Bus Reservation System Using multithreading



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**DEDICATION**

**Dedicated to**

**“The Teacher of the Universe”**

(Peace be Upon Him)

With whose existence and by having the charity of His knowledge the cosmos got illuminated with the light of insight and wisdom and the journey of human enlightenment was made possible.

**ACKNOWLEDGEMENT**

Praise to Allah Almighty, Lord of the worlds, the Merciful and the Beneficent, who gave us strength, thoughts and co-operative people to enable us to accomplish this goal and fulfill the required functionalities.

This was all not possible without the guidance, continuous appreciation and moral support by our honorable Supervisor **Mr. Muhammad Wakeel Ahmad.** He was always there whenever we need his help and ideas. We are really thankful to him who made our concepts clearer. We are very thankful to himfor helping us.

At last, we would like to acknowledge all of the assistance and contributions of UNIVERSITY OF ENGINEERING AND TECHNOLOGY, TAXILA for supporting us with all that is needed starting from the books, and ending with the full care that it is providing us with, to help us to be professionals in the field of Information Technology.

**DECLARATION**

We hereby declare that we have made this project and accompanied report entirely on the basis of our personal efforts. Not any of the portion of the application work presented has been submitted of any application for any other qualification or degree of this or any other university or institute of learning.

Students Name & Signature

**Student 1 Student 2 Student 3**

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**CERTIFICATE OF APPROVAL**

It is to certify that the semester project of BS (CS) **“Bus Reservation System using multi threading”** was developed by **Zarar Azwar Khalid, Shiza Khurram and Gul e Nayab** under the supervision of “**Mr. Muhammad**

**Wakeel Ahmad**” and that in his opinion, it is in scope, fully adequacy and quality of the degree of Bachelor of Science in Computer Sciences.

**External Examiner**

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Mr. Muhammad Wakeel Ahmad Rao

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**ABSTRACT**

This project is meant to help us to develop skills at working with **Bus reservation**

**System** **using multi threading** and writing entire programs from scratch. In this project we will only be provided with a project description and list of program requirements. It means we will need to learn to design and implement an entire program on our own. It would be beneficial for us.

By making this project we can be able to make our good understanding with the Desktop application development and different functions of Java.

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**CHAPTER # 1**

**INTRODUCTION**

# 1. INTRODUCTION

## 1.1 Introduction to JAVA:

Java is a popular programming language, created in 1995.It is owned by Oracle, and more than **3 billion** devices run Java.

It is used for:

* Mobile applications (especially Android apps)
* Desktop applications
* Web applications
* Web servers and application servers
* Games
* Database connection
* And much, much more!

## 1.2 Introduction

This project ‘Bus reservation system’ is simple desktop application for bus ticket reservations.

Our aim is to develop such a project using java language that enables the bus company to maintain their records and also helps the users to register their seats easily.

To display customized text with colors and fonts according to application requirements, functions have been created in the application, which fetch the exact video memory addresses of a target location, to write text at a location.

## 1.3 Statement of the problem

Now everything has gone digital. Everyone is trying to use easy methods to get any kind of services. And bus company also needs to maintain their records and provide the easy services to their customers to get easy bookings of their seats.

For this problem we are thinking to develop an application which help both companies and customers to get services in convenient way. Like company can easily enter their buses and check the record of every person. And user can easily get booking of his seats.

## 1.4 Introduction to the Software tools and Technologies

In order to develop this project, following software tools are used:

1. Netbeans 2.SQLite 3.Jdk 8.1

### 1.4.1 Why Java is used?

* Java works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc.)
* It is one of the most popular programming languages in the world
* It is easy to learn and simple to use
* It is open-source and free
* It is secure, fast and powerful
* It has a huge community support (tens of millions of developers)
* Java is an object-oriented language which gives a clear structure to programs and allows code to be reused, lowering development costs
* As Java is close to [C++](https://www.w3schools.com/cpp/default.asp) and [C#](https://www.w3schools.com/cs/default.asp), it makes it easy for programmers to switch to Java or vice versa

## 1.5 Objectives

The project is mainly based on following objectives:

* To create a project using Java and its features. .
* To be familiar with resource reusability by making user defined function.
* To make the program easy while running it.
* To concise the memory of program as far as possible.
* To get an idea about making a simple project using Java.
* To be able to solve problems by Compiling and Debugging.
* To learn about different functions.
* To learn about the use of user defined functions.
* To learn to be able to develop complex programs aimed at solving particular task in practical field as per users’ requirements.
* To be able to work in group as a team sharing different responsibilities.

## 1.6 Proposed Solution

For this problem we are thinking to develop an application which help both companies and customers to get services in convenient way. Like company can easily enter their buses and check the record of every person. And user can easily get booking of his seats.

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**CHAPTER # 2**

**STATE OF THE ART**

# . STATE OF THE ART

In this chapter, we will discuss what is Code blocks? What is Function? How we’ll implement this application in real world?

## 2.1 What is Netbeans?

NetBeans IDE is an [open-source](https://en.wikipedia.org/wiki/Open-source_software) integrated development environment. NetBeans IDE supports development of all Java application types ([Java SE](https://en.wikipedia.org/wiki/Java_Platform,_Standard_Edition) (including [JavaFX](https://en.wikipedia.org/wiki/JavaFX)), [Java ME](https://en.wikipedia.org/wiki/Java_Platform,_Micro_Edition), [web](https://en.wikipedia.org/wiki/Web_application), [EJB](https://en.wikipedia.org/wiki/EJB) and [mobile](https://en.wikipedia.org/wiki/MIDlet) applications) out of the box. Among other features are an [Ant](https://en.wikipedia.org/wiki/Apache_Ant)-based projectsystem, [Maven](https://en.wikipedia.org/wiki/Apache_Maven) support, [refactorings](https://en.wikipedia.org/wiki/Refactoring),[versioncontrol](https://en.wikipedia.org/wiki/Version_control_system) (supporting [CVS](https://en.wikipedia.org/wiki/Concurrent_Versions_System) , [Subversion](https://en.wikipedia.org/wiki/Subversion_(software)), [Git](https://en.wikipedia.org/wiki/Git_(software)),  [Mercurial](https://en.wikipedia.org/wiki/Mercurial_(software)) and [Clearcase](https://en.wikipedia.org/wiki/Clearcase))., such as:

* A flexible Gradle-based build system
* A fast and feature-rich emulator
* A unified environment where you can develop for all Android devices
* Apply Changes to push code and resource changes to your running app without restarting your app
* Code templates and GitHub integration to help you build common app features and import sample code
* Extensive testing tools and frameworks

## 2.2 What is Function?

Most languages allow you to create functions of some sort. Functions are used to break up large programs into named sections. You have already been using a function which is the main function. Functions are often used when the same piece of code has to run multiple times.

In this case you can put this piece of code in a function and give that function a name. When the piece of code is required you just have to call the function by its name. (So you only have to type the piece of code once).

### 2.2.1 Parameters and return

Functions can accept parameters and can return a result. (C functions can accept an unlimited number of parameters).

### 2.2.2 Global and local variables

A local variable is a variable that is declared inside a function. A global variable is a variable that is declared outside **all** functions. A local variable can only be used in the function where it is declared. A global variable can be used in all functions.

### 2.2.3 Function prototypes

A function prototype declares the function name, its parameters, and its return type to the rest of the program. This is done before a function is declared. (In most cases at the beginning of a program). To understand why function prototypes are useful.

## 

## 2.3 What is Arrays and Pointers?

### 2.3.1 Class

It is a user defined data type, which holds its own data members and member functions, which can be accessed and used by creating an instance of that class. A class is like a blueprint for an object.

For Example: Consider the Class of Cars. There may be many cars with different names and brand but all of them will share some common properties like all of them will have *4 wheels*, *Speed Limit*, *Mileage range* etc. So here, Car is the class and wheels, speed limits, mileage are their properties.2.3.5 Quadratic Probing

**CHAPTER # 3**

**METHODOLGY**

**&**

**WORKPLAN**

# 3. METHODOLOGY & WORK PLAN

In this chapter, we will discuss that what are the existing methodologies and which one we have chosen for implementation of this project in an effective way, also we will discuss advantages of adopted methodology [14, 15].

**What is methodology and why we need it?**

Whenever a small or large project has started to develop, first thing all of programmers required is methodology. Methodology is a way of developing a project, in which all of the programmers gather the user’s requirements, design the project, implement it, and after all this testing and maintenance of the project, in a satisfaction of user and according to the project requirements.

## 3.1 Adopted Methodology

Incremental model is used to develop this project, in which we divided our work in multiple modules. All these modules are further divided into more easily managed modules which made up the actual implementation of the requirements.

Reason behind using this model is:

* It is easy to test and debug the product during iterations.

* We incrementally developed our project and handled efficiently any changes made by supervisor.

## 3.2 Roles & Responsibilities

Project development team is consisting of three members. To accomplish a goal, documentation and development is equally distributed among them and each member work on parallel to avoid wastage of time. It is the duty of the students to pay their attention towards their projects and must be dedicated towards it. Students should consult their supervisor as much as they can because it removes their shyness between the teacher and the students. We have made a good co-ordination between our group mates in doing our project. The task was equally divided among all. Everyone among of us give his / her time to the project and we have learnt a lot of thing by completing this project. We are very thankful to our supervisor and co-supervisor.

## 3.4 Flow chart

Main Menu

Student Admin

Choice

Fill reservation form Enter new bus

View reservations

Wrong Choice Add, Modify or Delete a

Bus Record

Matches

Data will check from

Database to reserve End

End

**CHAPTER # 4**

**SYSTEM ANALYSIS**

**&**

**DESIGN**

# 4. SYSTEM ANALYSIS & DESIGN

In this chapter requirements analysis, feasibility study, planning, forecasting, modeling, scheduling and design of the project is discussed. For developing any project, the major problem is requirement gathering. We will also focus on functional and non-functional requirements.

The procedure for gathering requirements has its own defined procedure according to the complexity of the application. To define project schedule and processing, different models and techniques also focused on this chapter.

## 4.1 Requirements Gathering Techniques

A requirement can be defined as a condition or capability that must be processed by a product or an application. Techniques that can be used for collecting requirements are as follows:

* By analysis and observations

* Using software tools

## 4.2 Requirement Analysis

Requirements analysis is the process of planning, forecasting and studying the overall former needs of the application requirements. Requirements analysis is further divided into two parts based on our project:

1. Functional Requirements
2. Non-Functional Requirements

### 4.2.1 Functional Requirements

A functional requirement’ is that it essentially specifies something the system should do**.** Typically, functional requirements will specify a behavior or function, for example. Display the name, total size, available space and format of a flash drive connected to the USB port.”

### 4.2.2 Non-Functional Requirements

Non-functional requirements describe how the system works**, while** functional requirements describe what the system should do**.** The definition for a non-functional requirement is that it essentially specifies **how the system should behave** and that it is a constraint upon the systems behavior. One could also think of non-functional requirements as quality attributes for of a system.

### 4.2.3 Non-Functional Requirements of a word game

Following are the non-functional requirements of a project we will discuss them as follow.

* Scalability
* Capacity
* Availability
* Reliability
* Recoverability
* Maintainability
* Serviceability
* Security
* Regulatory
* Manageability
* Environmental
* Data Integrity
* Usability
* Interoperability

## 4.3 Project Quality Attribute

### 4.3.1 Availability

High availability software is software used to ensure that systems are running and available most of the time. High availability is a high percentage of time that the system is functioning. It can be formally defined as (1 – (down time/ total time)) \*100Application must be responsive and available at every time. For example, if we want to search our keyword in a given file then the program must be in use so that there is no excuse to this. It must be available every time because It is the quality of a good program to be responsive every time. 100 %.

### 4.3.2 Maintainability

Making modifications or upgrade-potential in the utility will not be so much difficult. It means then program must be easy to debug and easy to maintain. This is because it is the practice of a good programmer to type his code in such a way so that it can easily be understand by its user. This can be done by adding comments and major task must be performed in the functions so that everyone can understand and if anybody wants to make amendments in it. He can easily carry on with this. If you write your line of codes in an in-efficient manner, then program will become bulky and become difficult to maintain debug.

### 4.3.3 Consistency

When a developer is updating information, consistency must hold there. It means there must be consistency in your line of codes. Consistency is a broad term for any action that results in fewer ways to do any given thing in a system. Consistency can be achieved at the individual line level or even in the process level that lives outside of the code. Consistency isn’t the only principle that matters, but it is a high-impact one to a project’s long-term maintainability. You increase the number and frequency of correct assumptions by making your code consistent, and these correct assumptions (and verifications) lead to the many actionable steps you take during development. If you interact with me regularly, you’ll be guaranteed to have heard this phrase:

***“Consistently bad is better than inconsistently good.”***

### 4.3.4 Efficiency

The project must be efficient in performing the task. **Program efficiency** the [ratio](https://simplicable.com/new/efficiency-formula) of program output to input. It is a basic measure that can be used to [benchmark](https://simplicable.com/new/benchmarking) programs against each other. The following are common types of program efficiency.

**Calculation**

Efficiency is a financial metric based on the value of inputs and outputs:

##### Program efficiency = (output / input) x 100

[Efficiency](https://simplicable.com/new/efficiency) is best applied to highly optimized processes that produce a regular steam of outputs such as a [production line.](https://simplicable.com/new/production-line)

### 4.3.5 Time consumption

The project must consume less time as much as possible. It means be efficient like this so that it can performs the task as soon as early as possible. The user should not wait for long to get his task complete.

Time consumption plays a very important role in doing the valuation of the project.

### 4.3.6 Scalability

Scalability is the capability of a system, network, or process to handle a growing amount of work, or its potential to be enlarged to accommodate that growth. It is a highly significant issue in electronics systems, databases, routers, and networking. For example, a system is considered scalable if it is capable of increasing its total output under an increased load when resources are added.

### 4.3.7 Interoperability

**Interoperability** is the ability of different information technology systems and **software** applications to communicate, exchange data, and use the information that has been exchanged.

### 4.3.8 Security

Secure coding is the practice of developing computer software in a way that guards against the accidental introduction of security vulnerabilities. Defects, bugs and logic flaws are consistently the primary cause of commonly exploited software vulnerabilities.

### 4.3.9 Data Integrity

**Data integrity**. **Data integrity** is the maintenance of, and the assurance of the accuracy and consistency of, **data** over its entire life cycle, and is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves **data**.

### 4.3.10 Serviceability

**Serviceability** (RAS) is a set of related attributes that must be considered when designing, manufacturing, purchasing or using a computer product or component. ... Availability is the ratio of time a system or component is functional to the total time it is required or expected to function.

**CHAPTER#5**

**SYSTEM**

**IMPLEMENTATION**

# 5. SYSTEM IMPLEMENTATION

In this chapter, we’ll focus on an implementation of our project i.e. contact management system.

## 5.1 Functions

We have used different functions in our program. Following functions are used.

##### Admin

This function is used by administration of bus company. The user will check all records and can modify them and check all availabilities.

The Admin can perform the following functions:

1. Add a new bus.
2. Edit record of a bus
3. Remove record of a bus
4. View the buses
5. View the customers
6. View the users
7. Modify all these.

##### Student

This function is used by the customer. He can register his details and then the administration check all conditions and then allocate his seat and provide him ticket user can download his ticket in .PNG format or can print his ticket.

### 5.1.4 How do our project work?

In First the user can sign up or sign in as admin or user. Then if he is user so he will register his ticket then the data will be inserted in data base table then the process of multi threading will happen and all the conditions will check and then put in the final reservation table. If the user is admin than admin can enter new bus check all records of seats and user he can modify them.

## 5.2 GUI:

### 5.2.1 Start Activity:

A blue bus parked on the side of a road

Description automatically generated

### 5.2.2 Main Panel:

A screenshot of a cell phone

Description automatically generated

### 5.2.2 Sign up:

A screenshot of a cell phone

Description automatically generated

### 5.2.3 Sign in:

A screenshot of a cell phone

Description automatically generated

### 5.2.4 All buses(Customer):

A screenshot of a cell phone

Description automatically generated

### 5.2.5 Reservation Form:

A screenshot of a cell phone

Description automatically generated

### 5.2.6 Add bus(admin):

A screenshot of a cell phone

Description automatically generated

### 5.2.7All reservations:

A screenshot of a computer

Description automatically generated

### 5.2.8 All users:

A screenshot of a cell phone

Description automatically generated

## 

**CHAPTER #6**

**SYSTEM TESTING**

# 6. SYSTEM TESTING

In this chapter, we will discuss the testing phase of our project **“Bus reservation System using multi threading”** in different manner to know that how much efficient and effective project is.

## 6.1 Introduction

System testing is a procedure of executing an application or program with the expectation of discovering mistakes and whether the project is satisfying client needs. It can also be described as the capacity of a program in meeting the required or wanted outcomes.

Generally, in the field of software engineering, a separate phase is carried out which is called testing phase it is done after the implementation phase has been completed. This approach has a benefit that it is difficult for an individual to look for his mistakes, but a different perspective and fresh eye can readily find the observable errors much quicker than the individual that has written or read the said material several times.

## 6.2 Testing Plan

A process of performing as application or program with the intention of finding errors and whether the application is fulfilling user needs.

### 6.2.1 Unit Testing

The software units in an application are modules and subroutines that are incorporated and integrated to play a particular function. Unit testing first of all focuses around modules, irrespective of one another’s functionalities, to find errors. This enables the developers to recognize errors in the code and the logic within each individual module. This testing includes performing practically. All the feature controls are tested to make sure that each performs its action as required.

### 6.2.2 System Testing

To test the complete “**Bus reservation System using multi threading**”, system testing has been used. It is beneficial to check whether the application meets its requirements and fulfill Quality Standards.

### 6.2.3 Integration Testing

Integration testing allows the software developers to integrate all the components of the “**Bus reservation System using multi threading**” within one program and then test them in a group. Basically, this testing level is used to catch the defects in the user interface between the functions/ modules. It is useful to determine how logically and efficiently all the units/ components are running together.

### 6.2.4 User Acceptance Testing

User acceptance of “**Bus reservation System using multi threading**” is the key factor for the success of our application. The application under consideration has been tested for user compliance by frequently keeping in touch with the application users during developing period and making required changes.

**CHAPTER # 7**

**CONCLUSION**

**&**

**FUTURE WORK**

# 7. CONCLUSION & FUTURE WORK

In this chapter, we will discuss the results and discussions of this framework “**Bus reservation System using multi threading**” with conclude remarks and will also discuss related future work of this application.

## 7.1 Conclusion

“**Bus reservation System using multi threading**” is developed for a vast purpose. The main objective of this application is to provide the facility of quick Attendance with modern techniques with the development of a practical, reliable and inexpensive real time application that can be used everywhere.

Smartphones are becoming more preferred companions to users than desktops or notebooks. Knowing that smartphones are most popular, using smartphones to speed up the process of taking attendance by university instructors would:

* Provide better security.
* Maintenance of the system is easy and cost effective.
* Generate the result quickly.
* Provide accurate and efficient data.
* User friendly.

**Economic feasibility:**

The developed system is time effective because attendance is

marked automatically. It is also cost effective because of no use of paperwork.

**Technical feasibility:**

The system is economic, and it does not use any other additional Hardware and

software.

**Behavioral feasibility:**

The system is user friendly.

## 7.2 Future Work

The next generation **Bus reservation System using multi threading** needs to provide a few basic services:

1. **Android app:**

The future plan to create an android app.

1. **Security:**

There is a legitimate need for security and it would be nice to be able to determine who can see your information - and who can't.

1. **Syndication**

The ability to share and update copy of your list.

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