



**SOFTWARE ENGINEERING AND PROJECT
MANAGEMENT**

LAB FILE

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COURSE – B.Tech CSE(Big Data Spz)

BATCH – 2(Non – Honors)

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Lab 0

Name - Vaswati Gogoi

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UML :- Unified Modeling Language

Phase of system development

Requirement → Use case Model

Analysis → Analysis Model

Design → [Design Model] [Dept Model]

Implementation

Testing → Test Model

Use case Model

- Use case diagram
- Class diagram
- Component

Tools

- 1) Caliber - RM
- 2) Requisitepro
- 3) RTM Workshop

Use Cases

For

MOBILE TRACKING

Prepared by Vaswati Gogoi

22.01.2024

Revision History

Name	Date	Reason For Changes	Version
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1. Use Case Identification

1.1. Use Case ID

Give each use case a unique numeric identifier, in hierarchical form: X.Y. Related use cases can be grouped in the hierarchy. Functional requirements can be traced back to a labeled use case.

1.2. Use Case Name

- **Register** is used for new user to create an ID for the mobile.
- **Login** is to enter the system.
- **Database** is connected to the login and registration.

.

1.3. Use Case History

1.3.1 Created By

Vaswati Gogoi initially documented this use case

1.3.2 Date Created

The date of the creation when it is initially documented is 16.01.2024.

1.3.3 Last Updated By

Performed the most recent update to the use case description.

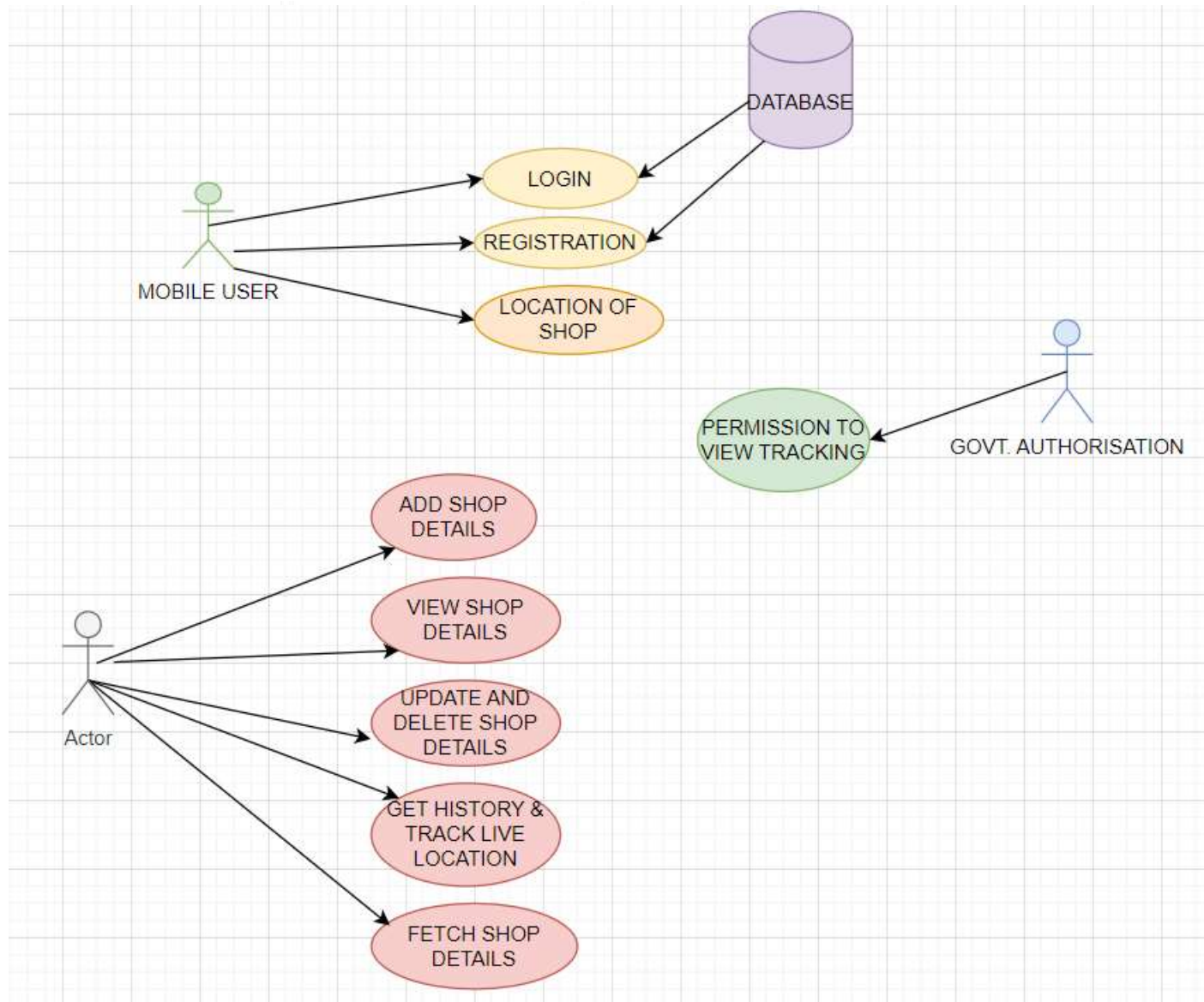
1.3.4 Date Last Updated

This use case was most recently updated on 23.01.2024

2 Use Case Definitions

2.1 Use Case Diagram

Figure 1: Shows the use-case diagram for the Mobile Tracking.



2.1 Actor

2.2.1 User

2.2.2 Government authorization

2.2.3 Admin

2.3 DESCRIPTION

“MOBILE TRACKING” is based on J2ME and PHP. In today’s fast world, mobile has become one of the important commodities of a human being. It has become a necessity rather than a luxurious commodity. The Mobile Tracking helps to track the current location of the mobile. It is a web application. This application tracks the mobile location in every 5 seconds in connection with the central tower. The Mobile Tracking application will be deployed in Symbian supporting mobile

phones. This system sends the following information to the server:- 1. Mobile ID 2. Location 3. Time at which the device was present on the above location

2.4. Preconditions

- There is an active internet connection for the user.
- The user must have an Id.
- User's Id has been registered.
- Ensuring that the mobile device has granted necessary permissions for location tracking

2.5. Post conditions

- After tracking, the reported location is accurate and within an acceptable range.
- If there was a loss of connectivity during tracking, the app should synchronize the data once the connection is restored.

2.5.1 Failure Condition

- Inaccurate Location Data

- No Internet Connection

2.5.2 Priority

The most priority is given to the Login and the registration Use case. It can handle all the authentication and session management for the user. Through which the admin can find the legal user.

3. Frequency of Use

The user can access the **Login** use case for as many times as they want. If the details match the user can access the system.

3.1 Normal Course of Events

The users of the mobile application can get the details of a place by providing the location. The application will fetch the shop information on that location and display the details on the mobile screen. In the proposed system we have created an application by means of which we can track the movement of the mobile phone of the desired user. Each mobile phone has a unique ID and it is this ID that sets apart a mobile phone from other mobile phones. By means of this ID can identify each mobile and track the mobile phone anywhere we want.

4. Alternative Courses

4.1 Invalid User

- If Validate User does not complete successfully, then the use case ends with a failure condition.

4.2 Password Recovery Request

Guide the user through a secure process to recover their password, possibly involving email verification, security questions, or other identity verification methods.

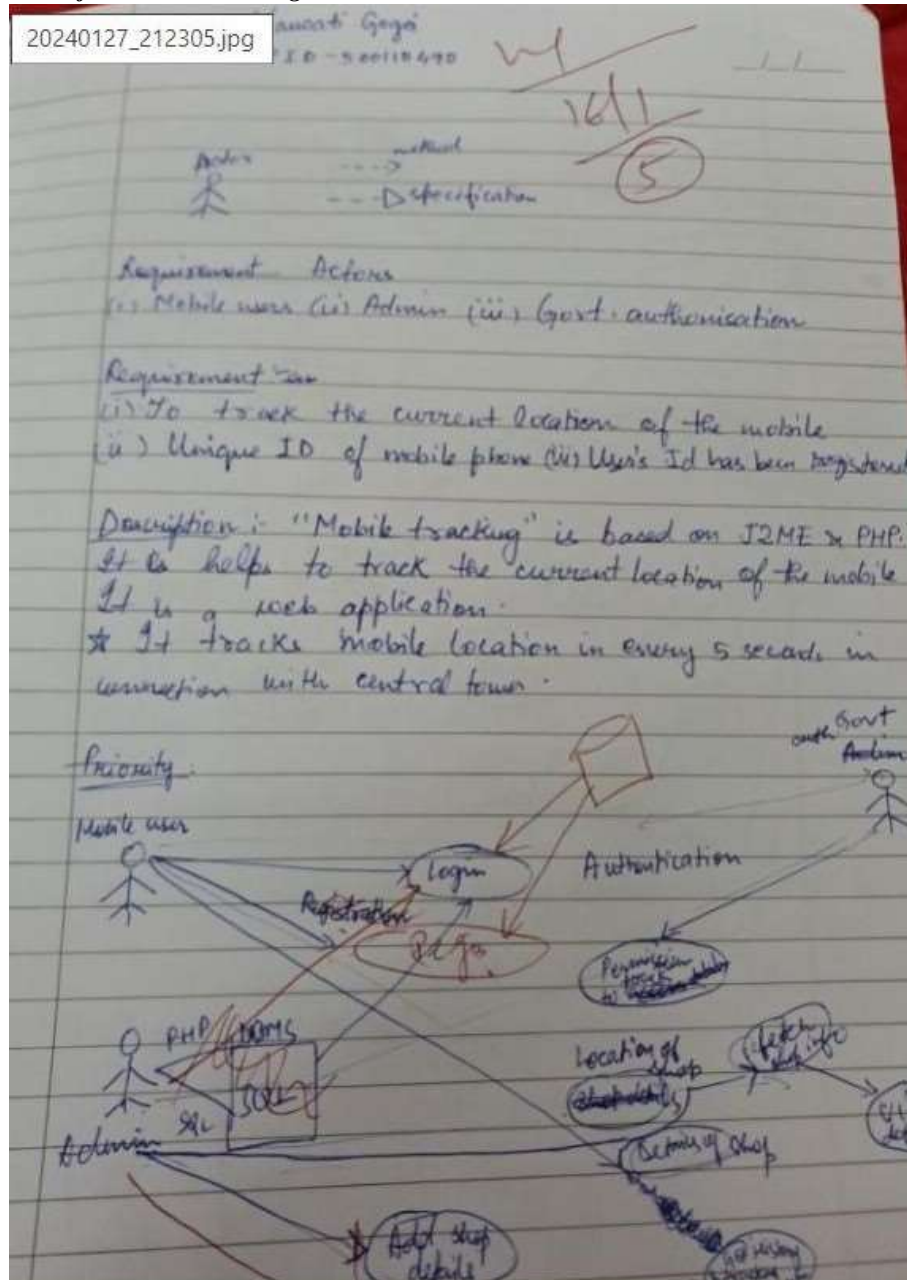
4.3 Connectivity Issues

Implement offline functionality and synchronize data when the connection is restored. Notify users of the temporary connection loss.

5. Notes and Issues

- (a) Continuous tracking can impact battery life significantly. Optimization is required for the application to minimize energy consumption.
- (b) GPS signal issues or interference can lead to inaccurate location tracking. Implement measures to handle and correct such inaccuracies.

20240127_212305.jpg



CLASS DIAGRAM

For

Mobile tracking

Prepared by Vaswati Gogoi

30.01.2024

Step 1:- Keeping the right class

ADMIN	LOCATION DISPLAY
	TEXT LOCATION DISPLAY
GOVT. AUTHORIZATION	MAP LOCATION DISPLAY
MOBILE USER	SERVER
LOGIN	LOGOUT
MAPSERVICE	SECURITY
LOCATION	USER ID
REGISTRATION	

Bad classes:-

REDUNDANT CLASSES

Admin
Govt. authorization
Mobile user

ATTRIBUTES

User id
Login
Registration

IRRELEVANT CLASS

Logout
Security

IMPLEMENTATION CONSTRUCTS

Location display
Map location display
Text location display

Redundant Class:-if the classes express the same information the most descriptive name should be kept. For example, admin, govt authorization and mobile users are redundant; so it is more descriptive is User for this case studies.

Irrelevant Classes:-if a class has little or nothing to do with the problem, it should be eliminated. In internet example, logout and security is outside the scope of the mobile tracking process.

Implementation Constructs: - constructs extraneous to the real world should be eliminated from the analysis model. They may be needed later during design but not now. For example location display, text location and map location.

Attributes: - Name that primarily describe individual object should be restarted as attributes. For example registration, login ,user id are usually attributes.

GOOD CLASSES:

User
Mapservice
Location
Server

Step 2:-Preparing Data Dictionary

- **User:** - It consist of one or more persons, the correspondence is not relevant to this problem. The person can holding the Chat id for the chatting with different user. The user is generalized in two parts LAN user and Remote user. They both have there Chat_id for login in chatting system.
- **Server:** - Server store the login details. When the user enter the user id it can check the id
- **MapService:-** has associations with both MapProvider and ApiKey classes, indicating that a MapService uses a MapProvider and requires an ApiKey.

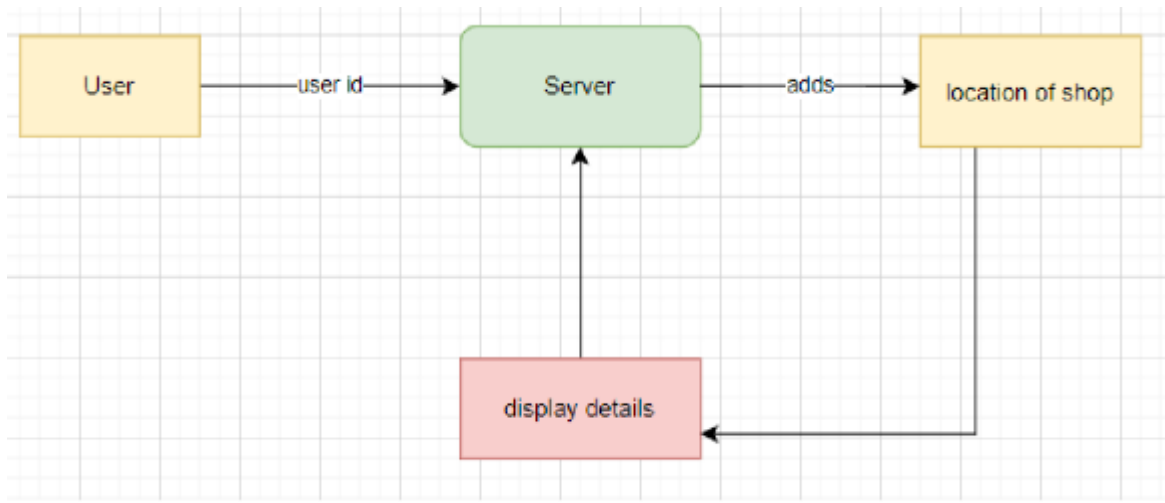
MapProvider has a method provideMap() that might be responsible for providing the map-related functionality. ApiKey has a method Location() to retrieve the location of the user.
- **User_id:-** The user_id is attribute for the user and it also used for identification for the user.
- **Location:-** It is added location that has child classes as location display which will display location, text location display will display in the form of text and map location.

Step 3:- Keeping the right association

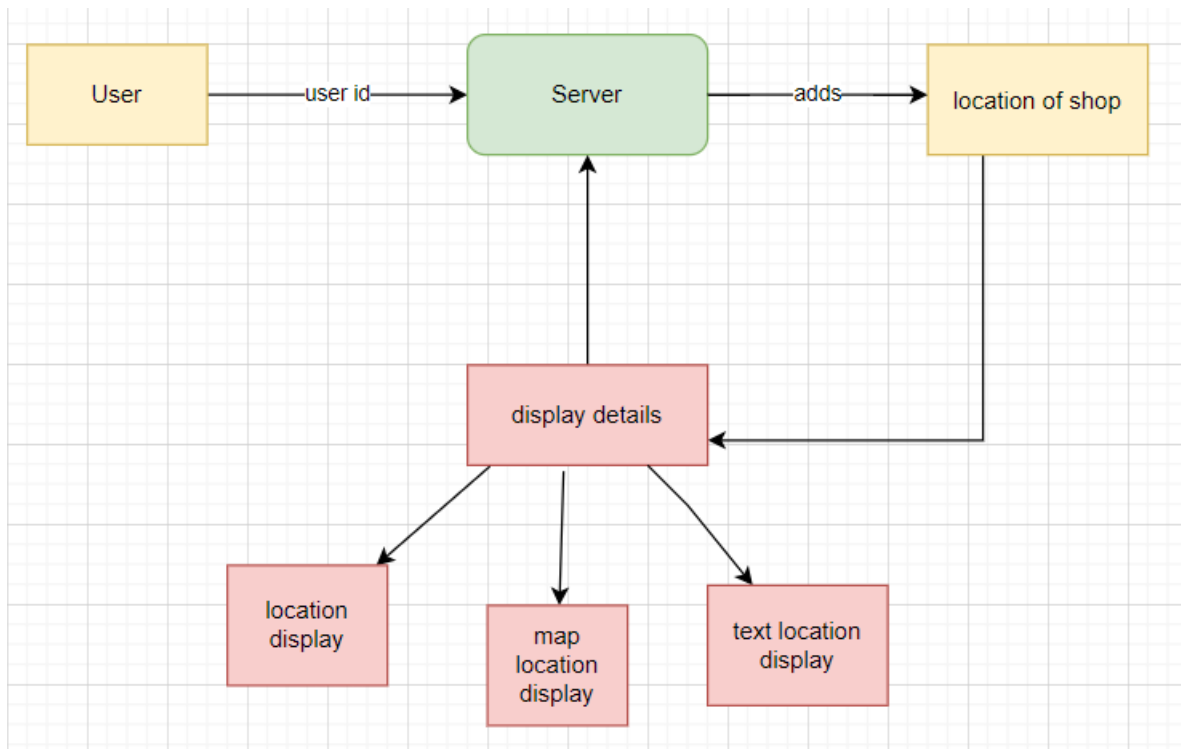
1. User enter the user_id to the login system.
2. User_id is sent to the server.
3. Server is verifies the user_id.
4. Server adds the location.

5. Server have a map service for the user.
6. Map Service has a part of many operation.

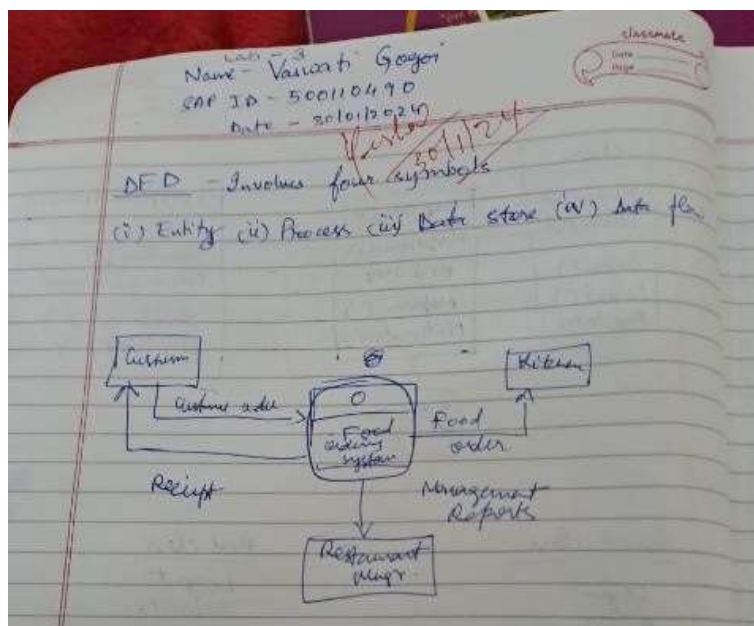
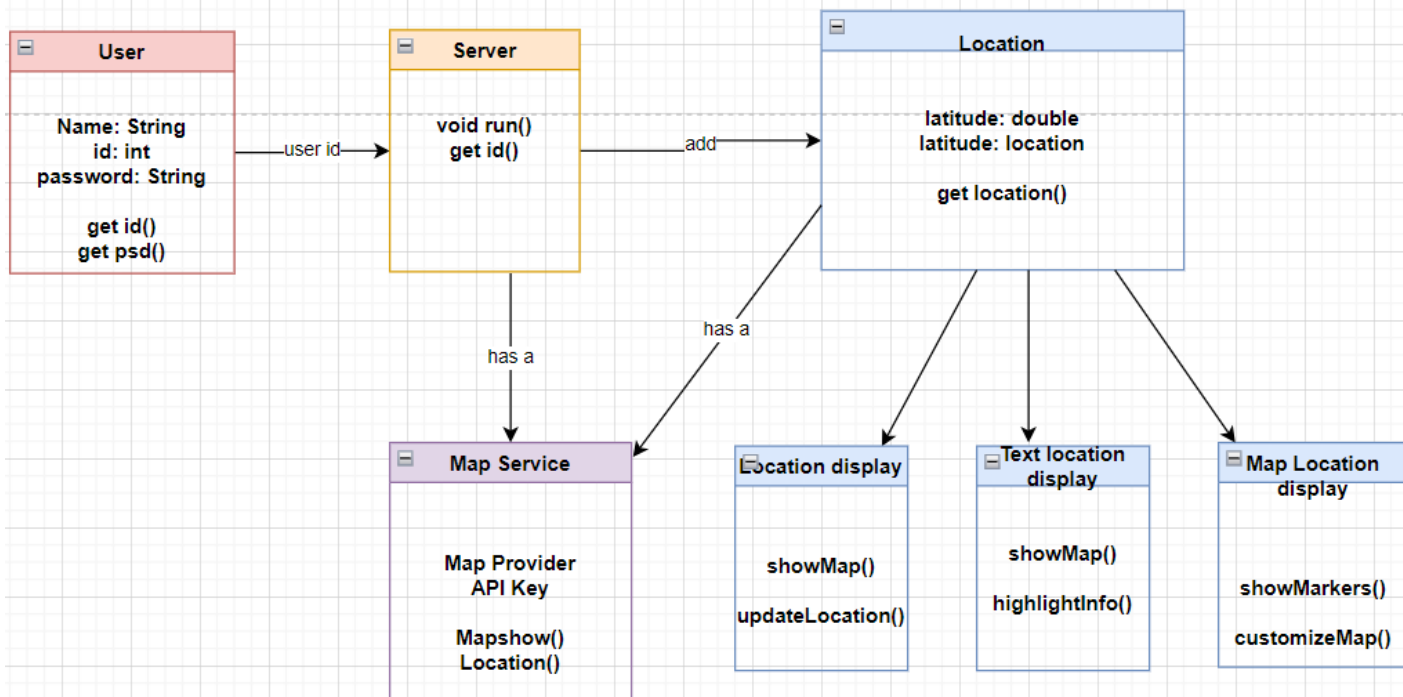
Step 4:- Initial diagram for mobile tracking.



Step 5:- Refining with Inheritance



Step 6:- Class diagram



Data Flow DIAGRAM

For
MOBILE TRACKING

Prepared by Vaswati Gogoi

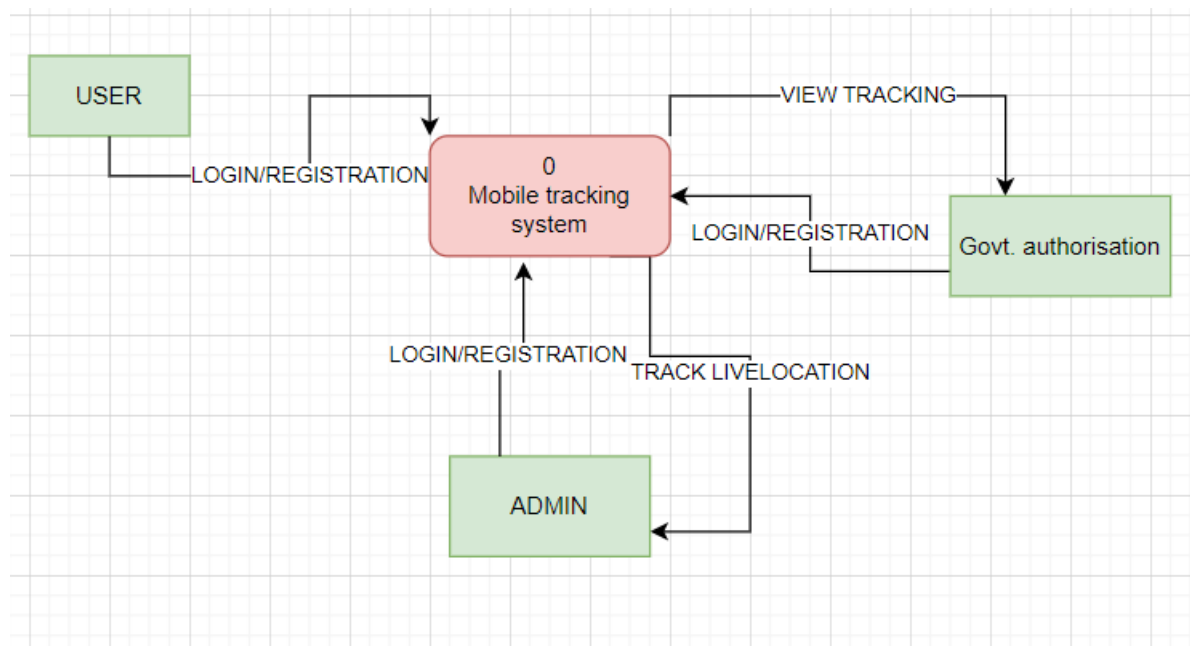
UPES DEHRADUN

23.01.2024

Revision History

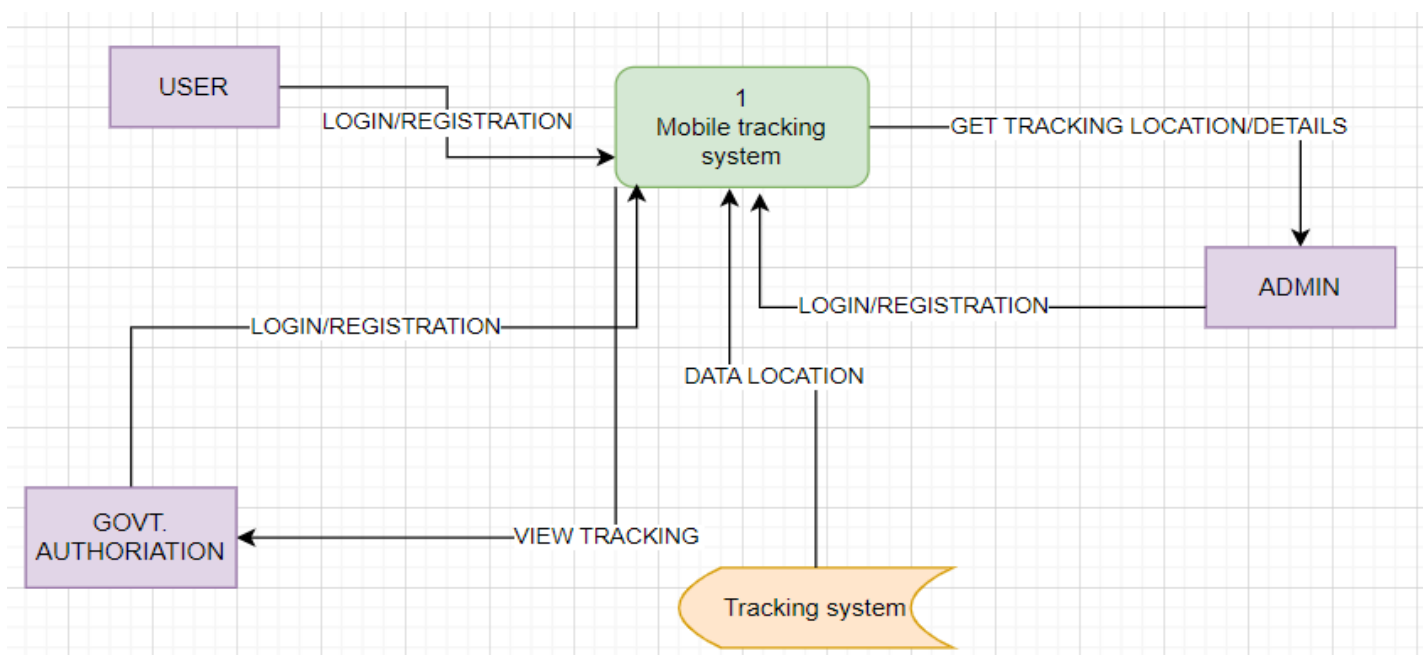
Name	Date	Reason For Changes	Version

LEVEL 0:-



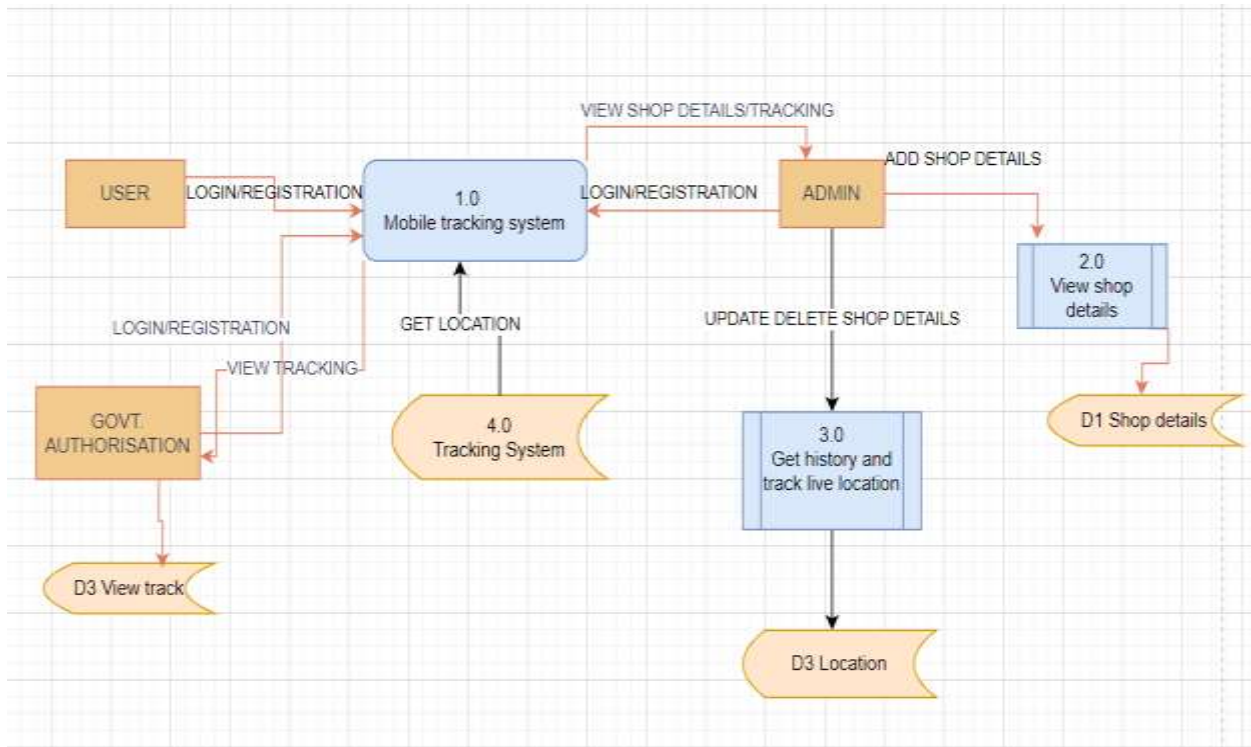
- In **level 0** the user login and registers to system.
- The Server grants the request through a response service.
- A mobile tracking system typically works on a continuous process of data collection, transmission, and analysis.
- Admin can update all the records and maintain the server.

LEVEL 1:-



- In **Level 1** the actors perform different actions.
- Admin gets the tracking location and details.
- Govt. authorization views tracking.
- There is a database- tracking system that provides data location to the system.

LEVEL 2:-



- In Level 2 the admin updates, views data and get the location. It also stores the location and the shop details.
- Govt. authorization views the track and stores it in a storage.

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SAP ID - 500110490

Mobile tracking 23/01/2024

Date	23/01/2024
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Class imp
Bad class

Good class

Logout

Login

Single sign on

Registration

Error handle

Control Access

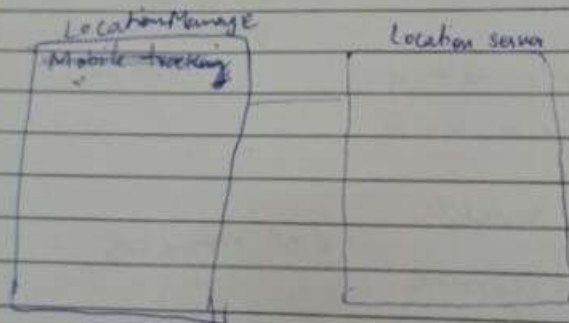
Security

Security Operation

Good internet connectivity

Use case

- 23/1/24
- (i) Login
 - (ii) Registration
 - (iii) Permission to view track



Software Requirements Specification

**For
MOBILE TRACKING**

Version 1.0 approved

Prepared by Vaswati Gogoi

06.02.2024

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Revision History

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1. Introduction

The following subsections of the Software Requirements Specifications (SRS) document provide an overview of the entire SRS.

1.1 Purpose

Mobile tracking serves a variety of purposes, catering to both individual and organizational needs.

Primarily, it facilitates location-based services like GPS navigation, location-sharing, and targeted advertising. It's instrumental in asset management, enabling the tracking of valuable assets such as vehicles and packages. Moreover, mobile tracking contributes to personal safety, offering features like emergency location sharing and distress signal broadcasting. For parents, it serves as a tool for monitoring their children's whereabouts for safety and security. In the corporate realm, mobile tracking aids in employee monitoring, enhancing security and productivity. Law enforcement agencies leverage mobile tracking for crime prevention and suspect location. In health and fitness, it plays a crucial role in tracking activities and progress towards fitness goals. Additionally, for businesses with fleets, mobile tracking optimizes routes, manages fuel consumption, and ensures vehicle safety. While mobile tracking offers numerous benefits, it raises concerns about privacy, necessitating careful regulation and ethical considerations regarding data usage.

1.2 Document Conventions

We use a bold font for the header. The size of the header font is 18. The size of the sub font is 16 and the size of the font is 14 for all the text documents. The description can be down in the points so that it is easy for read purposes. The font style is Times New Roman.

1.3 Intended Audience and Reading Suggestions

This SRS is designed especially for developers, project managers, testers, and documentation writer's .This document is intended for all individuals participating in and/or supervising the **MOBILE TRACKING** project. Readers interested in a brief overview of the product should focus on the rest of Part 1 (Introduction), as well as Part 2 of the document (Overall Description), which provide a brief overview of each aspect of the project as a whole. These readers may also be interested in Part 6 which lays out a concise timeline of the project.

1.4 Product Scope

The product scope of mobile tracking encompasses a wide range of functionalities and features tailored to meet diverse needs. At its core, mobile tracking solutions offer real-time location monitoring, allowing users to pinpoint the whereabouts of

devices or assets through GPS technology. These solutions often include comprehensive mapping interfaces, enabling users to visualize tracked data efficiently. Additionally, they may offer geofencing capabilities, allowing users to define virtual boundaries and receive notifications when tracked devices enter or exit designated areas. Mobile tracking products often incorporate robust reporting and analytics features, providing insights into movement patterns, usage trends, and historical data. For personal use, these solutions may focus on features like family location sharing and emergency assistance. In contrast, enterprise-oriented products may emphasize fleet management, employee monitoring, and asset tracking functionalities.

We can use “MOBILE TRACKING” for following activities:

1. **Navigation and Location Services:** Utilize mobile tracking for GPS navigation, finding directions, and locating points of interest.
2. **Family Safety and Communication:** Ensure family safety by sharing locations with each other and using location-based communication apps for coordination and emergency situations.
3. **Asset Management:** Track valuable assets such as vehicles, equipment, or packages in transit to optimize logistics, prevent theft, and ensure timely delivery.
4. **Fitness and Health Monitoring:** Monitor fitness activities like running, cycling, or hiking using mobile tracking apps to track distance, speed, and routes.
5. **Emergency Response:** Enable emergency location services to quickly pinpoint the location of individuals in distress, facilitating faster response times by emergency services.
6. **Fleet Tracking and Management:** Manage fleets of vehicles efficiently by tracking their locations, monitoring driver behavior, optimizing routes, and scheduling maintenance.
7. **Geo-Targeted Marketing:** Use location data for targeted advertising and marketing campaigns based on users' real-time locations or past movement patterns.
8. **Location-Based Social Networking:** Engage in location-based social networking by discovering nearby friends or interests and sharing location-tagged content.

1.5 References

I refer for this project on web. The link for that is

- www.w3schools.com
- Intranet - Wikipedia, the free encyclopedia.htm

2. Overall Description

2.1 Product Perspective

Mobile tracking software offers unparalleled convenience and peace of mind for individuals and businesses alike. With its user-friendly interface and seamless integration across multiple platforms, users can effortlessly monitor the real-time location of their assets or loved ones. The solution employs cutting-edge tracking technologies, including GPS, Wi-Fi, and cellular triangulation, ensuring pinpoint accuracy and reliability in any situation. Moreover, customizable features empower users to tailor their tracking experience, from setting geofences to personalizing notification preferences, enhancing overall usability and satisfaction.

Furthermore, mobile tracking software prioritizes privacy and security, employing robust encryption protocols and compliance measures to safeguard sensitive user data. Its scalability and flexibility make it adaptable to various industries and use cases, whether it's optimizing fleet management operations, ensuring employee safety, or enhancing customer service experiences. Backed by continuous updates and dedicated support services, our solution evolves alongside user needs, guaranteeing long-term value and customer satisfaction. With mobile tracking software, users can confidently navigate their world, knowing they have a reliable and comprehensive tracking solution at their fingertips.

2.2 Product Functions

- (a) It sends a request to the Server with an identification name like user-id.
- (b) The server responds to the request by identifying the user-id which is already registered in the server domain and when matched his request is granted and the client can begin to chat with the remote users present on the internet or local network.
- (c) Provides real-time tracking of mobile devices, allowing users to monitor their current location accurately.
- (d) Enables users to view historical location data, including routes traveled and timestamps, providing insights into past movements.

2.3 User Classes and Characteristics

This application can be mainly divided into two modules:

1. Server
2. User

SERVER: The server should be able to perform the following features:

- We should identify the program in the server which processes the user request.
- Administrator user who will be acting as a super user.
- The server is always waiting for clients requests .The clients come and go down but the server remains the same.
- The server stores all location data received from mobile devices securely and efficiently. This includes storing historical location data for analysis and reporting purposes.

USER: The user should be able to perform the following features:

- Users register their mobile devices with the tracking system, allowing the system to track the device's location and provide relevant tracking features.
- Users access the mobile tracking system by providing their login credentials, typically consisting of a username and password.

2.4 Operating Environment

while mobile tracking systems are designed to operate effectively in various environments, there can still be challenges that may arise. The potential problems that could affect the operating environment are mobile devices may experience hardware or software malfunctions that could disrupt the tracking system, leading to inaccuracies or failures in location tracking. Also data loss or corruption, either due to technical issues or malicious attacks, could compromise the integrity of the tracking system and lead to the loss of valuable tracking data.

The proposed system should have the following features:

1. **Device Compatibility:** The mobile tracking system should be compatible with a wide range of mobile devices, including smartphones and tablets, running different operating systems such as iOS and Android.
2. **Network Connectivity:** The system relies on network connectivity, including cellular data and Wi-Fi, to transmit location data between the tracked devices and the server. A stable and reliable network connection is essential for real-time tracking and communication.
3. **Geographic Coverage:** The effectiveness of the mobile tracking system depends on the availability of GPS signals and geographic coverage. It should be able to track devices accurately in various geographic locations, including urban areas, rural areas, and remote regions.

4. **Battery Life:** Mobile tracking can consume significant battery power, so the system should be optimized to minimize battery drain on tracked devices. This includes implementing efficient tracking algorithms,

2.5 Design and Implementation Constraints

The system should provide accurate and reliable location tracking data, with minimal errors or discrepancies. This requires using reliable positioning technologies (GPS, Wi-Fi, cellular triangulation) and implementing error correction mechanisms. The tracking system should be compatible with a wide range of mobile devices, operating systems, and versions. This necessitates testing and adaptation for different platforms to ensure seamless functionality.

2.6 User Documentation

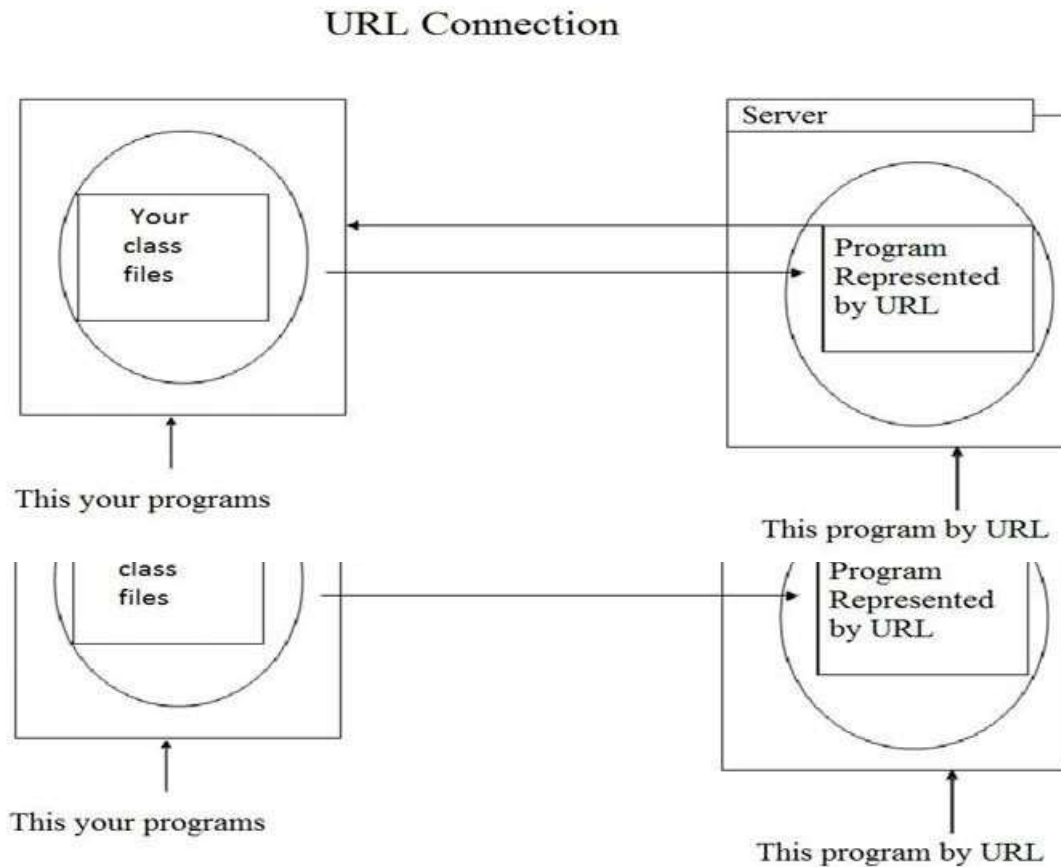
- Gupta, A. K., & Gupta, P. (2014). Mobile Tracking Systems: A Literature Review. *International Journal of Engineering Trends and Technology*, 13(7), 345-348.
- Kumar, A., & Dave, M. (2018). Design and Implementation of Mobile Tracking System Using GPS and GSM. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 3(5), 339-342.
- Choi, J., & Jung, W. (2016). Development of a Mobile Tracking Application for Real-Time Location-Based Services. *International Journal of Multimedia and Ubiquitous Engineering*, 11(9), 259-266.

2.7 Assumptions and Dependencies

It's assumed that the Admin are already enrolled with the central server system. The whole project is depended on the systems accuracy and maintainability. This can be down by the administrator. The server will create the room the client and it will works as a database for the client.

3. External Interface Requirements

3.1 User Interfaces



3.2 Hardware Interfaces

- Processor : Intel Pentium II or above
- Memory : 128 MB or above
- Hard Disk Drive : 10 GB or above
- Keyboard : 108 Keys

3.3 Software Interfaces

OS Platform : Windows 2000 or More

3.4 Communications Interfaces

(a) Bluetooth Low Energy (BLE):

BLE beacons can be deployed in indoor environments to enable proximity-based tracking. Mobile devices equipped with BLE capability can detect and communicate with nearby beacons to determine their proximity to specific locations.

(b)Internet Connectivity:

Mobile tracking systems often rely on internet connectivity to transmit location data between the mobile device and a central server or client application. Communication over cellular data networks (e.g., 3G, 4G, 5G) or Wi-Fi connections facilitates real-time tracking updates.

4. System Features

4.1 System Feature 1

There are several features of use case. The most important feature is validation and tracking.

4.1.1 Description and Priority

The validation is down by the server. After that the user can get the chat id for the login. If the user won't have id then it can go to the registration page. Its priority is much high as today for all the traditional tracking system.

4.1.2 Stimulus/Response Sequences

- The user is prompted to enter user id.
- The user's information is sent to server and stored in the database.
- Registration is completed and user is taken to main screen.
- The entered client ID and the device's current location data are sent securely to the server over the internet. This transmission may occur via HTTPS or another secure communication protocol to protect the user's privacy and data integrity.

4.1.3 Functional Requirements

Users should be able to register their mobile devices on the tracking server. Users initiate a tracking request by providing necessary information like the target mobile number or unique identifier associated with the device to be tracked. The server receives the tracking request and verifies the authenticity of the user. It validates the target mobile number or identifier provided in the request. Upon successful validation, the server retrieves the location data associated with the target mobile device.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Software specifications and hardware specifications should be maintained for good working of project.

5.2 Safety Requirements

Safety requirements for a mobile tracking system are critical to ensuring the secure and responsible operation of the platform while prioritizing user privacy and security. Firstly, data encryption protocols must be implemented to protect all communication between mobile devices and the server, preventing unauthorized access or interception of sensitive information. Secondly, stringent privacy protection measures are essential, ensuring compliance with privacy regulations and guidelines by anonymizing user location data and restricting access to authorized personnel only. Secure authentication mechanisms and role-based access control should be enforced to verify user identities and limit access to sensitive functionalities and data.

5.3 Security Requirements

Security measures are paramount in mobile tracking systems to protect sensitive location data and uphold system integrity. End-to-end encryption is essential, securing all data transmission channels between mobile devices and the tracking server to prevent unauthorized access.

5.4 Software Quality Attributes

- Enhanced Accuracy:** Investing in improving the accuracy of location tracking by utilizing multiple positioning technologies, such as GPS, Wi-Fi, and cellular networks, and implementing advanced algorithms for better location estimation.
- Real-Time Updates:** Providing real-time updates of device locations to users, allowing them to monitor movements instantly and respond promptly to changes in location.
- Geofencing Customization:** Allow users to create and customize geofences according to their specific needs, with options for defining shapes, sizes, and notification preferences.
- Battery Optimization:** Optimizing the system to minimize battery consumption on mobile devices, ensuring that continuous tracking does not significantly impact device performance or battery life.
- Integration with Wearables:** Extending the tracking system's capabilities by integrating with wearable devices, such as smartwatches or fitness trackers, to provide additional data points and enhance tracking accuracy.

5.5 Business Rules

- Regulation of Investigatory Powers Act 2000 (RIPA):**

- Data Protection Act 2018 (DPA 2018):
- General Data Protection Regulation (GDPR):
- Defamation Act 1996:
- Freedom of Information Act 2000 (FOI):
- ePrivacy Directive (EU Cookie Law):
- Human Rights Act 1998:

6. Other Requirements

- Cross-Platform Compatibility: Ensure that the mobile tracking system is compatible with a variety of mobile devices and operating systems (iOS, Android, etc.) to cater to a broader user base.
- Data Security and Encryption: Implement robust security measures to protect location data both in transit and at rest. This includes encryption of data transmissions, secure storage practices, and adherence to industry-standard security protocols.
- Location-Based Services Integration: Integrate with location-based services (LBS) such as mapping applications, navigation tools, or local business directories to enhance the functionality and utility of the mobile tracking system.
- Compliance with Industry Standards: Ensure compliance with relevant industry standards and best practices for location tracking systems, such as those outlined by the International Organization for Standardization (ISO) or the Open Geospatial Consortium (OGC).

Appendix A: Glossary

Communication: Intranets can serve as powerful tools for tracking.

Server: it allows us to map the applet and J2EE over the internet.

DBMS: (acronym) database management system.

SRS (acronym) Software Requirements Specification

User: - It can be defined in the use case by the two actors first one is mobile User and the second One is admin.

Validation: - It is a mechanism in which the two use case can perform the operation first one is authentication which can encrypt the data and the Second one is

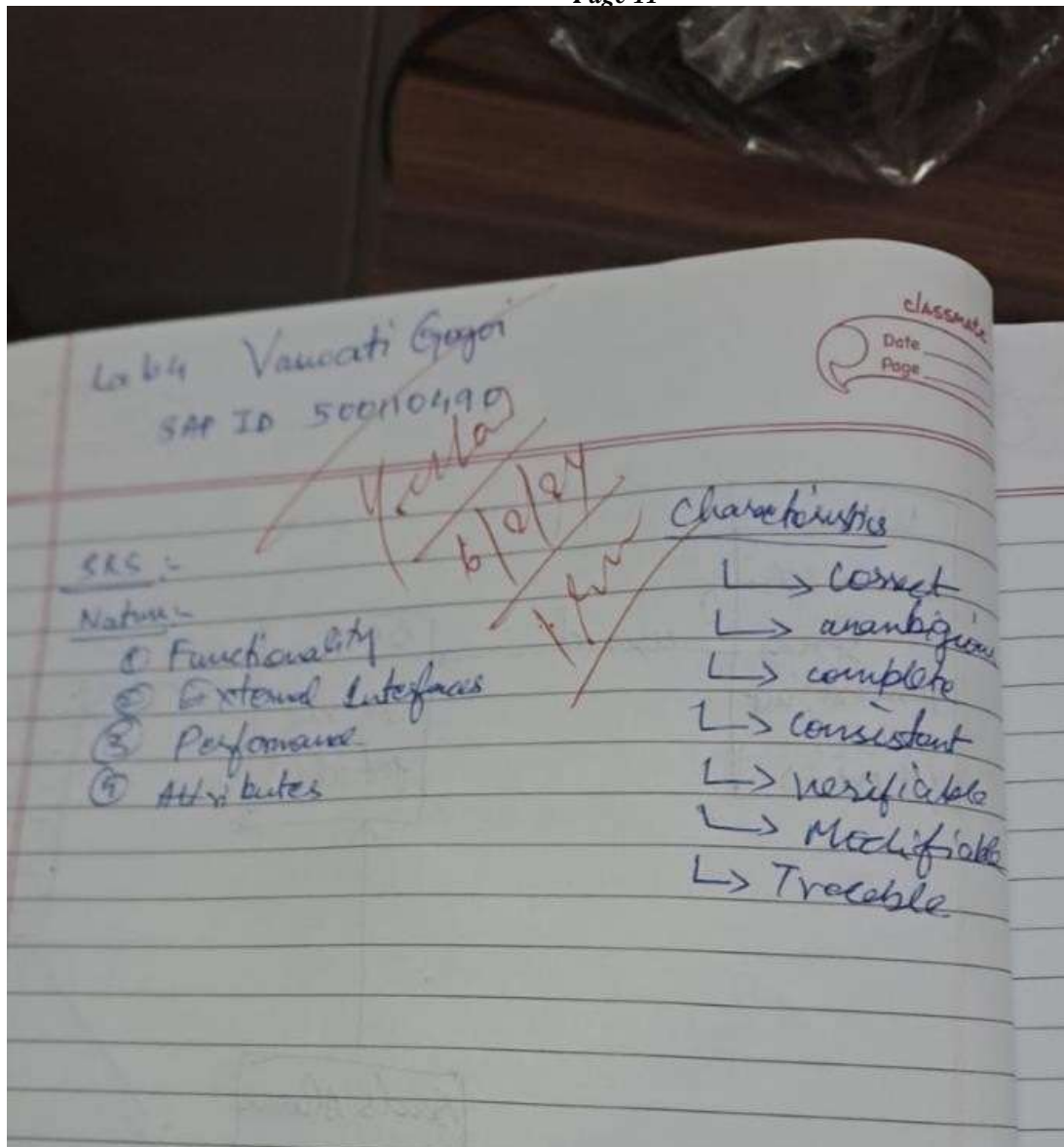
Session management:- which can create the time stamp for the user.

Appendix B: Analysis Models

<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams.>

Appendix C: To Be Determined List

<Collect a numbered list of the TBD (to be determined) references that remain in the SRS so they can be tracked to closure.>



ACTIVITY DIAGRAM

For

MOBILE TRACKING SYSTEM

Prepared by Vaswati Gogoi

UPES Dehradun

19.02.2024

Revision History

Name	Date	Reason For Changes	Version

1. ACTIVITY DIAGRAM DESCRIPTION

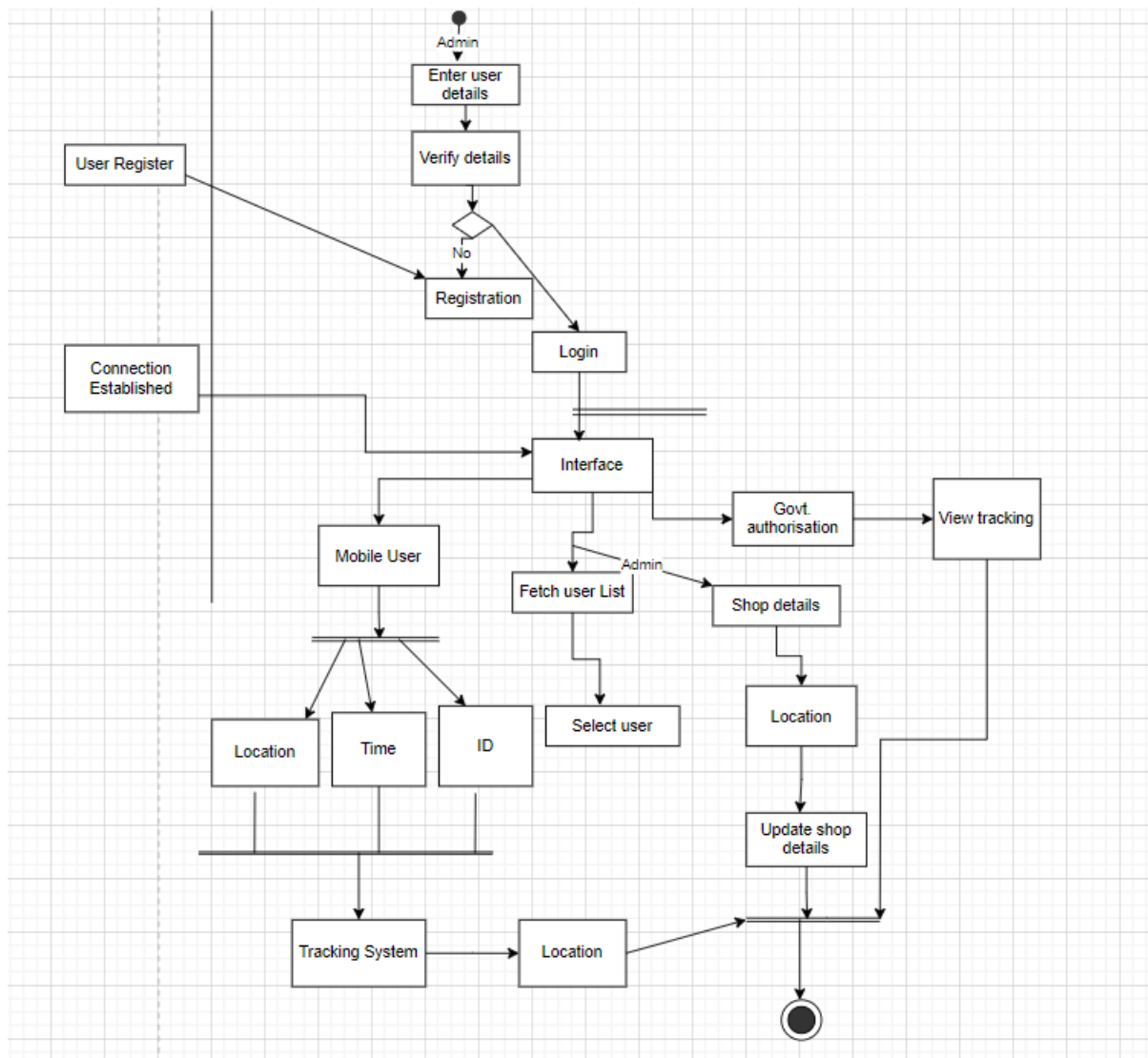
2. An activity diagram is a visual representation of any system's activities and flows of data or
3. decisions between activities.
4. Activity diagrams provide a very broad view of a business process.
5. They represent the dynamics of a system.
6. They are flow charts that are used to show the workflow of a system.
7. They show the flow of control from activity to activity in the system.
8. They show what activities can be done in parallel, and any alternative paths through the flow.
9. Purpose
10. Model business workflows
11. Model operations
12. Activity diagrams commonly contain
13. Activity states and action states
14. Transitions
- Objects

2. CONCLUSION

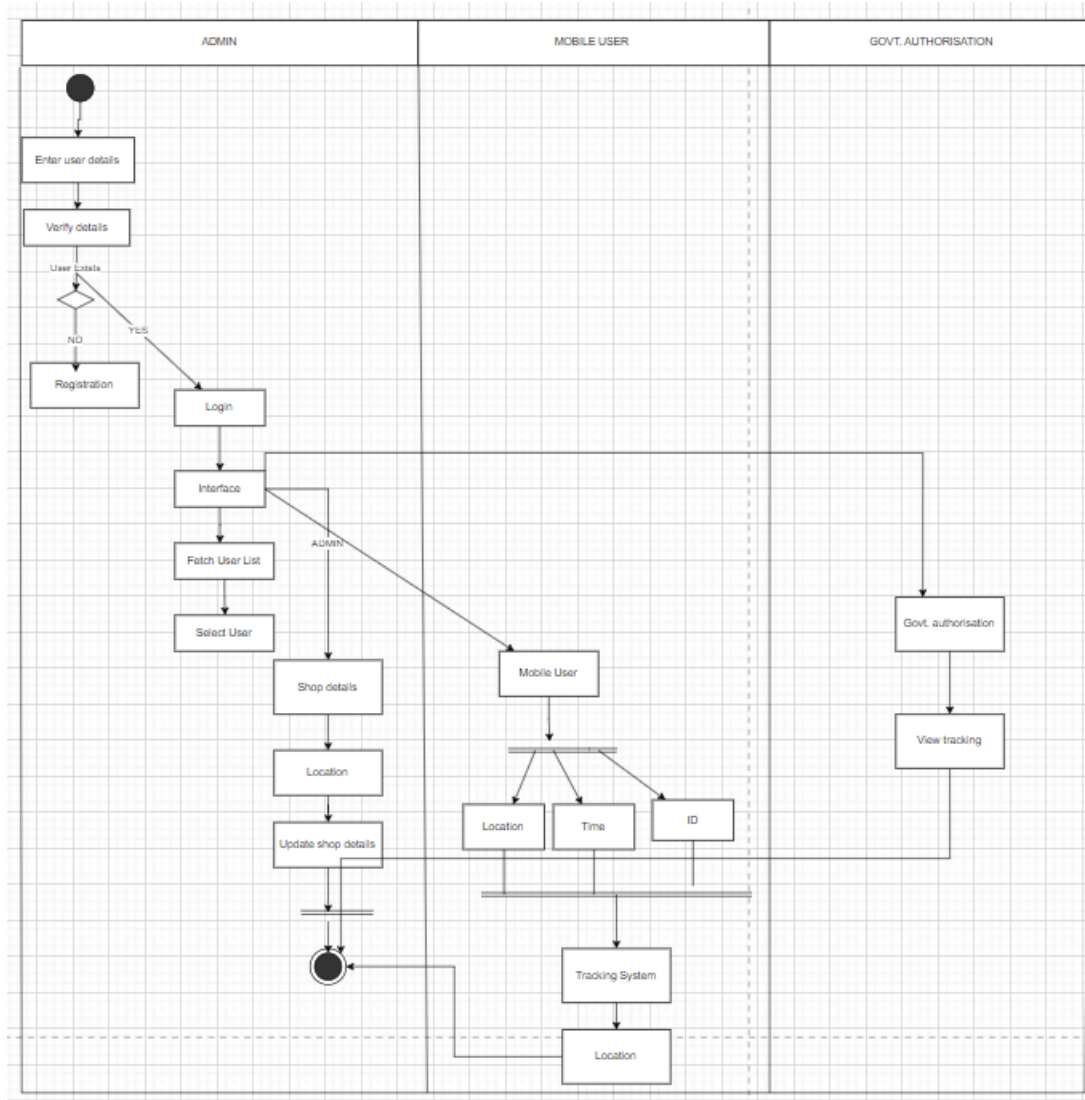
From this practical we have learnt how to make Activity Diagram.

3. Diagram with and without Swimlane

Without Swimlane



With Swimlane



Lab 5

Vaswati Gogoi

Activity

SAP ID - 500110490

Activity diagram

Action :- Movement of process from one phase to another

Step 1 :- Identify the process

↳ How many pages u have

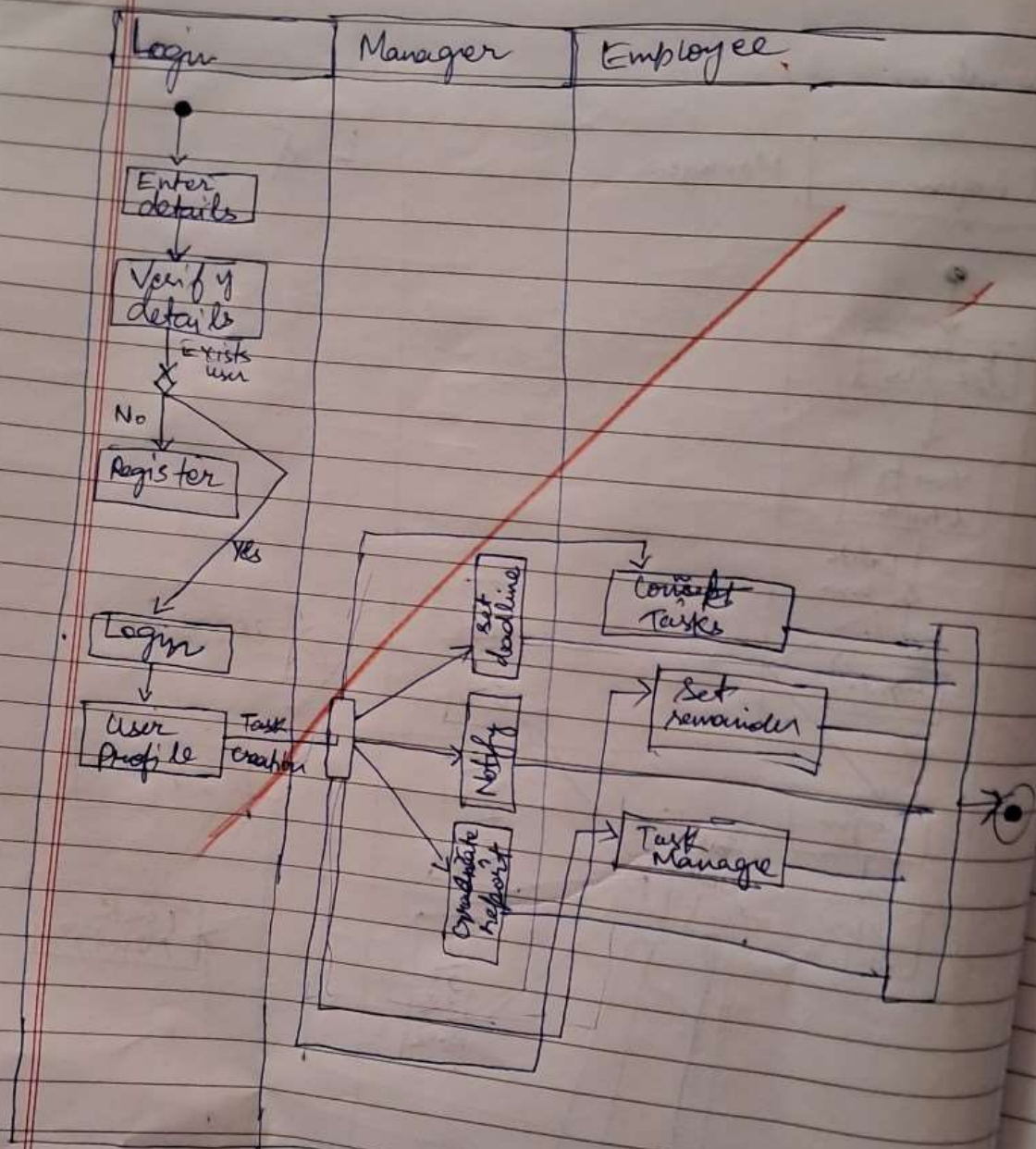
↳ login

↳ Registration

↳ working page

↳ payment

Activity Diagram



Lab 6
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SAP ID - 500110490

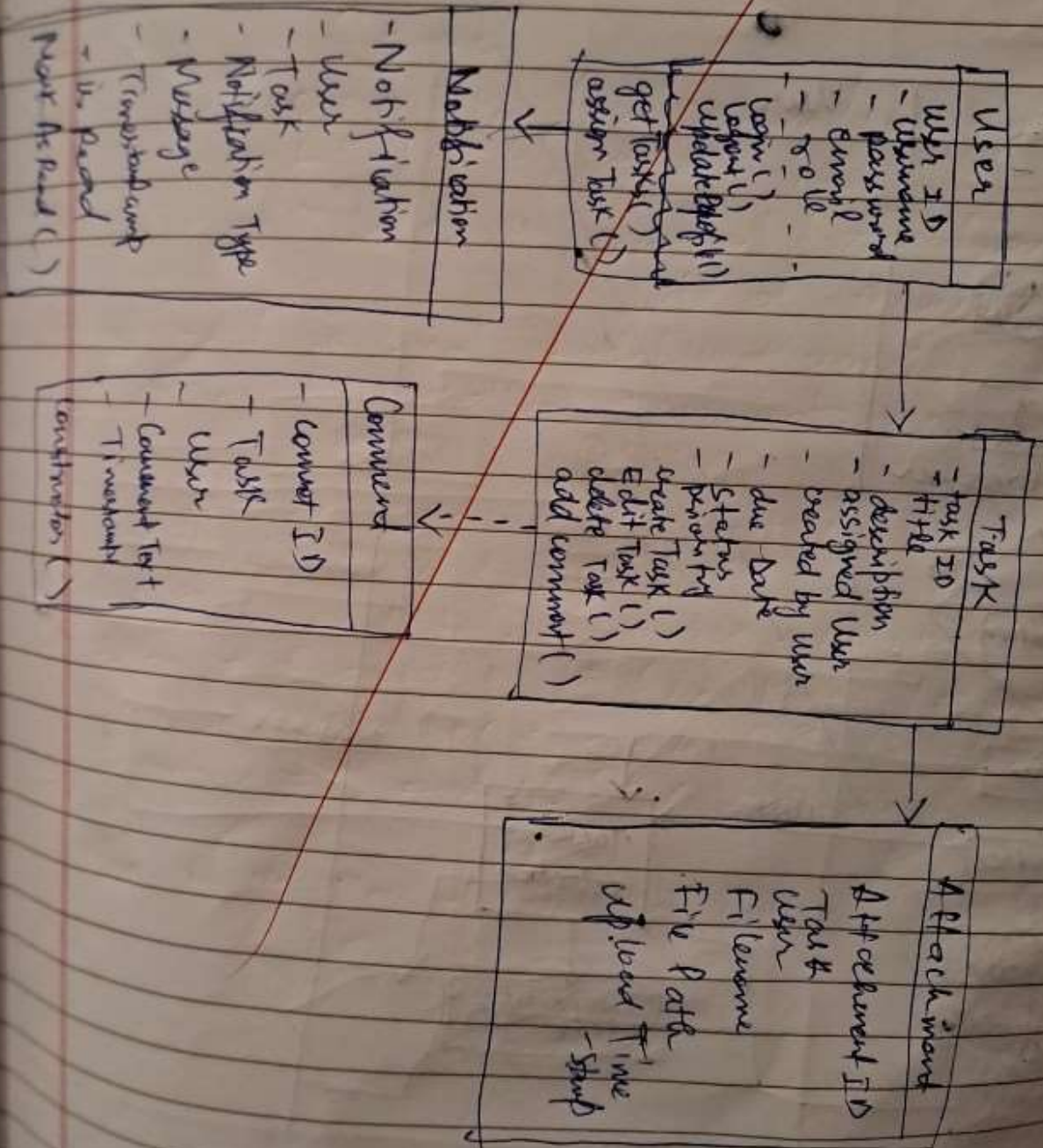
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Ans 1:- Requirement analysis

- (a) Interface - System should have user-friendly interface for task management.
- (b) Task assigner - There should be a task assigner for tasks to be assigned.
- (c) Reminder :- The system should have a notification system to remind users of deadlines.
- (d) Calendar Integration :- Calendar integration in the system is required for deadline tracking.
- (e) Management of Task :- System allows for task update, create & deletion.

Ans: Good classes

- (i) User class (ii) Task class (iii) Comment Class
(iv) Attachment class (v) Notifications class



INTERACTION DIAGRAMS

For

Mobile Tracking system

Prepared by Vaswati Gogoi

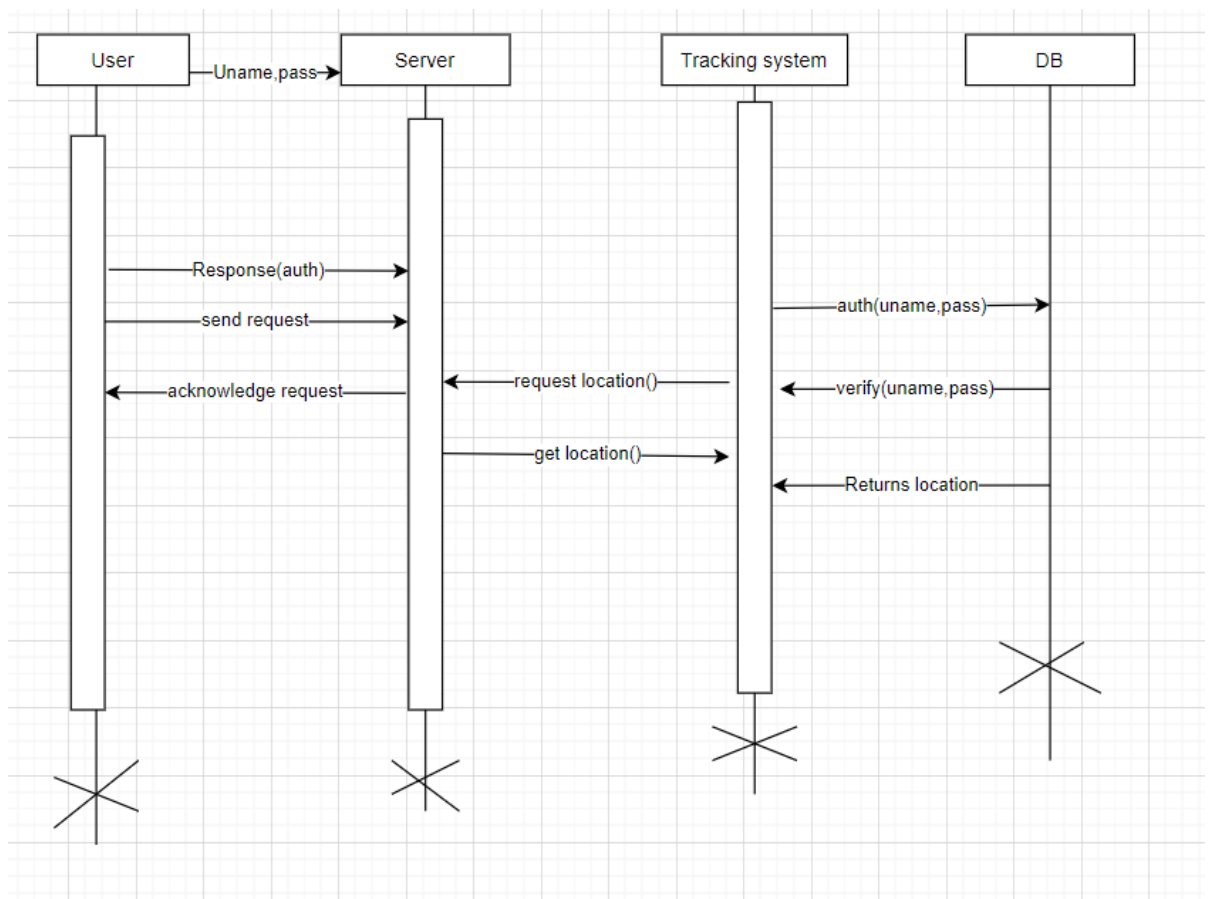
UPES

12.03.2024

SEQUENCE DIAGRAM –

A sequence diagram is an interaction diagram that details how operations are carried out -- what messages are sent and when. Sequence diagrams are organized according to time. The time progresses as you go down the page. The objects involved in the operation are listed from left to right according to when they take part in the message sequence. Sequence diagrams contain the following: – Class roles (subsystem/object/class, actor, and external system roles in the interaction). These are (usually) drawn across the top of the diagram. – Lifelines (subsystem/object/class existence). These (usually) extend down the diagram. – Activations (show when the subsystem/object/class is doing something) – Messages (communication between roles).

SEQUENCE DIAGRAM FOR Mobile Tracking System

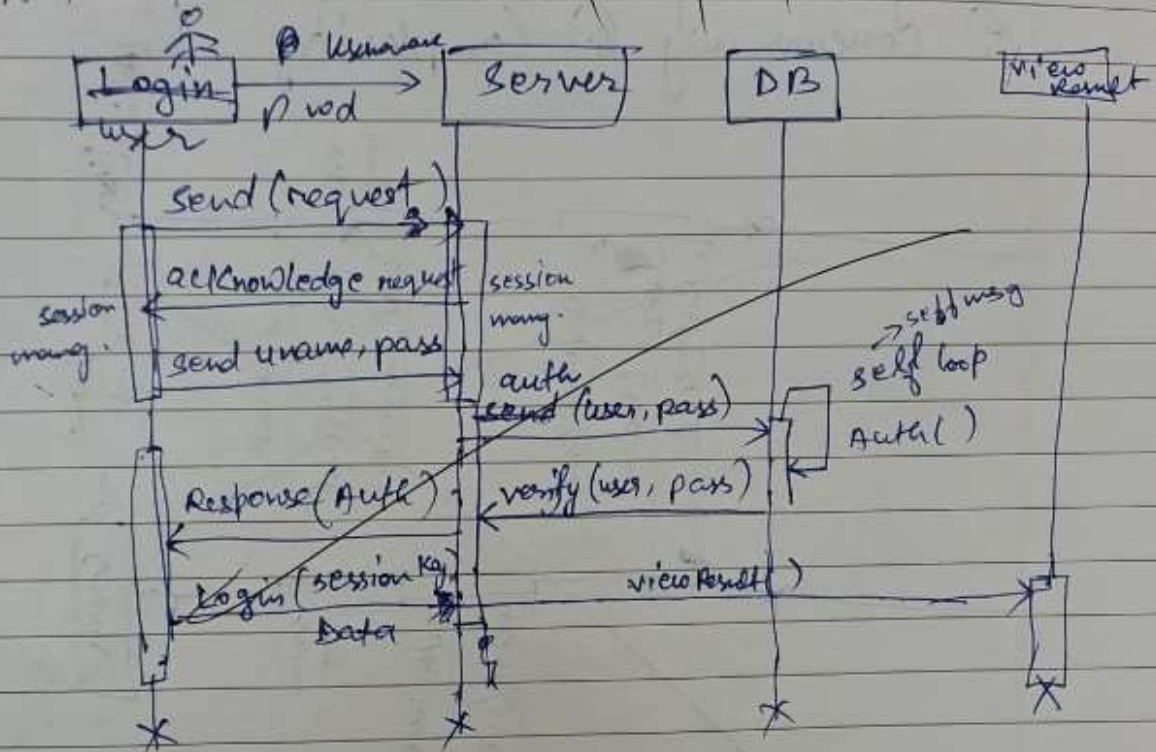


Sequence Diagram

→ Guidelines

→ used for flow information

(i) Actors



- ① Actor
- ② Lifeline
- ③ Message → synchronous/asynchronous
- ④ Create msg
- ⑤ Delete msg
- ⑥ self msg
- ⑦ Replay msg
- ⑧ Found "
- ⑨ Lost "
- ⑩ Guard

Q. When will u use seq. diagram?

- Ans:
- ① Behaviour of s/w
 - ② Design & architecture
 - ③ Communication
 - ④ Requirement analysis
 - ⑤ Debugging
 - ⑥ Designing

STATECHART DIAGRAM

For

MOBILE TRACKING SYSTEM

Prepared by Vaswati Gogoi

UPES, Dehradun

19.03.2024

Introduction

The name of the diagram itself clarifies the purpose of the diagram and other details. It describes different states of a component in a system. The states are specific to a component/object of a system. A Statechart diagram describes a state machine. Now to clarify it state machine can be defined as a machine which defines different states of an object and these states are controlled by external or internal events.

Purpose:

Statechart diagram is one of the five UML diagrams used to model dynamic nature of a system. They define different states of an object during its lifetime. And these states are changed by events. So Statechart diagrams are useful to model reactive systems. Reactive systems can be defined as a system that responds to external or internal events. Statechart diagram describes the flow of control from one state to another state. States are defined as a condition in which an object exists and it changes when some event is triggered. So the most important purpose of Statechart diagram is to model life time of an object from creation to termination. Following are the main purposes of using Statechart diagrams:

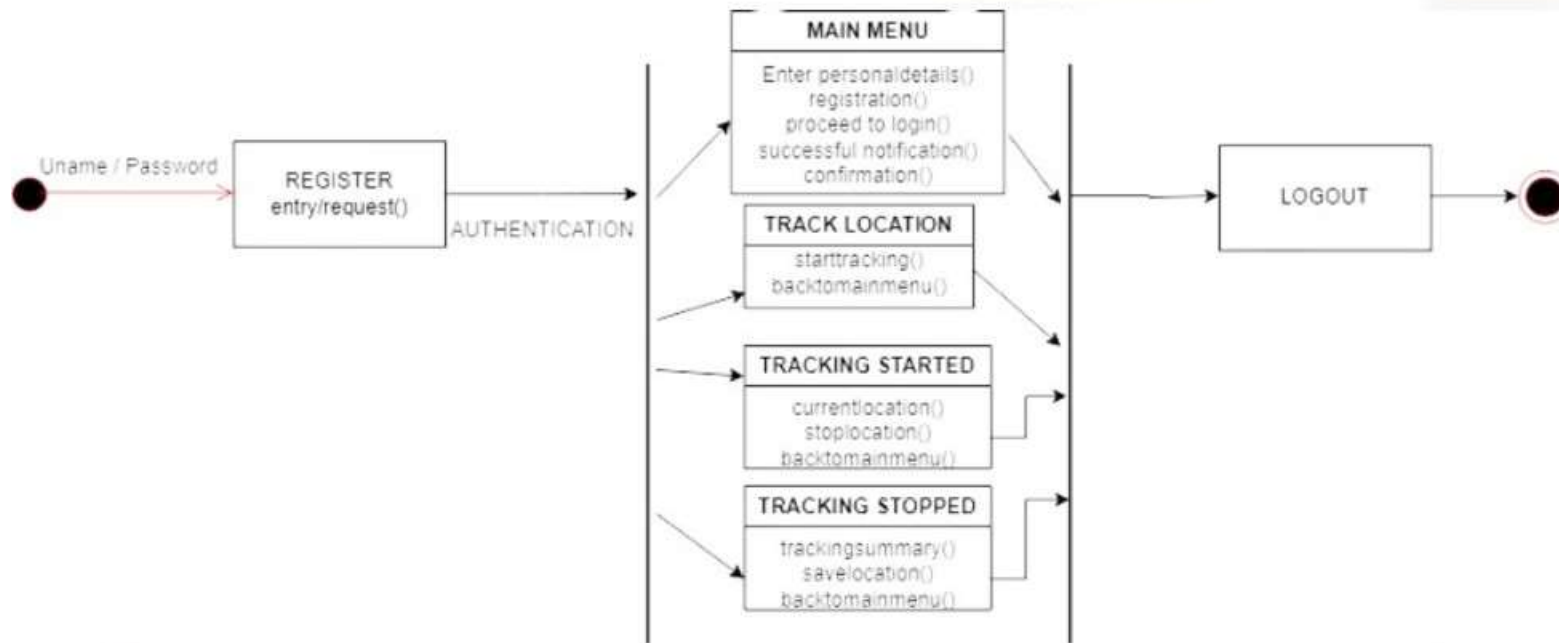
- To model dynamic aspect of a system.
- To model life time of a reactive system.
- To describe different states of an object during its life time.
- Define a state machine to model states of an object.

Conclusion:

From this practical we have learnt how to make State Chart Diagram using Rational Rose software in UML

-
- ```
graph LR
 Start(()) -- "Username / Password" --> Auth[AUTHENTICATION]
 Auth --> MainMenu[MAIN MENU]
 Auth --> TrackLoc[TRACK LOCATION]
 Auth --> TrackingStarted[TRACKING STARTED]
 Auth --> TrackingStopped[TRACKING STOPPED]
 MainMenu --> Logout[LOGOUT]
 TrackLoc --> Logout
 TrackingStarted --> Logout
 TrackingStopped --> Logout
 Logout --> End((()))
```
- The diagram illustrates the workflow of a tracking system. It begins with a start node leading to an **AUTHENTICATION** activity, which takes **Username / Password** as input. Following authentication, the user can access four main activities: **MAIN MENU**, **TRACK LOCATION**, **TRACKING STARTED**, and **TRACKING STOPPED**. Each of these activities has a path leading to a **LOGOUT** activity, which then leads to the final end node. The activities are detailed as follows:
- MAIN MENU**: Includes `viewprofile()` and `settings()`.
  - TRACK LOCATION**: Includes `starttracking()` and `backtomainmenu()`.
  - TRACKING STARTED**: Includes `currentlocation()`, `stoplocation()`, and `backtomainmenu()`.
  - TRACKING STOPPED**: Includes `trackingsummary()`, `saveolocation()`, and `backtomainmenu()`.

- Statechart diagram for user registration and tracking process.



Vaswoti Gogoi

Lab 8


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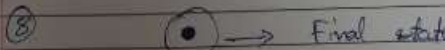
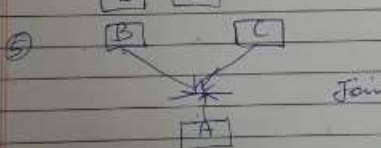
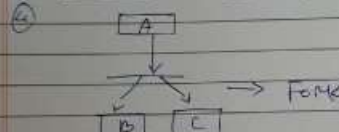
State / Machine Diagram - It represents condition of system or part of the system at finite instances of time

8 Notations / symbols

①  → Partial state

②  → State

③  → Transition



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# **COLLABORATION DIAGRAM**

## **For**

# **MOBILE TRACKING SYSTEM**

**Prepared by Vaswati Gogoi**

**UPES, Dehradun**

**09.04.2024**

## **UML Collaboration Diagram**

The collaboration diagram is used to show the relationship between the objects in a system. Both the sequence and the collaboration diagrams represent the same information but differently. Instead of showing the flow of messages, it depicts the architecture of the object residing in the system as it is based on object-oriented programming. An object consists of several features. Multiple objects present in the system are connected to each other. The collaboration diagram, which is also known as a communication diagram, is used to portray the object's architecture in the system.

### **When to use a Collaboration Diagram?**

Collaborations are used when it is essential to depict the relationship between the objects. Both the sequence and collaboration diagrams represent the same information, but the way of portraying it is quite different. The collaboration diagrams are best suited for analyzing use cases. Following are some of the use cases enlisted below for which the collaboration diagram is implemented:

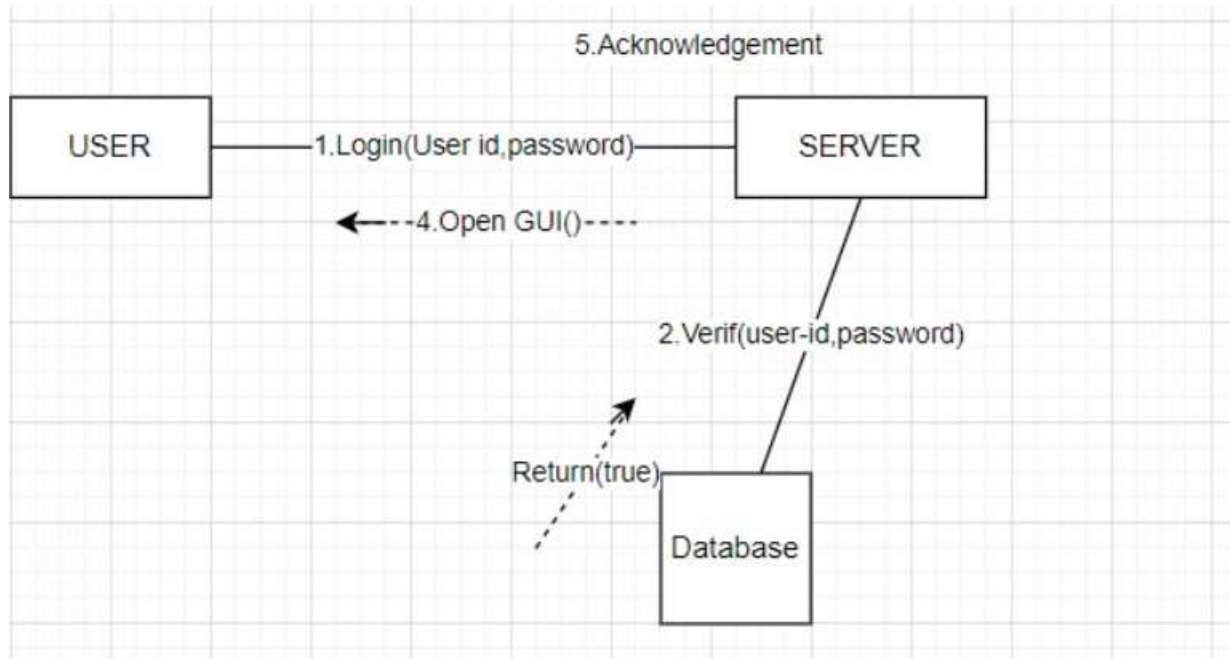
- To model collaboration among the objects or roles that carry the functionalities of use cases and operations.
- To model the mechanism inside the architectural design of the system.
- To capture the interactions that represent the flow of messages between the objects and the roles inside the collaboration.
- To model different scenarios within the use case or operation, involving a collaboration of several objects and interactions.
- To support the identification of objects participating in the use case.

In the collaboration diagram, each message constitutes a sequence number, such that the top-level message is marked as one and so on. The messages sent during the same call are denoted with the same decimal prefix, but with different suffixes of 1, 2, etc. as per their occurrence.

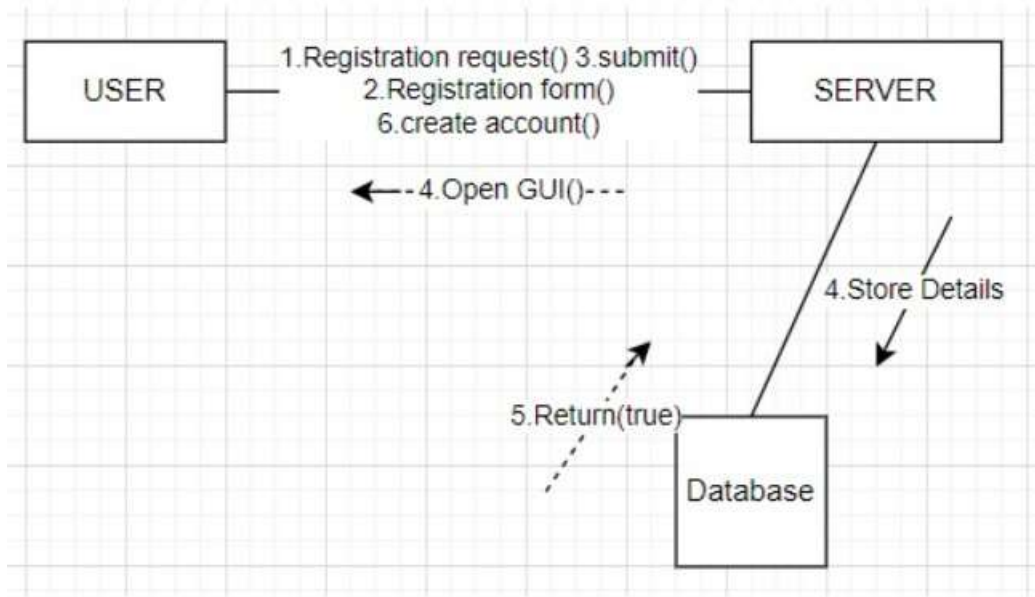
### **Steps for creating a Collaboration Diagram**

- Determine the behavior for which the realization and implementation are specified.
- Discover the structural elements that are class roles, objects, and subsystems for performing the functionality of collaboration.
- Choose the context of an interaction: system, subsystem, use case, and operation.
- Think through alternative situations that may be involved.
- Implementation of a collaboration diagram at an instance level, if needed.
- A specification level diagram may be made in the instance level sequence diagram for summarizing alternative situations.

- Collaboration diagram for login

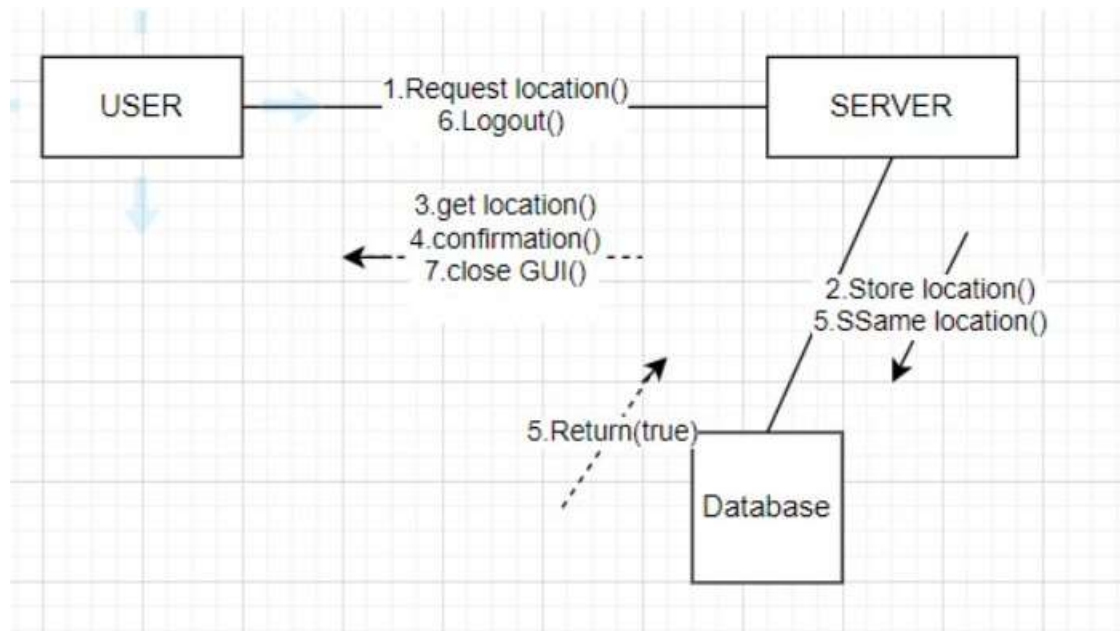


- Collaboration diagram for registration



- Collaboration diagram for registration

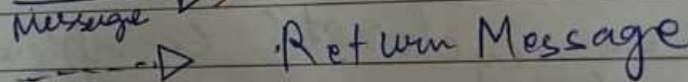
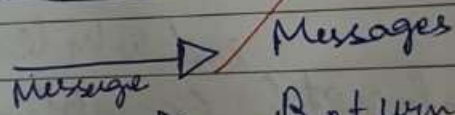
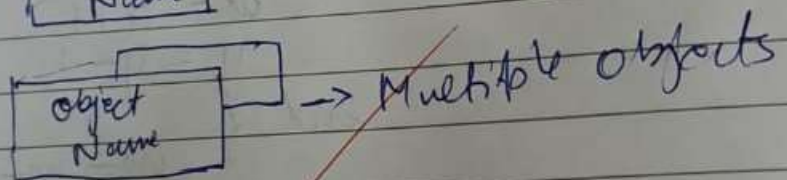
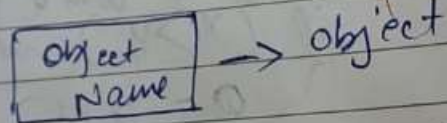




## Lab - 9

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Representations :-



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# **DEPLOYMENT DIAGRAM**

## **For**

# **MOBILE TRACKING SYSTEM**

**Prepared by Vaswati Gogoi**

**UPES, Dehradun**

**09.04.2024**

## UML Deployment diagrams

Deployment diagrams are used to visualize the topology of the physical components of a system where the software components are deployed. Deployment diagrams are used to describe the static deployment view of a system. Deployment diagrams consist of nodes and their relationships.

### Purpose:

The name Deployment itself describes the purpose of the diagram. Deployment diagrams are used for describing the hardware components where software components are deployed. Component diagrams and deployment diagrams are closely related. Component diagrams are used to describe the components and deployment diagrams show how they are deployed in hardware. UML is mainly designed to focus on software artifacts of a system. But these two diagrams are special diagrams used to focus on software components and hardware components. Most of the UML diagrams are used to handle logical components but deployment diagrams are made to focus on hardware topology of a system. Deployment diagrams are used by the system engineers.

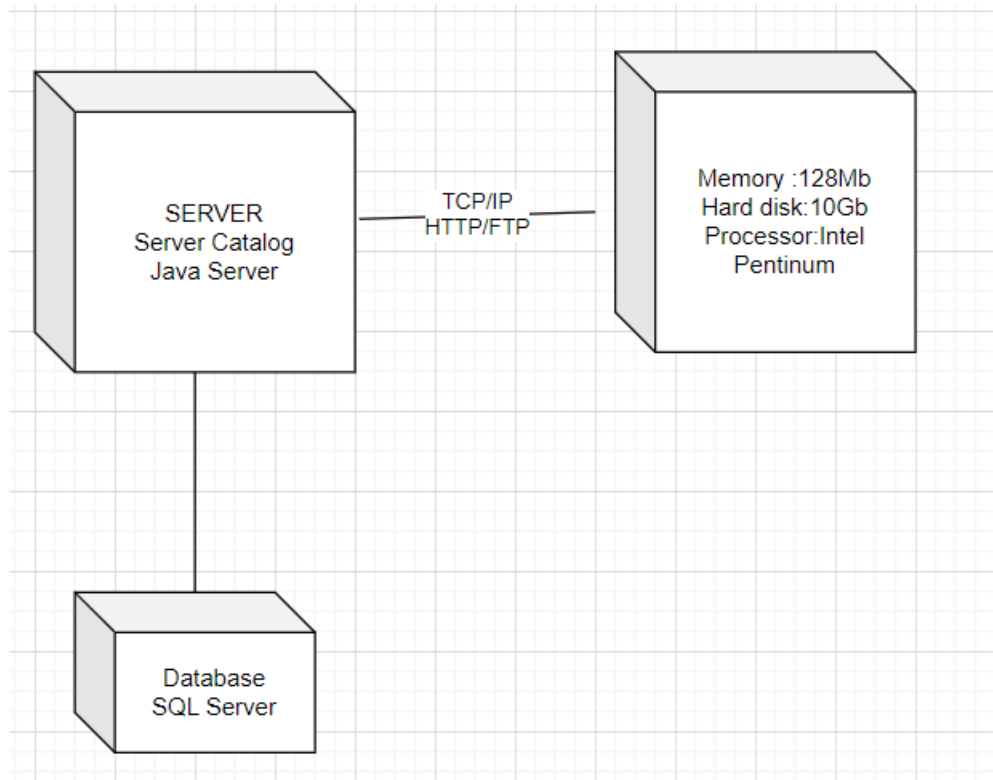
The purpose of deployment diagrams can be described as:

- Visualize hardware topology of a system.
- Describe the hardware components used to deploy software components.
- Describe runtime processing nodes.

### Conclusion:

From this practical we have learnt how to make Deployment Diagram using Rational Rose software in UML.

- **DEPLOYMENT diagram for mobile tracking system**



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Ex-10

classmate

Date  
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