



# **RAILWAY RESERVATION SYSTEM**

**A Report for the Evaluation 3 of Project 2**

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**Under the Supervision of  
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Professor**

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## **ABSTRACT**

This report is conducted in order to set the foundations upon which the final project. The title of the project is: “**Railway Reservation System**” and is supervised by **Dr. Jaya Kumar V.**

The following report contains information related to the development of Railway Reservation site. The main aim of the project is to develop a web based application that is going to make it possible for the customer to keep in touch with each other and that will substitute the manual system of the alumni office with an automated one. First of all, the tasks that need to be completed are stated. There is a separate modules where each task that was identified as necessary in order to successfully develop the Railway Reservation sites presented and described in detail. After each phase of the software development life cycle will be explained, the created system will be evaluated together with the software development process that was applied in order to implement the web site.

# **1. INTRODUCTION**

## **1.1 HISTORY**

A plan for a rail system in India was first put forward in 1832, but no further steps were taken for more than a decade. In 1844, the Governor-General of India Lord Hardinge allowed private entrepreneurs to set up a railway system in India. Two new railway companies were created and the East India Company was asked to assist them. Interest from a lot of investors in the UK led to the rapid creation of rail system over the next few years.

Railways was first introduced to India in 1853. By 1947, the year of India's independence, there were forty two rail systems. In 1951 the systems were nationalised as one unit, becoming one of the largest networks in the world. IR operates both long distance and suburban rail systems on a multi-gauge network of broad, metre and narrow gauges. It also owns locomotive and coach production facilities.

The first train in India become operational on 1851-12-22, and was used for the hauling of construction material in Roorkee. A few years later, on 1853-04-16, the first passenger train Bori Bunder, Bombay and Thana covering a distance of 34 km (21 miles) was inaugurated formally heralding the birth of railways in India.

## **1.2 INTRODUCTION TO THE RESERVATION SYSTEM**

The Indian Railways (IR) carries about 5.5 lakh passengers in reserved accommodation every day. The computerised Passenger Reservation System (PRS) facilities booking and cancelling of tickets from any of the 4000 terminals (i.e. PRS booking windows) all over the country. These tickets can be booked or cancelled for journeys commencing in any part of India and ending in any other part, with travel times as long as 72 hours and distance upto several thousand kilometres.

The pilot project of PRS was launched on 15 November 1985, over Northern Railway with the installation of the integrated Multiple Train Passenger Reservation System (IMPRESS), an online transaction processing system developed by the Indian Railways in association with the Computer Maintenance Corporation (CMC) Ltd, at New Delhi. The objective was to provide reserved accommodation on any train from any counter, preparation of train charts and accounting of the money collected. The applications was subsequently implemented in 1987, at Mumbai, Chennai, Kolkata and

Secunderabad with the additions of new locations and many redefinitions, the IMPRESS system fell short of growing expectations of the travelling public.

## **1.2.1 RAILWAY RESERVATION METHODS:**

- ✓ Online Booking
- ✓ Counter Booking

### **Online Booking:**

This facility is given to the general public by Railway department with the help of this facility people can book their tickets through internet, sitting in their home by a single click of mouse. Using their credit card or debit card people can easily get their tickets done within minutes. There are certain charges for online booking as well.

### **Counter Booking:**

This is the oldest method of booking the ticket. The Reservation counters are there at Railway departments from where people can get the tickets to their respective destinations. Now a days there re various ticket counters, apart from the railway station counters where tickets are available.

## **1.3 OUR PROJECT:**

This project introduces railway reservation system. It explains how reservation is being done in Indian Railways. The step by step procedure is explained. This project is developed in C++ language. Almost all the Header files have been used in this project. Proper comments have been given at desired locations to make the project user friendly. Various functions and structures are used to make a complete use of the language. This project is well versed with the programming. Railway reservation can easily accompanied with the help of this.

The basic functions being performed by our systems are:

- 1. RESERVATION MANAGEMENT**
- 2. FARE MANAGEMENT**
- 3. TIME TABLE MANAGEMENT**

These functions will be handled with the help of the following sub functions:-

- It reserves and cancels seats for the passenger.
- It contains information about the trains.
- It contains information about the passenger.
- It contains the details of reservation fee, any concessions etc.
- It makes entries for reservation, waiting, cancelled tickets.
- It will update for uptime and downtime trains.

## **1.4 EXISTING SYSTEM**

Under existing system passengers were only provided with list of trains between two stations and train number is only the available information by they can take action. Under existing system passengers were not able to get the information on their arrival and departure and route by which particular train will travel. Passengers were only able to select the seat number and not provided which seat type they want to select and this sometimes not creates a familiar environment during their journey. During making payment final validation and authorization was one by the system to identify the particular passenger to make deduction for their fare charges to make final reservation.

### **1.4 .1.LIMITATIONS OF EXISTING SYSTEM:**

#### **1. Data redundancy:**

It means that same data fields appear in many different files and often in different formats. In Manual system, it poses quite a big problem because the data has to be maintained in large volumes but in our system , this problem can be overcome by providing the condition that if the data entered is duplicate, it will not be entered, otherwise, updating will take place.

#### **2. Difficulty in accessing the data:**

In manual systems, searching the information is time consuming but in our system, user can access the information efficiently in a minimum time.

#### **3. Unsatisfactory security measures:**



In manual systems, no security measures were provided but in this system, password security has been provided. The person can access the system by providing the correct password otherwise he is denied the access.

## **2. PROPOSED SYSTEM**

Under this new Railway Reservation System, each passengers will go through the two steps identification and authentication process. The first checkup will be done at the login time and the second checkup will be done during making the final confirmation of their payments. During making payments, passengers have to enter their email id and contact number and these information will be matched from the passenger file, if they matched they were provided to get reservation details and equivalent amount will be deducted from their account. Only admin will read, write and modify privileges will be able to access the file information directly and change as and when required.

### **2.1 ADVANTAGES OF PROPOSED SYSTEM**

- The proposed system is comparatively faster than the existing system.
- As the proposed system is comparatively faster than the existing system, there will be less rush and shorter queues at the reservation counters or centers.
- In the proposed system, we are also making database for all the trains running across the country.
- As required, we can edit the database of the trains and also add the new trains which will be proposed in the future budgets.

#### **2.1.2 SIGNIFICANCE OF PROJECT:**

The significance of the project is to provide the following benefits:

- The significance of project is to automate the Reservation
- The online facility of the software will make it more efficient
- Passenger can be email directly.
- The software will be implemented in Railway Management System.

## **2.2 OBJECTIVE OF PROJECT**

The objectives of the system are

- Increased accuracy and reliability.
- Fast Process,
- Increased operational efficiency.
- To reduce paperwork.
- Reduced operational time.
- Data security.

This software package can be readily used by non-programming personal avoiding human handled chance of error. This project will be used by three types of users

1. Railway Administrator
2. Authorized Railway Reservation counters
3. Passengers

Administrator can access and modify the information stored in the database of this system. This includes adding and updating of train, station, train routes and also managing the user and the passenger details etc.

Reservation counters can work on the system forms only but cannot modify the information which is only accessed by Administrator.

Passengers can register by providing personal details, make fresh reservation and book one or more (limited to 3 seats per ticket) seats, view past booking and can ever do cancellation of booked ticket, can check seat availability in trains and get the fare details.

Department director can maintain daily updates in details and print reports (ex. Passenger Current Status) according to need. Administrator is must be an authorized user.

Application can be upgraded according to user's and administrator's requirements with little changes.

New features can be added as per requirements.

## **2.3 After implementation of project:**

- Easy to use GUI.
- The software will be accessed online by Administrator for authorized data, by reservation counters for reservation and by passenger for search for trains from a particular source to destination
- Time saving and Facilities of the software will be access online.

- New features as per requirement.

### **3. SCOPE:**

This project has a large scope as it has the following features which help in making it easy to use, understand and modify it:

- Automation of Reservation Status
- No Need to do Paper Work.
- To save the environment by using paper free work.
- To increase the accuracy and efficiency of the software.
- Management of Online Database.
- Management of Online Payment.

This software package can be readily used by non-programming personal avoiding human handled chance of error. This project is used by types of users

- Railway Administrator.
- Authorized railway reservation counters.

#### **3.1 Main Points are:**

- Simplified Management of Passengers
- Can be used online.
- Online Payment System.
- Human friendly interface.

### **4. TOOLS AND REQUIREMENTS:**

#### **4.1 SOFTWARE SPECIFICATION**

##### **4.1.1 Definition of Software:**

Software is a collection of programs, which is designed to perform a well-defined function. A program is a sequence of instructions written to solve a particular problem.

There are two types of software –

- System Software
- Application Software

### **System Software:**

The system Software is the main software that runs the computer. When you turn on the computer, it activates the hardware and controls and coordinates their functioning. The applications programs are also controlled by the system Software. An Operating System is an example of system software.

### **Application Software:**

Application software is a set of programs designed to perform a specific task. It does not control the working of a computer as it is designed for End-Users. A computer can run without application software. Application software can be easily installed or uninstalled as per the user requirements. It can be a single program or a collection of small programs.

- ❖ Computer Hardware and Software require each other and neither can be realistically used without each other.

## **4.1.2 Software Requirements:**

Following are the software required for our system.

- Operating System : Windows 10
- Client Script : HTML, C++ and JavaScript
- Component Model : Visual Studio 2010
- Data Base : SQL Server 2008
- Web Server : Asp.net

### **4.1.2 Technical Skills:**

- Front end Technology : Asp.net 4 with VS2010
- Programming Language : C++
- Back end Technology : SQL server 2008

## **4.2 HARDWARE SPECIFICATION**

### **4.2.1 Definition of Hardware:**

Hardware is the physical part of the computer system or electronic device.

Hardware is the only part of the computer system which a user can touch and feel. Hardware can be often categorized into input, output and storage or processing components. Devices which are not an integral part of the CPU are known as peripherals. These are used for input, storage or output. Hardware devices examples are monitor, keyboard, CPU and mouse and it includes all the parts inside the computer such as Hard Disk Drive, motherboard, video cards and many others. Basically, Hardware is the physical objects.

### **4.2.2 Hardware Requirements:**

The following are the Hardware tools required for our projects

- Processor : Intel Pentium 4 or above
- Ram : 512 MB
- Hard Disk : 80 GB

## **5. MODULES:**

We analyzed and conclude that project can be implemented using 3 major modules-

1. Ticket Reservation
2. Ticket cancellation
3. Status checking

They can be represented in **DFD** as:-

## **6. DATA FLOW DIAGRAMS**

### **6.1 Definition of DFD:**

The data flow diagram is a graphical representation that depicts information flow and the transforms that are applied as data moves from input to output. The DFD may be used to represent a system or software at any level of abstraction. In fact DFD may be partitioned into levels that represent increasing information flow and functional detail.

### **6.2 TYPES OF DFD:**

Data flow diagrams (DFD) are divided into three parts-

1. 0 level DFD or Context Free Diagram
2. 1 level DFD
3. 2 level DFD

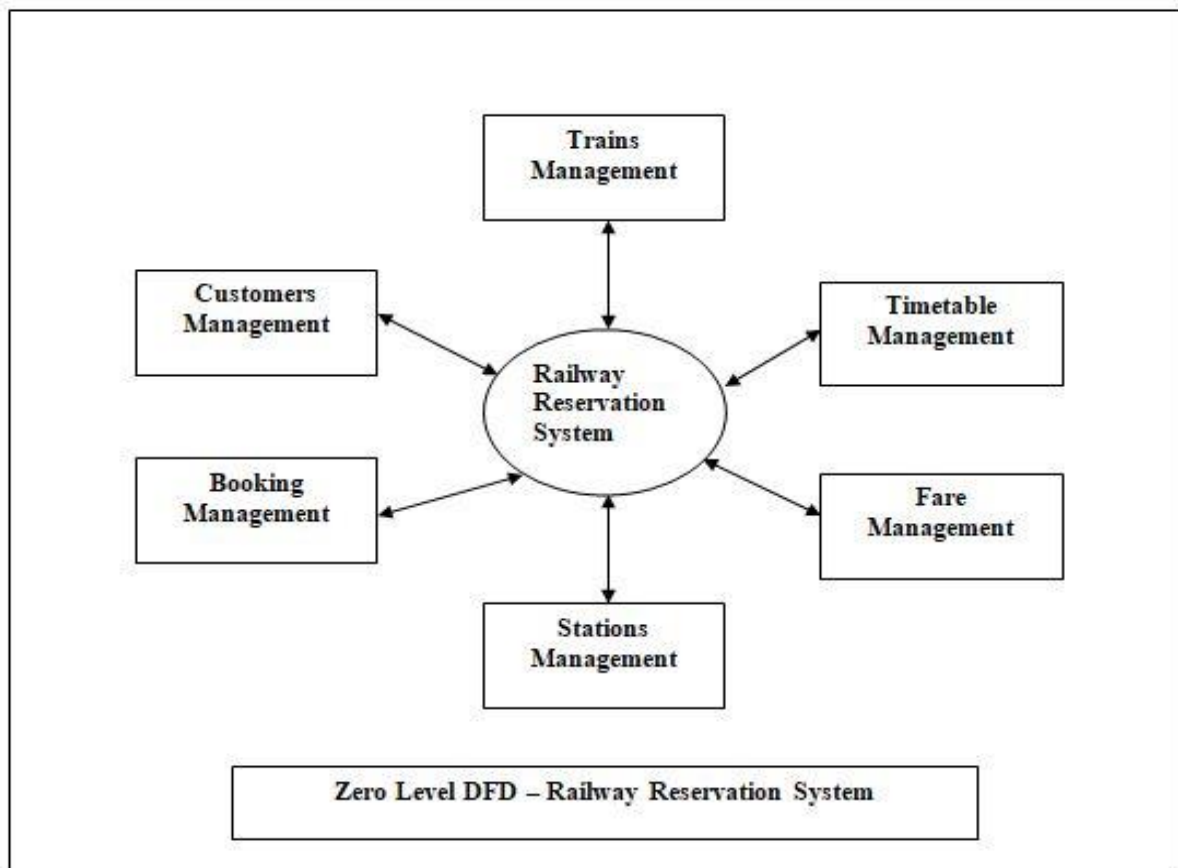
#### **6.2.1 Zero Level Data Flow Diagram (0 Level DFD) of Railway Reservation System:**

This is the Zero Level DFD of Railway Ticket Reservation System where we have elaborated the high level process of Railway. It's a basic overview of the whole Railway Ticket Reservation System or process being analyzed or modeled . its designed to be an at-a-glance view of Booking Customers and login showing the system as a single high level process, with its relationship to external entities of Trains, Timetable and Fare. It should be easily understood by a wide audience, including Trains, Fare and Booking in zero level DFD of Railway Reservation System. We have described the high level flow of Railway System.

High Level Entities and process flow of Railway Reservation System:

- Managing all the Trains
- Managing all the Timetable

- Managing all the Fare
- Managing all the Stations
- Managing all the Booking
- Managing all the Customers
- Managing all the login



## **6.2.2 First Level Data Flow Diagram (1<sup>st</sup> Level DFD) of Railway Reservation System:**

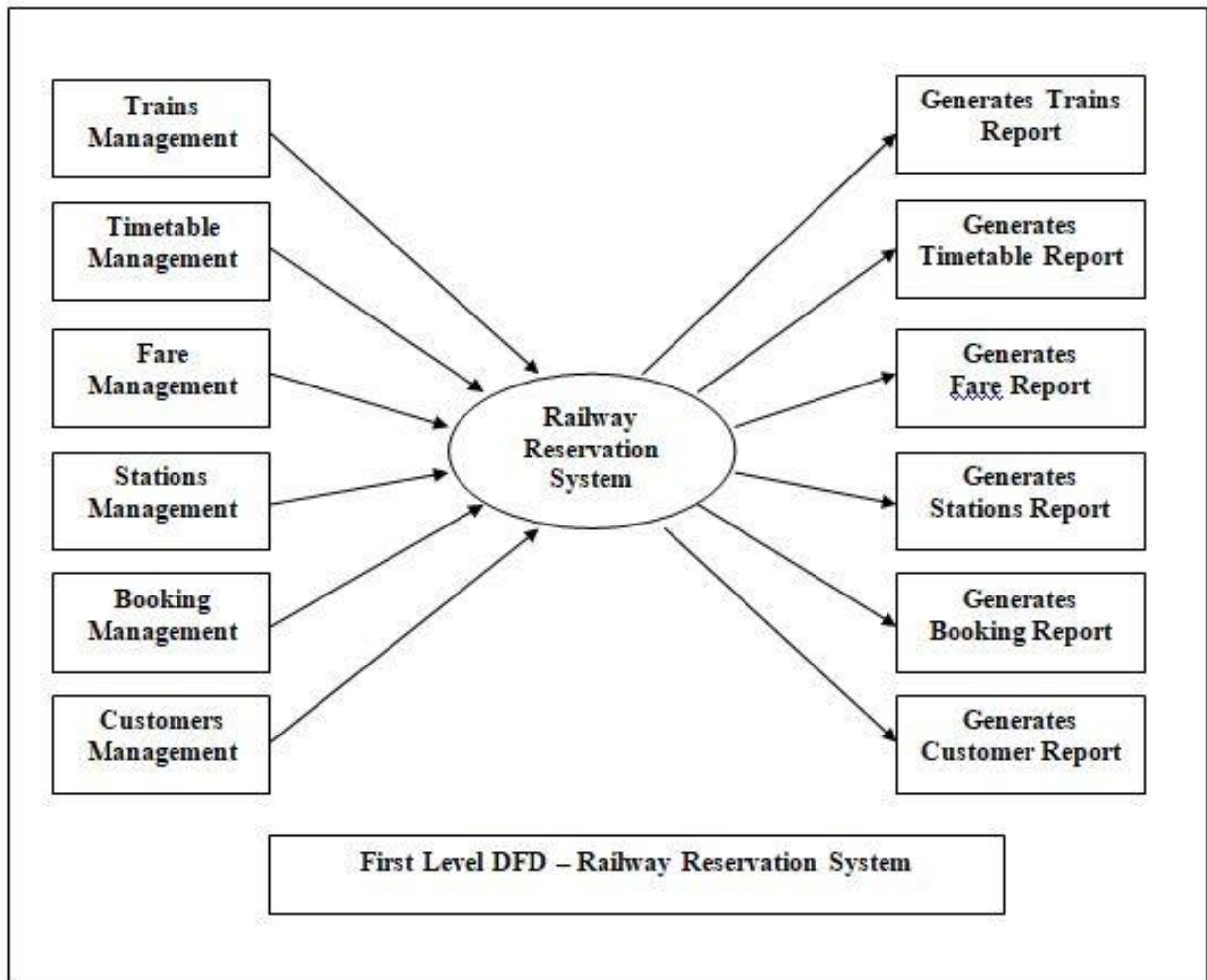
First Level DFD (1<sup>st</sup> Level) of Railway Reservation shows how the system is divided into sub-systems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all the functionality of the Railway Reservation System as a whole.

It also identifies internal data stores of Login, Customers, Booking, Stations, Fare that must be present in order for the Railway System to do its job, and shows the flow of data between the various parts of Trains, Fare, Customers, Login, Booking of the system. DFD Level 1 provides a more detailed breakout pieces of the 0 level DFD. You will highlight the main functionality of Railway.

Main Entities and output of First Level DFD (1<sup>st</sup> Level DFD):

- Processing Trains records and generate report of all Trains
- Processing Timetable records and generate report of all Timetable
- Processing Fare records and generate report of all Fare
- Processing Stations records and generate report of all Stations
- Processing Booking records and generate report of all Booking
- Processing Login records and generate report of all Login



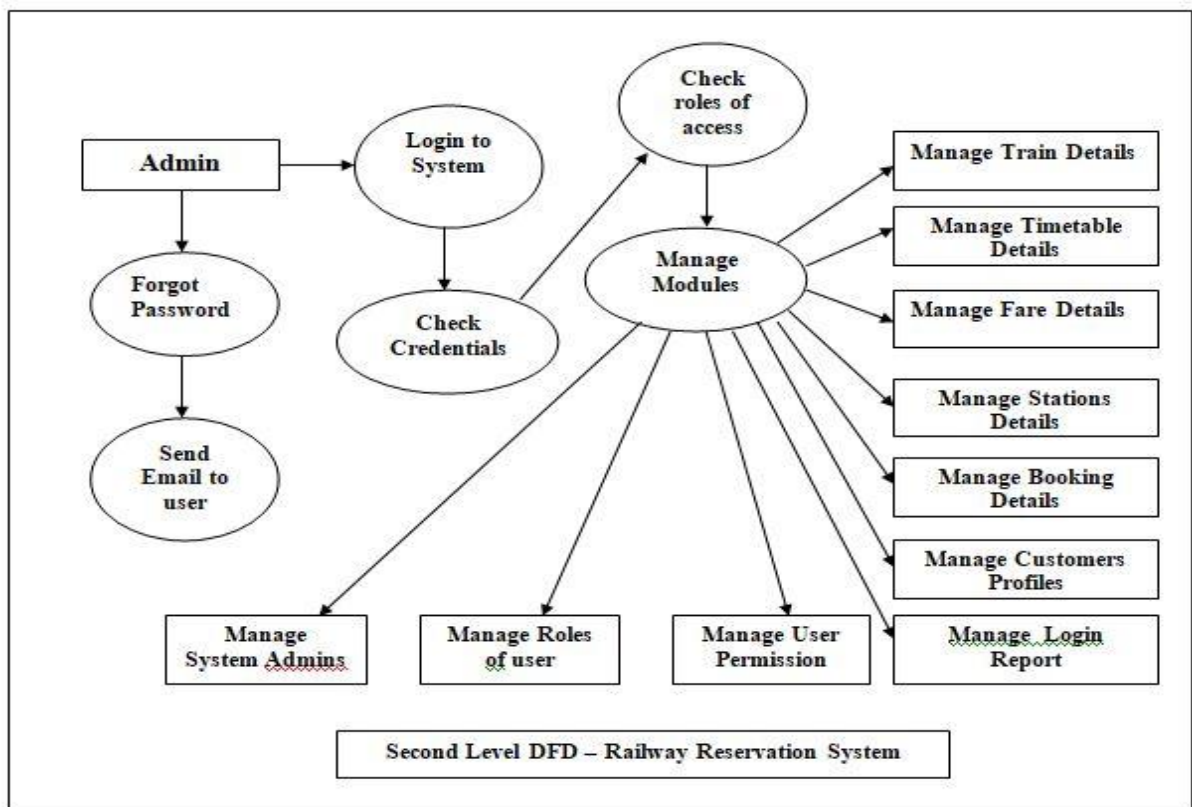


### 6.2.3 Second Level Data Flow Diagram (2<sup>nd</sup> Level DFD) of Railway Reservation System:

DFD Level 2 goes one step deeper into parts of level 1 of Railway. It may require more functionalities of Railway to reach the necessary level of detail about the Railway functioning. First Level DFD (1<sup>st</sup> Level) of Railway Reservation System shows how the system is divided into sub-systems (processes). The 2<sup>nd</sup> Level DFD contains more details of Login, Customers, Booking, Stations, Fare, Timetable, Trains.

## Low Level functionalities of Railway Reservation System

- Admin logs in to the system and manage all the functionalities of Railway Reservation System.
- Admin can add, edit, delete and view the records of Trains, Fare, Booking, and Login.
- Admin can manage all the details of Timetable, Stations, Customers
- Admin can also generates reports of Trains, Timetable, Fare, Stations, Booking, Customers
- Admin can search the details of Timetable, Booking, Customers
- Admin can apply different level of filters on report of Trains, Stations, Booking
- Admin can tracks the detailed information of Timetable, Fare, Stations, Booking



## 7. Flow Chart

A flow chart is a graphic representation of how a process works, showing at a minimum, the sequence of steps. The program flow chart shows how the system proceeds from the input form to the output form of the system. It explains how the system is actually processed step by step. It represents the flow of control as the system is processed.

There are three types of program flow chart:

1. Input flow chart
2. Output flow chart
3. Report flow chart

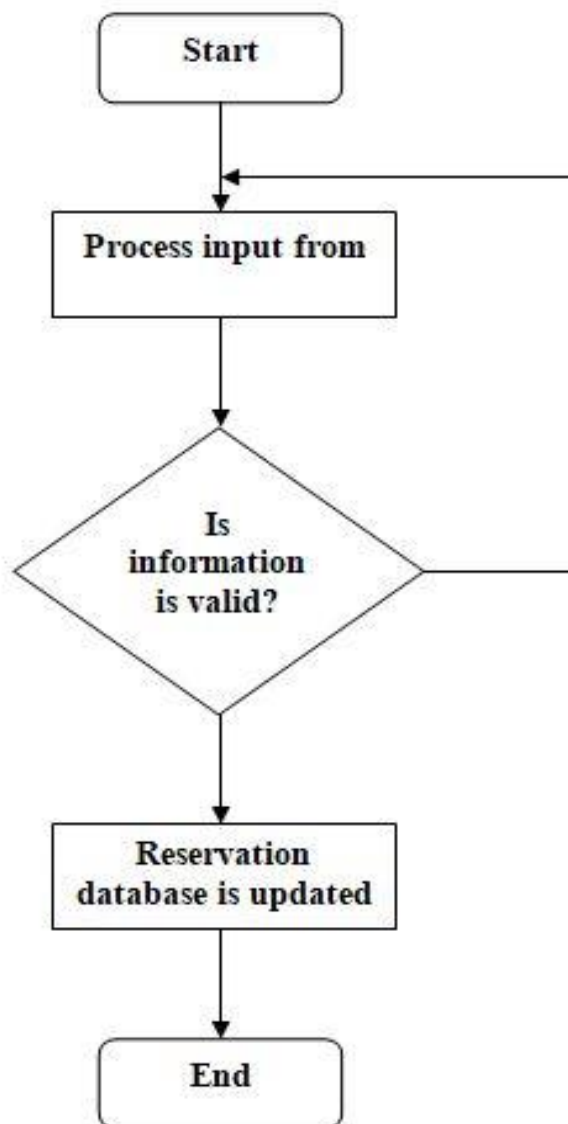
**7.1 Input flow chart:** This flow chart depicts the basic input operations in the system. In Railway Reservation System, first of all the password is checked then if the password is valid then we process the input form if the data is valid then the entries are updated in the database otherwise the form is refilled.

**7.2 Outflow flow chart:** This flow chart depicts the basic output operations in the system. The user is required to enter the criteria for output. If it is for the reservation then the availability for the seats is checked. If the seats are available then the confirmed ticket is generated otherwise the user is asked for waiting and if he wants then the waiting ticket is generated. If the user wants the seat to be cancelled it is done and the cancelled ticket is generated for the user. The information about all the above transaction is then transferred to the related databases.

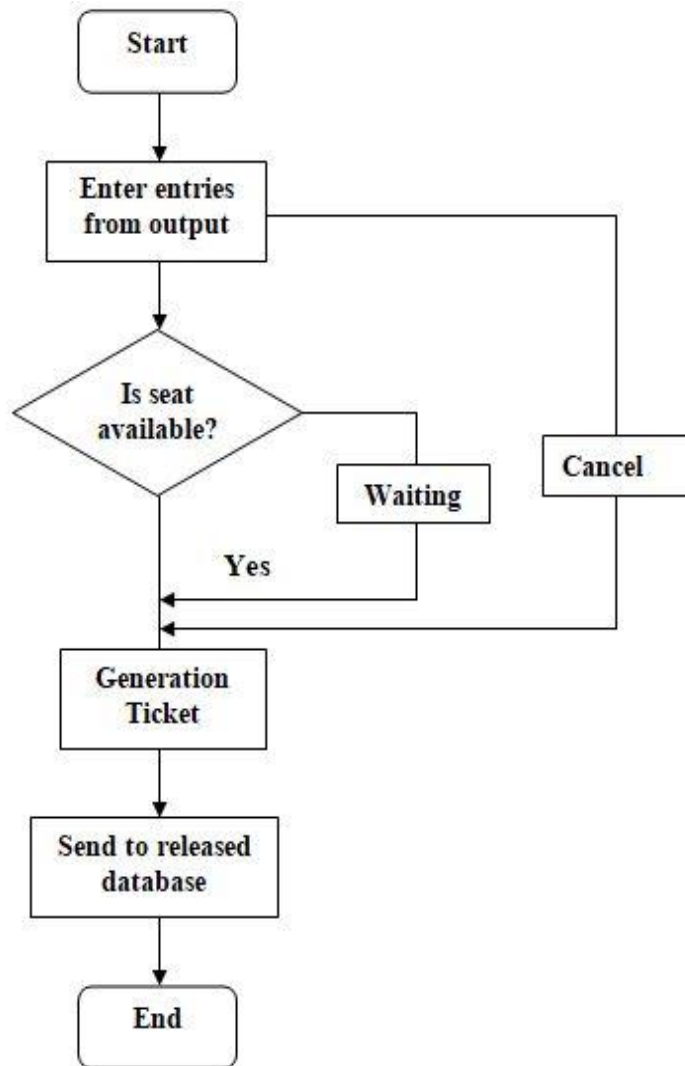
**7.3 Report flow chart:** This flow chart depicts the basic operations for the

generation of reports. If the entries from the processed database are valid the concerned reports are generated otherwise the process will have to be repeated.

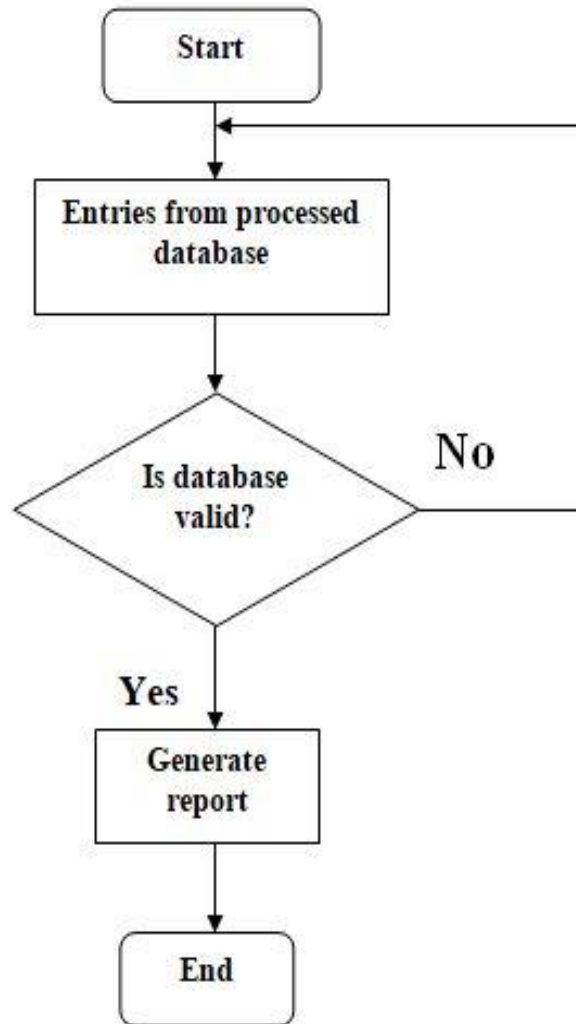
### **Input Flow Chart**



# Output Flow Chart



# Report Flow Chart



## 8. FEASIBILITY STUDY

A feasibility study is a way to evaluate the practicality and desirability of a project. The objective behind the feasibility study is to create the reasons for developing the software that is acceptable to the users, flexible to change and comfortable to established standards.

**8.1 Legal Feasibility:** It determines whether the proposed system conflicts with legal requirements, e.g. a data processing system must comply with the local Data Protection Acts.

**8.2 Operational Feasibility:** Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

The operational feasibility assessment focuses on the degree to which the proposed development projects fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture, and existing business processes.

**8.3 Economic Feasibility:** The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/benefits analysis.

**8.4 Technical Feasibility:** The technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system. `

## **9. TESTING**

### **9.1 Testing:**

Testing is the process of exercising software with the intent of finding errors and ultimately correcting them. The following testing techniques have been used to make this project free of errors.

#### **9.1.1 Content Review:**

The whole content of the project has been reviewed thoroughly to uncover typographical errors, grammatical error and ambiguous sentences.

#### **9.1.2 Navigation Errors:**

Different users were allowed to navigate through the project to uncover the navigation errors. The views of the user regarding the navigation flexibility and User friendliness were taken into account and implemented in the project.

### **9.2 Unit Testing:**

Focuses on individual software units, group of related units.

- Unit – smallest testable piece of software.
- A unit can be compiled/assembled/linked/loaded; and put under a test harness.
- Unit testing done to show that the unit does not satisfy the application and/or its implemented software does not match the intended designed structure.

### **9.3 Integration Testing:**

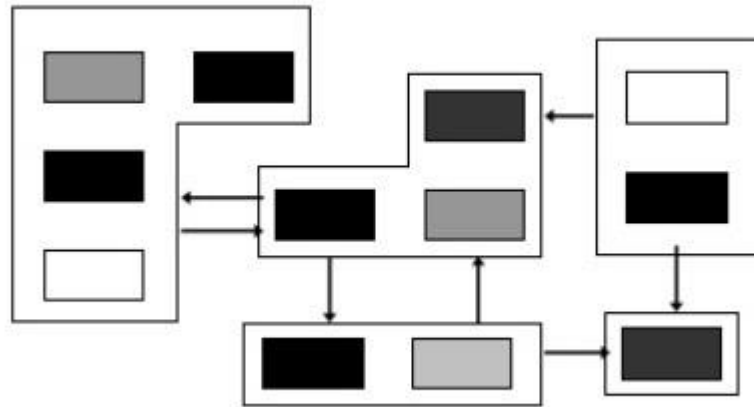
Focuses on combining units to evaluate the interaction among them.

- Integration is the process of aggregating components to create larger



components.

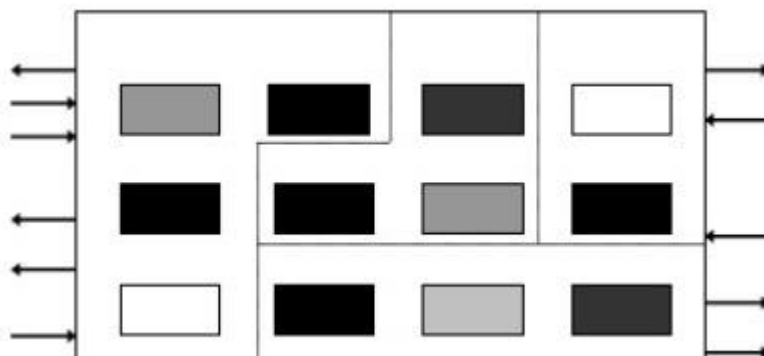
- Integration testing done to show that even though components were individually satisfactory, the combination is incorrect and inconsistent.



#### 9.4 System Testing:

Focuses on a complete integrated system to evaluate compliance with specified requirements ( test characteristics that are only present when entire system is run )

- A system is a big component.
- System testing is aimed at revealing bugs that can not be attributed to a component as such, to inconsistencies between components or planned interactions between components.
- Concern: issues behaviours that only can be exposed by testing the entire integrated system (e.g., performance, security, recovery)



Each form encapsulates (labels, texts, grid etc.). Hence in case of project in C++ form are the basic units. Each form is tested thoroughly in term of calculation, display etc.

### **9.5 Regression Testing:**

Each time in a new form is added to the project the whole project is tested thoroughly to rectify any side effects. That might have occurred to the addition of the new form. Thus regression testing has been performed.

### **9.6 White – Box Testing:**

White – box testing (also known as clear box testing, glass box testing, transparent box testing and structural testing) tests internal structures or workings of a program, as opposed to the functionality exposed to the end user. In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

White box testing can be applied at the unit, integration and system levels of the software testing process, it is usually done at the unit level. It can test paths within a unit, path between units during integration, and between subsystems during a system-level test. Through this method of test design can uncover many errors or problems, it might not detect unimplemented parts of the specification of missing requirements.

Techniques used in white-box testing include:

API testing (Application programming interface) – testing of the application using public and private APIs

Code coverage – creating tests to satisfy some criteria of code coverage (e.g., the test designer can create tests to cause all statements in the program to be executed at least once)

Fault injection methods – intentionally introducing faults to gauge the efficacy of testing strategies

Mutation testing methods

Static testing methods

Code coverage tools can evaluate the completeness of a test suite that was created with any method, including black-box testing. This allows the software team to examine parts of a system that are rarely tested and ensures that the most important function points have been tested. Code coverage as a software can be reported as a percentage for:

Function coverage, which reports on function executed

Statement coverage, which reports on the number of lined executed to complete the test

100% statement coverage ensures that all code paths, or branches (in terms of control flow) are executed at least once. This is helpful in ensuring correct functionality, but not sufficient since the same code may process different inputs correctly or incorrectly.

## **9.7 Black-box testing:**

Black-box testing treats the software as a “black-box”, examining functionality without any knowledge of internal implementation. The tester is only aware of what the software is supposed to do, not how it does it. Black-box testing

methods include: equivalence partitioning, boundary value analysis, all-pairs testing, state transition tables, decision table testing, fuzz testing, model-based testing, use case testing, exploratory testing and specification-based testing.

Specification-based testing aims to test the functionality of software according to the applicable requirements. This level of testing usually requires through test cases to be provided by the tester, who then can simply verify that for a given input, the output value (or behaviour), either “is” or “is not” the same as the expected value specified in the test case. Test case are built around specifications and requirements, i.e., what the application is supposed to do. It uses external descriptions of the software, including specifications, requirements, and designs to derive test cases. These tests can be functional or non-functional, through usually functional.

Specification-based testing may be necessary to assure correct functionality, but it is sufficient to guard against complex or high risk situations.

One advantage of the black-box technique is that no programming knowledge is required. Whatever biases the programmer may have had, the tester likely has a different set and may emphasize different areas of functionality. On the other hand, black-box testing has been said to be “like a walk in a dark without a flashlight”. Because they do not examine the source code, there are situations when a tester writes many test cases to check something that could have been tested by only one test case, or leaves some parts of the program untested.

This method of the test can be applied to all levels of the software testing: unit, integration, system and acceptance. It typically comprises most if not all testing at higher levels, but can also dominate unit testing as well.

## **9.8 Alpha Testing:**

Alpha testing is simulated or actual operational testing by potential users/customers or independent test team at the developers site. Alpha testing is often employed for off-the-shelf software as a form of internal acceptance testing, before the software goes to the beta testing.

### **9.8.1 Beta Testing:**

Beta testing comes after alpha testing and can be considered a form of external user acceptance testing. Versions of the software, known as beta versions, are released to the limited audience outside of the programming team. The software is released to the groups of people so that further testing can ensure the product has few faults or bugs. Sometimes, beta versions are made available to the open public to increase the feedback field to a maximal number of future users.

## **10. Conclusion:**

The application for project is used to storing the detail of the station and the customer can get the information from railways through this web page easily any time. So this project is very useful to both employee and customer.

During this project we are learning more about asp .net , web programming (HTML, Java script, CSS) , C++ programming language and we are getting technical knowledge. This project is done by us for academic purpose only.

From the beginning of this project we planned about usage of the system, gradually we implemented on that idea.

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