

DIRE DAWA UNIVERSITY



IOT department of: software engineering. 3rd year

Assignment: software engineering tools and practices

Title: bus reservation ticket booking system.

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Abstract

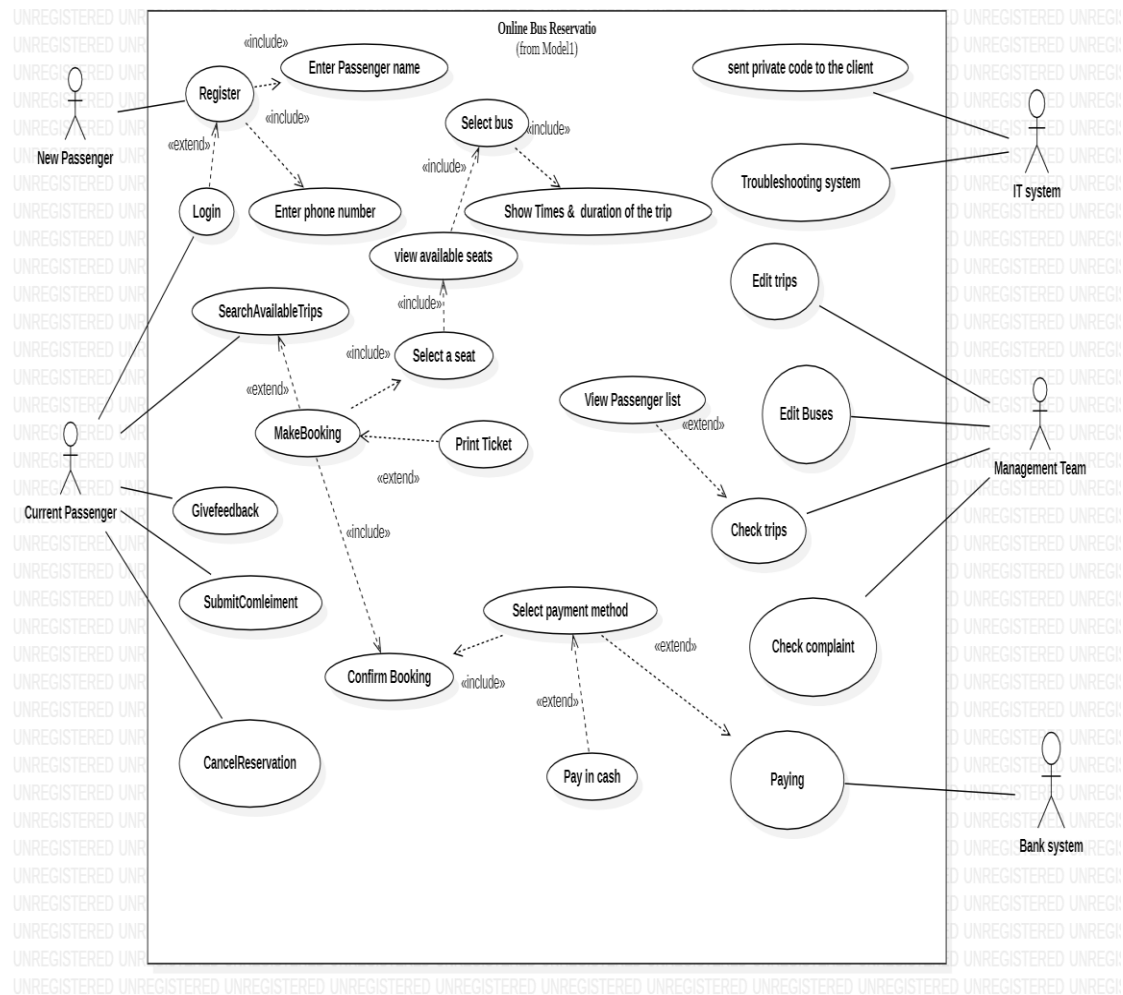
Designing a proper public transportation system is a main concern for many countries with large population size like Ethiopia. Therefore, the online based transportation business for individuals is highly growing in Ethiopia and the concept of online reservation in the transportation field has arisen. In this paper, a model in the analysis phase for an online public bus reservation system (OPBRS) is proposed. The system is large, complex and includes many interrelated functions. Therefore, the object-oriented modeling approach is chosen for developing the system by using the industry standard Unified Modeling Language (UML). The basic functions of the system are defined. Hence, the functional and structural models are presented to provide a framework for a public transportation OPBRS in Ethiopia.

BUS RESERVATION SYSTEM DOCUMENTATION

Documentation for use case diagrams:

In the early phase of identifying system requirements, the functional requirements of the system, presented in the use case diagram, visually describes the interactions between the system and the actors. A Use Case diagram is considered the most effective UML tool to describe the functional requirements of a system. Information exchange and sharing is important in the transportation industry. Therefore, it is desirable to first model the system using a use case diagram as it will form a functional view of the system. Fig. 1 describes the interaction between (New Passengers - Current Passengers - IT System - Management Team - 3rd Party) and the OBRS.

This use case diagram is a graphic depiction of the interaction among the elements of bus ticket booking system. It represents the methodology used in system analysis to identify, coloring and organize system requirement of bus ticket booking system.



Documentation for activity diagrams:

Activity Diagram

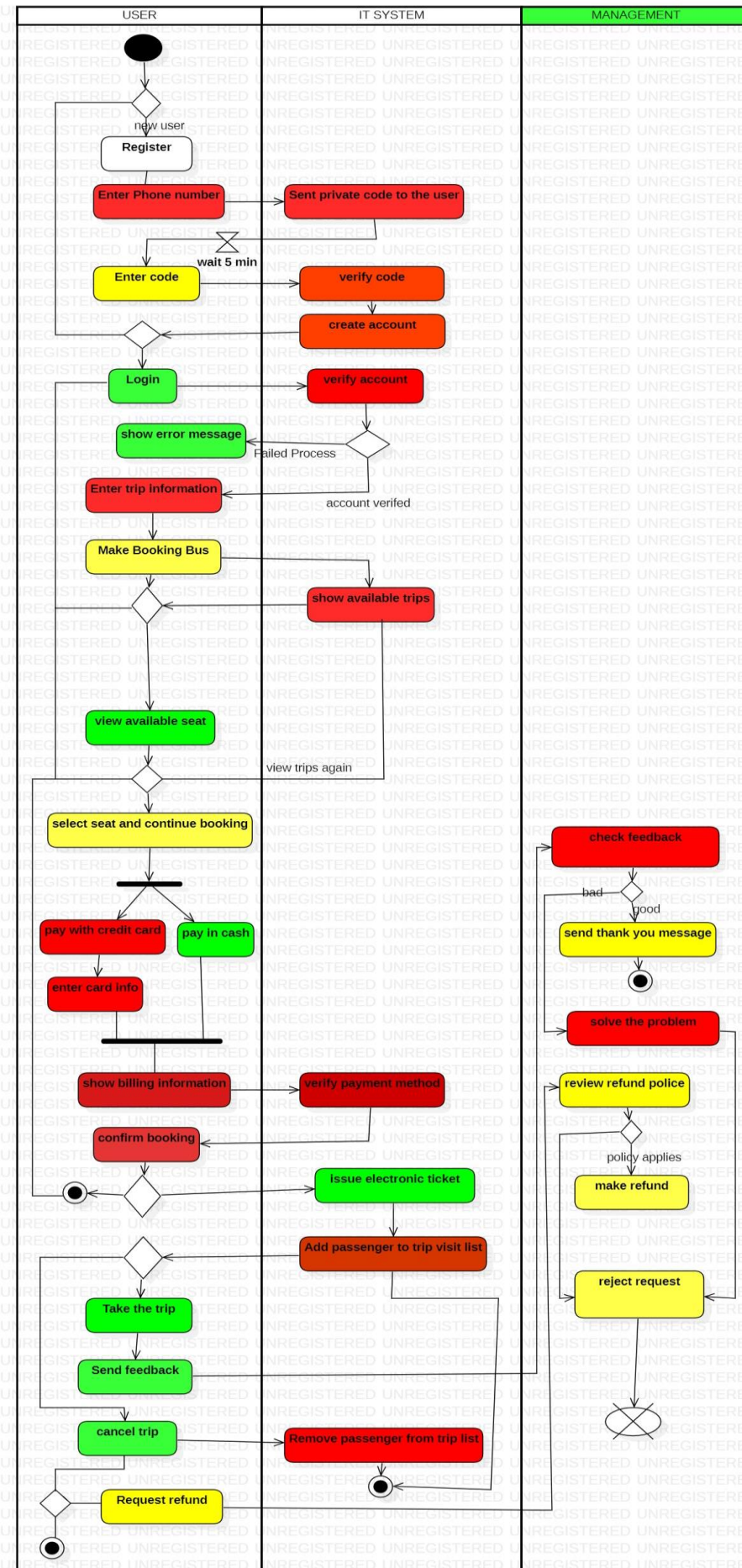
To describe the functionality of the system from a dynamic view, a swim lanes activity diagram is developed as shown in Fig. 2. An activity diagram in general describes the objects within the system from an operational sequence view. However, Swim lane diagram is very beneficial as the activities are organized in the diagram according to the main actors' responsibilities. A set of guidelines in have been considered while developing the activity diagram. These guidelines are as follows:

- 1) Model the important processes as possible
- 2) Use pen & paper or whiteboard first until the processes are fully understood and then use a modeling software
- 3) Modeling a system is an iterative process
- 4) The model is just an abstraction of the real system, focusing on the big picture.
- 5) Focus on one process at a time. Different colors are used to visualize the importance level of each object in the activity diagram. They have been widely used in design and graphical documents to illustrate the relationships between the entities and highlight different categories in a document. The red color was used to indicate the high importance of the activity, the orange color shows medium importance or priority and green is for activities with the lowest priority. The diagram shows the main activities within the system which includes registration, booking, payment, cancellation, submitting feedback processes.

III. SYSTEM STATIC VIEW

Any complex system including the OPBRS with high flow of information must have privacy and different access limitations for different users. Information accessing in OPBRS has five privilege tier levels illustrated and described as follows:

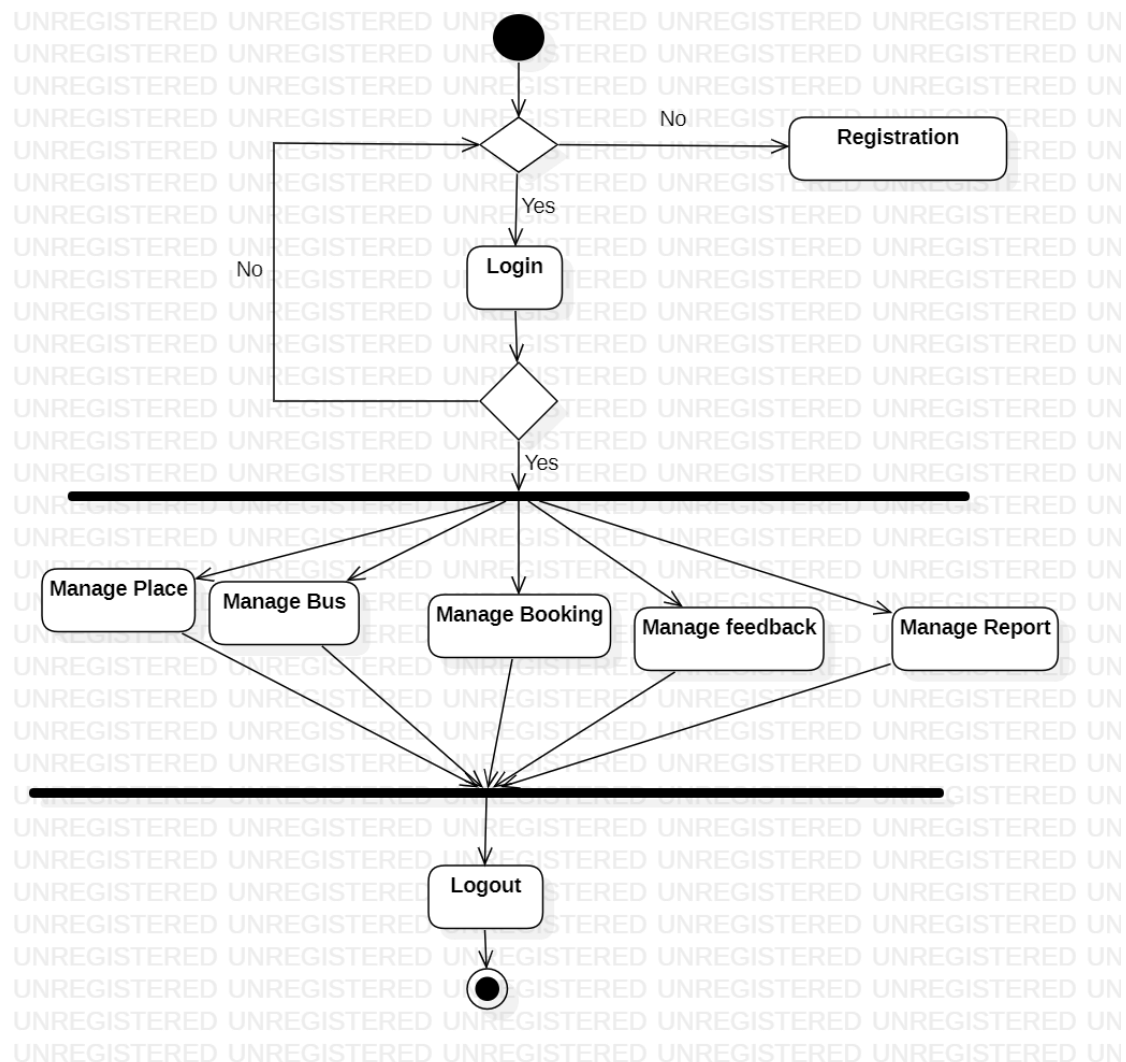
- A. Tier I is for public use such as information about the routes and the schedules of buses.
- B. Tier II is for registered members with tickets confirmations such as the contact number of the bus driver.
- C. Tier III is for internal employees, for example the customer service team must have access to users' data such as previous trips in order to handle customer complaints.
- D. Tier IV is an administrative and R&D level that helps in taking strategic decisions such as modifying pricing strategy and when to make marketing campaigns or offer discounts and other important business-related decisions.
- E. Tier V is for encrypted highly protected data such as sensitive credit card information.



Documentation for state chart diagrams:

A state chart diagram is normally used to model how the state of an object changes in its lifetime. State chart diagrams are good at describing how the behavior of an object changes across several use case executions.

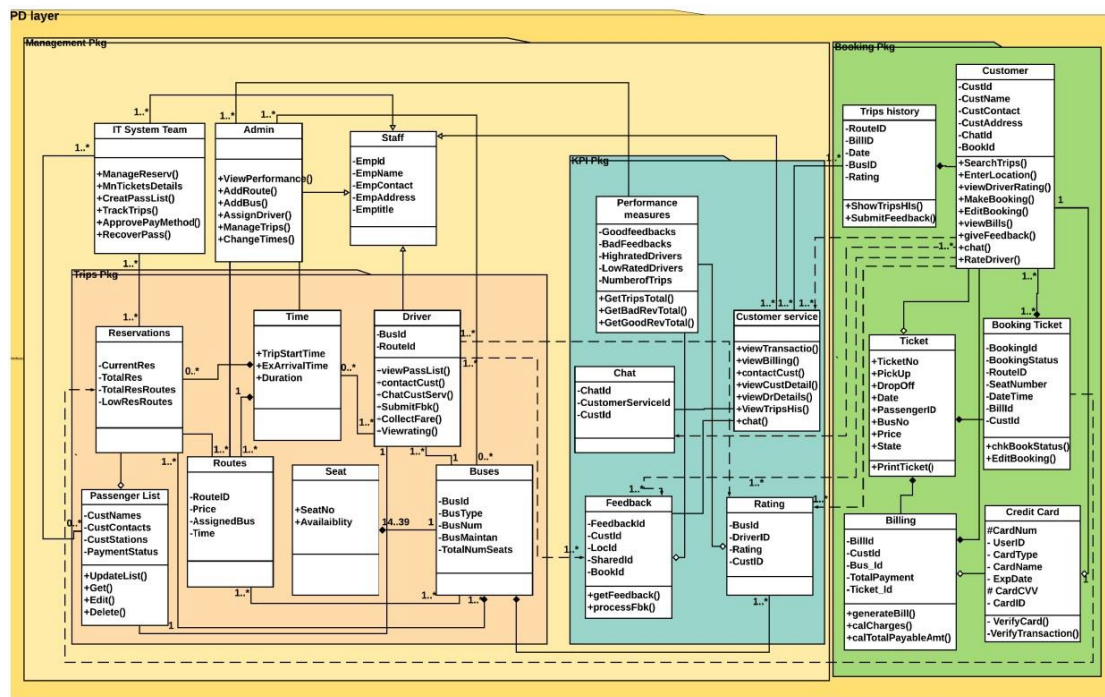
This state chart diagram shows the process of the system with the customer from the beginning this means from registration to logout.



Documentation for class diagrams:

Structural models in an object-oriented system show the static relations between the objects in the system. To represent the relations and the functions limitations for each object, a package class diagram is developed. In UML, a class is a rectangle divided into three sections. On the top section there is the class name then comes the attributes of the class and in the last section comes the methods or behavior and that determines the duties or limitations for each object. Class diagrams are powerful tools that show the constraints and relationships between classes from a static perspective. A package class diagram is a higher-level version of class diagrams as it uses a grouping technique to simplify the system into components or sub-systems. A package diagram is more considered in the design phase

rather than the analysis phase. However, it's useful in the analysis phase in showing the dependency relationships between objects that when an object status changes, it could affect the status of another object which might be in another package. The package class diagram in Fig. 3 shows the main package diagram (PD) layer and four packages (Management Pkg – Key Performance Indication Pkg – Trips Pkg – Customer Pkg). The rating and feedback classes are stimulated by the customers and drivers and make changes to the KPI Pkg and the Trips Pkg. The Trips Pkg also changes when any booking take place in the customer Pkg.



CONCLUSION

This paper developed a model to represent an online public bus reservation system in Ethiopia. The model was developed using an object-oriented approach and the industry standard Unified Modelling Language. The system was illustrated from different profiles. First, the basic functions of the system were analysed, a use case diagram and an activity diagram were developed. After that, static multilayer class diagram was presented to describe the relations between the objects within the system. Future development of the system design is to develop dynamic models to describe the system from a behavioral point of view by using interaction diagrams.