



**TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
PULCHOWK CAMPUS**

**A PROJECT PROPOSAL ON  
BAAL ARJUN : A 2D ARROW SHOOTING GAME**

Submitted by:  
**ANUJ SHRESTHA (078BCT014)**  
**ARISHA PRASAIN (078BCT019)**  
**AYUSH ADHIKARI (078BCT024)**

**A PROJECT PROPOSAL TO THE DEPARTMENT OF  
ELECTRONICS AND COMPUTER ENGINEERING ON OBJECT  
ORIENTED PROGRAMMING APPLICATION USING C++**

**SUBMITTED TO:  
DEPARTMENT OF ELECTRONICS AND COMPUTER  
ENGINEERING**

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### **Authors:**

Anuj Shrestha  
Arisha Prasain  
Ayush Adhikari

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# 1 OBJECTIVES

The primary objective of this project is to facilitate the practical application of the Object-Oriented Programming (OOP) model using the well-established and effective programming language, C++. The key objectives pertaining to the development of this project are outlined as follows:

1. To gain a comprehensive understanding of the Object-Oriented Programming paradigm, encompassing its principles and successfully implementing them in the project.
2. To explore the fundamental as well as advanced features offered by C++.
3. To acquire knowledge and proficiency in designing custom header files, thereby familiarizing ourselves with the concepts of modularity and reusability.
4. To acquire a foundational understanding of game development and testing, with a specific focus on the development of game.
5. To become acquainted with graphics libraries such as SFML, enabling the design and implementation of a user-friendly user interface (UI).
6. To develop a program that exhibits high performance and efficiency, taking the factors such as memory management, time constraints, algorithmic complexity, and optimal resource utilization into consideration.
7. To enhance our abilities in teamwork and collaborative communication, fostering effective cooperation among project members.

By pursuing these objectives, we aim to gain practical knowledge and skills in OOP principles, C++ programming, modular design, game development practices, UI design, and optimization techniques. Moreover, this project serves as an opportunity to strengthen our collaborative abilities, enhancing our team dynamics and communication skills.

## 2 INTRODUCTION

Baal Arjun is a 2D arrow shooting game that takes inspiration from the esteemed character Arjuna in the epic Mahabharata, who is widely regarded as the preeminent archer of that era. This game, known as "Baal Arjun," offers an engaging single-player experience, consisting of three chapters, each comprising numerous levels.

Within each level, the player navigates the screen and utilizes both the mouse and keyboard to precisely adjust the angle of the character named 'Arjun' in order to strike the target. The angle and position of the character can be modified until the left mouse button is clicked. Once the left button is released, the arrow swiftly propels toward the designated target coordinate. Initially, the player is allotted a limited number of arrows and possesses a finite life. With each successful hit on the target, the player's score increases. If the target is missed, the player continues playing the same level until all arrows are depleted. To successfully pass a level, all targets must be accurately hit within the designated time frame, subsequently unlocking the next level.

In the initial stages, the targets remain stationary, gradually transitioning into a non-stationary state as the levels progress, thus adding an element of challenge and dynamism to the gameplay.



Figure 1: Proposed Loading Screen

## 3 PROPOSED SYSTEM

### 3.1 DESCRIPTION

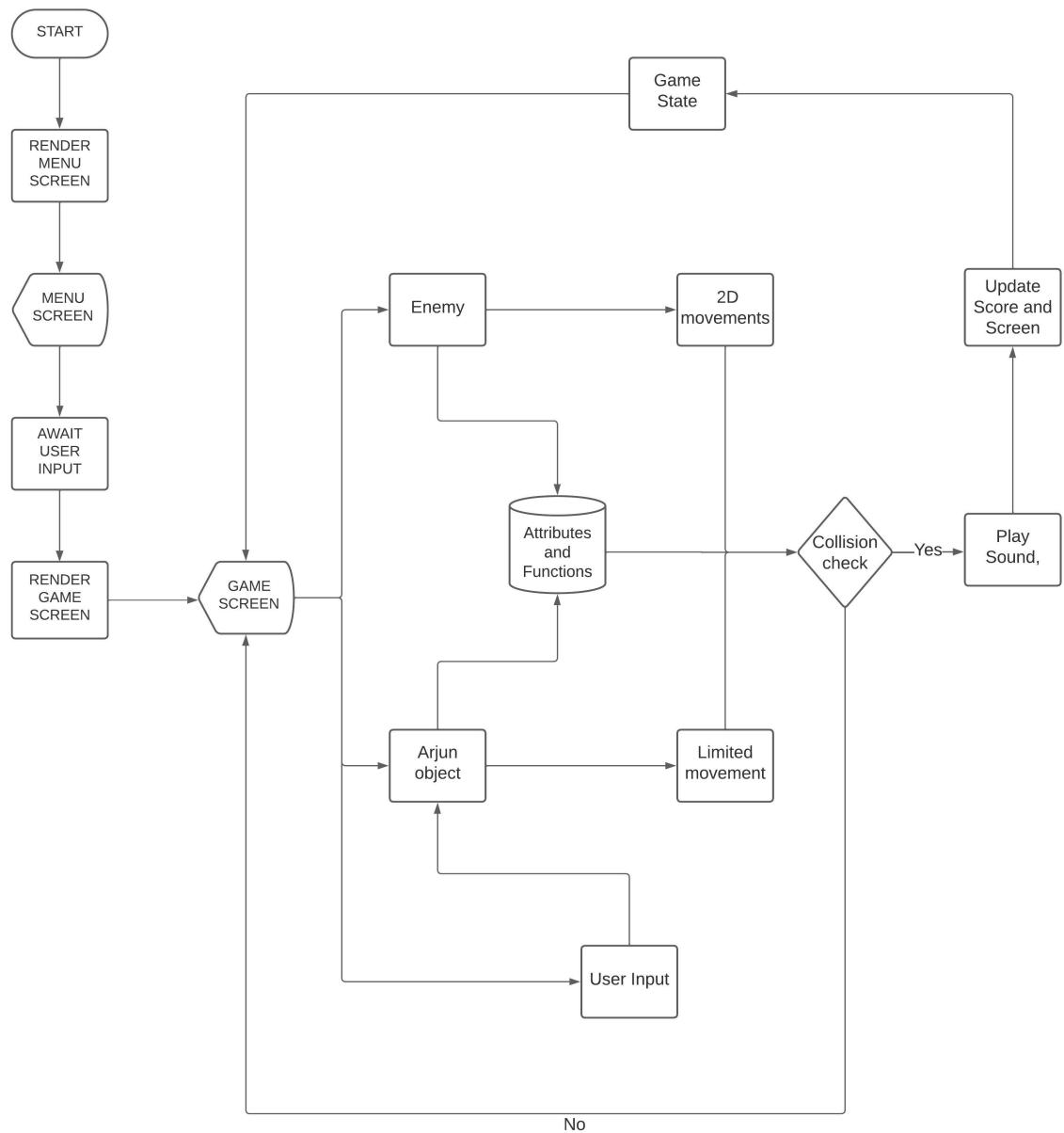
The game comprises three chapters, each centered around pivotal events, skills, and battles in Arjuna's life. The first chapter serves as a practice level, emulating the training of a young Arjuna in Guru Dronacharya's Gurukul. Our objective for this chapter is to enhance the user's skills, ensuring their qualification to progress to subsequent levels. The levels in this chapter are designed with increasing complexity, gradually acquainting the user with the mechanics and nuances of the game.

The second chapter revolves around the legendary account where Arjuna utilizes his skills to protect the vulnerable kingdom of Virata. During their final year of exile, the Pandavas concealed their identities and worked as common laborers in Virata's palace. This chapter not only allows users to demonstrate the skills acquired by completing all levels of the first chapter but also provides a meticulously tailored environment that hones their ability to pinpoint and shoot moving targets. Similar to the Virata battle, which symbolized the uprising and unwavering victory of the Pandavas, this chapter emphasizes the user's agility in dodging occasional arrows shot by adversaries. Failure to evade incoming arrows leads to a reduction in the character's life points, and when these points reach zero, the game concludes. Consequently, this level emphasizes the user's dodging and swerving abilities.

The proposed third chapter centers around the climax of the epic Mahabharata i.e. monumental war of "The Mahabharata", for which Arjuna has tirelessly practiced and honed his skills since his early days. This chapter serves as an extraordinary platform for users to showcase their abilities, drawing upon the orientation and practices from the previous chapter. It encompasses precise targeting, shooting, and evasive maneuvers to dodge incoming arrows. Arjuna confronts more formidable adversaries such as Dronacharya, Bhishma Pitamah, Karna, Kripacharya, Ashwathama, and others. Only through complete mastery of accurate targeting, shooting, and dodging skills can victory be assured in this chapter.

"The Mahabharata" chapter serves as the culmination of the game, providing a challenging and immersive experience for users to fully demonstrate their prowess. It encapsulates the essence of Arjuna's journey, from his early training to the pinnacle of warfare. As players progress through the game, they acquire skills and knowledge, mirroring Arjuna's own growth and development. By incorporating elements of strategy, precision, and quick reflexes, the game offers an engaging and authentic portrayal of Arjuna's legendary archery prowess. Whether players excel in targeting, shooting, or evading obstacles, their success ultimately hinges on their ability to merge these skills seamlessly. With each chapter building upon the previous one, the game provides a rewarding and immersive experience for players as they embark on a journey inspired by the remarkable life and achievements of Arjuna.

## 3.2 SYSTEM BLOCK DIAGRAM



## 4 METHODOLOGY

To complete our project, we will follow the following methods:

1. Research and Planning:

- (a) Conduct research on various aspects of game development, including features, fundamental requirements, and tools required.
- (b) Familiarize ourselves with the necessary libraries and divide the work among the team members.
- (c) Develop comprehensive coding guidelines to ensure self-documenting code.

2. Algorithm Design:

- (a) Design the algorithm and create a flowchart based on the gathered rules and information.
- (b) Develop a basic prototype for testing purposes, using the console.

3. Sources: Utilize the following sources as references to support our project:

- (a) Documentation for SFML.
- (b) Concepts of object-oriented programming (OOP) and C++ programming from college courses, online references, books, etc.

4. Game Design:

- (a) Implement the code using an object-oriented programming (OOP) paradigm.
- (b) Use Simple and Fast Multimedia Library to create build the game.
- (c) Choose Visual Studio as our Integrated Development Environment (IDE) and visual c++ as the compiler in the Windows Operating System.
- (d) Manage our code using GitHub for version control.

5. Maintenance: Regularly maintain the project by following these procedures:

(a) Corrective maintenance:

- Compile and check specific parts of the code for potential bugs and errors, fixing them as necessary.

(b) Preventive maintenance:

- Identify errors and take measures to avoid them during runtime and the development cycle.
- Comment and document the source code thoroughly and back it up to prevent potential data loss.

**6. Testing and Debugging:**

- (a) Develop a minimum viable product sample for testing and debugging purposes.
- (b) Conduct frequent testing and debugging to add features and make necessary edits to the project code based on our requirements and capabilities.

**7. Documentation:**

- (a) Ensure comprehensive documentation of the app, including the addition of copyright licenses.
- (b) Ship the completed app with the accompanying documentation.

## 5 PROJECT SCOPE

Our project involves developing an exciting game based on the character Arjun from Mahabharat. Players will control Arjun and use their mouse to shoot arrows at targets while moving in the game world.

The key aspects of the project scope include:

1. User Engagement: We aim to create an engaging game that immerses players in the world of Arjun. By providing an enjoyable experience, we hope to entertain players and make them feel connected to the character and the epic.
2. Skill Development: The gameplay mechanics, such as arrow shooting and precision aiming, offer players the chance to improve their hand-eye coordination, concentration, and reflexes. These skills can be valuable not just in the game, but also in real-life situations.
3. Cultural Appreciation: Our game's theme, inspired by Mahabharat, aims to spark interest and curiosity among players who are fans of the epic or have an interest in Hindu mythology and culture. We want to contribute to cultural appreciation and raise awareness of this rich heritage.
4. Learning and Engagement with Mahabharat: Through the gameplay and accompanying content, we want to provide players with an opportunity to learn more about Arjun and his role in Mahabharat. By delving into the mythology, players can gain insights and develop a deeper understanding of the epic.
5. Entertainment Industry Impact: If our game gains popularity and positive reception, it could have an impact on the entertainment industry. It may inspire similar projects and encourage the exploration of Indian mythological themes in gaming, diversifying the offerings in the industry.

Our project aims to develop an immersive and enjoyable game centered around Arjun from Mahabharat. We want to provide players with an engaging experience, improve their skills, foster cultural appreciation, facilitate learning about Mahabharat, and potentially contribute to the broader landscape of the entertainment industry.

## **6 PROJECT SCHEDULE**

Following is the planned project schedule for our project:

<b>Requisites</b>	<b>Time Allocated</b>
Research and Planning:	5
Algorithm Design	3
Software Design	15
Maintenance	Throughout the project
Testing and Debugging	Throughout the project
Documentation	2 days