# SIP-2 REPORT

**BACHELOR OF COMPUTER APPLICATIONS**

SEMESTER V

By

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# DECLARATION

I, **Jatin Shekhawat**, Enrolment Number -**A21704822042** , student of Bachelor of Computer Application (BCA) / Bachelor of Science (Information Technology, Amity Institute of Information Technology, Amity University Rajasthan hereby declare that the I have done my internship from "**PIE INFOCOMM**" from 10th June, 2024 to 27st July, 2024.

Date: ___________________

Place: ________________________

## ACKNOWLEDGMENT

I, **Jatin Shekhawat** would like to take this opportunity to thank **Amity Institute of Information and Technology** for helping me acquire a summer internship at **PIE INFOCOMM**, I would like to express my deepest gratitude to Pie Infocomm for providing me with the opportunity to complete my internship on the Java-based Quiz Application project. The experience I gained during my time at the company has been invaluable and has helped me grow both technically and professionally.

I extend my heartfelt thanks to my project supervisor, **AISHWARYA SAXENA** , for their constant guidance, support, and encouragement throughout the project. Their expertise and feedback were instrumental in helping me understand and apply the concepts of Java development effectively.

I would also like to thank the entire team at Pie Infocomm for creating a conducive learning environment and for their assistance whenever needed. The collaborative atmosphere made it possible to overcome challenges and achieve the project's objectives.

Finally, I am grateful to my institution, Amity University Jaipur, for facilitating this internship and providing me with the foundational knowledge necessary to succeed in this role.

This internship has been a significant step in my career development, and I look forward to applying the skills and experiences I gained in future projects.

Thank you.

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## About the company

Pie Infocomm is an innovative IT solutions provider that focuses on delivering high-quality technology services and products to a diverse range of clients. The company is dedicated to harnessing cutting-edge technology to create solutions that enhance business operations, productivity, and overall efficiency. With a focus on customer-centric solutions, Pie Infocomm operates across several domains, including software development, web development, mobile application development, and digital marketing.

### Key Areas of Expertise:

1. **Custom Software Development:** Pie Infocomm specializes in creating bespoke software solutions tailored to the specific needs of businesses. This includes desktop, web-based, and mobile applications designed to optimize business processes.

2. **Mobile Application Development:** Pie Infocomm develops intuitive and scalable mobile applications for both Android and iOS platforms. Their solutions cater to a wide range of industries, providing users with seamless mobile experiences.

3. **Web Development:** The company has significant expertise in building responsive, user-friendly websites using modern technologies such as HTML, CSS, JavaScript, and popular frameworks like React.js and Angular. These websites help businesses maintain a robust online presence.

4. **Digital Marketing and SEO:** Alongside their technical offerings, Pie Infocomm provides digital marketing services that include search engine optimization (SEO), social media marketing, and content creation to help clients enhance their digital footprint.

5. **Cloud Solutions:** The company offers cloud-based services, enabling businesses to leverage the power of the cloud for scalability, storage, and data management. Their cloud expertise ensures that solutions are secure, reliable, and cost-efficient.

6. **Enterprise Solutions:** Pie Infocomm has a strong background in delivering enterprise-grade solutions such as ERP (Enterprise Resource Planning) systems, CRM (Customer Relationship Management) systems, and other complex platforms that cater to the specific needs of large organizations.

## Company Vision:

Pie Infocomm aims to be a leading provider of IT solutions, driven by a commitment to innovation and excellence. The company strives to build long-term relationships with clients by providing them with reliable, scalable, and future-proof technology solutions.

## Client-Centric Approach:

One of the core philosophies of Pie Infocomm is to maintain a deep understanding of the client's needs and offer solutions that directly address their business challenges. Their collaborative approach ensures that the solutions are flexible, scalable, and perfectly aligned with the client's vision.

## Industry and Market Focus:

Pie Infocomm serves clients across various sectors, including healthcare, education, retail, e-commerce, and finance. Their diverse industry knowledge allows them to create targeted solutions that meet the unique needs of each client.

# Introduction

This report provides an overview of my internship experience at Pie Infocomm, where I had the opportunity to work on a Java-based Quiz application project. The internship spanned several weeks, during which I was able to apply and enhance my skills in Java development, software design, and problem-solving.

The main objective of the internship was to develop a robust, user-friendly Quiz application that allows users to create, participate in, and evaluate quizzes. The project offered me a hands-on experience in full-stack development, including back-end logic, user interface design, and database integration. Additionally, I gained insight into industry-standard practices, project management, and the importance of testing and quality assurance in software development.

This report details my contributions to the project, the learning outcomes, and the skills I developed during the internship at Pie Infocomm.

# Reason for Choosing Java Domain

**1. Introduction**

Java is one of the most widely-used and versatile programming languages, well-known for its platform independence and powerful object-oriented features. After careful consideration of various programming domains, I chose to focus on Java because of its robustness, wide industry applicability, ease of learning, and the career opportunities it provides.

**2. Platform Independence**

One of the primary reasons for choosing Java is its platform independence, which is enabled by the Java Virtual Machine (JVM). Java code can run on any device or platform that supports JVM, making it ideal for cross-platform applications. This portability is highly advantageous for modern software development, where applications need to run seamlessly on various platforms like Windows, macOS, Linux, and mobile devices.

**3. Strong Object-Oriented Programming (OOP) Foundation**

Java is a purely object-oriented language, making it well-suited for developing scalable, modular, and maintainable software. OOP concepts such as inheritance, encapsulation, polymorphism, and abstraction are easily implemented in Java, allowing developers to create complex systems with reusable code. My inclination toward designing robust and maintainable systems made Java a natural choice, as it provides clear structures for developing enterprise-grade applications.

**4. Wide Industry Usage and Demand**
Java is a language used extensively in large-scale enterprise applications, financial services, web applications, and Android development. Many industries rely on Java for building high-performance, secure, and scalable systems. The widespread demand for Java developers in the job market, particularly in sectors like banking, retail, and healthcare, makes it a smart career choice. Java's relevance in modern development, especially with frameworks like Spring, Hibernate, and microservices architectures, further reinforces its importance in the industry.

**5. Rich Ecosystem and Frameworks**
Java offers a rich ecosystem of libraries, tools, and frameworks that support efficient software development. Frameworks like Spring and Hibernate simplify web development, database management, and server-side programming. Java’s extensive set of APIs provides tools for networking, concurrency, and security, making it a comprehensive language for a wide variety of applications. The ecosystem’s maturity ensures that developers can rely on stable, well-documented resources for any kind of project.

**6. Scalability and Performance**
Java is well-suited for developing scalable applications, especially those with high performance and reliability requirements. It can handle large volumes of data and

support multi-threaded processes, which is essential for applications in industries like finance, where performance and speed are critical. Its scalability and reliability make Java the preferred choice for companies building enterprise-level systems, web services, and cloud-based solutions.

**7. Strong Community and Learning Resources**
The Java community is one of the largest and most active in the world of programming. Whether you are a beginner or an experienced developer, there are plenty of resources, including documentation, tutorials, forums, and conferences, that help in learning and resolving issues. The availability of numerous learning platforms and a strong community of developers ensures that any challenges encountered can be easily addressed. The continuous evolution of Java through regular updates also provides access to new features, keeping the language modern and relevant.

**8. Career Opportunities**
Java remains one of the top languages sought by employers worldwide. It is frequently listed among the required skills in job postings for roles such as software developer, backend developer, and systems architect. Specializing in Java opens doors to numerous career paths, including web development, mobile app development (through Android), and enterprise software development. The strong demand for Java professionals ensures a secure and fulfilling career with opportunities to grow in the software industry.

**9. Versatility in Application Development**
Java can be used to develop a wide range of applications,

from mobile apps to large-scale enterprise systems. Its versatility allows developers to work in diverse fields such as Android development, server-side applications, cloud computing, and even game development. This versatility appealed to me because it enables me to explore different areas of software development while building on a single skill set.

## 10. Security Features

Java has built-in security features that make it a preferred language for applications requiring high levels of security. Its architecture includes mechanisms like bytecode verification, memory management, and access control that help prevent vulnerabilities such as buffer overflows and other common security flaws. These features are essential for developing secure and reliable applications, particularly in sectors like banking and healthcare where data security is critical.

# History of Java

Java is one of the most widely used and influential programming languages in the world. Its development and evolution have had a profound impact on the field of software development. Here's an overview of its history:

## 1. Origins and Creation (1991-1995)

Java was conceived in the early 1990s by James Gosling, Mike Sheridan, and Patrick Naughton while they were working at Sun Microsystems. Initially, the project was called "Oak" after a tree outside Gosling's office. The goal of the project was to create a platform-independent language for programming electronic devices such as set-top boxes and other consumer electronics. However, as the project evolved, its scope expanded to cover a wider range of applications.

By 1994, the development team realized the potential of the web, particularly with the rise of the internet and web-based applications. Oak was renamed to "Java" in 1995 because of trademark issues, and its focus shifted to being a platform-independent language for web programming.

## 2. Launch of Java (1995)

Java was officially launched on May 23, 1995, at the SunWorld conference. It was marketed as a revolutionary language that would allow developers to "write once, run anywhere." This slogan highlighted Java's key feature: platform independence. Programs written in Java could run on any device that had the Java Virtual Machine (JVM), making it a versatile language for various platforms.

During its initial release, Java was bundled with a web browser called HotJava, which demonstrated the capabilities of applets—small Java programs that could be embedded in web pages to provide interactive content.

**3. Java 1.0 and Applet Boom (1996)**
In January 1996, Sun Microsystems released the first official version of the Java Development Kit (JDK 1.0). This version was designed for building applications and applets, small programs that could run inside web browsers. The use of Java applets quickly grew in popularity because they allowed developers to create dynamic and interactive web content, something that was not possible with HTML alone at the time. Although applets became popular, they were soon overtaken by other web technologies like JavaScript and Flash due to performance limitations and security concerns.

**4. Expansion into Enterprise Applications (Late 1990s)**
By the late 1990s, Java had shifted from being primarily associated with web applets to becoming a powerful language for enterprise applications. Sun Microsystems released Java 2 in 1998, which included the introduction of different editions, notably:

- **Java Standard Edition (SE):** For desktop and general-purpose applications.
- **Java Enterprise Edition (EE):** For large-scale enterprise applications.
- **Java Micro Edition (ME):** For mobile and embedded systems.

Java EE (Enterprise Edition) became especially popular for building server-side applications and web services, leading to the widespread use of Java in large organizations.

## 5. Introduction of the JVM and Platform Independence

The Java Virtual Machine (JVM) was an essential part of the Java platform, allowing Java programs to be executed on any device, regardless of its underlying architecture, as long as it had a JVM installed. This made Java incredibly versatile and ensured its adoption across a wide range of industries. The JVM also became a foundation for other languages like Kotlin and Scala, which are interoperable with Java.

## 6. Open-Source Transition and Oracle Acquisition (2006-2010)

In 2006, Sun Microsystems made Java open source by releasing most of its Java implementations under the GNU General Public License (GPL). This move helped Java gain even more popularity among developers and strengthened its position in the open-source community.

In 2010, Oracle Corporation acquired Sun Microsystems, and along with it, the rights to Java. Oracle's acquisition raised some concerns in the developer community about the future of Java, but Oracle continued to support and develop the language. They also became involved in legal battles over the use of Java, most notably with Google over the use of Java in the Android operating system.

## 7. Java's Role in Android (2008-Present)

In 2008, Google released Android, a mobile operating system based on the Linux kernel, and Java became the primary language used for developing Android apps. Though Android uses a modified version of Java (Dalvik/ART instead of JVM), it allowed Java developers to transition easily into the mobile app development space. This further solidified Java's dominance in the programming world.

## 8. Modern Java: Continuous Evolution (2011-Present)

Since Oracle’s acquisition, Java has continued to evolve with regular updates to the language and platform. Significant updates include:

- **Java SE 7 (2011):** Introduced features like try-with-resources and the switch statement for strings.
- **Java SE 8 (2014):** A major release that introduced lambdas, the Stream API, and other features aimed at improving functional programming capabilities.
- **Java SE 9 (2017):** Introduced the module system (Project Jigsaw) to help developers create more modular applications.
- **Java SE 10 and Beyond:** Oracle switched to a six-month release cycle for Java, ensuring that the language evolves continuously and stays relevant in the fast-changing software landscape. This move brought more frequent updates with smaller incremental changes.

## Types of Java

Java is a versatile programming language that has evolved over the years to cater to different application domains. Depending on the application’s nature, Java is divided into four main types: **Java Standard Edition (Java SE)**, **Java Enterprise Edition (Java EE)**, **Java Micro Edition (Java ME)**, and **JavaFX**. Each of these types serves specific purposes in software development.

### 1. Java Standard Edition (Java SE)

Java SE is the core platform of the Java programming language. It includes essential libraries and APIs (Application Programming Interfaces) for building desktop applications, server-side applications, and applets. Java SE provides the foundation for all other editions and includes core functionalities such as:

- **Core Libraries**: Libraries for basic data structures, algorithms, networking, input/output (I/O), and threading.
- **Java Virtual Machine (JVM)**: The engine that allows Java programs to run on different platforms.
- **Development Tools**: Compilers, debuggers, and other tools required for Java development.

**Common uses**: Desktop applications, command-line programs, and simple web applications.

### 2. Java Enterprise Edition (Java EE)

Java EE, built on top of Java SE, is designed for building large-scale, distributed, and scalable enterprise applications. It provides a set of APIs and services that simplify development

for enterprise-level software such as web applications, microservices, and distributed systems.
Some key features of Java EE include:

- **Servlets and JSP**: For web-based applications.
- **Enterprise JavaBeans (EJB)**: To simplify the development of distributed business components.
- **Java Message Service (JMS)**: For messaging between systems in an enterprise environment.
- **Java Persistence API (JPA)**: For managing relational data in enterprise applications.

**Common uses**: Enterprise applications, banking systems, e-commerce platforms, and web services.

### 3. Java Micro Edition (Java ME)

Java ME is a subset of Java SE, designed for resource-constrained devices like mobile phones, embedded systems, and Internet of Things (IoT) devices. Java ME includes a smaller set of APIs than Java SE but is optimized to run on devices with limited memory and processing power.
Some key features of Java ME include:

- **MIDlets**: Applications developed for mobile devices.
- **CLDC (Connected Limited Device Configuration)**: A configuration for devices with low memory.
- **Mobile Information Device Profile (MIDP)**: Provides a framework for developing applications for mobile phones and PDAs.

**Common uses**: Mobile applications, embedded systems, and IoT devices.

### 4. JavaFX

JavaFX is a platform for developing rich internet applications

(RIAs) using a lightweight user interface (UI) toolkit. It is a modern alternative to the older Swing and AWT libraries used in Java SE for building graphical user interfaces (GUIs). JavaFX is widely used for developing desktop applications and cross-platform applications with a rich graphical experience.
Some key features of JavaFX include:

- **CSS-like Styling**: Allows for customization of the UI appearance.
- **FXML**: An XML-based language for defining the UI.
- **Rich Media Support**: Provides APIs for handling video, audio, and other multimedia elements.
- **Scene Builder**: A visual tool for designing JavaFX user interfaces.

**Common uses**: Desktop applications, media players, and interactive web applications.

# Conclusion

My internship at Pie Infocomm has been an enriching and transformative experience. Working on the Java-based Quiz application project allowed me to apply theoretical knowledge from my academic background in a real-world environment, enhancing my skills in Java development and software engineering practices. The project involved designing and developing a dynamic, user-friendly quiz platform, where I gained practical experience in coding, debugging, testing, and ensuring functionality.

Throughout the internship, I encountered and solved various challenges, which significantly boosted my problem-solving abilities and technical confidence. Moreover, I had the opportunity to collaborate with a team of experienced professionals, which sharpened my teamwork and communication skills. By following software development best practices, I learned the importance of writing clean, maintainable code and how to optimize application performance.

In conclusion, the internship was a crucial step in my professional development, providing me with valuable hands-on experience. It has solidified my interest in software development, specifically Java applications, and has prepared me for future career opportunities. The experience at Pie Infocomm has been highly rewarding, and I look forward to applying the lessons and skills learned in my future endeavors.

## Terminologies

**1. Java**
Java is a high-level, class-based, object-oriented programming language designed to have as few implementation dependencies as possible. It is widely used for building platform-independent applications. In the context of the Pie Infocomm internship, Java was the primary language used to develop the Quiz Application, leveraging its robustness and portability
.

**2. Quiz Application**
A Quiz Application is a software tool designed to create, manage, and administer quizzes or tests. It can include functionalities such as user authentication, question management, and scoring. The Java-based Quiz Application developed during the internship allowed users to engage in quizzes with various types of questions, track their scores, and view results.

**3. Object-Oriented Programming (OOP)**
Object-Oriented Programming is a programming paradigm based on the concept of "objects," which are instances of classes. OOP principles such as inheritance, encapsulation, and polymorphism were utilized in the development of the Quiz Application to create a scalable and maintainable codebase.

**4. Swing**
Swing is a part of Java’s Standard Library used for creating graphical user interfaces (GUIs). It was employed in the Quiz

Application to build interactive and user-friendly interfaces for quiz management and user interaction.

**5. Java Development Kit (JDK)**

The Java Development Kit is a software development kit used to develop Java applications. It includes the Java Runtime Environment (JRE), an interpreter/loader (Java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc), and other tools needed for Java development.

**6. Integrated Development Environment (IDE)**

An IDE is a software application that provides comprehensive facilities to computer programmers for software development. During the internship, an IDE such as Eclipse or IntelliJ IDEA was used to write, debug, and test the Java code for the Quiz Application

.

**7. Database Management System (DBMS)**

A Database Management System is software that facilitates the creation, manipulation, and management of databases. In the Quiz Application, a DBMS like MySQL or SQLite was used to store and retrieve quiz questions, user data, and scores.

**8. User Interface (UI)**

The User Interface is the point of interaction between the user and the application. In the Quiz Application, the UI comprised various elements like buttons, forms, and dialogs designed using Swing, allowing users to interact with the application seamlessly.

**9. Exception Handling**

Exception Handling is a programming mechanism used to handle runtime errors, ensuring the application can continue operating even if an error occurs. Java’s built-in exception handling mechanisms were employed to manage and resolve potential issues during the quiz execution and user interactions.

**10. Unit Testing**

Unit Testing involves testing individual components or pieces of code to ensure they function correctly. During the internship, unit testing was performed on various modules of the Quiz Application to verify their functionality and reliability.

**11. Version Control**

Version Control systems like Git are used to manage changes to source code over time. Git was utilized during the development of the Quiz Application to track changes, collaborate with team members, and maintain different versions of the application.

**12. Agile Methodology**

Agile Methodology is a project management approach that involves iterative development, where requirements and solutions evolve through collaborative effort. The development of the Quiz Application followed Agile principles to adapt to changes and deliver incremental improvements.

**13. Deployment**

Deployment is the process of making a software application available for use. For the Quiz Application, deployment involved preparing the application for release, including configuration, packaging, and distribution.

## 14. Debugging

Debugging is the process of identifying and fixing bugs or issues in the code. Throughout the development of the Quiz Application, debugging techniques were employed to ensure the application operated correctly and efficiently.

## 15. API (Application Programming Interface)

An API is a set of rules and tools that allows different software applications to communicate with each other. The Quiz Application might have used APIs to integrate with external services or libraries for enhanced functionality.

# Abstract

This report outlines the completion of an internship at Pie Infocomm, where I contributed to the development of a Java-based quiz application. During the internship, I engaged in various stages of the project lifecycle, including requirements analysis, system design, implementation, and testing. The quiz application aimed to provide an interactive and user-friendly platform for users to test their knowledge across various subjects.

My responsibilities involved coding the core functionalities of the application, which included user authentication, question management, and scoring mechanisms. I utilized Java and related technologies to develop a robust backend while ensuring seamless integration with the user interface. The project also included implementing features for tracking user progress and generating performance reports.

Through this internship, I gained practical experience in Java development, improved my problem-solving skills, and enhanced my understanding of software engineering practices. The successful completion of the quiz application project not only demonstrated my technical capabilities but also provided valuable insights into real-world software development processes.

## Objective

The primary objective of my internship at Pie Infocomm was to gain practical experience and deepen my understanding of Java development by working on a Java-based quiz application project. Throughout this internship, I aimed to achieve the following goals:

1. **Application Development:** To contribute effectively to the development of a Java-based quiz application, including designing, coding, and testing various features of the application to ensure its functionality and user-friendliness.

2. **Technical Skill Enhancement:** To enhance my technical skills in Java programming, including advanced concepts such as object-oriented programming, exception handling, and data management, while also becoming proficient with development tools and best practices used in the industry.

3. **Project Management Experience:** To gain insights into project management methodologies, including version control, task tracking, and collaborative development, and to understand how these practices are implemented in a professional software development environment.

4. **Problem-Solving and Innovation:** To develop and apply problem-solving skills by addressing technical challenges encountered during the project, and to propose

innovative solutions that improve the application's performance and user experience.

5. **Professional Development:** To build a comprehensive understanding of the software development lifecycle and to acquire skills that are essential for a successful career in software development, including teamwork, communication, and time management.

By achieving these objectives, I aimed to contribute positively to the quiz application project while also preparing myself for future professional opportunities in software development.

## Rules of Java

1. **Java is Case-Sensitive:** Java treats uppercase and lowercase letters as distinct. For example, Variable, variable, and VARIABLE would be considered different identifiers.

2. **Class Names Should Be Capitalized:** By convention, class names should start with an uppercase letter and follow CamelCase. For example, MyClass or QuizApplication.

3. **Method Names Should Start with a Lowercase Letter:** Method names should start with a lowercase letter and follow camelCase. For example, calculateScore() or getUserInput().

4. **Every Application Must Have a main Method:** The entry point of any Java application is the main method. It must be defined as public static void main(String[] args).

5. **Java Uses Static Typing:** Every variable must be declared with a data type before it is used. This helps Java maintain type safety.

6. **Code Blocks Are Enclosed in Curly Braces:** In Java, code blocks (such as those for classes, methods, and loops) are enclosed in curly braces {}.

7. **Java Supports Object-Oriented Programming (OOP):** Java is designed around the principles of OOP, which

include encapsulation, inheritance, and polymorphism.

8. **Every Class Must Be Defined in a Separate File:** By convention, each class should be defined in a separate file, and the file name should match the class name. For example, the class QuizApplication should be in a file named QuizApplication.java.

9. **Use Semicolons to End Statements:** Each statement in Java must end with a semicolon ;.

10. **Java Has Built-In Memory Management:** Java uses automatic garbage collection to manage memory, meaning developers do not need to manually handle memory allocation and deallocation.

11. **Java is Platform-Independent:** Java code is compiled into bytecode, which runs on the Java Virtual Machine (JVM). This allows Java applications to be platform-independent.

12. **Use import Statements for External Libraries:** To use classes from external libraries or other packages, you must use import statements at the beginning of your Java file.

13. **Access Modifiers Control**

**Visibility:** Java uses access modifiers like public, protected, private, and default (no modifier) to control the visibility of classes, methods, and variables.

14. **Java Is Multi-Threaded:** Java provides built-in support for multithreading, allowing multiple threads to run concurrently.

15. **Exception Handling with Try-Catch:** Java uses try-catch blocks to handle exceptions and errors gracefully, ensuring that the application can recover from unexpected situations.

16. **Immutable Strings:** In Java, strings are immutable, meaning once a String object is created, it cannot be changed.

# Methodology

## Introduction

The methodology section of an internship report outlines the approach and techniques employed during the project. For the Java-based Quiz Application developed during my internship at Pie Infocomm, this section details the steps followed from inception to completion.

## 1. Project Planning and Requirements Gathering

**Objective:** To establish a clear understanding of the project goals, requirements, and constraints.

- **Initial Meetings:** Conducted meetings with the project supervisor and team members to discuss the project scope, objectives, and expected deliverables.
- **Requirement Analysis:** Gathered detailed requirements for the quiz application, including functional requirements (e.g., quiz creation, user management, scoring) and non-functional requirements (e.g., performance, security).
- **Documentation:** Created a requirements document outlining the project specifications, user stories, and use cases.
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## 2. System Design

**Objective:** To design the architecture and user interface of the quiz application.

- **Architecture Design:** Developed a high-level architecture diagram, including the client-server model, database schema, and key components such as the quiz engine and user management module.

- **UI/UX Design:** Designed wireframes and mockups for the user interface, focusing on usability and accessibility.
- **Technology Stack:** Decided on the technology stack, including Java for backend development, JDBC for database connectivity, and a suitable front-end framework if applicable.
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## 3. Implementation

**Objective:** To develop and integrate the various components of the quiz application.

- **Backend Development:**
  - **Database Integration:** Set up the database using MySQL, created tables for users, quizzes, questions, and answers.
  - **Core Functionality:** Implemented core features using Java, including quiz management, user authentication, and scoring algorithms.
  - **API Development:** Developed RESTful APIs for communication between the client and server.
- **Frontend Development:**
  - **User Interface:** Developed the user interface using Java Swing or JavaFX (depending on the chosen framework), ensuring it was intuitive and responsive.
  - **Integration:** Integrated the frontend with backend APIs for dynamic content retrieval and submission.
  -

## 4. Testing and Quality Assurance

**Objective:** To ensure the application functions as expected and meets quality standards.

- **Unit Testing:** Conducted unit tests for individual

components using JUnit to verify their correctness.
- **Integration Testing:** Performed integration testing to ensure seamless interaction between different modules of the application.
- **User Acceptance Testing (UAT):** Engaged potential users in testing to gather feedback on usability and functionality.
- **Bug Fixing:** Identified and resolved bugs and issues reported during testing phases.
-

## 5. Deployment and Documentation

**Objective:** To deploy the application and prepare comprehensive documentation.

- **Deployment:**
    - **Environment Setup:** Configured the deployment environment, including server setup and database configuration.
    - **Deployment:** Deployed the application on the server and conducted final tests to verify successful deployment.
- **Documentation:**
    - **Technical Documentation:** Prepared detailed documentation on the system architecture, codebase, and API usage for future reference.
    - **User Manual:** Created a user manual with instructions on how to use the application and troubleshoot common issues.
    -

## 6. Post-Deployment Support and Feedback

**Objective:** To provide support post-deployment and gather feedback for future improvements.

- **Support:** Offered support to users for any issues encountered post-deployment.
- **Feedback Collection:** Collected feedback from users to identify areas for improvement and potential new features.

# Feasibility Analysis

## 1. Introduction

This feasibility analysis assesses the viability of the Java-based quiz application project completed during the internship at Pie Infocomm. It evaluates technical, economic, operational, and schedule feasibility to determine if the project meets its intended goals and objectives efficiently and effectively.

## 2. Project Overview

The Java-based quiz application developed during the internship aims to provide an interactive platform for users to test their knowledge through various quizzes. The application includes features such as quiz creation, user management, scoring, and feedback. The primary goal is to create a user-friendly and robust application that can handle multiple quizzes and users seamlessly.

## 3. Technical Feasibility

### 3.1. Technology Stack

- **Programming Language:** Java
- **Database:** MySQL (or another relational database)
- **Frameworks/Libraries:** Java Swing (for GUI), JDBC (for database connectivity)
- **Development Environment:** Eclipse/IntelliJ IDEA

### 3.2. System Requirements

- **Hardware:** Standard PC with minimum 4GB RAM, 2 GHz processor
- **Software:** Java Development Kit (JDK) 8 or higher, Database Management System (DBMS) such as MySQL

### 3.3. Development and Integration

- **Integration with Database:** JDBC provides a reliable method for integrating Java applications with MySQL, ensuring smooth data operations.
- **User Interface:** Java Swing offers a robust set of GUI components that support creating an interactive and user-friendly interface.
- **Scalability:** The application architecture is designed to be scalable to accommodate additional quizzes and users.

### 3.4. Risk Assessment

- **Technical Skills:** Proficiency in Java and related technologies is crucial. Any gaps in skillsets can be mitigated through training or consultation.
- **Compatibility Issues:** Ensuring compatibility across different environments may require additional testing.
-

## 4. Economic Feasibility

### 4.1. Cost Analysis

- **Development Costs:** Primarily involves the time and resources of the development team, including any software licenses and development tools.
- **Operational Costs:** Minimal operational costs if using open-source tools and software.

### 4.2. Benefits

- **Educational Value:** Provides a valuable learning experience for users and developers.
- **Market Potential:** The application has potential for commercialization or as a portfolio piece for career advancement.

### 4.3. Cost-Benefit Ratio

The project demonstrates a favorable cost-benefit ratio due to low development costs and significant educational and professional benefits.

## 5. Operational Feasibility

### 5.1. User Acceptance

- **User Experience:** The application’s design emphasizes user-friendly interactions, enhancing the likelihood of user acceptance.
- **Feedback Mechanisms:** Includes mechanisms for user feedback to continually improve the application.

### 5.2. Support and Maintenance

- **Documentation:** Comprehensive documentation provided for both end-users and developers ensures ease of maintenance.
- **Support:** Potential need for ongoing support and updates to address any issues or add new features.

## 6. Schedule Feasibility

### 6.1. Project Timeline

- **Development Phase:** Completed within the internship period, demonstrating the project's feasibility within a defined timeframe.
- **Testing and Deployment:** Adequate time allocated for testing to ensure application reliability.

### 6.2. Milestones

- **Initial Design and Planning:** Completed in the early stages.
- **Development:** Achieved as per the planned schedule.
- **Testing and Finalization:** Conducted towards the end of

the internship.

## Scope

The scope of the internship project at Pie Infocomm focused on the development and enhancement of a Java-based Quiz application. The primary objectives of the project were to design, implement, and test the application's core functionalities while ensuring that it met the company's standards for usability, performance, and reliability.

**1. Project Overview:**

The Quiz application is a software solution designed to facilitate interactive quizzes for users, providing a platform for both educational and entertainment purposes. The application supports multiple choice questions, timers, scoring systems, and user profiles.

**2. Development Goals:**

- **User Interface Design:** Develop an intuitive and user-friendly graphical user interface (GUI) using Java Swing to ensure an engaging user experience.
- **Backend Development:** Implement the core functionality of the application, including question management, answer validation, and scoring, using Java programming.
- **Database Integration:** Integrate a relational database management system (RDBMS) to store and retrieve quiz questions, user data, and performance metrics.
- **Error Handling and Testing:** Ensure robust error handling mechanisms and conduct thorough testing to identify and resolve bugs and performance issues.

**3. Key Deliverables:**

- **Functional Quiz Application:** A fully functional application with features such as quiz creation, question randomization, scoring, and user feedback.
- **Technical Documentation:** Comprehensive documentation detailing the application architecture, codebase, and user guide.
- **Test Reports:** Reports on the results of unit testing, integration testing, and system testing.

**4. Constraints:**

- **Time Limitations:** The project had to be completed within the timeframe of the internship, necessitating effective time management and prioritization of tasks.
- **Resource Availability:** Limited access to advanced development tools and resources during the internship period.
- **Integration Challenges:** Ensuring seamless integration between the Java application and the database while maintaining performance efficiency.

**5. Expected Outcomes:**

- **Enhanced Application Performance:** Improved functionality and performance of the Quiz application as compared to its previous versions.
- **Skill Development:** Gained practical experience in Java development, database integration, and application testing.
- **Professional Growth:** Developed project management and problem-solving skills in a real-world development environment.

The scope of the project at Pie Infocomm aimed to deliver a high-quality Quiz application that meets user expectations and adheres to industry standards, while also contributing to personal and professional development.

# Implementation

## 1. Introduction

This report details the implementation process of a Java-based Quiz Application developed during my internship at Pie Infocomm. The project aimed to create an interactive and engaging platform for users to test their knowledge across various subjects through a series of quizzes. This document covers the project objectives, technical implementation, development process, challenges faced, and the final outcome.

## 2. Project Objectives

The primary objectives of the Java-based Quiz Application were:

- To develop a user-friendly application that allows users to participate in quizzes.
- To implement features for quiz creation, question management, and user performance tracking.
- To ensure the application is scalable and maintainable with a clean code structure.

## 3. Technical Implementation

### 3.1. Development Environment

- **Language:** Java
- **IDE:** Eclipse IDE
- **Database:** MySQL
- **Version Control:** Git

## 3.2. Architecture

The application follows a Model-View-Controller (MVC) architecture:

- **Model:** Represents the data and business logic. For this project, it includes classes for managing quizzes, questions, and user profiles.
- **View:** Handles the presentation layer. The user interface is built using Swing for desktop interaction.
- **Controller:** Manages user input and updates the model and view accordingly.

## 3.3. Core Components

- **Quiz Management:** Allows administrators to create, update, and delete quizzes.
- **Question Management:** Facilitates the addition, modification, and removal of questions within quizzes.
- **User Interface:** Designed using Swing to provide a graphical interface for users to interact with the application.
- **Database Integration:** Utilizes MySQL to store and retrieve quiz data, questions, and user responses.

## 3.4. Data Flow

1. **User Interaction:** Users interact with the application through the graphical interface.
2. **Controller:** Receives user inputs and processes them.
3. **Model Update:** The controller updates the model based on user actions.
4. **Database Operations:** The model interacts with the database to store or retrieve data.
5. **View Update:** The view is updated to reflect the changes in the model.

## 4. Development Process

## 4.1. Planning

- **Requirement Analysis:** Gathered requirements through discussions with project stakeholders.
- **Design:** Created detailed design documents outlining the architecture and user interface.

## 4.2. Implementation

- **Database Setup:** Designed and implemented the database schema for storing quiz-related data.
- **Application Development:** Developed the core functionalities, including quiz and question management.
- **User Interface:** Implemented the graphical user interface using Swing components.

## 4.3. Testing

- **Unit Testing:** Conducted unit tests for individual components to ensure correctness.
- **Integration Testing:** Tested the integration between different components and database interactions.
- **User Acceptance Testing:** Performed testing with actual users to validate functionality and usability.

## 4.4. Deployment

- **Build Process:** Compiled the Java code and packaged the application for distribution.
- **Documentation:** Created user manuals and technical documentation for reference.

## 5. Challenges and Solutions

## 5.1. Challenge: Database Integration

- **Solution:** Implemented robust database connection handling and error management to ensure data integrity and reliability.

## 5.2. Challenge: User Interface Design

- **Solution:** Utilized Swing components effectively and incorporated user feedback to enhance the user experience.

### 5.3. Challenge: Performance Optimization

- **Solution:** Optimized database queries and application logic to improve performance and response times.

## 6. Outcome

The Java-based Quiz Application was successfully implemented, meeting the project objectives and user requirements. The application is fully functional, providing a seamless experience for users to engage in quizzes and track their performance. The project demonstrated effective use of Java programming, database management, and user interface design.

# Limitations

## 1. Introduction

During my internship at Pie Infocomm, I worked on a Java-based quiz application project. While the experience was invaluable, several limitations impacted the project's progress and completion. This report outlines these limitations, providing insights into the challenges faced and their implications on the project.

## 2. Scope of the Project

The project aimed to develop a Java-based quiz application with features such as user registration, quiz creation, score tracking, and reporting. The application was designed to be user-friendly and scalable, incorporating both front-end and back-end functionalities.

## 3. Limitations Encountered

### 3.1. Time Constraints

One of the primary limitations was the limited timeframe available for completing the project. Given the tight deadlines, several features had to be prioritized over others. Consequently, some planned functionalities, such as advanced analytics and multiplayer support, were not fully developed.

### 3.2. Resource Constraints

Access to resources, including development tools and software licenses, was limited. For instance, the lack of access to advanced testing tools impacted the thoroughness of the quality assurance phase. Additionally, limited hardware resources led to constraints in testing the application across various platforms and configurations.

## 3.3. Technical Challenges

Several technical challenges emerged during the development process:

- **Integration Issues:** Integrating the quiz application with external APIs for features such as user authentication and data storage proved challenging. Compatibility issues and limited documentation for certain APIs resulted in delays.
- **Performance Optimization:** The application experienced performance issues related to response times and memory management. These issues were partly due to the application's design and the need for further optimization.
- **Bug Fixing:** A number of bugs were encountered during the testing phase, some of which were difficult to diagnose and resolve due to the complexity of the codebase.

## 3.4. Knowledge Gaps

Despite having foundational knowledge in Java, certain advanced concepts and frameworks used in the project required additional learning. The steep learning curve associated with these technologies delayed some aspects of the development process.

## 3.5. Communication Challenges

Effective communication with team members and supervisors was occasionally hindered by remote work constraints and scheduling conflicts. This sometimes led to misunderstandings regarding project requirements and expectations.

## 4. Impact on Project Outcomes

The limitations outlined above had several impacts on the project's outcomes:

- **Incomplete Features:** Some planned features were either partially implemented or omitted, affecting the overall functionality and user experience of the application.
- **Delayed Timelines:** The project faced delays in its completion due to the challenges mentioned, affecting the overall project timeline and deliverables.
- **Quality Concerns:** The performance issues and bugs that persisted in the final stages of development impacted the quality of the application, requiring further attention post-internship.

# Hardware and Software Details

## 1. Introduction

This report provides an overview of the hardware and software requirements and configurations for the Java-based quiz application project completed during the internship at Pie Infocomm. The purpose of this document is to outline the technical infrastructure and tools utilized to develop, test, and deploy the application.

## 2. Hardware Details

### 2.1 Development Environment

- **Processor:** Intel Core i5 (8th Generation) or higher
- **RAM:** 8 GB or more
- **Storage:** Minimum 256 GB SSD
- **Operating System:** Windows 10/11 or equivalent macOS/Linux distribution

### 2.2 Testing and Deployment Environment

- **Processor:** Intel Core i7 or higher
- **RAM:** 16 GB or more
- **Storage:** Minimum 512 GB SSD
- **Operating System:** Windows Server 2019 or equivalent Linux distribution (for deployment)

## 3. Software Details

### 3.1 Development Tools

- **Java Development Kit (JDK):** JDK 11 or later. The JDK provides the necessary tools for compiling and running Java applications.
- **Integrated Development Environment (IDE):** IntelliJ IDEA or Eclipse. These IDEs offer comprehensive support for Java development with features like code completion, debugging, and version control integration.

- **Build Tools:** Apache Maven or Gradle. These tools manage project dependencies, build processes, and packaging.
- **Version Control:** Git. Git was used for version control to track changes and collaborate with other team members.

## 3.2 Frameworks and Libraries

- **Spring Framework:** Used for dependency injection and managing application context.
- **JUnit:** Employed for unit testing to ensure individual components work as expected.
- **Apache POI:** Used for reading and writing Excel files, if the application involved data import/export functionalities.
- **JDBC:** Java Database Connectivity for interacting with the database.

## 3.3 Database

- **Database Management System (DBMS):** MySQL or PostgreSQL. The choice of DBMS was based on the project’s requirements for relational data storage and querying.

## 3.4 Deployment Tools

- **Web Server:** Apache Tomcat or Jetty. These servers were used for deploying and running the web application.
- **Containerization (optional):** Docker. If containerization was used, Docker allowed for consistent development and deployment environments.
- **Continuous Integration/Continuous Deployment (CI/CD) Tools:** Jenkins or GitHub Actions. These tools facilitated automated testing and deployment processes.

## Tools and Technologies Used

**1. Java Development Kit (JDK):** The core technology used for the development of the quiz application was Java. The JDK provided the necessary libraries and tools to compile, debug, and execute Java programs. It also included the Java Runtime Environment (JRE) required to run the application.

**2. Integrated Development Environment (IDE):**

- **Eclipse/IntelliJ IDEA:** The development of the quiz application was carried out using either Eclipse or IntelliJ IDEA. These IDEs offered robust features like code auto-completion, debugging tools, and project management capabilities, which facilitated an efficient development process.

**3. Apache Maven:**

- **Build Management:** Apache Maven was used for build management and dependency management. It allowed the project to be built and packaged into deployable formats, such as JAR files. Maven's dependency management ensured that all required libraries and frameworks were included and up-to-date.

**4. MySQL:**

- **Database Management:** MySQL was employed as the database management system for storing quiz questions, user data, and scores. It provided a reliable and scalable way to manage and query the application's data.

**5. JDBC (Java Database Connectivity):**

- **Database Interaction:** JDBC was used to connect the Java application with the MySQL database. It facilitated the execution of SQL queries and updates, enabling dynamic interaction with the database from within the Java code.

**6. Java Swing/JavaFX:**

- **User Interface Development:** For developing the graphical user interface (GUI) of the quiz application, Java Swing or JavaFX was used. These libraries provided a set of components to build user interfaces, such as buttons, text fields, and panels, creating an interactive experience for users.

**7. Git/GitHub:**

- **Version Control:** Git, along with GitHub for repository hosting, was utilized for version control. This allowed for tracking changes to the codebase, collaborating with team members, and maintaining a history of the project's development.

**8. JUnit:**

- **Testing Framework:** JUnit was employed for unit testing the application. It helped ensure that individual components and functionalities of the quiz application were working correctly by providing a framework for writing and running tests.

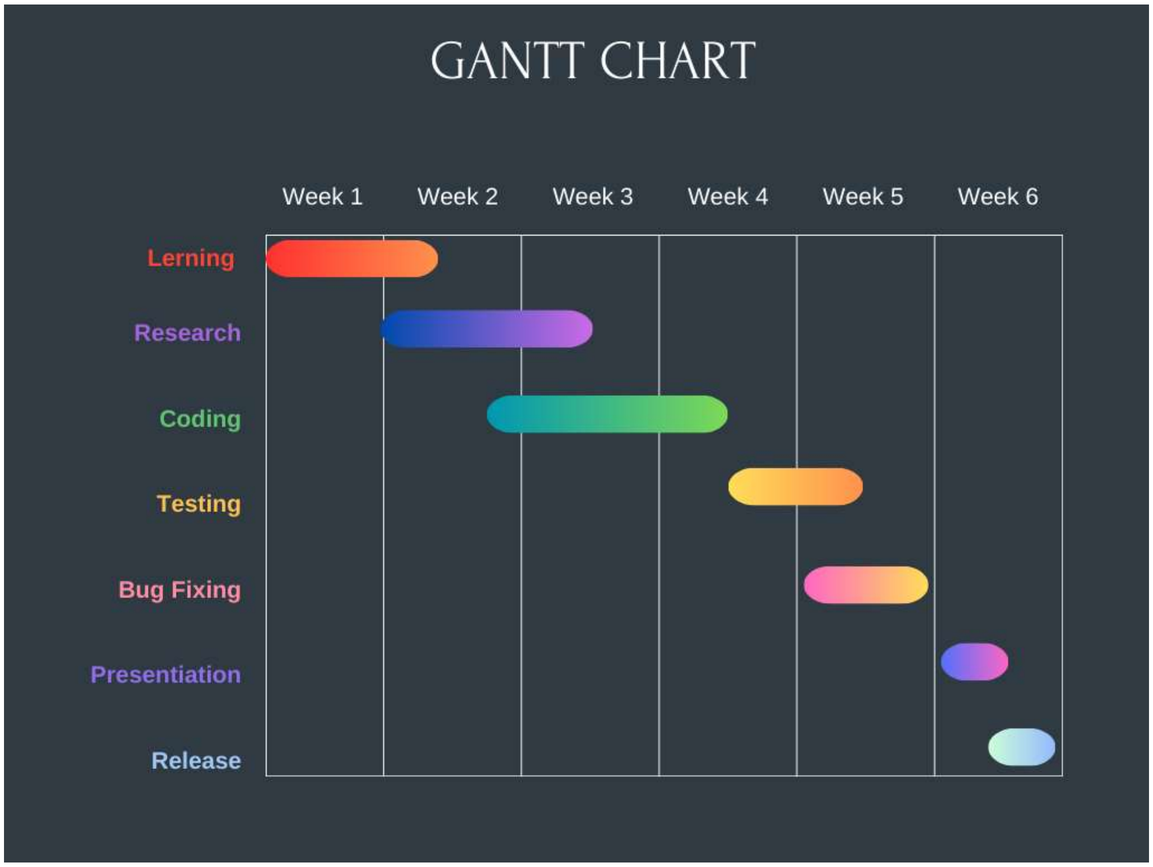
**9. Apache Tomcat:**

- **Web Server (if applicable):** If the quiz application was deployed as a web application, Apache Tomcat was used as the web server. It provided a runtime environment for serving Java Servlets and JavaServer Pages (JSP), handling client requests, and delivering responses.

**10. UML Tools:**

- **Design and Documentation:** UML (Unified Modeling Language) tools such as Lucidchart or Microsoft Visio were used for designing and documenting the application's architecture, including class diagrams, sequence diagrams, and use case diagrams.

## Working on project-Gantt chart



# Source code

## LOGIN.JAVA

```
package quiz.application;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class Login extends JFrame implements ActionListener{

    JButton rules, back;
    JTextField tfname;

    Login() {
        getContentPane().setBackground(Color.WHITE);
        setLayout(null);

        ImageIcon i1 = new
ImageIcon(ClassLoader.getSystemResource("icons/login.jpeg"));
        JLabel image = new JLabel(i1);
        image.setBounds(0, 0, 600, 500);
        add(image);

        JLabel heading = new JLabel("Simple Minds");
        heading.setBounds(750, 60, 300, 45);
        heading.setFont(new Font("Viner Hand ITC", Font.BOLD, 40));
        heading.setForeground(new Color(30, 144, 254));
        add(heading);

        JLabel name = new JLabel("Enter your name");
        name.setBounds(810, 150, 300, 20);
        name.setFont(new Font("Mongolian Baiti", Font.BOLD, 18));
        name.setForeground(new Color(30, 144, 254));
        add(name);

        tfname = new JTextField();
        tfname.setBounds(735, 200, 300, 25);
        tfname.setFont(new Font("Times New Roman", Font.BOLD, 20));
        add(tfname);

        rules = new JButton("Rules");
        rules.setBounds(735, 270, 120, 25);
        rules.setBackground(new Color(30, 144, 254));
        rules.setForeground(Color.WHITE);
        rules.addActionListener(this);
        add(rules);

        back = new JButton("Back");
        back.setBounds(915, 270, 120, 25);
        back.setBackground(new Color(30, 144, 254));
        back.setForeground(Color.WHITE);
        back.addActionListener(this);
        add(back);

        setSize(1200, 500);
        setLocation(200, 150);
        setVisible(true);
    }

    public void actionPerformed(ActionEvent ae) {
        if (ae.getSource() == rules) {
            String name = tfname.getText();
            setVisible(false);
            new Rules(name);
        } else if (ae.getSource() == back) {
            setVisible(false);
        }
    }

    public static void main(String[] args) {
        new Login();
    }
}
```

## QUIZ.JAVA

```
package quiz.application;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class Quiz extends JFrame implements ActionListener {

   String questions[][] = new String[10][5];
   String answers[][] = new String[10][2];
   String useranswers[][] = new String[10][1];
   JLabel qno, question;
   JRadioButton opt1, opt2, opt3, opt4;
   ButtonGroup groupoptions;
   JButton next, submit, lifeline;

   public static int timer = 15;
   public static int ans_given = 0;
   public static int count = 0;
   public static int score = 0;

   String name;

   Quiz(String name) {
      this.name = name;
      setBounds(50, 0, 1440, 850);
      getContentPane().setBackground(Color.WHITE);
      setLayout(null);

      ImageIcon i1 = new
ImageIcon(ClassLoader.getSystemResource("icons/quiz.jpg"));
      JLabel image = new JLabel(i1);
      image.setBounds(0, 0, 1440, 392);
      add(image);

      qno = new JLabel();
      qno.setBounds(100, 450, 50, 30);
```

```
        qno.setFont(new Font("Tahoma", Font.PLAIN, 24));
        add(qno);

        question = new JLabel();
        question.setBounds(150, 450, 900, 30);
        question.setFont(new Font("Tahoma", Font.PLAIN, 24));
        add(question);

        questions[0][0] = "Which is used to find and fix bugs in the Java 
programs.?";
        questions[0][1] = "JVM";
        questions[0][2] = "JDB";
        questions[0][3] = "JDK";
        questions[0][4] = "JRE";

        questions[1][0] = "What is the return type of the hashCode() method in the 
Object class?";
        questions[1][1] = "int";
        questions[1][2] = "Object";
        questions[1][3] = "long";
        questions[1][4] = "void";

        questions[2][0] = "Which package contains the Random class?";
        questions[2][1] = "java.util package";
        questions[2][2] = "java.lang package";
        questions[2][3] = "java.awt package";
        questions[2][4] = "java.io package";

        questions[3][0] = "An interface with no fields or methods is known as?";
        questions[3][1] = "Runnable Interface";
        questions[3][2] = "Abstract Interface";
        questions[3][3] = "Marker Interface";
        questions[3][4] = "CharSequence Interface";

        questions[4][0] = "In which memory a String is stored, when we create a 
string using new operator?";
        questions[4][1] = "Stack";
        questions[4][2] = "String memory";
        questions[4][3] = "Random storage space";
        questions[4][4] = "Heap memory";
        questions[5][0] = "Which of the following is a marker interface?";
        questions[5][1] = "Runnable interface";
        questions[5][2] = "Remote interface";
        questions[5][3] = "Readable interface";
        questions[5][4] = "Result interface";

        questions[6][0] = "Which keyword is used for accessing the features of a
package?";
        questions[6][1] = "import";
        questions[6][2] = "package";
        questions[6][3] = "extends";
        questions[6][4] = "export";

        questions[7][0] = "In java, jar stands for?";
        questions[7][1] = "Java Archive Runner";
        questions[7][2] = "Java Archive";
        questions[7][3] = "Java Application Resource";
        questions[7][4] = "Java Application Runner";

        questions[8][0] = "Which of the following is a mutable class in java?";
        questions[8][1] = "java.lang.StringBuilder";
        questions[8][2] = "java.lang.Short";
        questions[8][3] = "java.lang.Byte";
        questions[8][4] = "java.lang.String";

        questions[9][0] = "Which of the following option leads to the portability
and security of Java?";
        questions[9][1] = "Bytecode is executed by JVM";
        questions[9][2] = "The applet makes the Java code secure and portable";
        questions[9][3] = "Use of exception handling";
        questions[9][4] = "Dynamic binding between objects";

        answers[0][1] = "JDB";
        answers[1][1] = "int";
        answers[2][1] = "java.util package";
        answers[3][1] = "Marker Interface";
        answers[4][1] = "Heap memory";
        answers[5][1] = "Remote interface";
        answers[6][1] = "import";
```

```
answers[7][1] = "Java Archive";
answers[8][1] = "java.lang.StringBuilder";
answers[9][1] = "Bytecode is executed by JVM";

opt1 = new JRadioButton();
opt1.setBounds(170, 520, 700, 30);
opt1.setBackground(Color.WHITE);
opt1.setFont(new Font("Dialog", Font.PLAIN, 20));
add(opt1);

opt2 = new JRadioButton();
opt2.setBounds(170, 560, 700, 30);
opt2.setBackground(Color.WHITE);
opt2.setFont(new Font("Dialog", Font.PLAIN, 20));
add(opt2);

opt3 = new JRadioButton();
opt3.setBounds(170, 600, 700, 30);
opt3.setBackground(Color.WHITE);
opt3.setFont(new Font("Dialog", Font.PLAIN, 20));
add(opt3);

opt4 = new JRadioButton();
opt4.setBounds(170, 640, 700, 30);
opt4.setBackground(Color.WHITE);
opt4.setFont(new Font("Dialog", Font.PLAIN, 20));
add(opt4);

groupoptions = new ButtonGroup();
groupoptions.add(opt1);
groupoptions.add(opt2);
groupoptions.add(opt3);
groupoptions.add(opt4);

next = new JButton("Next");
next.setBounds(1100, 550, 200, 40);
next.setFont(new Font("Tahoma", Font.PLAIN, 22));
next.setBackground(new Color(30, 144, 255));
next.setForeground(Color.WHITE);
next.addActionListener(this);
```

```
        add(next);

        lifeline = new JButton("50-50 Lifeline");
        lifeline.setBounds(1100, 630, 200, 40);
        lifeline.setFont(new Font("Tahoma", Font.PLAIN, 22));
        lifeline.setBackground(new Color(30, 144, 255));
        lifeline.setForeground(Color.WHITE);
        lifeline.addActionListener(this);
        add(lifeline);

        submit = new JButton("Submit");
        submit.setBounds(1100, 710, 200, 40);
        submit.setFont(new Font("Tahoma", Font.PLAIN, 22));
        submit.setBackground(new Color(30, 144, 255));
        submit.setForeground(Color.WHITE);
        submit.addActionListener(this);
        submit.setEnabled(false);
        add(submit);

        start(count);

        setVisible(true);
    }

    public void actionPerformed(ActionEvent ae) {
        if (ae.getSource() == next) {
            repaint();
            opt1.setEnabled(true);
            opt2.setEnabled(true);
            opt3.setEnabled(true);
            opt4.setEnabled(true);

            ans_given = 1;
            if (groupoptions.getSelection() == null) {
               useranswers[count][0] = "";
            } else {
                useranswers[count][0] =
groupoptions.getSelection().getActionCommand();
            }
```

```
         if (count == 8) {
            next.setEnabled(false);
            submit.setEnabled(true);
         }

         count++;
         start(count);
      } else if (ae.getSource() == lifeline) {
         if (count == 2 || count == 4 || count == 6 || count == 8 || count == 9) {
            opt2.setEnabled(false);
            opt3.setEnabled(false);
         } else {
            opt1.setEnabled(false);
            opt4.setEnabled(false);
         }
         lifeline.setEnabled(false);
      } else if (ae.getSource() == submit) {
         ans_given = 1;
         if (groupoptions.getSelection() == null) {
            useranswers[count][0] = "";
         } else {
            useranswers[count][0] =
groupoptions.getSelection().getActionCommand();
         }

         for (int i = 0; i < useranswers.length; i++) {
            if (useranswers[i][0].equals(answers[i][1])) {
               score += 10;
            } else {
               score += 0;
            }
         }
         setVisible(false);
         new Score(name, score);
      }
   }

   public void paint(Graphics g) {
      super.paint(g);
```

```
    String time = "Time left - " + timer + " seconds"; // 15
    g.setColor(Color.RED);
    g.setFont(new Font("Tahoma", Font.BOLD, 25));

    if (timer > 0) {
       g.drawString(time, 1100, 500);
    } else {
       g.drawString("Times up!!", 1100, 500);
    }

    timer--; // 14

    try {
       Thread.sleep(1000);
       repaint();
    } catch (Exception e) {
       e.printStackTrace();
    }

    if (ans_given == 1) {
       ans_given = 0;
       timer = 15;
    } else if (timer < 0) {
       timer = 15;
       opt1.setEnabled(true);
       opt2.setEnabled(true);
       opt3.setEnabled(true);
       opt4.setEnabled(true);

       if (count == 8) {
          next.setEnabled(false);
          submit.setEnabled(true);
       }
       if (count == 9) { // submit button
          if (groupoptions.getSelection() == null) {
            useranswers[count][0] = "";
          } else {
             useranswers[count][0] =
groupoptions.getSelection().getActionCommand();
          }
```

```
            for (int i = 0; i < useranswers.length; i++) {
                if (useranswers[i][0].equals(answers[i][1])) {
                    score += 10;
                } else {
                    score += 0;
                }
            }
            setVisible(false);
            new Score(name, score);
        } else { // next button
            if (groupoptions.getSelection() == null) {
               useranswers[count][0] = "";
            } else {
                useranswers[count][0] =
groupoptions.getSelection().getActionCommand();
            }
            count++; // 0 // 1
            start(count);
        }
    }

  }

  public void start(int count) {
    qno.setText("" + (count + 1) + ". ");
    question.setText(questions[count][0]);
    opt1.setText(questions[count][1]);
    opt1.setActionCommand(questions[count][1]);

    opt2.setText(questions[count][2]);
    opt2.setActionCommand(questions[count][2]);

    opt3.setText(questions[count][3]);
    opt3.setActionCommand(questions[count][3]);

    opt4.setText(questions[count][4]);
    opt4.setActionCommand(questions[count][4]);

    groupoptions.clearSelection();
  }

  public static void main(String[] args) {
    new Quiz("User");
  }
}
```

## RULES.JAVA

```
package quiz.application;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class Rules extends JFrame implements ActionListener{

   String name;
   JButton start, back;

   Rules(String name) {
      this.name = name;
      getContentPane().setBackground(Color.WHITE);
      setLayout(null);

      JLabel heading = new JLabel("Welcome " + name + " to Simple Minds");
      heading.setBounds(50, 20, 700, 30);
      heading.setFont(new Font("Viner Hand ITC", Font.BOLD, 28));
      heading.setForeground(new Color(30, 144, 254));
      add(heading);

      JLabel rules = new JLabel();
      rules.setBounds(20, 90, 700, 350);
      rules.setFont(new Font("Tahoma", Font.PLAIN, 16));
      rules.setText(
         "<html>"+
            "1. You are trained to be a programmer and not a story teller, answer
point to point" + "<br><br>" +
            "2. Do not unnecessarily smile at the person sitting next to you, they
may also not know the answer" + "<br><br>" +
            "3. You may have lot of options in life but here all the questions are
compulsory" + "<br><br>" +
            "4. Crying is allowed but please do so quietly." + "<br><br>" +
            "5. Only a fool asks and a wise answers (Be wise, not otherwise)" +
"<br><br>" +
            "6. Do not get nervous if your friend is answering more questions, may
be he/she is doing Jai Mata Di" + "<br><br>" +
            "7. Brace yourself, this paper is not for the faint hearted" + "<br><br>"
+
            "8. May you know more than what John Snow knows, Good Luck" +
"<br><br>" +
         "<html>"
      );
      add(rules);

      back = new JButton("Back");
      back.setBounds(250, 500, 100, 30);
      back.setBackground(new Color(30, 144, 254));
      back.setForeground(Color.WHITE);
      back.addActionListener(this);
      add(back);

      start = new JButton("Start");
      start.setBounds(400, 500, 100, 30);
      start.setBackground(new Color(30, 144, 254));
      start.setForeground(Color.WHITE);
      start.addActionListener(this);
      add(start);

      setSize(800, 650);
      setLocation(350, 100);
      setVisible(true);
   }

   public void actionPerformed(ActionEvent ae) {
      if (ae.getSource() == start) {
         setVisible(false);
         new Quiz(name);
      } else {
         setVisible(false);
         new Login();
      }
   }

   public static void main(String[] args) {
      new Rules("User");
```

```
    }
}
```

## SCORE.JAVA

```
package quiz.application;

import java.awt.*;
import javax.swing.*;
import java.awt.event.*;

public class Score extends JFrame implements ActionListener {

    Score(String name, int score) {
        setBounds(400, 150, 750, 550);
        getContentPane().setBackground(Color.WHITE);
        setLayout(null);

        ImageIcon i1 = new
ImageIcon(ClassLoader.getSystemResource("icons/score.png"));
        Image i2 = i1.getImage().getScaledInstance(300, 250,
Image.SCALE_DEFAULT);
        ImageIcon i3 = new ImageIcon(i2);
        JLabel image = new JLabel(i3);
        image.setBounds(0, 200, 300, 250);
        add(image);

        JLabel heading = new JLabel("Thankyou " + name + " for playing Simple
Minds");
        heading.setBounds(45, 30, 700, 30);
        heading.setFont(new Font("Tahoma", Font.PLAIN, 26));
        add(heading);

        JLabel lblscore = new JLabel("Your score is " + score);
        lblscore.setBounds(350, 200, 300, 30);
        lblscore.setFont(new Font("Tahoma", Font.PLAIN, 26));
        add(lblscore);

        JButton submit = new JButton("Play Again");
        submit.setBounds(380, 270, 120, 30);
        submit.setBackground(new Color(30, 144, 255));
        submit.setForeground(Color.WHITE);
        submit.addActionListener(this);
        add(submit);

        setVisible(true);
    }

    public void actionPerformed(ActionEvent ae) {
        setVisible(false);
        new Login();
    }

    public static void main(String[] args) {
        new Score("User", 0);
    }
}
```

## Learning from the Java-Based Quiz Application Project at Pie Infocomm

1. Introduction

During my internship at Pie Infocomm, I was assigned to work on a Java-based quiz application project. This report summarizes the key learnings and experiences gained throughout the project, highlighting technical skills, project management insights, and personal growth.

2. Project Overview

The Java-based quiz application aimed to provide an interactive and engaging platform for users to test their knowledge on various topics. The application included features such as multiple-choice questions, timed quizzes, score tracking, and user feedback.

3. Technical Skills Acquired

3.1. Java Programming

Core Java Concepts: Gained a deeper understanding of Java fundamentals, including object-oriented programming principles, exception handling, and data structures.
Swing Framework: Utilized Java Swing for creating the graphical user interface (GUI) of the application, which enhanced my skills in designing user-friendly interfaces.
File Handling: Implemented file handling to manage quiz data, including reading from and writing to text files, which

improved my ability to work with file I/O operations.

### 3.2. Database Integration

JDBC (Java Database Connectivity): Used JDBC to connect the application with a database for storing quiz questions, user scores, and other relevant data. This experience strengthened my knowledge of database interactions and SQL queries.

Database Design: Designed and implemented the database schema, which involved creating tables, relationships, and ensuring data integrity.

### 3.3. Application Testing

Unit Testing: Applied JUnit for unit testing Java classes, which helped in identifying and fixing bugs early in the development process.

User Testing: Conducted user testing sessions to gather feedback and make necessary improvements based on user experience and usability.

## 4. Project Management Insights

### 4.1. Agile Methodology

Sprint Planning: Participated in sprint planning meetings to prioritize tasks and set achievable goals for each development cycle.

Daily Standups: Engaged in daily standup meetings to provide updates on progress, discuss challenges, and collaborate with team members.

### 4.2. Time Management

Task Prioritization: Learned to prioritize tasks effectively and

manage time efficiently to meet project deadlines.
Milestone Tracking: Monitored project milestones and adjusted plans as needed to stay on track with project goals.

## 5. Personal Growth

### 5.1. Problem-Solving Skills

Debugging: Enhanced problem-solving abilities by debugging code, identifying issues, and implementing solutions.
Critical Thinking: Developed critical thinking skills through analyzing project requirements and finding optimal solutions.

### 5.2. Team Collaboration

Communication: Improved communication skills by collaborating with team members, participating in meetings, and providing constructive feedback.
Teamwork: Gained experience in working as part of a team, understanding different roles, and contributing to a shared goal.

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