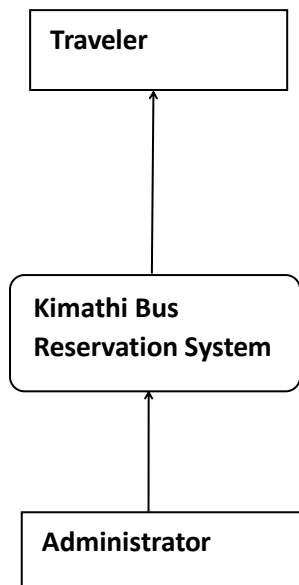


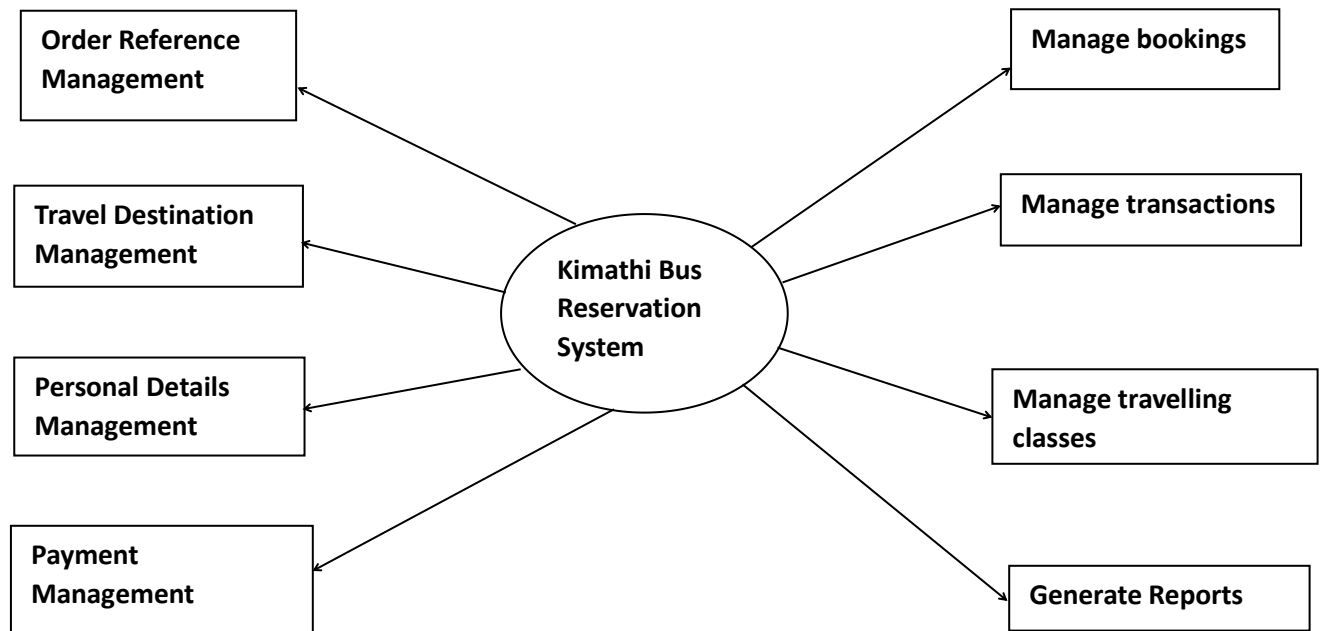
## **SOFTWARE DESIGN SPECIFICATION**

### **System Overview**

The Kimathi Bus Reservation System is a modern solution that saves the traveler the hustle of going up-to the stage to find a seat for a bus to their destinations. It allows travelers to book a seat by submitting all the required necessary details including personal info, bank details e.t.c. the system aims to enhance traveler satisfaction and deliver a convenient and efficient service experience.

**The following diagram describes an overview of Kimathi Bus Reservation System**





### **System Architecture**

Kimathi Bus Reservation System will be designed with a layered architecture to ensure modularity, scalability and maintainability. The architecture will incorporate various components that interact with each other to provide a seamless self-service experience for travelers. The following components are essential to the system architecture:

#### **I. Presentation Layer:**

The presentation layer is responsible for the user interface through which travelers interact with the system. it includes a mobile application that provides intuitive and user-friendly interfaces for travelers to book for seats and make payments.

#### **ii. Application Layer:**

This layer contains the logic and functional components of the system. It handles the processing and coordination of various tasks, such as filling personal details, destination interested in, process payments. This layer ensures the smooth execution of self-service operations and manages flow of data between the presentation layer and the underlying layers.

#### **iii. Data Layer:**

Comprises the database and data resources required for the system's operation. It stores and manages information, reservation details, payments and other relevant data. Data layer ensures data integrity, security and availability for the system's functionalities.

#### **Iv. Hardware Components:**

Hardware components of the architecture encompass the physical devices that support the system's operation. Servers and network infrastructure are also part of the hardware components, providing the necessary computing and networking resources for system operation.

#### **V. Network Infrastructure:**

The network infrastructure facilitates communication and data exchange between the different components of the system. It enables seamless connectivity between the mobile devices and servers. Ensures reliable and secure data transmission, facilitating real-time updates and ensuring the system responsiveness.

### **Software Design**

Kimathi Bus Reservation System is a software solution that allows travelers to book for seats for a given fleet of buses to their preferred destinations.

The proposed system is based on a three-tier client-server architecture design that has a web application module. A user interface is used by the web module to start a new application and for updates. The module is connected to a database, where requests from the clients or the server or any data retrieved. In addition user data can be written to the database. Any interaction between the mobile interface and the database shall be done through a web service. When the client machine sends the data request to the server machine, the request is first received by a middleware then is obtained to the server.

The response is first received by the middle layer which then sends it to the requester, the client machine. All data logic and business logic are stored on the middleware. The use of middleware improves the flexibility of this architecture.

### **Logical Design**

This describes the required functionalities of a system. Mostly concerned with hardware and software requirements and the process to be performed.

## Use Case Diagram

This is a diagram that shows the relationship between a set of use cases and the actors involved.

**Admin**

- **Actors**

These are the roles that the users of the system play with respect to the system itself.

Actors include: customers (travelers), administrator.

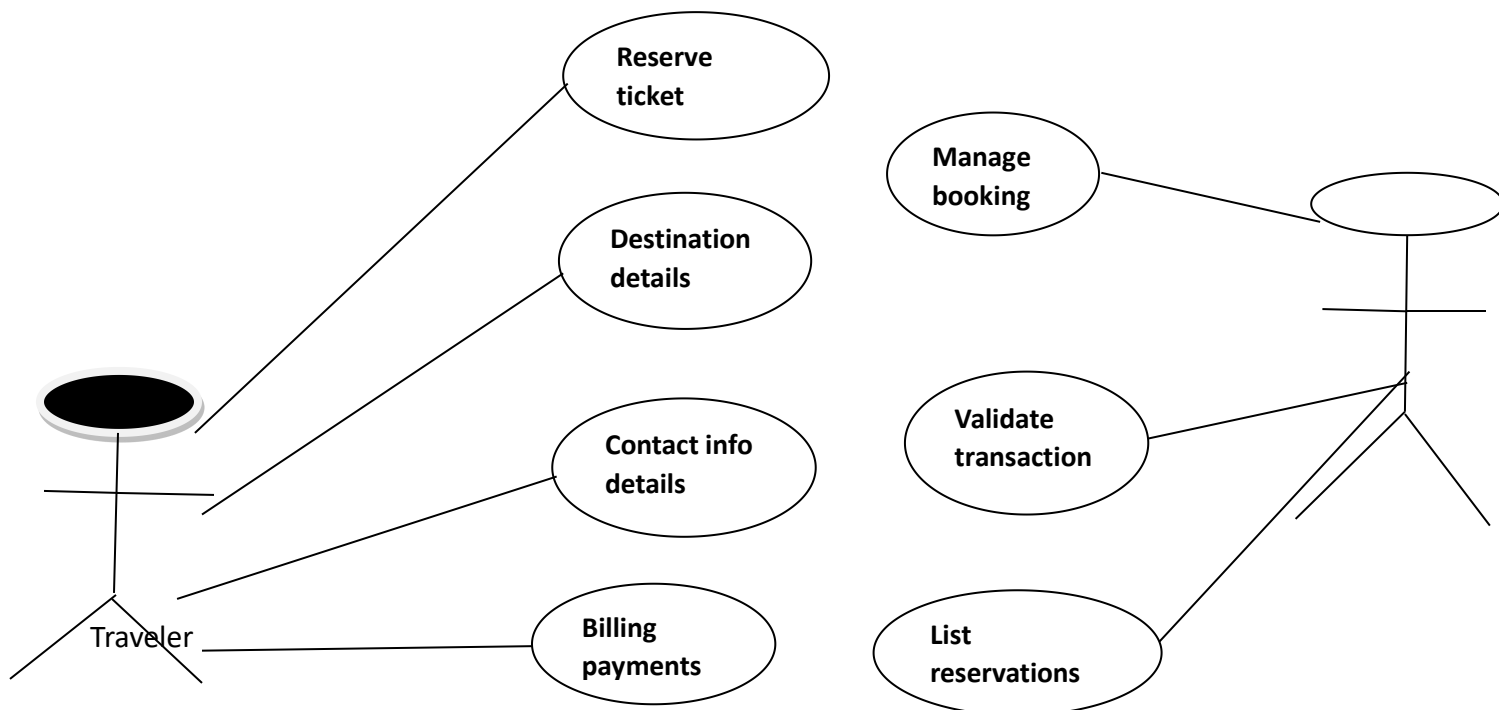
- **Travelers**

They are the main users of the system as they book for their preferred destinations via the website.

- **Administrator**

This a user who is authenticated to have full access to the database and the system at large. He/she oversees management of made bookings, validate transactions and control billings.

### Use case diagram of the System



## **RESERVATION MODULE**

### **Pseudo Code**

Start

    Generate order reference

    Prompt for destination

    Prompt for travelling class

    Prompt for No of seats, date of travel

Validate submitted details

If validation successful

Confirm Reservation

Prompt for Name

Prompt for Contact

Prompt for Gender

If validation is successful

Proceed to next process

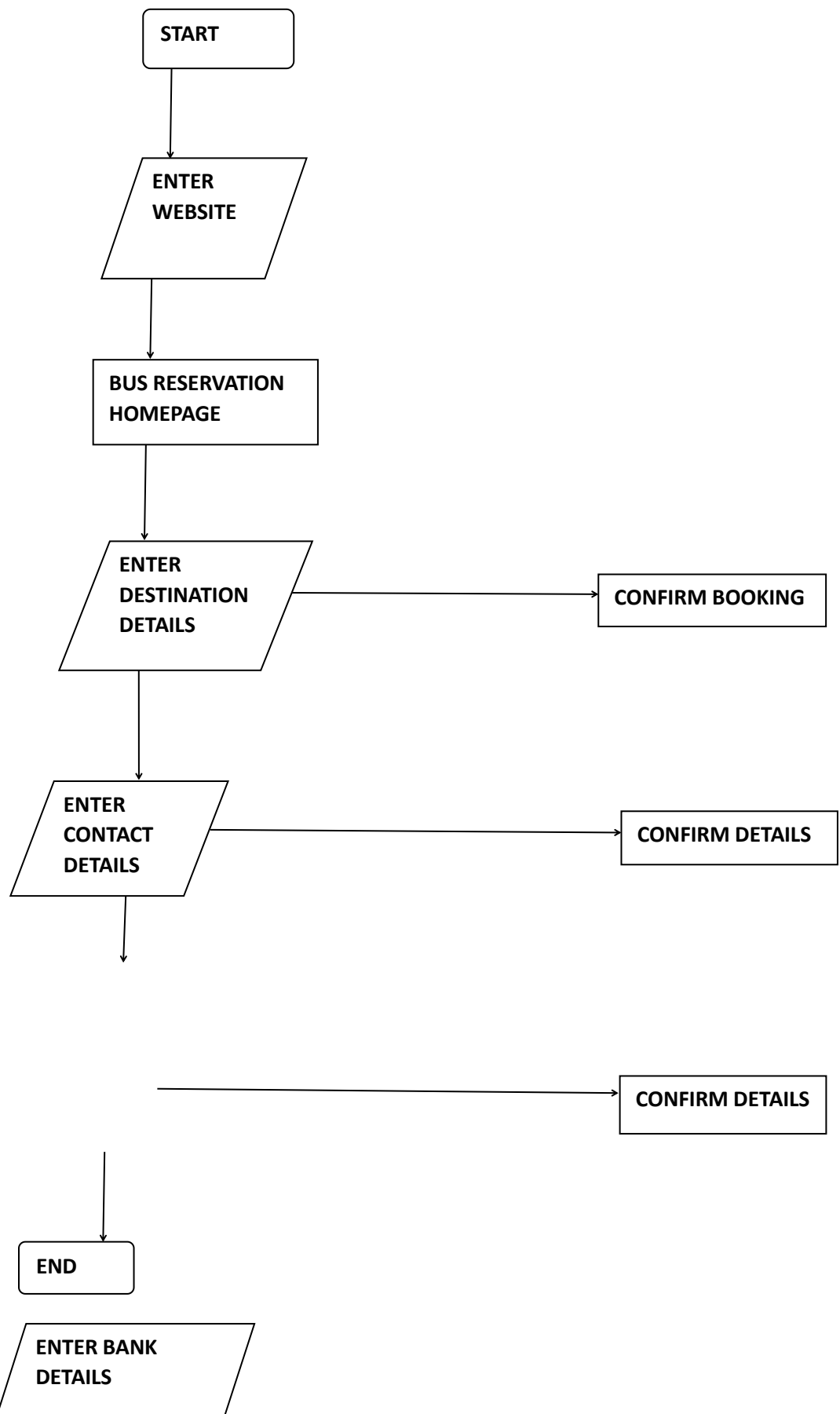
Prompt for Payment

Prompt for Transaction ID

Confirm Payments

End

## Data Flow Diagram



UN NORMALIZED FORM	1 <sup>st</sup> NORMAL FORM	2 <sup>nd</sup> NORMAL FORM	3 <sup>rd</sup> NORMAL FORM
First name	first name	First name	Order ref
last name	Last name	Last name	Last name
Ticket ref	Ticket ref	Ticket ref	transaction

## File and Database Design

The file and database design is useful for the development of the project

## Database Description

### ADMIN TABLE

<u>SERIAL NO</u>	<u>FIELDS</u>	<u>DATA TYPE</u>	<u>DESCRIPTION</u>
1	Name	Varchar	
2	ID	Int	PK
3	Contact	Int	
4	email	Varchar	
5	username	Varchar	
6	password	Int	

**AVAILABLE CLASS TABLE**

<b><u>SERIAL NO</u></b>	<b><u>FIELDS</u></b>	<b><u>DATA TYPE</u></b>	<b><u>DESCRIPTION</u></b>
<b>1</b>	<b>Class ID</b>	Int	FK
<b>2</b>	<b>Class Name</b>	Varchar	
<b>3</b>	<b>Class Capacity</b>	Int	
<b>4</b>	<b>Class Price</b>	Int	
<b>5</b>	<b>Description</b>	varchar	

**BOOKING DETAILS**

<b>SERIAL NO.</b>	<b>FIELDS</b>	<b>DATA TYPE</b>	<b>DESCRIPTION</b>
<b>1</b>	Order reference	Varchar	<b>PK</b>
<b>2</b>	Name	Varchar	
<b>3</b>	Contact	Int	
<b>4</b>	Gender	Varchar	
<b>5</b>	Class_reserved	Varchar	
<b>6</b>	Destination	varchar	
<b>7</b>	Seat reserved	Int	
<b>8</b>	Date	date	
<b>9</b>	Transaction ID	Int	<b>FK</b>
<b>10</b>	Account	Varchar	
<b>11</b>	Amount	int	



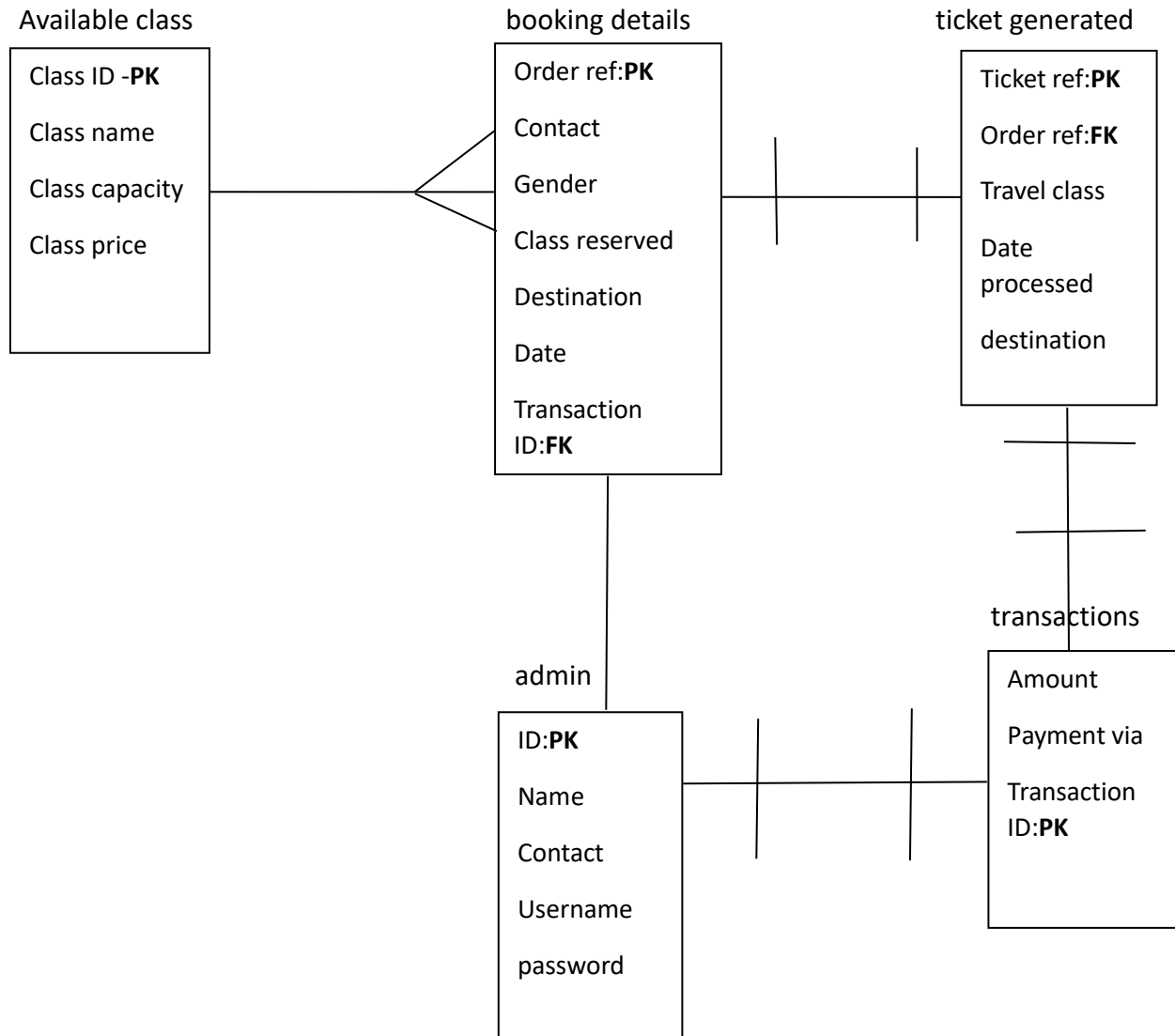
### TICKETS GENERATED TABLE

<u>SERIAL NO</u>	<u>FIELDS</u>	<u>DATA TYPE</u>	<u>DESCRIPTION</u>
1	Ticket reference	Varchar	
2	Order reference	Varchar	FK
3	Travel class	Varchar	
4	Date processed	Date	
5	destination	varchar	

### TRANSACTIONS TABLE

<u>SERIAL NO</u>	<u>FIELDS</u>	<u>DATA TYPE</u>	<u>DESCRIPTION</u>
1	Amount	Int	
2	Payment via	Varchar	
3	Transaction ID	Int	PK
4	Used	varchar	

## ENTITY RELATIONSHIP DIAGRAM



## System Integrity controls

For a bus reservation system that handles sensitive information , the following should be incorporated to ensure data security, privacy and compliance:

- Internal security: implement robust access controls to restrict access to critical data items based on the principle of least privilege.
- Application audit trails: implement application trails to dynamically record and monitor retrieval access to designated critical data.
- Standard tables: establish standard tables for validating and verifying data fields within the system. This ensures data integrity and consistency by enforcing predefined rules and constraints on data input and updates.
- Verification Processes: define verification processes for any additions, deletions or updates made to critical data. This includes implementing appropriate approval workflows, data validation checks, and change management controls to ensure accuracy and integrity of sensitive information.