

PROFORMA FOR THE APPROVAL PROJECT PROPOSAL

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1. Title of the Project

Non Chalant

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4. Is this your first submission?

Yes

☐

No

☐

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Signature of the Coordinator Date:

NON CHALANT

A Project Report

Submitted in partial fulfillment of the
Requirements for the award of the Degree of

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY

By

Aamir Bashir Joad
RollNo. 327

Under the esteemed guidance of
Prof. Ismail Popatiya



DEPARTMENT OF INFORMATION TECHNOLOGY
MAHARASHTRA COLLEGE OF ART,
SCIENCE & COMMERCE
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MUMBAI -400037
MAHARASHTRA
YEAR 2018-2019

**MAHARASHTRA COLLEGE OF ART,
SCIENCE & COMMERCE**
(Affiliated to University of Mumbai)
MUMBAI-MAHARASHTRA-400037

DEPARTMENT OF INFORMATION TECHNOLOGY



CERTIFICATE

This is to certify that the project entitled, "**Non Chalant**", is bonafied work of
AAMIR BASHIR JOAD bearing Seat.No: (327) submitted in partial fulfillment of the
requirements for the award of degree of BACHELOR OF SCIENCE in INFORMATION
TECHNOLOGY from University of Mumbai.

Internal Guide

Coordinator

External Examiner

Date:

College Seal

Abstract

NON CHALANT : It means Effortlessly texting in a manner requiring no physical or mental exertion, a“text and call answering ” app that auto-responds to text messages and call you receive while you’re driving (or in the office, etc.), speaks text messages aloud, and even sends location information as part of the automated text reply, and also remember where the user has park there vehicle and guide the user form his current location to the parked location.

The aim of the app is to help you stay away from your phone while driving, so you could drive safe everyday but also still stay connected to your friends and family at the same time , and also remember where the user has park there vehicle and guide the user form his current location to the parked location. The app demonstrates how you can control some of the great features of an Android phone, including SMS texting, text - to - speech, persistent data, and GPS location sensing.

ACKNOWLEDGEMENT

I undersigned, have great pleasure in giving my sincere thanks to those who have contributed their valuable time in helping me to achieve the success in my project work. My heartfelt thanks to The Principle of the college **PROF.SIRAIUDDIN CHOUGLE** and the IT Department of College for helping in the project with words of encouragement and has shown full confidence in our abilities.

I would like to express my sincere thanks to **PROF.SAIMA SHAIKH** head of I.T Department for her constant encouragement, which made this project a success.

I am indebted and thankful to our Project Guide **PROF.ISMAIL POPATIA** to Whom I owe his piece of knowledge for his valuable and timely guidance, co-operation, encouragement and time spent for this project work. I would also like to thank our IT staff for providing us sufficient information, which helped us to complete our project successfully. My sincere thanks to the Library staff for extending their help and giving me all the books for reference in a very short span of time.

I also thank MY PARENTS and all my family members for their continued Support, without their support this project would not be possible.

DECLARATION

I here by declare that the project entitled, “**Non Chalant**” done at **Maharashtra college of Arts,Science & Commerce** , has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university.

The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of our curriculum.

Name and Signature of the Student

Aamir Bashir Joad

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INTRODUCTION

1.1 Background:

This chapter walks you through the creation of NON CHALANT : It means Effortlessly texting in a manner requiring no physical or mental exertion, a “text and call answering ” app that auto-responds to text messages and call you receive while you’re driving (or in the office, etc.), speaks text messages aloud, and even sends location information as part of the automated text reply, and also remember where the user has park there vehicle and guide the user form his current location to the parked location.

Daniel Finnegan, a student at the University of San Francisco taking a programming class came up with an app idea to help with the driving and texting epidemic. The app he created, responds automatically (and hands-free) to any text with a message “I’m driving right now, I’ll contact you shortly.”

Clive Thompson of Wired magazine picked up on the novelty and wrote this Software, after all, affects almost everything we do. Pick any major problem—global warming, health care, or in our case, highway safety—and clever software is part of the solution. Yet only a tiny chunk of people ever consider learning to write code, which means we’re not tapping the creativity of a big chunk of society. Thompson mentions, about opening up the world of software creation to everyone.

Some weeks after the app was posted on a website, State Farm Insurance created an Android app called On the Move, which had similar functionality to No Texting While Driving. We don't know if Daniel's app or the website influenced On the Move, but it's interesting to consider the possibility that an app created in a Android beginning programming course (by a creative writing student, no less!) might have inspired this mass-produced piece of software, or at least contributed to the ecosystem that brought it about. It certainly demonstrated how Android has lowered the barrier of entry so that anyone with a good idea can quickly and inexpensively turn his idea into a tangible, interactive app.

1.2 Objectives:

The aim of the app is to help you stay away from your phone while driving, so you could drive safe everyday but also still stay connected to your friends and family at the same time! The app demonstrates how you can control some of the great features of an Android phone, including SMS texting, text - to - speech, persistent data, and GPS location sensing.

The app responds automatically (and hands-free) to any text and call with a custom response message such as "I'm driving right now, I'll contact you shortly." The app was later extended so that it would speak the incoming texts and caller's number aloud and add the driver's GPS location to the auto-response text, and also remember where the user has park there vehicle and guide the user form his current location to the parked location.

.This is a more complex app than those previous build in this field, so we'll build it one piece of functionality at a time, starting with the auto-response message.

what is going to be done in the project.

- The Texting and calling component for sending texts and processing received texts and calls
- The calling component component for sending texts and processing received calls
- An input form for submitting the custom response message.
- The firebase database component for saving the customized message even after the app is closed.
- The Screen. Initialize event for loading the custom response when the app launches.
- The Text-To-Speech component for speaking texts aloud.
- The Speech component for speaking the incoming caller's number.
- The Location Sensor component for reporting the driver's current location.
- The firebase database component for saving the vehicle location..

1.3 Purpose:

1 in 4 car accidents in the United States are caused by texting while driving . That's 1.6 million accidents and 330,000 injuries .In January 2010, the Indian National Safety Council (NSC) announced the results of a study that found that at least 28 percent of all traffic accidents close to 1.6 million crashes every year.

Are caused by drivers using cell phones, and at least 200,000 of those accidents occurred while drivers were texting. As a result, many states have banned drivers from using cell phones while driving altogether this app help with the driving and texting epidemic.

This app was designed to save those innocent lives, so they could drive safe everyday. The app texts a custom response message chosen by you as an auto-reply. It helps you stay away from your phone while driving, but also still stay connected to your friends and family at the same time!

Do you, like most people, find it hard to stay focused on the road while your cell phone tempts you? But is turning it off the best way to curb texting-while-driving? Let NON CHALANT handle your calls and texts, keeping you connected and responsible, and making you and the road safer, And also help you find your park vehicle.

NON CHALANT is your one — click ticket to distraction — free driving
The app can also keep you focused on more than just the road and can find parked vehicle.

- Start the app to minimize distractions during meetings, class, and family time

- Practice “digital wellness” by being in control of your phone, not “compelled” by it
- Work and play better, by concentrating on being where you are, while effortlessly letting caller's know you'll get back to them soon
- Automatically response to text and call while you're driving – without ever taking your hand of the wheel or your eyes off the road with a pre-define customized text.
- Remember your parked vehicle location.
- Guide you from your current location to your parked location.

1.3.1 Scope:

Texting while driving is a habit more dangerous than drunk driving, and is a serious problem, especially among teenagers. A texting driver is 23 times more likely to get into an accident than a non-texting driver.

Easy to use & auto responder that can be used for various purposes. Can be used for safe driving, meetings, good sleeping, etc. Just turn text auto responder on and it will run and auto reply to calls and texts. This is an app that should have been built into all cell phones to keep our loved ones safe from distracted driving accidents. Turn it on during driving, meetings, class, and family time. Turn it off when you are done and also remember where the user has parked their vehicle and guide the user from his current location to the parked location.

The user interface for the app is relatively simple: it has a label instructing on how the app works, a label that displays the text that is to be automatically sent in response to incoming texts and calls, a text box for changing the response, and a button for submitting the change.

Features Include:

- Sending Current location. Keep your caller's up to date with your current location sent to them.

- Reads Caller Number Aloud - When someone calls you while driving, it will read your caller's number aloud.
- Auto reply to any incoming call
- Text Messages Aloud - When someone texts you while driving, this app will read the sender's number and the text message aloud.
- Auto reply to any incoming sms (texting).
- Set customized with different configurations for different purposes, such as driving or meetings
- Keeps user Safe - This app will keep your eyes off your phone and on the road.
- This app makes Effortlessly texting in a manner requiring no physical or mental exertion,
- Remember where the user has park there vehicle and guide the user form his current location to the parked location.

System Analysis

2.1 Existing System

1 in 4 car accidents in the United States are caused by texting while driving . That's 1.6 million accidents and 330,000 injuries .In January 2010, the Indian National Safety Council (NSC) announced the results of a study that found that at least 28 percent of all traffic accidents close to 1.6 million crashes every year. Are caused by drivers using cell phones, and at least 200,000 of those accidents occurred while drivers were texting. As a result, many states have banned drivers from using cell phones.

- currently user has to manually respond to each call/sms.
- user has to search for there vehicle .
- currently there are no exclusive system available for the same.

2.2 Proposed System

This app was designed to save those innocent lives, so they could drive safe everyday. The app texts a custom response message chosen by user as an auto-reply. It helps you stay away from your phone while driving, but also still stay connected to your friends and family at the same time.

You parked as close to the stadium as you possibly could, but when the concert ends, you don't have a clue where your car is. Your friends are equally clueless. Fortunately, you haven't lost your Android phone, which never forgets anything, and you remember you have the hot new app, NON CHALANT. With this app, you click a button when you park your car, and the Android uses its location sensor to record the car's GPS

coordinates and address. Later, when you reopen the app, it gives you directions from where you currently are to the saved location—problem solved!

- Start the app to minimize distractions during meetings, class, and family time
- Practice “digital wellness” by being in control of your phone, not “compelled” by it
- Work and play better, by concentrating on being where you are, while effortlessly letting caller's know you'll get back to them soon
- Automatically response to text and call while you're driving – without ever taking your hand of the wheel or your eyes off the road with a pre-define customized text.
- With a click of a button find where you have parked your vehicle and get directed to words it.

2.2.1 Advantages of the Proposed System

- Sending Current location .Keep your caller's up to date with your current location sent to them.
- Text Messages Aloud - When someone texts you while driving, this app will read the sender's number and the text message aloud.
- Auto reply to any incoming sms or call
- This app will keep user's eyes off their phone and on the road.
- Practice “digital wellness” by being in control of your phone, not “compelled” by it
- Work and play better, by concentrating on being where you are, while effortlessly letting caller's know you'll get back to them soon

Will guide you to where you have parked your vehicle

2.3 Requirement Analysis

Step 1: Develop Requirements

The first step is to gather, analyze and develop requirements from the Concept of Operations (CONOPS), stakeholder needs, objectives and other external requirement. Once requirements are documented, they are prioritized, de-conflicted, and validated with the stakeholders.

Step 2: Write and Document Requirements

The second step focuses on writing down the functional and performance requirements into the appropriate requirements documents; Initial Capabilities Document (ICD), Capability Development Document (CDD), and Capability Production Document (CPD). Requirements must be documented in order to establish a requirements baseline to start building a system and manage any changes. Requirements can be developed using the Capability Development Tracking and Manager (CDTM) tool for DoD programs.

Step 3: Check Completeness

The third step is to check that a complete set of requirements have been developed and documented that defines all system functions that are needed to satisfy the stakeholder needs with their associated performance, environmental, and other non-functional requirements. Requirement Tracing is a big tool in this step.

Step 4: Analyze, Refine, and Decompose Requirements

Requirements Analysis is the first major step in the Systems Engineering Process. This step examines each requirement to see if it meets the characteristics of a good requirement. Each requirement is then decomposed into a more refined set of requirements that are allocated to sub-systems and documented in the Weapons System Specification (WSS). Newly derived requirements are expected to emerge from this process, which continues until all requirements are defined and analyzed.

Step 5: Validate Requirements

In step five each requirement must be verified and validated to ensure that these are the correct requirements. This ensures that the requirements meet the overall objective of the system and all stakeholder needs.

Step 6: Manage Requirements

In step six the requirements have been accepted and a baseline is established by the stakeholders. Any changes to the requirements are controlled using a Configuration Management process.

2.4 Hardware Requirements

- Pentium4 (P4) or higher version.
- 2 GB RAM or more
- 50GB free space in Hard Disk.
- Android phone with 1GZ processor and minimum 1gb ram

2.5 Software Requirements

- android studio 3.2

Technologies:

- Java
- Firebase

2.6 Justification of Platform

Android platform

The world's no. 1 mobile platform relies on Java.

Whether you like it or not, Android is the no. 1 mobile platform in the world, with 86 percent of smartphones and 65 percent of tablets running on this mobile platform. And since Android applications are built with Java, this level of market share establishes this technology as a mainstay in mobile development.

Java, the language and the platform, owes much of its fame and longevity to the libraries, frameworks and tools which together make up its ecosystem. No other programming language has been able to match the support that a rich ecosystem like the JVM has achieved.

Despite being over 20 years old, Java is still one of the most widely-used programming languages. Just look at the stats: according to the 2017 STACK Overflow Developer Survey Java is the third most popular technology in the world.

The TIOBE index, which is a ranking based on the number of skilled engineers worldwide, courses, and third-party vendors, shows an even more impressive score, placing Java in the first position.

Looking at the results of the past 15 years, Java has consistently ranked as either the first or second most popular language

Considering such massive popularity and the thousands of video tutorials, in-depth textbooks, online courses, and offline coding schools that offer free or affordable Java training to anyone willing to learn

Most importantly, Java offers a wide range of libraries that solve most of the common problems that enterprise applications need to solve. In many cases, there are a few good options to choose

from when addressing a particular issue. And more often than not, these options are free and open source under a business-friendly license.

Google, Oracle, IBM, Philips, Facebook, Netflix, Spotify, eBay, and Uber are just a few of the larger players that utilize Java. And quite frankly, you'll have a hard time finding an enterprise that doesn't rely on Java for application development.

WHY JAVA?

Java provides backwards compatibility

First Sun, the original developer of Java, and then Oracle have dedicated special effort to make sure that code written for one iteration of Java will run unchanged on newer ones. This consistency makes Java very compelling for developers and enterprises alike. No one wants to take code that works perfectly fine and rewrite it every time a new language version comes out.

Java's readability, speed, and performance are hard to beat

In this day and age, speed is everything. Just look at this Twitter case study by GoJava. Twitter wouldn't be able to handle 6,000 tweets per second if it hadn't migrated from Ruby on Rails to a JVM. Java's just-in-time compiler allows it to remain one of the fastest language/implementation combinations available today. If scalability and performance are your goals, Java is an obvious choice.

Android Studio

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems. It is a replacement for the Eclipse Android Development Tools (ADT) as primary IDE for native Android application development.

Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014.[The first stable build was released in December 2014, starting from version 1.0.The current stable version is 3.2, which was released in September 2018.

System Design

ENTITY-RELATIONSHIP DIAGRAM

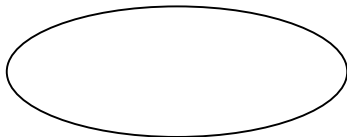
The Entity Relationship Diagram(Model) is based on perception of a real world that consists of collection of basic objects called as Entity and Relationship among these objects. Entities in database is a described as set of attributes.

- A Relationship is an association among several Entities.
- The set of Entities of the same type are called as Entity Set.
- The set of Relationships of same type are called as Relationship Set.

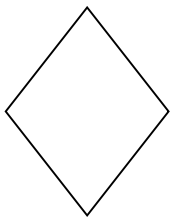
Notations used in E-R diagram



It Represents Entity Set.



It Represents Attributes.



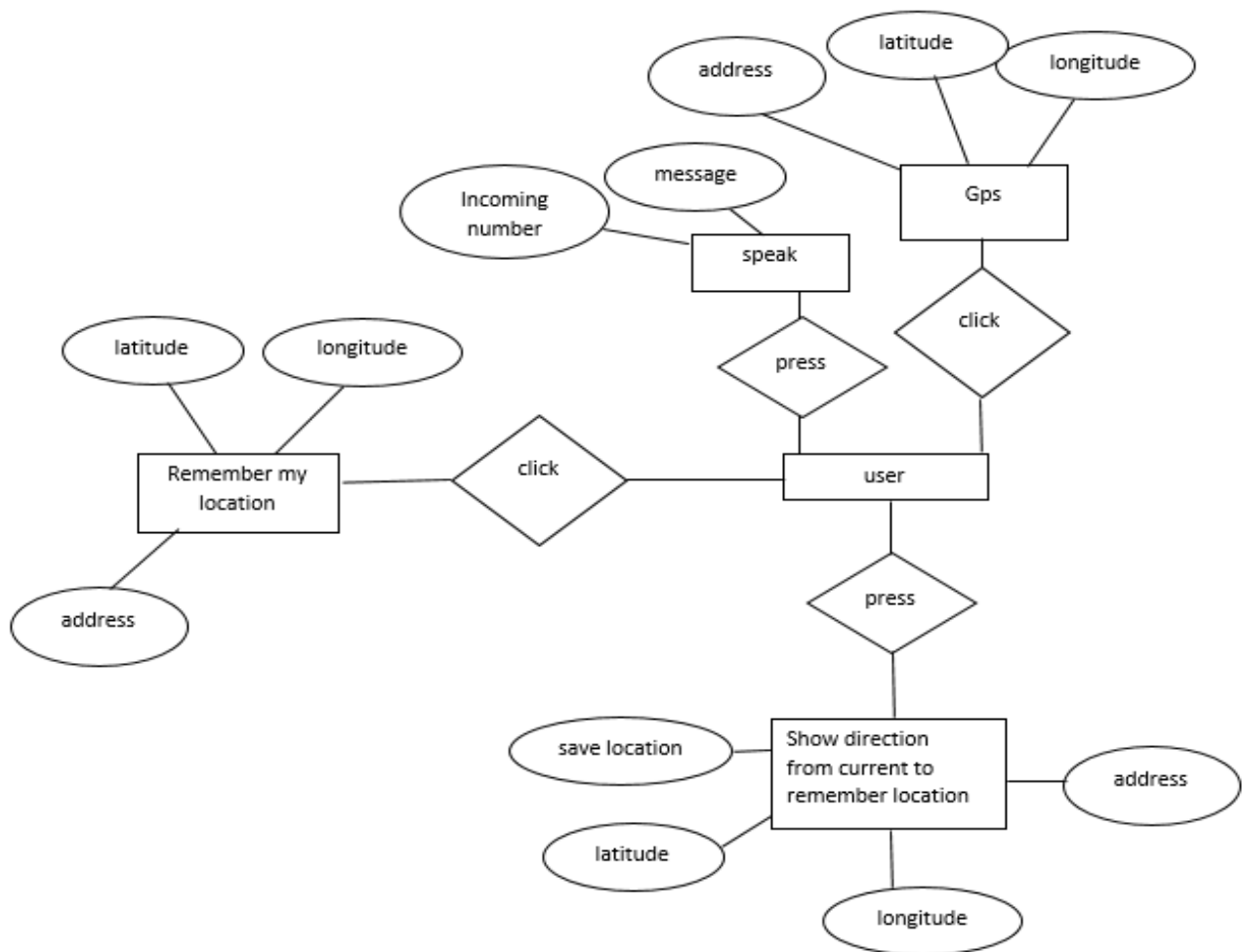
It Represent relationship.

Entities in the diagram also have a set of attributes.

An underlined attribute indicates a primary key.

All attributes are placed within the ovals.

Entities can have either one-to-one, one-to-many, many-to-many and many-to-one relationship



USE CASE DIAGRAM, SCENARIOS & USE CASE DESCRIPTION

This usecase describes the operation in the selling and buying the Books online that are handled by admin

Actors:

Admin: since the system is used by him.

User: since who used the system.

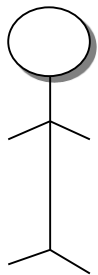
Systems:

This usecase is constructed on Bookstore website which comprises of various forms.

USECASE DIAGRAM

A use case is a set of scenarios that describing an interaction between a user and a website....or user and admin. A use case diagram displays the relationship among actors and use cases. The two main components of a use case diagram are use cases and actors. The object oriented approach uses the term use case to describe an activity the website carries out in response model that summaries the information about the actors of cases.

The symbols used are as follows:



Actor : stick figure representing a role.

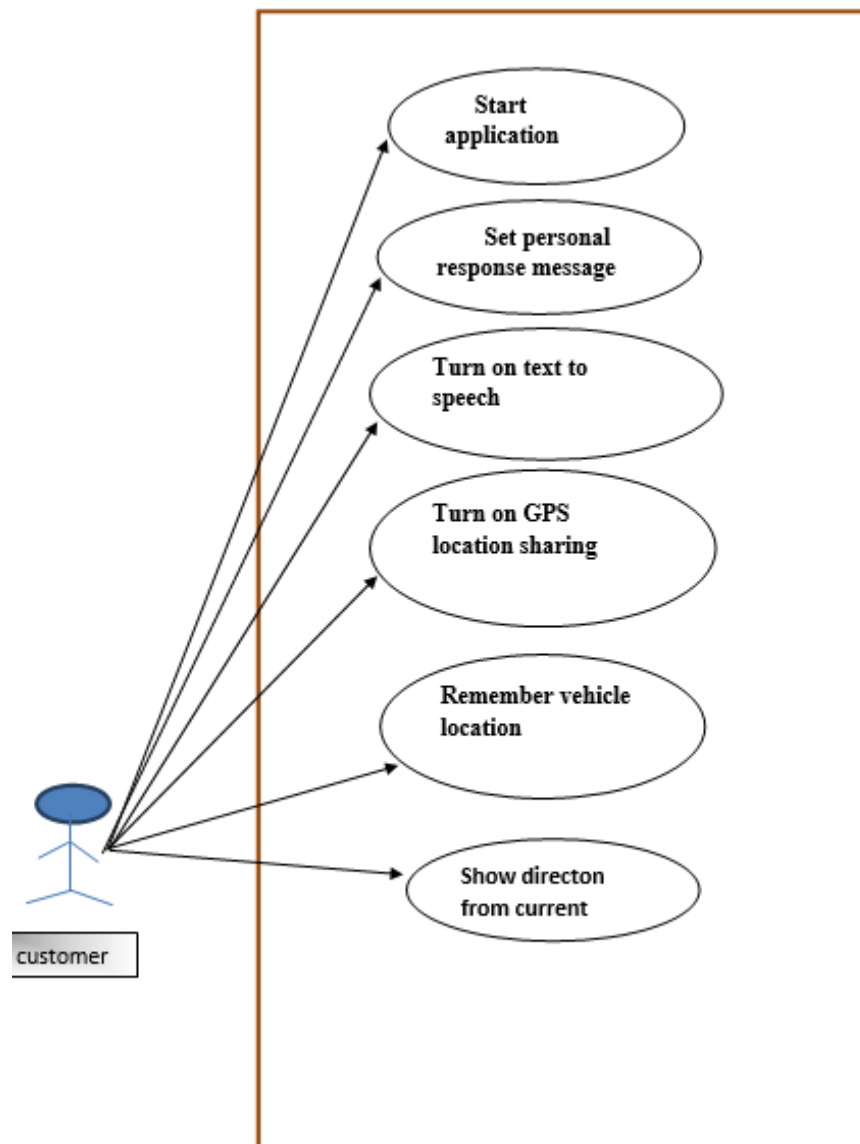


Connecting: Connecting line to show which actor participate in Which use case.



Activity: An activity describes the statement or interval activity Within a use case.

USECASE DIAGRAM

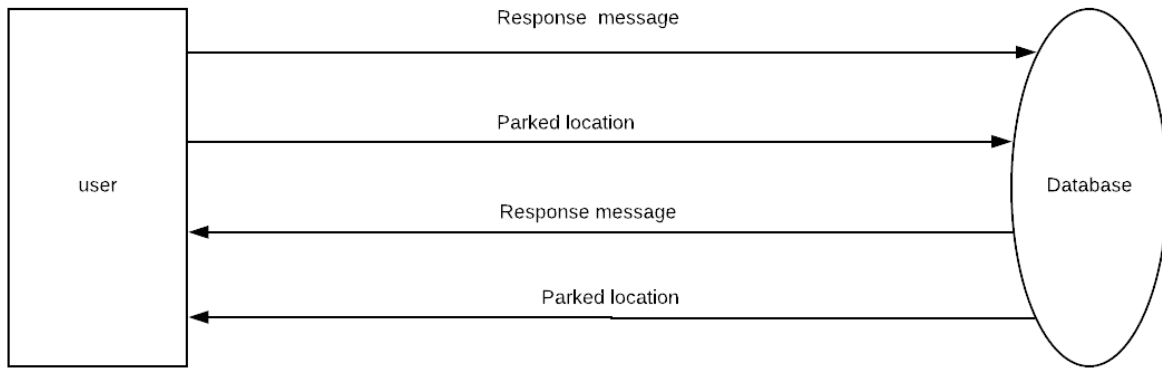


Data Flow Diagram

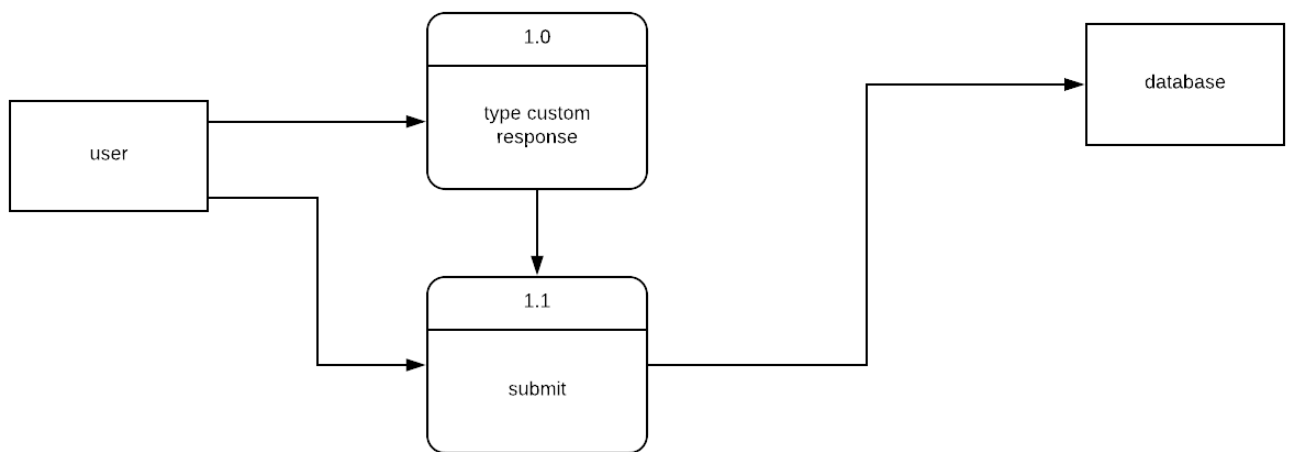
A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

A DFD shows what kind of information will be input to and output from the system, how the data will advance through the system, and where the data will be stored. It does not show information about process timing or whether processes will operate in sequence or in parallel, unlike a traditional structured flowchart which focuses on control flow, or a UML activity workflow diagram, which presents both control and data flows as a unified model

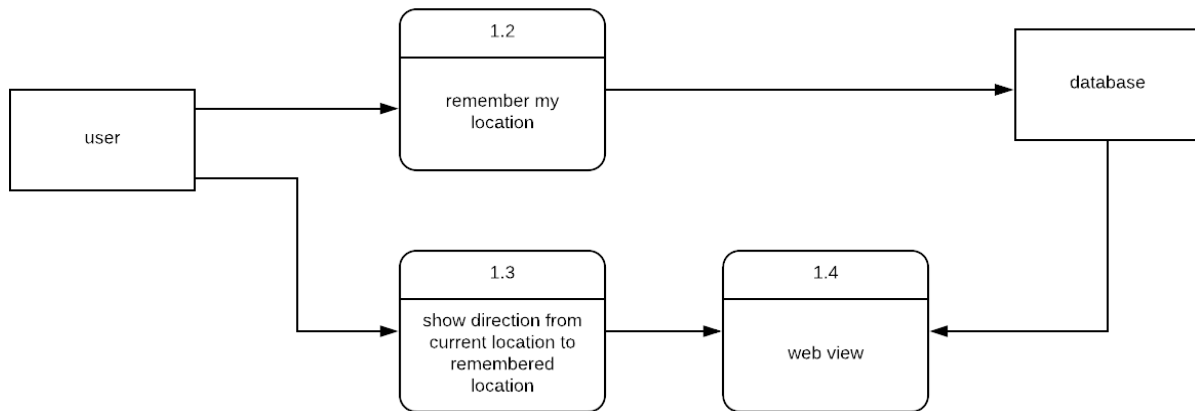
DFD LEVEL 0



DFD LEVEL 1



DFD LEVEL 1 (PART 2)



ACTIVITY DIAGRAM

Activity diagram are a loosely defined diagram technique for showing workflow of stepwise and action,with support for choice ,iteration and concurrency. An activity diagrams shows the over control.

Activity diagram is basically a flow chart to represent the flow form one activity to another form .Activity can be described as an operation of the system.

So the control floe is drawn from one operation to another. This flow can be sequential,and concurrent. Activity diagram deals with all type of flow control by using different elements like fork.

It does not show any meesage floe form one activity to another. Activity diagram is considered as the flow chart.

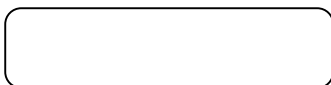
Before drawing an activity diagram we should identify the following elements:

- Activities
- Association
- Condition
- Constraint

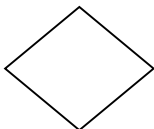
Notation used in activity diagram are as follows:



The small circle denotes a start of a process.



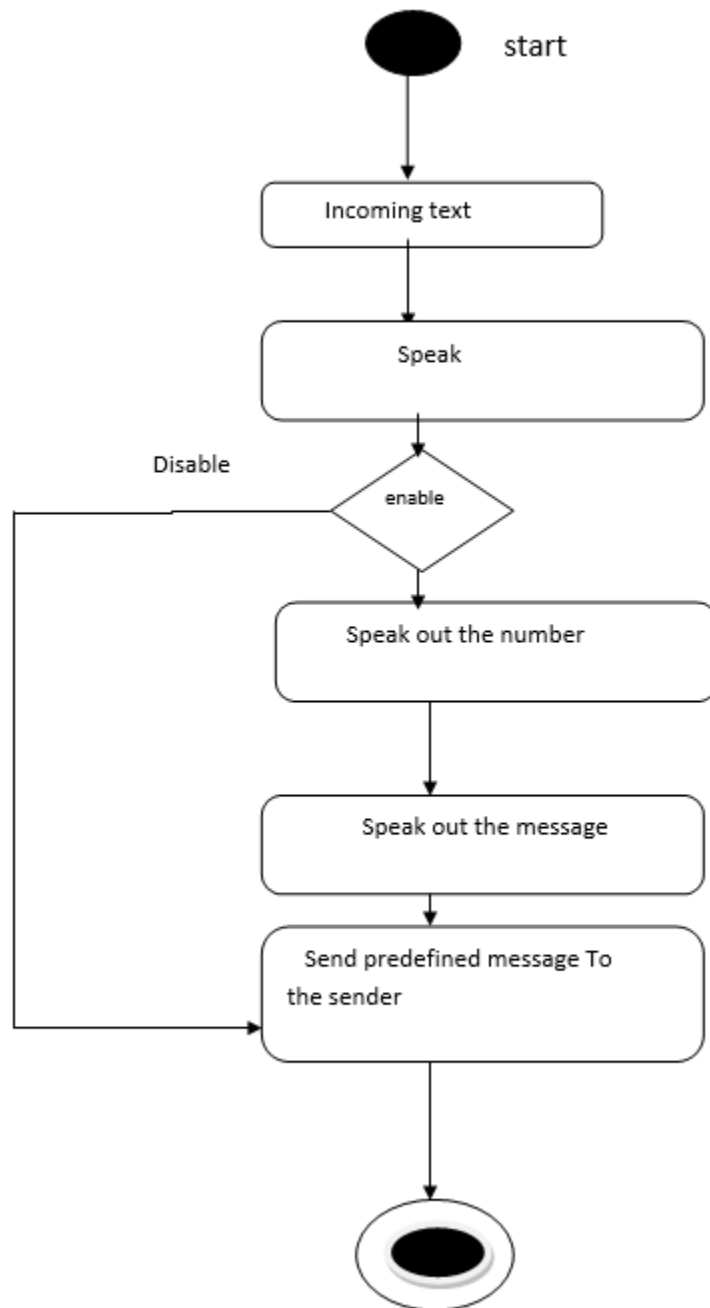
The oval denotes an activity

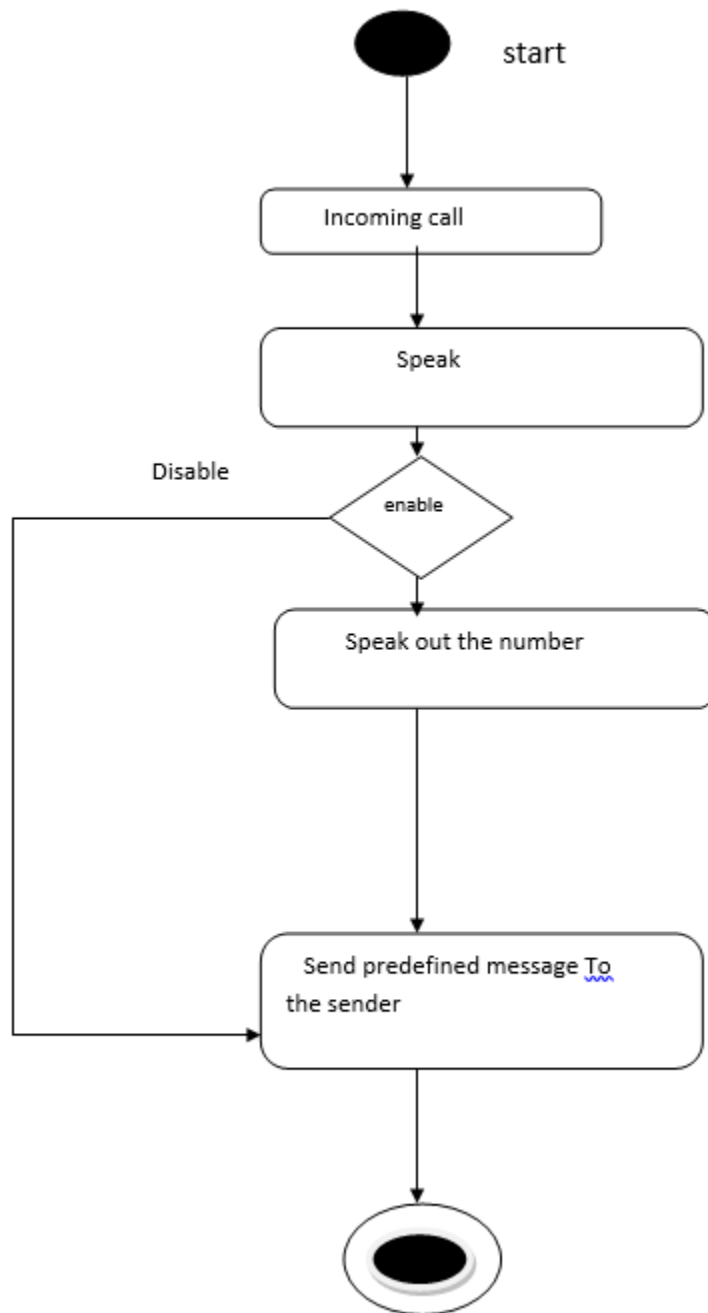


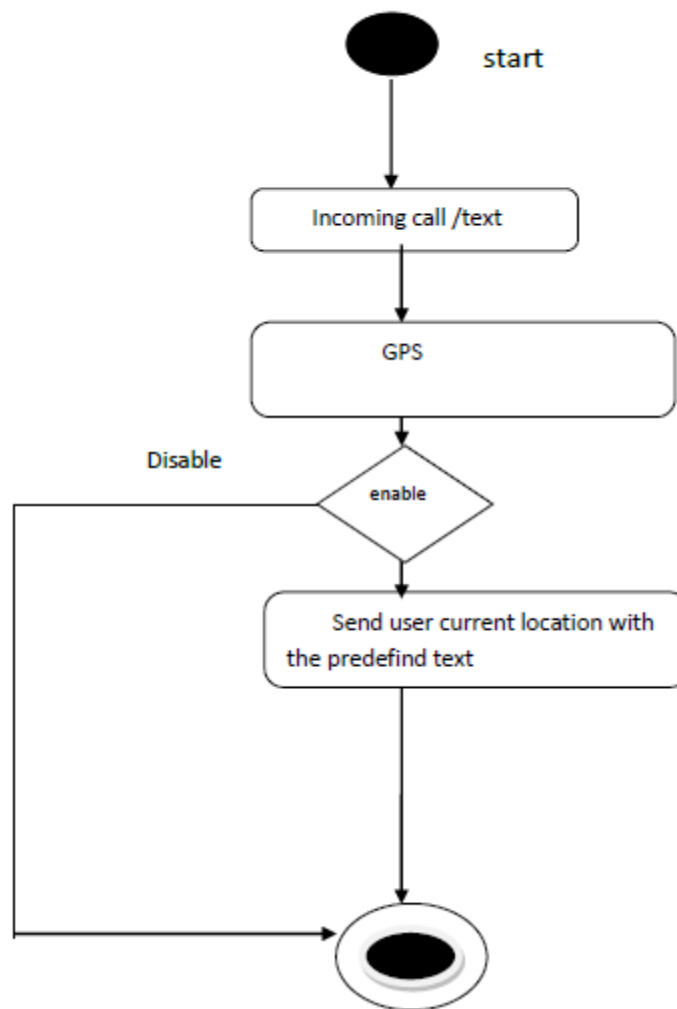
This diamond indicates a condition is to be checked or a decision taken.
The lines leaving the diamond have two results positive and eg










This small circle within a circle indicates end of an activity.

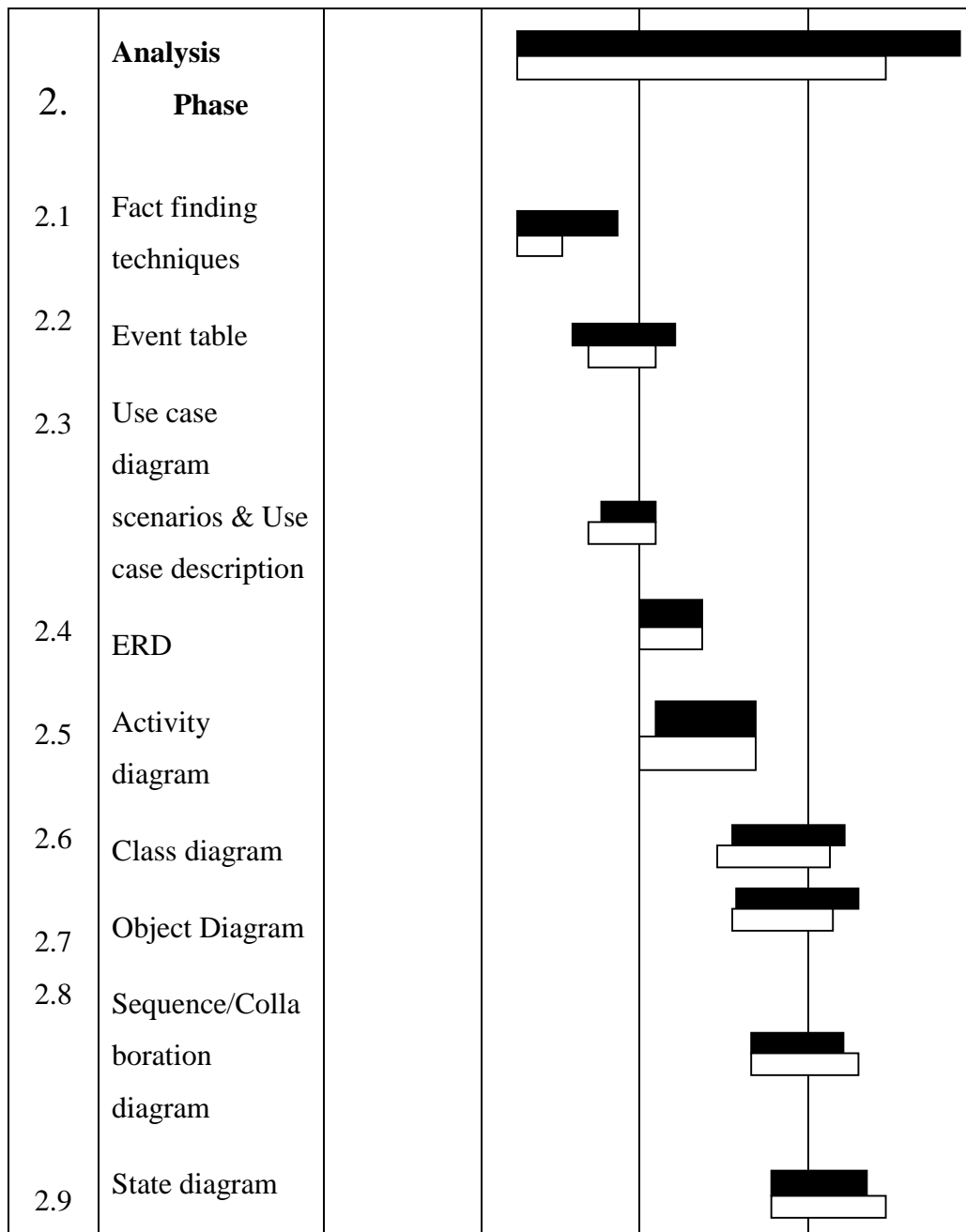














GANTT CHART

Sr. No.	Tasks	SEPTEMBER				OCTOBER					NOVEMBER			
		1	1	2	3	0	1	1	2	3	0	1	2	2
		0	7	4	0	3	0	7	4	1	7	4	1	8
1.	Project Planning Phase													
1.1	Organizational overview													
1.2	Description of system													
1.3	Limitations of present system													
1.4	Proposed system and advantage													
1.5	Feasibility study													
1.6	Stakeholders													



SR. NO	TASKS	DECEMBER				JANUARY				FEBRUARY			
		09	16	23	30	06	13	20	27	04	11	18	25
3.	Design Phase												
3.1	Converting ERD to table												
3.2	Design Class Diagram												
3.3	Design Sequence Diagram												
3.4	Component Diagram												
3.5	Package Diagram												
3.6	Deployment Diagram												
4.	ImplementationPhase												
4.1	Screen /form designing												
4.2	Coding												

SR. NO	TASKS	JANUARY				FEBRUARY				MARCH			
		0 9	1 6	2 3	3 0	0 6	1 3	2 0	2 7	0 10	1 1	1 8	2 1
4.3	Validations												
4.4	Report Generations (if any)												
5	TestingPhase&ImplementationPhase												

SEQUENCE DIAGRAM

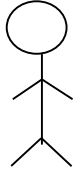
Sequence diagram demonstrate the behaviour of objects in a use case by descriing the object and the messages they pass . the diagram are read left to right and descending.sequence diagram generally show the sequence of events that occur.

A sequence diagram shows how processed operate with one another . sequence diagram are also sometime called event trace diagram. A sequence diagram shows parallel vertical lines.different processed or object that live simultaneous and a horizontal arrows, the messages exchange between then, in te order in which they occur.

Sequence diagram emphasizes on time sequence of message on the structural organization of the objects that send and receive messages.

A sequence diagram shows the sequence of the instruction between the object that occurs during the flow of event of a single scenario or use case.

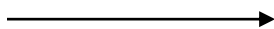
The symbol used in the sequence diagram are as follows:



Actor : stick figure representing a role



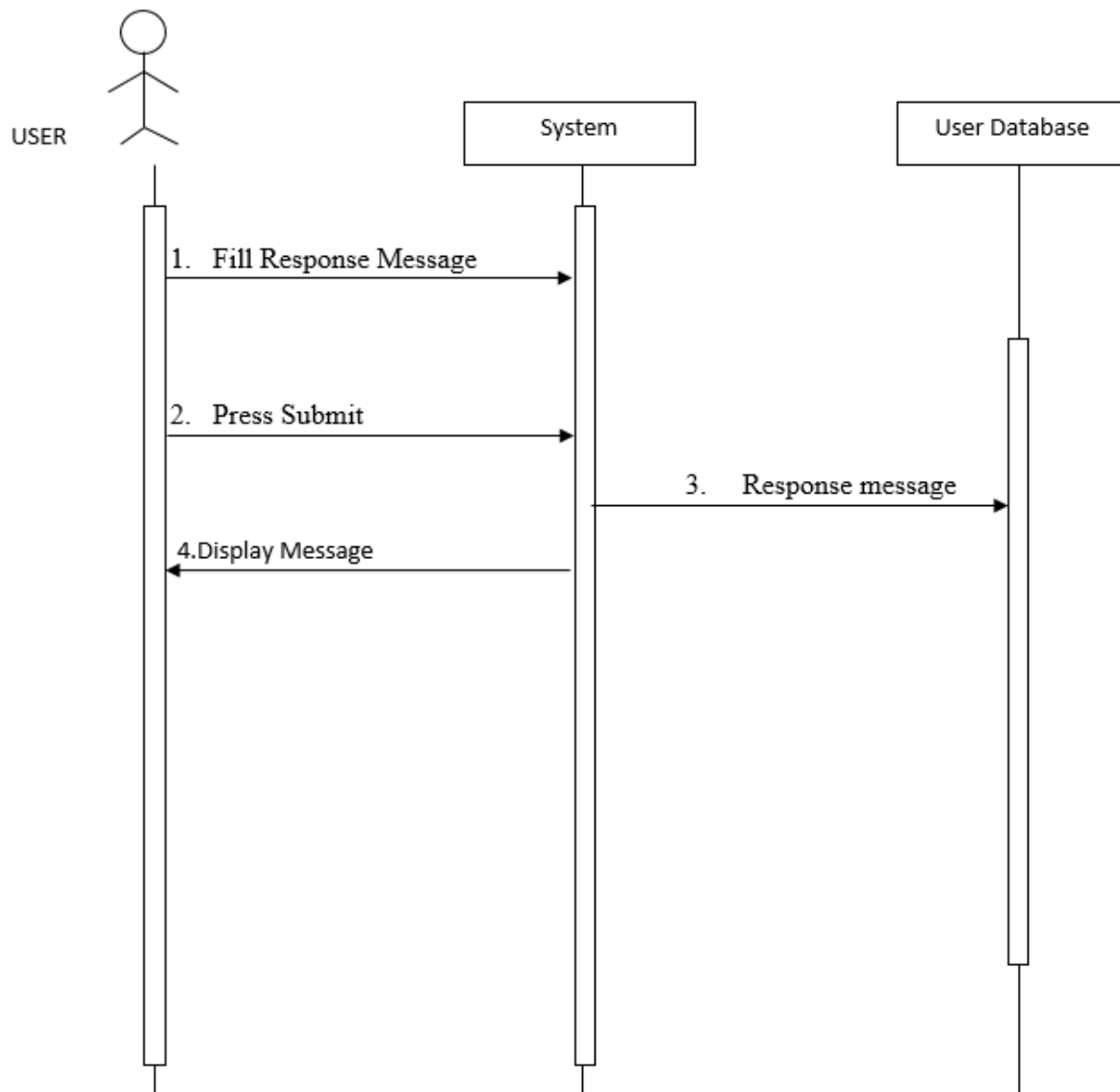
Object: A rectangle with the name of the object underlined.

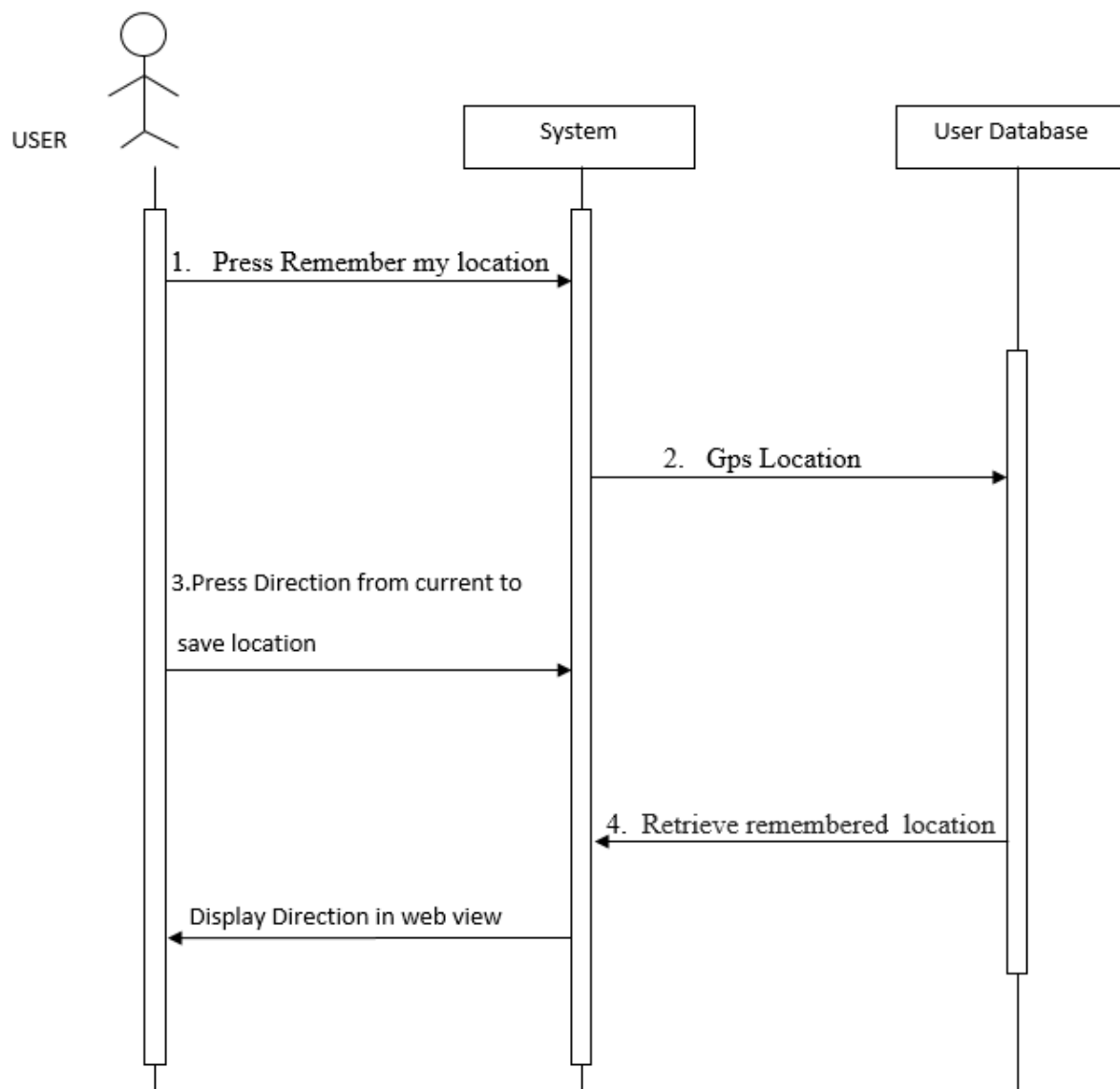


Connecting: connecting line to show the direction with the message above the line.



The lifetime symbol: represented by a line or a narrow vertical rectangle.





CLASS DIAGRAM

A class diagram is a diagram showing a collection of classes and interfaces, along with the collaborations and relationships among classes and interfaces.

A class diagram is a pictorial representation of the detailed system design. Design experts who understand the rules of modeling and designing systems design the system's class diagrams. A thing to remember is that a class diagram is a static view of a system. The structure of a system is represented using class diagrams..

UML provides a class notation to represent classes in class diagram. The class notation has three components:

- ☐ The first compartments depict the name of the class.
- ☐ The second compartments depicts the attributes of the class
- ☐ The third compartments depicts the operations of the class

Representing Relationships in class diagram

In UML relationships model the way in which the elements of a software system connect to each other, either logically or physically. The various types of relationships among the classes and objects are

- ☐ **Association:** When two classes are connected to each other in any way, an association relation is established
- ☐ **Dependency:** When a class is formed as a collection of other classes, it is called an aggregation relationship between these classes.
- ☐ **Generalization:** Also called an "is a" relationship, because the child class **is a** type of the parent class. Generalization is the basic type of relationship used to define reusable elements in the class diagram. Literally, the child classes "inherit" the common functionality defined in the parent class
- ☐ **Realization:** In a realization relationship, one entity (normally an interface) defines a set of

functionalities as a contract and the other entity (normally a class) "realizes" the contract by implementing the functionality defined in the contract.



OBJECT DIAGRAM

An object diagram in the Unified Modeling Language(UML) is a diagram that shows a complete or partial view of the structure of a modeled system at a specified time.

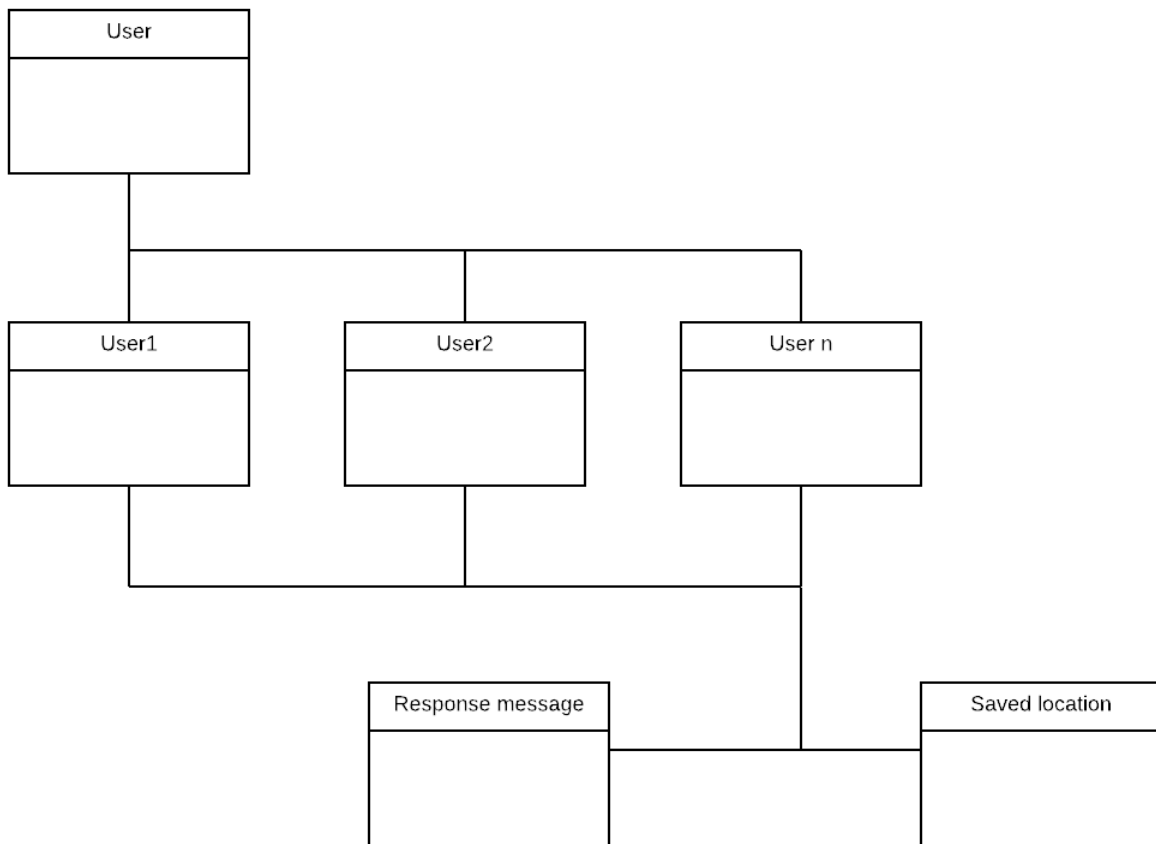
An object diagram focuses on some particular set of object instances and attributes, and the links between the instances. A correlated set of object diagrams provides insight into how an arbitrary view of a system is expected to evolve over time.

Before drawing an object diagrams the following things should be remembered and understood clearly:

- Object diagrams are consist of objects.
- The link in object diagram is used to connect objects.
- Objects and link are the two elements used to construct an object diagram.

Now after this the following things are to be decided before starting the construction of the diagram.

- The object diagram should have a meaningful name to indicate its purpose.
- The most important elements are to be identified.
- The association among objects should be clarified.
- Values of different elements need to be captured to include in the object diagram.
- Add proper notes at points where clarity is required.



EVENT TABLE

A table that lists events in rows and key pieces of information about each event in columns.

EVENT:

It causes the system to do something.

SOURCE:

An external Agent or Actor that supplies Data to the System.

TRIGGER:

An occurrence that tells the System that an event has occurred, either the arrival of data needing processing or of a point in time.

ACTIVITY:

Behavior that the system performs when an event occurs.

RESPONSE:

An output, produced by the system that goes to a destination.

DESTINATION:

An external Agent or Actor that receives data from the system.

EVENTS	TRIGGERS	SOURCE	ACTIVITY	RESPONSE	DESTINATION
Submit	Adding new response message	User	Saving response message	Response message displayed on label	User
Gps	Enable gps	User	Search current location	Gps started	User
Speak	Enable text to speech	User	Read incoming messages and number	Speak started	User
Remember my location	Gps location	User	Remember your location	Display address, latitude & longitude	User
Show direction from current to parked location	Web view	User	Display direction from current to parked location	Display address, latitude & longitude	User

Implementation and Testing

4.1 code

NON CHALANT : It means Effortlessly texting in a manner requiring no physical or mental exertion, An app that answers incoming calls and text by auto-replying them with a custom response while driving .(or in the office,etc.), speaks text messages aloud, and even sends location information as part of the automated text reply and also remember where the user has park there vehicle and guide the user form his current location to the parked location.

4.2 Testing Approach

White Box Testing

WHITE BOX TESTING (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees.

Definition by ISTQB

- **white-box testing:** Testing based on an analysis of the internal structure of the component or system.
- **white-box test design technique:** Procedure to derive and/or select test cases based on an analysis of the internal structure of a component or system.

Example:

A tester, usually a developer as well, studies the implementation code of a certain field on a webpage, determines all legal (valid and invalid) AND illegal inputs and verifies the outputs against the expected outcomes, which is also determined by studying the implementation code.

White Box Testing is like the work of a mechanic who examines the engine to see why the car is not moving.

Levels Applicable To

White Box Testing method is applicable to the following levels of software testing:

- Unit Testing: For testing paths within a unit.
- Integration Testing: For testing paths between units.
- System Testing: For testing paths between subsystems.

However, it is mainly applied to Unit Testing.

Advantages

- Testing can be commenced at an earlier stage. One need not wait for the GUI to be available.
- Testing is more thorough, with the possibility of covering most paths.

Disadvantages

- Since tests can be very complex, highly skilled resources are required, with a thorough knowledge of programming and implementation.
- Test script maintenance can be a burden if the implementation changes too frequently.

- Since this method of testing is closely tied to the application being tested, tools to cater to every kind of implementation/platform may not be readily available.

4.2.1 Unit Testing

UNIT TESTING is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of any software. It usually has one or a few inputs and usually a single output. In procedural programming, a unit may be an individual program, function, procedure, etc. In object-oriented programming, the smallest unit is a method, which may belong to a base/ super class, abstract class or derived/ child class. (Some treat a module of an application as a unit. This is to be discouraged as there will probably be many individual units within that module.) Unit testing frameworks, drivers, stubs, and mock/ fake objects are used to assist in unit testing.

Definition by ISTQB

- **unit testing:** See component testing.
- **component testing:** The testing of individual software components.

Unit Testing Method

It is performed by using the White Box Testing method.

When is it performed?

Unit Testing is the first level of software testing and is performed prior to Integration Testing.

Who performs it?

It is normally performed by software developers themselves or their peers. In rare cases, it may also be performed by independent software testers.

Unit Testing Benefits

- Unit testing increases confidence in changing/ maintaining code. If good unit tests are written and if they are run every time any code is changed, we will be able to promptly catch any defects introduced due to the change. Also, if codes are already made less interdependent to make unit testing possible, the unintended impact of changes to any code is less.
- Codes are more reusable. In order to make unit testing possible, codes need to be modular. This means that codes are easier to reuse.
- Development is faster. How? If you do not have unit testing in place, you write your code and perform that fuzzy ‘developer test’ (You set some breakpoints, fire up the GUI, provide a few inputs that hopefully hit your code and hope that you are all set.) But, if you have unit testing in place, you write the test, write the code and run the test. Writing tests takes time but the time is compensated by the less amount of time it takes to run the tests; You need not fire up the GUI and provide all those inputs. And, of course, unit tests are more reliable than ‘developer tests’. Development is faster in the long run too. How? The effort required to find and fix defects found during unit testing is very less in comparison to the effort required to fix defects found during system testing or acceptance testing.
- The cost of fixing a defect detected during unit testing is lesser in comparison to that of defects detected at higher levels. Compare the cost (time, effort, destruction, humiliation) of a defect detected during acceptance testing or when the software is live.
- Debugging is easy. When a test fails, only the latest changes need to be debugged. With testing at higher levels, changes made over the span of several days/weeks/months need to be scanned.
- Codes are more reliable. Why? I think there is no need to explain this to a sane person.

4.2.2 Integration Testing

INTEGRATION TESTING is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration Testing.

Definition by ISTQB

- **integration testing:** Testing performed to expose defects in the interfaces and in the interactions between integrated components or systems. See also component integration testing, system integration testing.
- **component integration testing:** Testing performed to expose defects in the interfaces and interaction between integrated components.
- **system integration testing:** Testing the integration of systems and packages; testing interfaces to external organizations (e.g. Electronic Data Interchange, Internet)

4.2.3 SYSTEM TESTING

SYSTEM TESTING is a level of software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements.

Definition_by_ISTQB

- **system testing:** The process of testing an integrated system to verify that it meets specified requirements

When is it performed?

System Testing is the third level of software testing performed after Integration Testing and before Acceptance Testing.

Who performs it?

Normally, independent Testers perform System Testing.

4.2.4 Test Cases , Test Data & Test Result

Test cases should be designed and written by someone who understands the function or technology being tested. A test case should include the following information –

1. Purpose of the test
2. Software requirements and Hardware requirements (if any)
3. Specific setup or configuration requirements
4. Description on how to perform the test(s)
5. Expected results or success criteria for the test

Designing test cases can be time consuming in a testing schedule, but they are worth giving time because they can really avoid unnecessary retesting or debugging or at least lower it.

Organizations can take the test cases approach in their own context and according to their own perspectives. Some follow a general step way approach while others may opt for a more detailed and complex approach.

It is very important for you to decide between the two extremes and judge on what would work the best for you.

Designing proper test cases is very vital for your software testing plans as a lot of bugs, ambiguities, inconsistencies and slip ups can be recovered in time as also it helps in saving your time on continuous debugging and re-testing test cases.

Test case 1

Case No: c1

Component Name : Submit button

Test Condition : To check working of submit button.

Procedure : Enter a response message in the text box and click submit button.

Expected output: It should store the response message in the database and display the response message on label 1

Test case 2.

Case No: c2

Component Name: Label1

Test Condition : To check the working of lable1.

Procedure : Close the app and re-open it

Expected output: It should fetch the response message from database and display it on label1.

Test case 3.

Case No: c3

Component Name: Texting component

Test Condition : To check the working of texting component.

Procedure : start the app and leave it untouched

Expected output: It should send response message to any incoming call or sms.

Test case 4.

Case No: c4

Component Name: Text-to-speech component

Test Condition : To check the working of Text-to-speech component

Procedure : Click on the speak checkbox

Expected output: It should read incoming call (number) and sms.

Test case 5.

Case No: c5

Component Name: Gps component

Test Condition : To check the working of gps component

Procedure : Click on the gps checkbox

Expected output: It should add user present gps location in the response message .

Test case 6.

Case No: c6

Component Name: Remember my location

Test Condition : To check the working of remember my location .

Procedure : Click on the remember my location button

Expected output: It should save present user location in database and display latitude , longitude and street address in text box.

Test case 7.

Case No: c7

Component Name: where is my vehicle.

Test Condition : To check the working of where is my vehicle.

Procedure : Click on the show direction from current to saved location button

Expected output: It should fetch your saved location from data base and show direction from current to saved location in web view by opening google maps