integration	7/21/2021	7/26/2021	4d
9	Feedback report	7/28/2021	7/30/2021	3d
10	Entire evaluation	8/2/2021	8/6/2021	5d
11	New requirement planned	8/9/2021	8/13/2021	5d

C. Scrum Methodology - Suraj Pandey (NPI000051)

Scrum is the widely accepted framework for implementing agile methodology. The main idea of scrum is to carry out the project work via a series of sprints. Here,. sprint is the time period within which the work need to be completed and make ready for review. One sprint must not be more that two to three weeks. At the end of every sprint the product is delivered to the customer to collect the feedback and plan for next sprint.

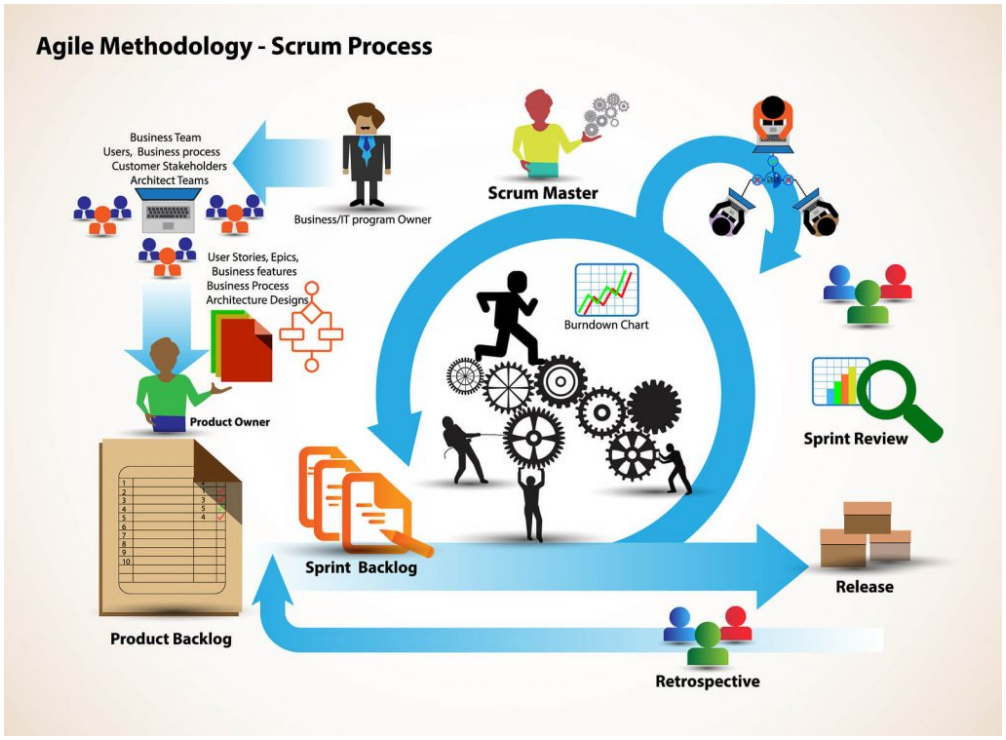


Fig: Scrum Framework (D., 2021)

Scrum says that rather than wasting the time on documentation, team must be more focused on adding user stories to the backlog, drafting wireframes, documenting client meeting and creating flowchart which helps to deliver the product on time as well as fulfill the user's expectations(Nuclino,). Beside this, the main goal of this methodology is to provide better quality products to the customer, and to help people to work in a team . Scrum is cost effective, flexible, fast and adaptable agile framework. So, due to these reasons about 70 percent of companies around the world prefer to use scrum (digital.ai, 2021).

From the above figure we can find out that there are three role models in scrum methodology which are described below:

Product owner:

The **product owner** is the person who collects feedback from end users and various stakeholders. Then after the feedback is collected, he creates a prioritise list of the features, requirements and enhancements provided by the end users in the form of user stories that need to be considered in the project. This prioritise list is known as **product backlog**. Here, user story is the unofficial and rough description of the features that need to be included in the software, which is written from the point of view of end user.

Scrum master:

All the activities that is carried out during sprint duration are supervise by the scrum master. He is responsible of conducting daily standup meeting to review the project progress and identify whether the project is going according to plan or not. He/she must be able to guid and coach his/ her team . Scum master must stay adaptable and open to promising circumstances for the group to improve their work process.

Scrum team:

It is the group of team member who work under the software development team. Scrum team are responsible of preparing Sprint backlog. Here sprint backlog is the core features that are selected among the features mentioned in product backlog.

How we can develop car rental system under scrum methodology?

To work under scrum methodology we need to interact with customer on daily basis. Customer involvement is the most important in scrum. If clients are less interactive, then we might fail to implement scrum methodology.

There are certain steps need to be considered while working under scrum framework which are describe below:

1. **Create Scrum Team:**

The very first step that we need to perform is to define a scrum team for the development of the project. We can include 4-9 member in our team. This team include project analyst, designer, tester, developer, etc.

2. **Appoint Product owner:**

Before starting the project we need to appoint the suitable product owner who can collect the necessary feedbacks or requirements from their customer and stakeholders. So, we must choose a product owner among the owners of car rental company who is eligible of collecting all these requirements as well as has clear vision regarding what need to be done. We can advice product owner about the software that helps to create a product backlog.

3. **Appoint Scrum master:**

After the team is being formed for the development of software, we need to choose a scrum master among team member who is capable of giving better decision and adapting all the responsibility that we have mentioned above.

4. Conduct Sprint planning :

After the product backlog is provided to us, we must conduct **sprint planning** to define what can be conveyed in the sprint and how that work will be accomplished.. As mentioned above, sprint backlog does not include all the features that are addressed on the product backlog. This sprint backlog helps us to determine the sprint budget as well.

5. Allocate task:

After preparing sprint backlog, we can assign the work for each individual member of the team. Each and every member are involved while working under this methodology. If we create a sprint task flowchart it will be easier for the scrum master to clarify that which task is assigned to which individual member of the team. It can be created using various software tools. The sample template of the sprint task flow chart is given below:

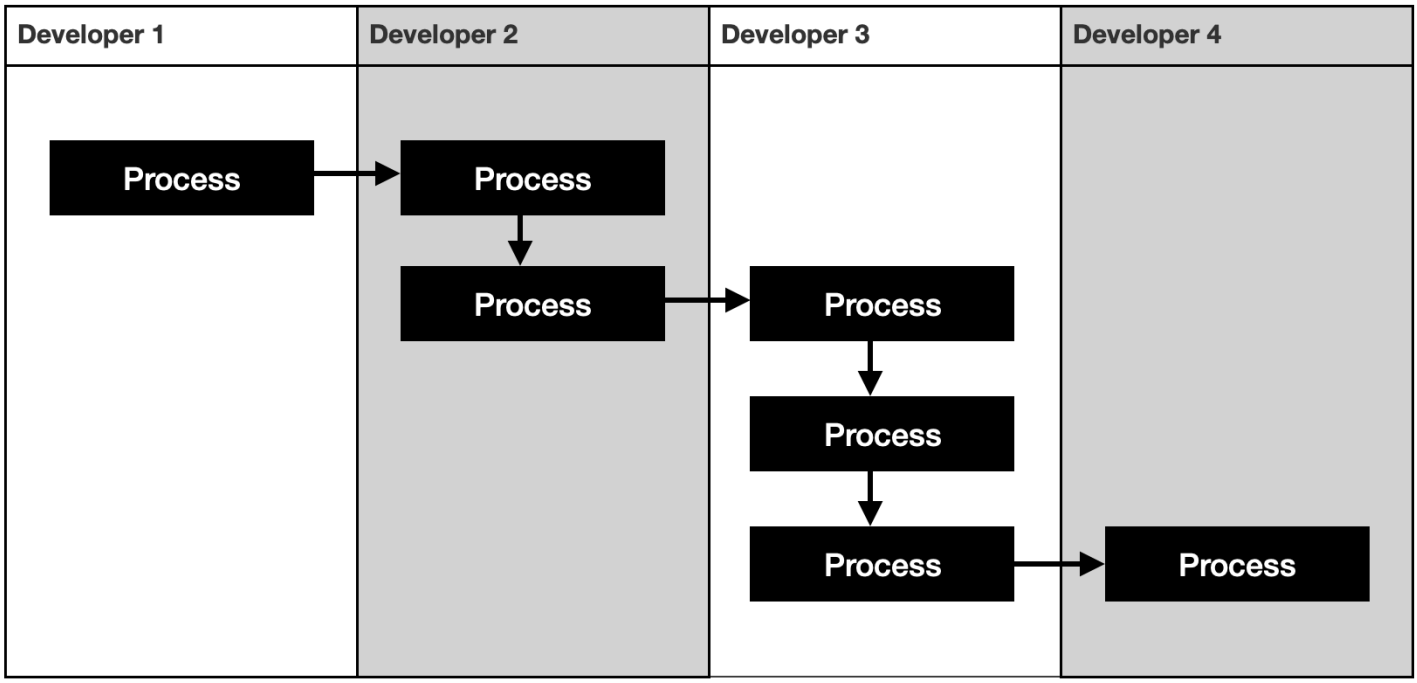


Fig: Sprint task flowchart template.

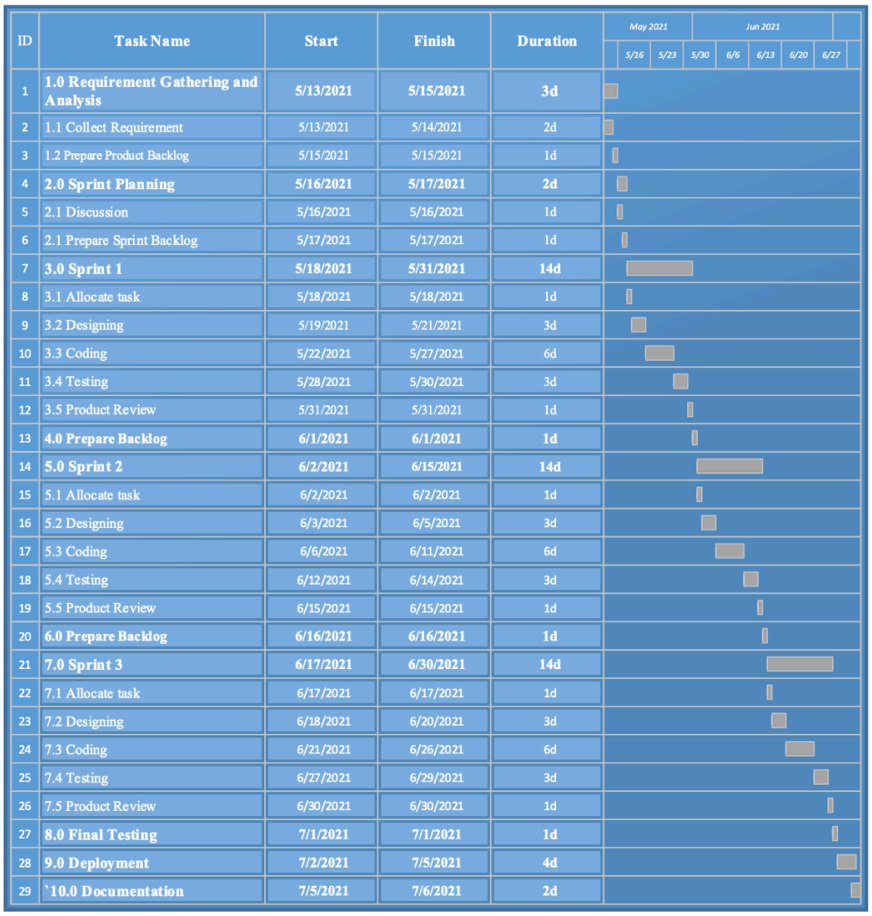
6. Conduct retrospective ceremony

After the completion of each sprint ,meeting must be held between product owner and scrum team where we can deliver our product and collect feedback from them. This is called **Retrospective ceremony.**

After the feed back is being collected, next sprint starts where we can add those features on our product which we collected during retrospective ceremony. If the product owner does not want to add more features then the product is finalised and is ready to be delivered to the client. After the completion of the sprint testing is performed. If the testing is successful then software will be ready to deliver.

In case of scrum framework entire team member can interact and address the problems. Unlike traditional methodology, frequent changing requirements are acceptable in scrum. Moreover, as mentioned above, this methods is cost effective as well as flexible than other methodology. So, due to these reasons I have recommended my team to implement scrum methodology for the development of the car rental system .

Gantt chart



ID	Task Name	Start	Finish	Duration
1	**1.0 Requirement Gathering and Analysis**	**5/13/2021**	**5/15/2021**	**3d**
2	1.1 Collect Requirement	5/13/2021	5/14/2021	2d
3	1.2 Prepare Product Backlog	5/15/2021	5/15/2021	1d
4	**2.0 Sprint Planning**	**5/16/2021**	**5/17/2021**	**2d**
5	2.1 Discussion	5/16/2021	5/16/2021	1d
6	2.1 Prepare Sprint Backlog	5/17/2021	5/17/2021	1d
7	**3.0 Sprint 1**	**5/18/2021**	**5/31/2021**	**14d**
8	3.1 Allocate task	5/18/2021	5/18/2021	1d
9	3.2 Designing	5/19/2021	5/21/2021	3d
10	3.3 Coding	5/22/2021	5/27/2021	6d
11	3.4 Testing	5/28/2021	5/30/2021	3d
12	3.5 Product Review	5/31/2021	5/31/2021	1d
13	**4.0 Prepare Backlog**	**6/1/2021**	**6/1/2021**	**1d**
14	**5.0 Sprint 2**	**6/2/2021**	**6/15/2021**	**14d**
15	5.1 Allocate task	6/2/2021	6/2/2021	1d
16	5.2 Designing	6/3/2021	6/5/2021	3d
17	5.3 Coding	6/6/2021	6/11/2021	6d
18	5.4 Testing	6/12/2021	6/14/2021	3d
19	5.5 Product Review	6/15/2021	6/15/2021	1d
20	**6.0 Prepare Backlog**	**6/16/2021**	**6/16/2021**	**1d**
21	**7.0 Sprint 3**	**6/17/2021**	**6/30/2021**	**14d**
22	7.1 Allocate task	6/17/2021	6/17/2021	1d
23	7.2 Designing	6/18/2021	6/20/2021	3d
24	7.3 Coding	6/21/2021	6/26/2021	6d
25	7.4 Testing	6/27/2021	6/29/2021	3d
26	7.5 Product Review	6/30/2021	6/30/2021	1d
27	**8.0 Final Testing**	**7/1/2021**	**7/1/2021**	**1d**
28	**9.0 Deployment**	**7/2/2021**	**7/5/2021**	**4d**
29	**`10.0 Documentation**	**7/5/2021**	**7/6/2021**	**2d**

Fig : Gantt chart

D. Waterfall Methodology - Sandesh Giri (NPI000041)

Waterfall model is a sequential model which was first introduced by Winston Roynce in 1970 with a concept in which software development activities are broken down into phases. (What is waterfall model? - Definition from WhatIs.com, 2021). It can be also known as linear-sequential cycle mode. In this phase, there is no overlap because each phase must be completed before moving on to the next just like a waterfall. This methodology requires extensive documentation of all stages of development of system from requirement analysis to maintenance stages. This permits Mantra Car Rental Company to give over the system documentation to any other developer in the case of problems and bugs that needs to be investigated. This model is highly structure and rigid which can be used for almost all types of projects. (Rouse, 2019).

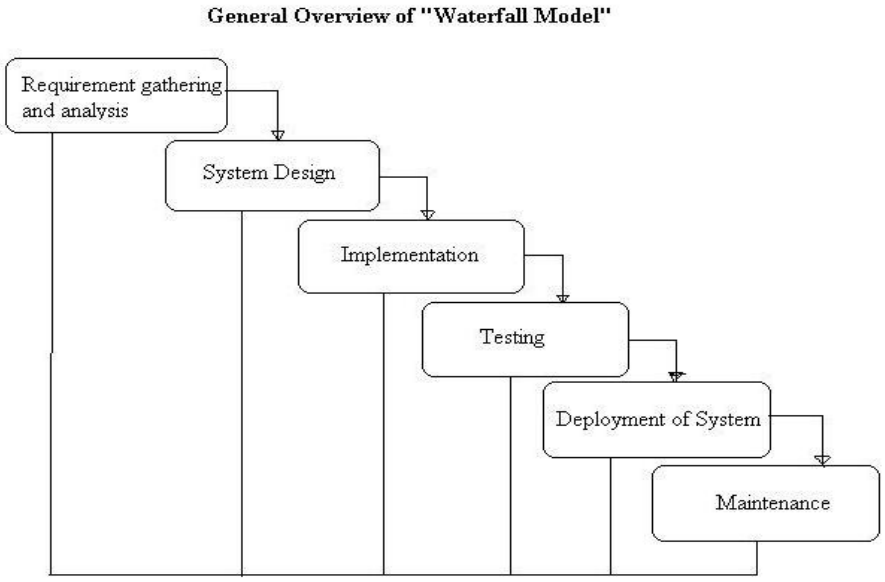


Figure : PHASES OF WATERFALL MODEL (Tutorialspoint, 2018)

i. Requirement Analysis:

In this phase of waterfall, all the requirement needed for project are analyzed and documented in specific document and a feasibility study needs to be carried out if these

requirement are valid or not. It is also vital to think about limitation and constraints that could affect the development process at this phase. Requirement Understanding Document (RUD) is created following comprehensive analysis of the requirements. In car Rental Company, system analyst employed by company will understand the new system before developers begin constructing the system. After understanding the Meta of business works, analyst will find out the errors occur in the current system by interviewing the staffs of the car rental company. After collecting all the requirements, analyst will have meeting of head of the company to ensure that all the requirements are accurate and get acceptance to move on to the next phase of the model.

ii. System Design:

Every requirement which is documented in System Requirement Specifications (SRS) will be considered and system design for Mantra Online Car Rental Company will be constructed. System design helps in defining the overall system by determining the software and hardware requirement of new system. Entire inputs, process and outputs are identified so that the system owner (CEO) of Car Rental Company can understand how the online car rental system works and how the user interface appears. Physical design and Logical design are 2 types of system design which is done in this phase. Physical design is generally the graphical representation of the product whereas logical design is the new system's abstract represented in DFD diagram to show the data flows of Car Rental Company .Accordingly, the physical design of Online Car Rental Company is the prototype for the new system so that users may get a sense of how it appears and functions. (Level et al., 2021)

iii. Implementation:

This phase entails writing source code to implement the requirements. The physical design specifications are converted into code that may be used. During coding, some of the coding which is useful for the following phase is integrated. The system is built up of small programs called units which are then linked together to form a complete system.

Every unit is tested by unit testing before integration. The rental company has various modules like customer side and management staff, that's why every module is separately implemented and integrated after testing.

iv. Testing:

Figure : Different types of testing

After the complete implementation phase, the testing phase begins. The source code is shared to the team of testing. The team runs the test case either manually or automatically to check the system for every possible errors and problems. Users are also involved in this phase as they provide detailed feedbacks about the system and make sure if all requirements are met or not. If any error is found during this phase then report have to be made for all the action and fix that error immediately. After correcting or fixing all the flaws and problems found during this step, quality assurance is ensured ("SDLC Waterfall Model: The 6 phases you need to know about", 2021). During this phase, the system is handled to car rental company to test if it takes the car booking of the customers and if customer or user have full access to their online car booking or not.

v. Deployment:

Following the testing phase, this phase occurs when the system is ready to be deployed in practical or live environment. It is available to end users once it has been deployed and its performance can be tested through them. This phase also includes end-user training to inform about the current system. When the system is deployed on Online Car Rental Company, customers can easily create an account for themselves to find and book the rental car based on different criteria such as price and modules. The quality and

performance of system is also thoroughly tested in this system. The system is also provided to staff of the rental company to ensure that every people can use the system without any problem and errors.

vi. **Maintenance:**

After deployment phase, this phase (Maintenance) mainly consist of providing support or assistance to the system. Maintenance to Car Rental Company makes sure that this system runs smoothly and fluently. This phase main goal is to fix any error or bugs which are discovered by the end user or client of the system. The car rental company may encounter some issues or problems as a result of customer feedback which are then resolved during this phase.

Gantt chart (Waterfall Model)

ID	Task Name	Start	Finish	Duration
	1.0 Requirement Analysis	**5/3/2021**	**5/12/2021**	**10d**
	1.1 Functional Requirement	5/3/2021	5/7/2021	5d
	1.2 Non-functional Requirement	5/8/2021	5/12/2021	5d
	2.0 System Design	**5/13/2021**	**6/3/2021**	**22d**
	2.1 Physical Design	5/13/2021	5/22/2021	10d
	2.1 Logical Design	5/23/2021	6/3/2021	12d
	3.0 Implementation	**6/4/2021**	**6/28/2021**	**25d**
	3.1 Unit testing	6/19/2021	6/28/2021	10d
	4.0 Testing	**6/29/2021**	**7/13/2021**	**15d**
	4.1 Integration testing	6/29/2021	7/6/2021	8d
	4.2 System testing	7/7/2021	7/13/2021	7d
	5.0 System Deployment	**7/14/2021**	**7/23/2021**	**10d**
	6.0 Maintenance	**7/24/2021**	**8/2/2021**	**10d**

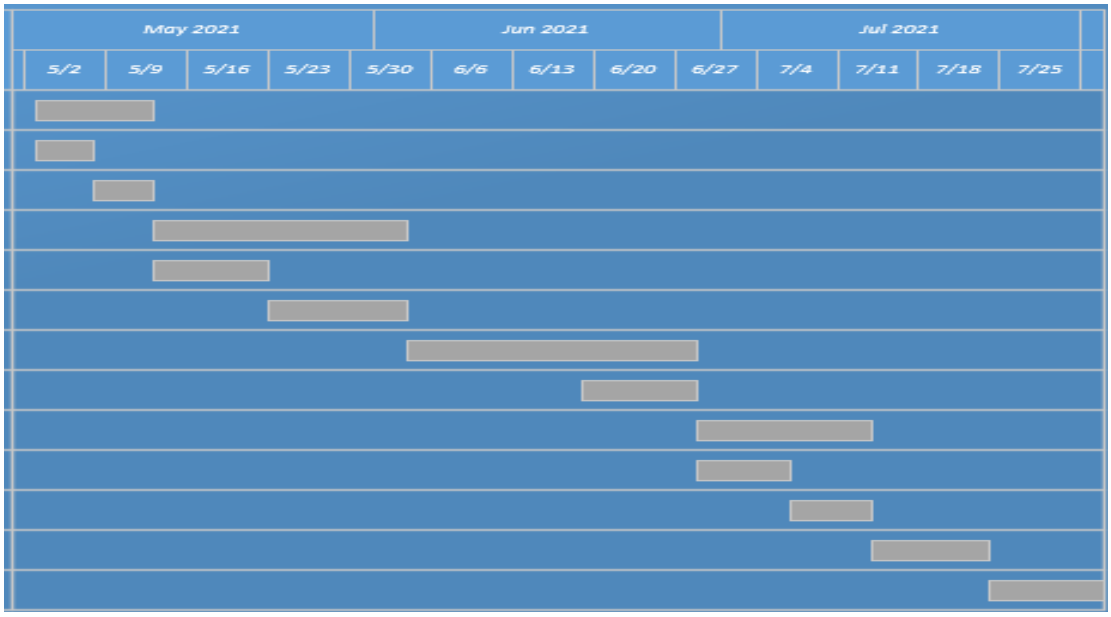


Figure : Gantt chart of Waterfall Methodology

References

AN INTRODUCTION TO RAPID APPLICATION DEVELOPMENT. (2009). *RAD STRUCTURAL MODEL OVERVIEW*, 15–20. https://www.ogcio.gov.hk/en/our_work/infrastructure/methodology/system_development/past_documents/rad/doc/g47a_pub.pdf

D. (n.d.). *Car Park*. Car Park. Retrieved July 18, 2021, from http://app4carpark.com/login

D. (2021, July 2). *What Is Scrum Methodology? & Scrum Project Management*. Digite. https://www.digite.com/agile/scrum-methodology/?fbclid=IwAR0BDgpwizkK-e-_5LiV9tv4W0GmS0rCmMPpsJRBwn7PoKe96unkg4CMUs0

Forget about waterfall ! let's do Rapid Application Development. (2019, April 1). Konijn Design Studio. https://blog.konijnstudio.com/2019/04/rapid-application-development.html

Hyundai Elantra Wins Prestigious 2021 North American Car of the Year. (n.d.). HYUNDAI MOTORS. Retrieved July 8, 2021, from https://www.hyundai.com/worldwide/en/company/newsroom/-0000016609

Kaur, M., & Verma, N. (2014). INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN TECHNOLOGY. *THE UTILITY OF A RAPID APPLICATION DEVELOPMENT (RAD) APPROACH FOR A LARGE COMPLEX INFORMATION SYSTEMS DEVELOPMENT*, *1*(6), 31–32.

Kikama Jr, K. (2010). *Securing the Rapid Application Development (RAD) Methodology*, 31–33. http://cs.lewisu.edu/mathcs/msis/projects/msis595_KividiKikama.pdf

Kumar, V. (2021, January 19). *A Complete Guide on Software Development Methodologies 2020*. SAP Blogs. https://blogs.sap.com/2020/10/08/a-complete-guide-on-software-development-methodologies-2020/?utm_source=dlvr.it&utm_medium=facebook

Level, I., Manager, I., Tutorial, A., Tests, I., Us, C., & Policy, P. et al. (2021). What is Waterfall model- Examples, advantages, disadvantages & when to use it?. Retrieved 15 July 2021, from http://tryqa.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/

Leung, S. (2014, September 15). *Sorry, Your Spreadsheet Has Errors (Almost 90% Do)*. Forbes. https://www.forbes.com/sites/salesforce/2014/09/13/sorry-spreadsheet-errors/?sh=4e7d8c7856ab

Li, Z. (2013). Design and Realization of Car Rental Management System Based on AJAX+SSH. Information Technology Journal, 12(14), 2756-2761. doi: 10.3923/itj.2013.2756.2761

McCormick, M. (2012). *Waterfall vs. Agile Methodology* (Revised ed., Vol. 2) [E-book]. MPCS, inc.

Overview Of Online Car Rental Systems Information Technology Essay. (n.d.). Uni Assignment Centre. Retrieved July 15, 2021, from https://www.uniassignment.com/essay-samples/information-technology/overview-of-online-car-rental-systems-information-technology-essay.php

Pawar, P. (2019, December 14). *Insights to Agile Methodologies for Software Development*. Hacker Noon. https://hackernoon.com/a-case-study-type-insight-into-agile-methodologies-for-software-development-cd5932c6

Pisuwala, U. (2019, May 2). *A comprehensive guide on agile methods for modern software development*. Peerbits. https://www.peerbits.com/blog/agile-software-development.html

Rapid Application Development Model | RAD Model - javatpoint. (n.d.). Www.Javatpoint.Com. Retrieved July 18, 2021, from https://www.javatpoint.com/software-engineering-rapid-application-development-model

Ranna, O. (2014, November 22). *Top 10 Cars for an Adventurous Lifestyle*. The Official Blog of SpeedList.Com. https://blog.speedlist.com/top-10-cars-adventurous-lifestyle/

Rungta, K. (2021, May 28). *Waterfall vs. Incremental vs. Spiral vs. Rad Model: Key Difference*. Guru99. https://www.guru99.com/compare-waterfall-vs-incremental-vs-spiral-vs-rad.html?fbclid=IwAR2qy7SJvmh9CtnIcPCkr13DnH9aI-yu5NEU8RFuUT9Gp6NSe4AVFi3wR1Y

Rungta, K. (2021b, July 12). *Spiral Model: When to Use? Advantages & Disadvantages*. Guru. https://www.guru99.com/what-is-spiral-model-when-to-use-advantages-disadvantages.html

SDLC - Spiral Model - Tutorialspoint. (n.d.). Tutorialspoint. Retrieved July 17, 2021, from https://www.tutorialspoint.com/sdlc/sdlc_spiral_model.htm

SDLC Waterfall Model: The 6 phases you need to know about. (2021). Retrieved 4 July 2021, from https://rezaid.co.uk/sdlc-waterfall-model/

Softermii. (2021, June 16). *Rapid Application Development Model: How and When To Use It In Your Software Project*. https://www.softermii.com/blog/rapid-application-development-model-how-and-when-to-use-it-in-your-software-project

The Ultimate Guide to Rapid Application Development. (2021, May 27). NIX United – Custom Software Development Company in US. https://nix-united.com/blog/the-ultimate-guide-to-rapid-application-development/

Try QA. (2020, April 2). Try. http://tryqa.com/what-is-spiral-model-advantages-disadvantages-and-when-to-use-it/

What is Spiral Model? Definition of Spiral Model, Spiral Model Meaning. (n.d.). The Economic Times. Retrieved July 17, 2021, from https://economictimes.indiatimes.com/definition/spiral-model

What is waterfall model? - Definition from WhatIs.com. (2021). Retrieved 25 June 2021, from https://searchsoftwarequality.techtarget.com/definition/waterfall-model

What is Waterfall Model in SDLC? Advantages and Disadvantages. (2021). Retrieved 11 July 2021, from https://www.guru99.com/what-is-sdlc-or-waterfall-model.html

Wikipedia contributors. (2021, May 5). *Iterative and incremental development*. Wikipedia. https://en.wikipedia.org/wiki/Iterative_and_incremental_development#/media/File:Iterative_Process_Diagram.svg