DECLARATION

I Bhagya Raju Naik [4HG21CS403] student of 8th semester B.E, CSE, Government Engineering College, here by declare that the internship entitled **"CORE JAVA"** has been carried out by me, under the supervision of **"INTERNSHALA"** submitted in partial fulfilment of the requirements for the award of the degree of Computer Science and Engineering by the Visvesvaraya Technological University during the academic year 2023-24. This report has not been submitted to any other organization/university for any award of degree certificate.

BY:

BHAGYA RAJU NAIK [4HG21CS403]

ABSTRACT

Tic-Tac-Toe is a very common game that is fairly easy to play. The rules of the game are simple and well-known. Because of these things, Tic-Tac-Toe is fairly easy to code up. we will be looking at how to code a working game of Tic-Tac-Toe in Java. This project assumes that you have knowledge of the syntax of Java, and access to a working Java compiler. This project will use the IntelliJ IDEA.

There are many ways to implement a game of Tic-Tac-Toe in Java, so before we begin coding, I must think about how we will implement the game specifically. In the Tic-Tac-Toe game, you will see the approach of the game is implemented. In this game, two players will be played and you have one print board on the screen where from X and O symbol will be displayed. Now, you have to choose X or O for the specific box number. For example, if you have to select any symbol then X or O will be shown on the print board, and turn for next will be there. The task is to create a Java program to implement a 3×3 Tic-Tac-Toe game for two players. Our Tic-Tac-Toe will start out by printing the board, and then asking for input from the first player.That will specify where on the board to place that player's Result. We will print the board state again and then ask the other player for their move. That process will be continued until one player wins or the board is filled up. The input that will be taken in to specify where to place a mark will be in the format of two integers, which specify the row and column where the mark is to be placed.

ACKNOWLEDGEMENT

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Chapter 1

Introduction

The word Core describes the basic concept of something, and here, the phrase 'Core Java' defines the basic Java that covers the basic concept of Java programming language. We all are aware that Java is one of the well-known and widely used programming languages, and to begin with it, the beginner has to start the journey with Core Java and then towards the Advance Java. The Java programming language is a general-purpose programming language that is based on the OOPs concept. The ocean of Java is too deep to learn, i.e., as much you learn more, you will know its depth. Java is a platform-independent and robust programming language. Although Java is self-contained, it is normal for newcomers to start with the fundamentals of the language. In reality, there are several editions of Java, with Core Java being one of them.

The goal of this project was to make a computer game using core java, and Tic tac toe seemed like the most fun. This project version of tic tac toe to be as realistic to the actual board game as possible. This follows all the same rules to apply. The motivation for this project came from the desire to give a fun game to play over winter break, and from the aspiration to make a game people can really play on the computer. This project is interesting because the code involves some complicated nested for loops and if then statements. This project took a lot of problem solving, but with lots of trial and error we were successful with creating Tic Tac Toe game.

1.1   About the training center

Internshala is an online platform that serves as a bridge between students and employers, primarily focusing on internship opportunities. Founded in 2010 by Sarvesh Agrawal, it has grown into one of the largest internships and online training platforms in India, with a mission to create a world where every student is equipped to realize their aspirations.The platform offers a wide array of internships across various fields, including engineering, management, design, content writing, and more. These internships cater to students from diverse educational backgrounds, ranging from undergraduate to postgraduate levels.

Internshala provides a user-friendly interface where students can easily search for internships based on their preferences such as location, duration, stipend, and field of interest. It also offers resources and guidance to help students prepare for interviews, build their resumes, and enhance their skills through online training programs.For employers, Internshala offers a platform to reach out to a vast pool of talented students, enabling them to find the right candidates for their internships and entry-level positions. This benefits both students seeking valuable work experience and employers looking to discover fresh talent.Overall, Internshala has emerged as a vital platform in the Indian job market, facilitating meaningful connections between students and employers while empowering.

Figure 1.1: Internshala logo

1.1.1   Vision

Internshala's vision revolves around empowering students and young professionals by providing them with access to meaningful opportunities that help them realize their potential and kick-start their careers. Here's a more detailed breakdown of Internshala's

- **Access to Opportunities:** Internshala envisions a world where every student, regardless of their background or geographic location, has access to a wide range of internship and training opportunities. By democratizing access to such opportunities, Internshala aims to level the playing field and ensure that talent is recognized and nurtured irrespective of socio-economic factors.

- **Skill Development:** Internshala believes in the importance of continuous learning and skill development. Its vision involves equipping students with the necessary skills and knowledge required to succeed in their chosen fields. Through its online training programs and resources, Internshala aims to empower individuals to enhance their skill sets and stay competitive in a rapidly evolving job market.

- **Career Readiness:** Internshala strives to bridge the gap between academic learning and practical industry experience. Its vision entails preparing students and young professionals for the realities of the workplace by providing them with opportunities to gain hands-on experience, develop industry-relevant skills, and build professional networks.

- **Impact:** Internshala's vision extends beyond individual success to societal impact. By nurturing talent and fostering a culture of learning and innovation, Internshala envisions contributing to the growth and development of industries and economies, ultimately creating a positive ripple effect on society as a whole.

1.1.2 Mission

- **Connect Talent with Opportunities:** Internshala aims to bridge the gap between students/young professionals and employers by providing a platform where they can connect seamlessly. The mission involves matching talented individuals with diverse internship and job opportunities across various industries and sectors.

- **Facilitate Skill Development:** Internshala is committed to facilitating skill development and learning among students and young professionals. Its mission includes providing access to high-quality online training programs, workshops, and resources that empower individuals to acquire new skills, enhance their knowledge, and stay relevant in a rapidly changing job market.

- **Promote Career Readiness:** Internshala strives to prepare individuals for the realities of the workplace and enhance their career readiness. Its mission involves offering guidance, support, and resources to help students and young professionals build their resumes, ace interviews, and navigate the complexities of starting their careers.

- **Empowerment through Knowledge:** Internshala believes in the transformative power of education and knowledge. Its mission includes democratizing access to educational resources and information, empowering individuals with the knowledge they need to make informed decisions about their careers, and fostering a culture of lifelong learning.

1.2   Problem Statement

The problems are solved by forming a possible set of solutions based on the endgame condition, or searching for the set of solutions based on the current game condition. The machine cannot learn to play the games by itself.Unlike an evolutionary approach was employed to evolve and to learn for playing Tic-Tac-Toe without the need of a database.Tic-tac-toeis a pencil-and-paper game for two players X and O, The player who succeeds in placing three respective marks in a horizontal, vertical,or diagonal row wins the game.

1.3   Objectives

Here are some possible objectives for a Tic-Tac-Toe creator on a Java project:

- **Platform independence:** Java programs can run on any platform or operating system without any modifications. This is possible because Java code is compiled into bytecode, which can run on any machine with a Java Virtual Machine (JVM).

- **Object-oriented programming:** Java is an object-oriented programming language. This means that it supports the creation of reusable code in the form of objects, which can be used and modified as needed.

- **Memory management:** Java provides automatic memory management, which means that the programmer does not need to manually allocate and deallocate memory. This helps prevent common programming errors such as memory leaks.

- **Security:** Java is designed with security in mind. It provides features such as sandboxing and security manager, which can prevent malicious code from causing harm.

- **Multithreading:** Java supports multithreading, which means that multiple threads can run simultaneously within a program. This can improve performance and responsiveness of the program.

- **Exception handling:** Java provides built-in support for handling exceptions, which are runtime errors that can occur during program execution. This allows programmers to write code that can handle errors gracefully.

- **Standard libraries:** Java provides a large set of standard libraries that can be used to perform common programming tasks. This can save programmers time and effort by providing pre-built functionality

1.4 Application

Here are some potential applications for Tic-Tac-Toe game creators in java :

- **Education and Cognitive Development:** Tic-tac-toe is commonly used in educational settings to teach concepts like logic, spatial reasoning, and critical thinking skills. It helps in developing strategic thinking and problem-solving abilities.

- **Teaching Tool:** Tic-tac-toe is often used as a teaching tool to introduce basic concepts of game theory, decision-making, and strategy. It helps in understanding fundamental principles like decision trees, optimal strategies, and outcomes.

- **Artificial Intelligence (AI) Research:** Tic-tac-toe serves as a fundamental problem in the field of artificial intelligence. It is frequently used as a starting point for teaching AI concepts and developing simple AI algorithms, such as minimax and alpha-beta pruning.

- **Algorithm Design and Analysis:** Tic-tac-toe provides a simple yet effective platform for testing and implementing various algorithms and data structures. It can be used to teach concepts like recursion, backtracking, and graph traversal algorithms.

- **Testing and Debugging:** In software development, tic-tac-toe can be employed as a test case for debugging and testing algorithms and programs. Its simplicity allows developers to quickly iterate and refine their code.

- **Reinforcement Learning:** Tic-tac-toe is often used as a benchmark problem in reinforcement learning research. Agents can be trained to play tic-tac-toe using techniques like Q-learning or deep reinforcement learning.

- **Game Design and Analysis:** Analyzing tic-tac-toe can provide insights into game design principles such as balance, symmetry, and player engagement. It serves as a case study for understanding the dynamics of simple games.

- **Interactive Learning:** Tic-tac-toe can be utilized as an interactive learning tool in various educational domains, including mathematics, computer science, and psychology. It engages learners in a hands-on activity while reinforcing important concepts.

- **Physical Board Games:** While digital versions are common, Tic-Tac-Toe can also be implemented as a physical board game using materials like paper, cardboard, or wood. Physical board games can be great for social gatherings, family game nights, or educational settings.

- **Variations and Extensions:** Developers can create variations of the traditional Tic-Tac-Toe game by adding new rules, board sizes, or player configurations. For example, a 3D version of Tic-Tac-Toe played on a cube grid or a larger grid with more players could offer a new twist on the classic game.

1.5   Advantages

- **Simple Rules:** Tic-Tac-Toe has very simple rules, making it easy for players of all ages to learn and understand. The game can be enjoyed by children as young as preschool age, as well as adults.

- **Quick to Play:** A typical game of Tic-Tac-Toe can be completed in just a few minutes, making it ideal for situations where players have limited time available, such as during a short break or while waiting for an appointment.

- **No Special Equipment Required:** Tic-Tac-Toe can be played using nothing more than a pen and paper, making it accessible to virtually anyone, anywhere. It can also be played digitally on computers, smartphones, or other electronic devices.

- **Promotes Strategic Thinking:** Despite its simplicity, Tic-Tac-Toe requires players to think strategically and plan their moves in advance. Players must anticipate their opponent's moves and adapt their strategy accordingly to win the game.

- **Encourages Problem-Solving Skills:** Playing Tic-Tac-Toe helps develop problem-solving skills as players must analyze the game board, identify potential winning moves, and decide the best course of action to achieve victory.

- **Teaches Spatial Awareness:** Tic-Tac-Toe requires players to understand and manipulate spatial relationships, as they must place their marks strategically on the game board to create winning patterns.

- **Fosters Social Interaction:** Tic-Tac-Toe can be played with friends, family members, or even strangers, providing opportunities for social interaction and bonding. It encourages communication, cooperation, and friendly competition among players.

- **Suitable for All Ages:** Tic-Tac-Toe is a timeless game that appeals to people of all ages, from young children to seniors. It can be enjoyed as a casual pastime or as a more serious strategic challenge, depending on the skill level of the players.

- **Adaptable for Learning Purposes:** Tic-Tac-Toe can be adapted for educational purposes to teach various concepts, such as mathematics, logic, critical thinking, and decision-making. Teachers can create customized game boards to reinforce learning

objectives and engage students in interactive activities.

- **Versatile and Customizable:** Tic-Tac-Toe can be played in different variations, such as on larger game boards, with additional players, or with modified rules. This versatility allows players to tailor the game to their preferences and experiment with new challenges.

1.6   Disadvantages

- **Limited Complexity:** Tic-Tac-Toe has a relatively simple game structure, which means that once players understand the basic strategy, the game becomes predictable and may lose its appeal over time. Advanced players may find Tic-Tac-Toe lacking in depth compared to more complex strategy games.

- **Potential for Draws:** Due to its small game board and limited number of moves, Tic-Tac-Toe has a high likelihood of ending in a draw if both players play optimally. This can lead to frustration for players seeking a clear winner and may result in less satisfaction from the game.

- **Linear Gameplay:** Tic-Tac-Toe follows a linear progression where players take turns placing their marks on the game board. This sequential gameplay may become repetitive or monotonous for some players, especially those seeking more dynamic or interactive gaming experiences.

- **Minimal Skill Development:** While Tic-Tac-Toe can help develop basic problem-solving and strategic thinking skills, its simple rules and limited complexity may not provide significant opportunities for skill improvement or mastery. Players may reach a plateau in their abilities relatively quickly.

- **Lack of Long-Term Engagement:** Unlike more complex games with evolving storylines or progression systems, Tic-Tac-Toe may lack long-term engagement for some players. Once they have mastered the game's strategy, they may lose interest in playing repeatedly.

- **Limited Player Interaction:** In standard Tic-Tac-Toe games, players take turns making moves without directly interacting with each other beyond placing their

marks on the game board. This minimal player interaction may result in less social engagement compared to multiplayer games with more collaborative or competitive elements.

- **Not Suitable for Large Groups:** Tic-Tac-Toe is typically designed for two players, which may limit its suitability for social gatherings or events with larger groups of people. While variations of the game can accommodate more players, the core game play remains relatively simple and may not scale well for larger groups.

- **Dependency on Randomization:** In scenarios where players have equal skill levels and employ optimal strategies, the outcome of a Tic-Tac-Toe game may be determined by chance or randomization, such as who makes the first move. This element of luck can diminish the perceived fairness or competitiveness of the game.

- **Limited Educational Value:** While Tic-Tac-Toe can be used as an educational tool to teach basic concepts such as logic and spatial reasoning, its simplistic nature may not provide sufficient depth for more advanced learning objectives. Educators may need to supplement Tic-Tac-Toe with additional teaching methods or materials to achieve desired educational outcomes.

- **Perception as a Child's Game:** Tic-Tac-Toe is often perceived as a children's game due to its simple rules and associations with elementary school activities. This perception may deter some adults from playing or taking the game seriously, limiting its appeal to certain demographics.

1.7   Organization of Report

This internship in Java development with a project is divided up into chapters, each dealing with different aspects of the project. Each chapter has a short introduction explaining the subject of each chapter, and then the details Each module is explained separately. The following is a short overview of each of the chapters

Chapter 1 : In this chapter, we will discuss the introduction of a core java internship with a simple project. and also discuss the problem statement, objectives, advantages, and disadvantages.

Chapter 2: In this chapter, we will discuss the literature survey of Java.

Chapter 3: In this chapter, we discuss the requirements specifications of the project and functional and nonfunctional requirements.

Chapter 4: This section specifies the overflow / Methodology of the project.

Chapter 5: Gives the design description of the project, conceptual and detailed design well supported with the design diagrams.

Chapter 6: In this chapter, we specify the snapshots of the implementation of the project.

Chapter 7: The conclusion of the internship with project is discussed here.

Chapter 2

Literature Survey

Tic Tac Toe might have been studied under broader discussions of ancient games or recreational mathematics. Specific publications may be scarce, but historical accounts could provide insights into its early forms and cultural significance.

- 1952: Claude Shannon's paper "Programming a Computer for Playing Chess" discusses Tic Tac Toe as a solved game, exploring its mathematical properties and optimal strategies.

- 1953: Herbert Simon and Allen Newell's work on logic theory machines includes analyses of Tic Tac Toe as a simple game for AI experimentation. Computational Complexity and AI (Late 20th Century):

- 1960s-1970s: Various publications emerge discussing Tic Tac Toe as a benchmark problem in AI research, focusing on algorithmic approaches to game playing. 1989: Victor Allis publishes "A Knowledge-Based Approach to Connect-Four," which includes discussions on Tic Tac Toe as a case study in game-solving techniques. Modern AI and Machine Learning (21st Century):

- 2006: "Monte Carlo Sampling for Regret Minimization in Extensive Games" by Coulom discusses Monte Carlo Tree Search, a technique later applied to games like Tic Tac Toe. 2010s: With advancements in machine learning, Tic Tac Toe serves as a simple yet effective testbed for exploring neural network-based approaches to game playing. Educational and Psychological Studies (21st Century):

- 2008: "Ultimate Tic Tac Toe" gains popularity, spawning research on more complex variants and their implications for strategy and gameplay.

- 2012: Tic Tac Toe is featured in educational apps and platforms as a gamified learning tool, catering to diverse age groups and learning objectives. Recent Trends and Future Directions:

- 2015: Research emerges on the educational benefits of Tic Tac Toe in teaching logic and strategic thinking to children, with a focus on its simplicity and accessibility. Variants and Extensions (21st Century):

- 2019: "Quantum Tic Tac Toe" is explored in theoretical physics and computer science, introducing quantum mechanics concepts to the game. Practical Applications and Gamification (21st Century):

- 2020s: Ongoing research focuses on hybrid approaches that combine classical AI techniques with modern machine learning methods to enhance Tic Tac Toe gameplay and strategy.

2.1   Summary

Overall, a literature survey of core Java would cover a wide range of topics related to the Java programming language and its associated libraries and frameworks. It would be useful for both novice and experienced Java developers looking to deepending their understanding of the language and improve their development skills.

Chapter 3

Requirement Analysis

3.1 Hardware Requirements

Name	Minimum Requirement
Processor	i3 or i5 2Ghz
RAM	4Gb
Hard Disk	10Gb

Table 3.1: Minimum Hardware Requirement

3.2 Software Requirements

Name	Minimum Requirement
Operating System	Windows 10
Language	Core JAVA
IDE	IntelliJ IEDA

Table 3.2: Minimum Software Requirement

Figure 3.1: Core Java Programming logo

The word Core describes the basic concept of something, and here, the phrase 'Core Java' defines the basic Java that covers the basic concept of Java programming language. We all are aware that Java is one of the well-known and widely used programming languages, and to begin with it, the beginner has to start the journey with Core Java and then towards the Advance Java. The Java programming language is a general-purpose programming language that is based on the OOPs concept. The ocean of Java is too deep to learn, i.e., as much you learn more, you will know its depth. Java is a platform-independent and robust programming language. The principle followed by Java is WORA that says Write Once, Run Anywhere. The programming language is quite simple and easy to understand. But one should know that Core Java is not different from Java. Java is complete in itself, but for the beginners, it is natural that the beginner must begin with the core concepts of Java. In actual, Java has different editions, where Core Java is one of the parts of an edition.

The following concepts are some of the major basic concepts of Java through which a beginner should go through:

- Java Fundamentals

- OOPs Concepts

- Overloading Overriding

- Inheritance with Interface and Abstract Class

- Exception Handling

- Packages

- Collections

- Multithreading

- Swings

- Applets

- JDBC (Basic Database Connections)

Although these major concepts hold its own depth, after gaining and implementing the best knowledge in the basic Java concepts, one can move towards the advanced Java version as the advanced section of the Java is quite interesting but can only be understood when the core concepts of Java are clear.

3.3 IntelliJ IEDA

Figure 3.2: IntelliJ IEDA logo

IntelliJ IDEA is an integrated development environment (IDE) written in Java for developing computer software written in Java, Kotlin, Groovy, and other JVM-based languages. It is developed by JetBrains (formerly known as IntelliJ) and is available as an Apache 2 Licensed community edition, and in a proprietary commercial edition. Both can be used for commercial development. IntelliJ IDEA is the leading IDE for Java and

Kotlin development. It helps you stay productive with a suite of efficiency-enhancing features such as intelligent coding assistance, reliable refactorings, instant code navigation, built-in developer tools, web and enterprise development support, and much more.

Features

- Coding assistance: The IDE provides certain features[14] like code completion by analyzing the context, code navigation which allows jumping to a class or declaration in the code directly, code refactoring, code debugging[15] , linting and options to fix inconsistencies via suggestions.

- Built in tools and integration: The IDE provides[14] integration with build/packaging tools like Grunt, bower, Gradle, and sbt. It supports version control systems like Git, Mercurial, Perforce, and Subversion. Databases like Microsoft SQL Server, Oracle, PostgreSQL, SQLite, and MySQL can be accessed directly from the IDE in the Ultimate edition, through an embedded version of DataGrip, another IDE developed by JetBrains.

- Plugin ecosystem: IntelliJ supports plugins through which one can add additional functionality to the IDE. Plugins can be downloaded and installed either from IntelliJ's plugin repository website or through the IDE's inbuilt plugin search and install feature. Each edition has separate plugin repositories, with both the Community and Ultimate editions totaling over 3000 plugins each as of 2019.

3.4   Functional Requirements

Functional requirements define the features and capabilities that a software application must have to meet the needs of its users. Here are some functional for a TicTacToe game:

- **Game board:**   The game should have a 3x3 board with 9 slots for placing game pieces.

- **Game pieces:** There should be two different colored game pieces that players can use to place in the slots of the game board.

- **Game rules:** The game should follow the standardtic tac toe rules where players take turns placing their game pieces in the board, with the objective of getting four of their pieces in a row, either vertically, horizontally, or diagonally.

- **Player options:** The game should allow players to choose their players Symbol preference. choose whether to play against a humans.

- **Game modes:** The game should include two players mode only.

- **Scoring:** The game should keep track of player result and display them at the end of each game.

- **User interface:** The game should have a user-friendly interface that allows players to easily place their game pieces, view the game board and result. selections.

3.4.1   Summary

The functional requirements for a Tic Tac Toe game include a standard game board,game pieces, rules, player options, multiple game modes, result, user interface By meeting these requirements, the game can provide a fun and engaging experience for players.

3.5   Non Functional Requirements

Non-functional requirements define the qualities that a software application must possess in addition to its functional requirements. Here are some non-functional requirements for a TicTacToe game:

- **Performance:** The game should be responsive and perform smoothly, with quick load times and minimal lag during gameplay.

- **Reliability:** The game should be stable and free of errors or crashes.

- **Compatibility:** The game should be compatible with multiple operating systems and devices, and should be designed to function on different screen sizes.

- **Security:** The game should be designed with security measures to protect user data and prevent unauthorized access.

- **Accessibility:** The game should be designed to be accessible to a wide range of users, including those with disabilities. This includes options for adjusting the font size, color contrast, and sound settings.

- **Usability:** The game should have an intuitive and user-friendly interface that is easy to navigate and understand.

- **Scalability:** The game should be able to accommodate a two number of players at the same time without compromising performance.

- **Maintainability:** The game should be easy to maintain, with clear documentation and a modular architecture that allows for easy updates and bug fixes. secure.

3.5.1 Summary

This in section we discus about the requirements for the project such as hardware, software, functional like game board, game,pieces, user interface, and so on. and non functional requirements like performance, reliability, security, and so on.

Chapter 4

Proposed Methodology

4.1 Methodology

- **Open IntelliJ IDEA:** Launch IntelliJ IDEA and create a new project.

- **Create a Java Class for the Game:** Right-click on the src folder in your project, select New Java Class, and name it TicTacToe.

- **Implement the Game Logic:** Inside the TicTacToe class, implement the game logic according to the methodology mentioned earlier.

- **Build and Run the Game:** After implementing the game logic, build and run the project to play the game.

- **Define the Game Board:** You'll need to represent the Tic-Tac-Toe board. Decide on the size of the board (typically 3x3).Two symbols are there such as X and O.

- **Display the Board:** Create a method to display the current state of the board to the players.

- **Player Input:** Implement a way for players to input their moves. This can be done by accepting input for the row and column they want to place their mark.

- **Check for Winning Condition:** After each move, check if there is a winner. The game is won when a player has placed three of their marks in a horizontal, vertical, or diagonal row.

- **Check for Draw Condition:** If there are no winners and no more moves can be made, the game is a draw.

- **Alternate Turns:** Implement logic to alternate turns between the players.

- **Implement Game Loop:** Create a loop that continues until the game is won or a draw occurs.

- **Handle Game Ending:** Once the game is won or drawn, display the result and ask if players want to play again.

4.2   Summary

In this chapter, we discussed methodology. The methodology involves the modules of our system.IntelliJ IDEA,creating class,run the game Game Board,Player Input and result of the game.

Chapter 5

Design

Tic Tac Toe is typically played on a 3x3 grid. So, you need to represent this grid/board in your Java program. A common of characters to represent the board. Each cell of the array can hold one of three values: 'X', 'O' represents an empty cell, 'X' represents a move by player 1, and 'O' represents a move by player 2. In Tic Tac Toe, players take turns to make their moves. You need to keep track of whose turn it is. A simple way to do this is by using a variable to represent the current player. This variable alternates between 'X' and 'O' after each move.

You need to provide a way to display the current state of the board to the players. Players can only make moves on empty cells of the board. You need to validate the moves made by players to ensure that they are making valid moves. If a player tries to make a move on a non-empty cell or an out-of-bounds cell, it should be rejected. A player wins the game if they have three of their symbols ('X' or 'O') in a row (horizontally, vertically, or diagonally). After each move, you need to check if the current player has won the game. If so, you should declare the winner and end the game.

The game should continue until either a player wins or the game ends in a tie. They need to implement a loop that allows players to make moves alternately until the game is over.
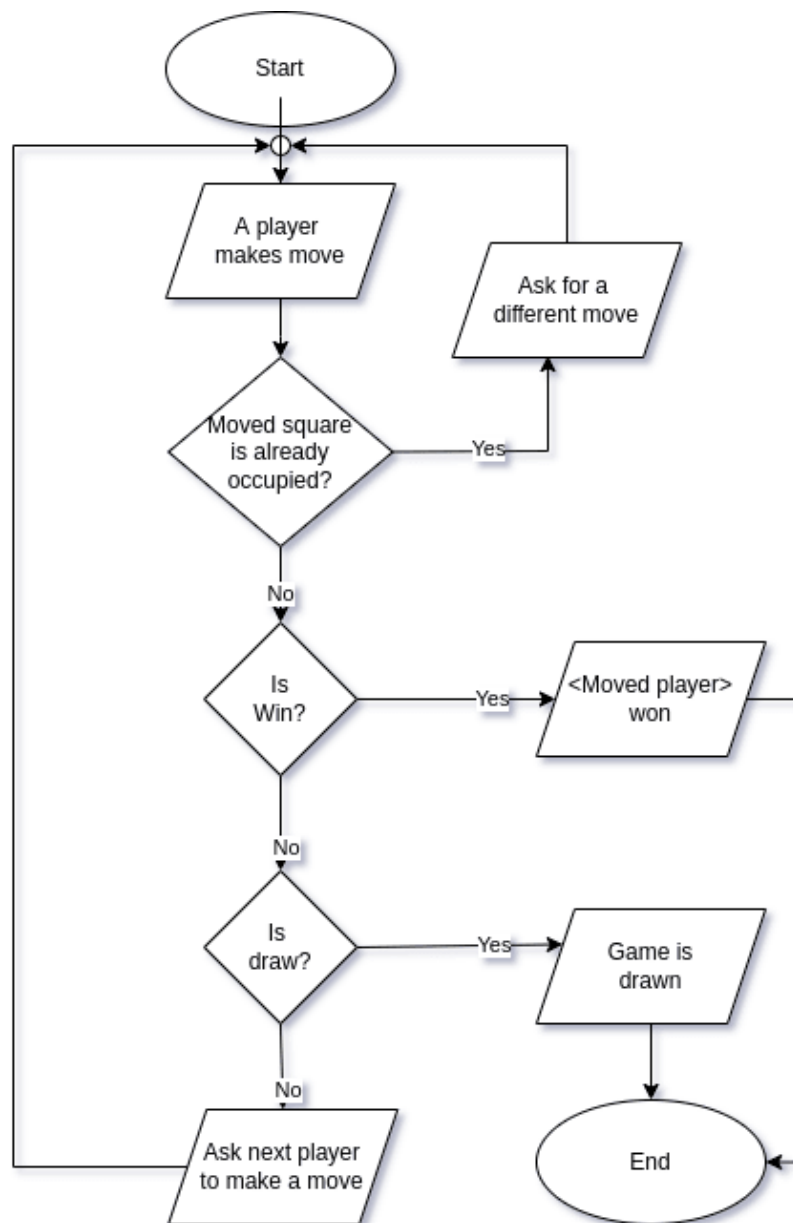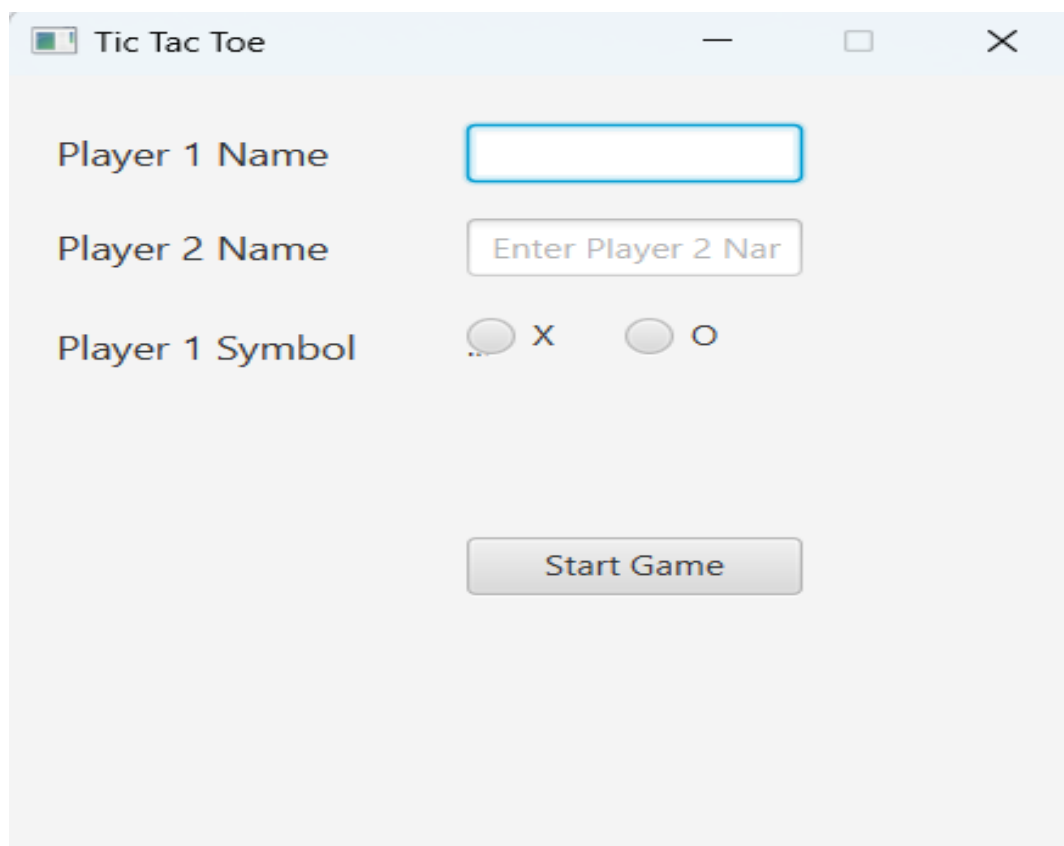
5.1   Flow chart

Figure 5.1: Flow chart

Chapter 6

Implementation

6.1   Home Page

Figure 6.1: Home page

The above figure shoes the design layout. In this game, two When it is the player's turn to play. Players name should mantioned and select the Symbole of X and O. and start the game.
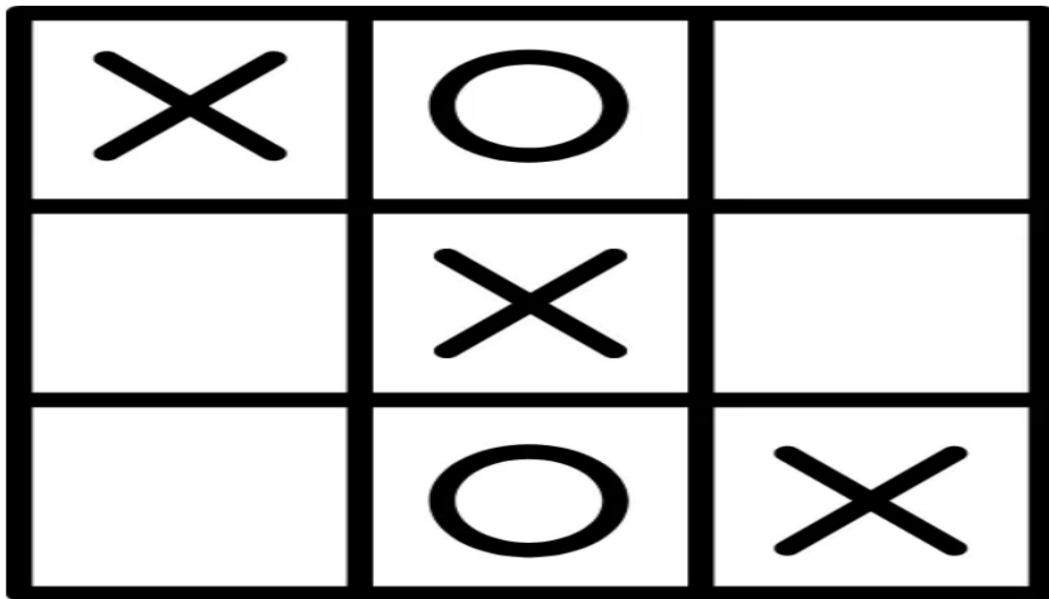
6.2   Tic Tac Toe game Layout

Figure 6.2: Layout page

It is a grid of three rows by three columns.The rules are simple two player's game rack game, in which the players choose a symbol and then take turns dropping symbol tokens into a three-column, three-row vertically suspended grid. The pieces fall straight down, occupying the lowest available space within the column. The objective of the game is to be the first to form a horizontal, vertical, or diagonal line of four of one's own tokens. TicTacToe is a solved game.

6.3   Tic Tac Toe Game Result

Figure 6.3: Tic Tac Toe Game Result

In the figure 6.2 above, describe the message of Tic Tac Toe game final result and game winner name is display, and play again and exit game option is there.

Chapter 7

Conclusion

Java is an object-oriented programming language. It is a general-purpose programming language, mainly designed to run developed java code on all platforms that support Java without recompilation.As all know, Java is one of the most popular and in-demand programming languages to learn and it was one of the first languages to standardise high-level threading utilities.Java project is a must for aspiring developers. This project helps developers develop real-world projects to hone their skills and materialise their theoretical knowledge into practical experience. Java has significant advantages both as a commercial language and also as a teaching language.In conclusion,

The implementation of the Tic-Tac-Toe game in Java using IntelliJ IDEA provides a practical demonstration of software development using a popular integrated development environment (IDE). By leveraging IntelliJ IDEA's features and tools, developers can efficiently write, debug, and test their code, resulting in a well-structured and functional applications.Tic-Tac-Toeis a classic strategy game that can be enjoyed by people of all ages. The game's simple rules and objective make it easy to learn, yet difficult to master, providing hours of entertainment and intellectual challenge.

Bibliography

[1] S. Garg and D. Songara,"The winner decision model of Tic-Tac-Toe" game by using multi-tape turing machine,Sep 2016,

[2] Sai Surya Teja Gontumukkala, Yogeshwara Sai Varun Godavarthi, Bhanu Rama Ravi Teja Gonugunta,"Implementation of Tic Tac Toe Game using Multi-Tape Turing Machine", May 2022.

[3] Dwi H. Widyantoro,Yus G."Learning to play Tic-tac-toe",05-07 August 2009.

[4] Ghory, Imran,"Reinforcement learning in board games" march -2004.

[5] D.B. Fogel,"Using evolutionary programing to create neural networks that are capable of playing tic-tac-toe", 28 March 1993 - 01 April 1993.