RIPHAH INTERNATIONAL UNIVERSITY

DATA STRUCTURE AND ALGORITHUMS

Project Proposal

Card Battle Game

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Contents

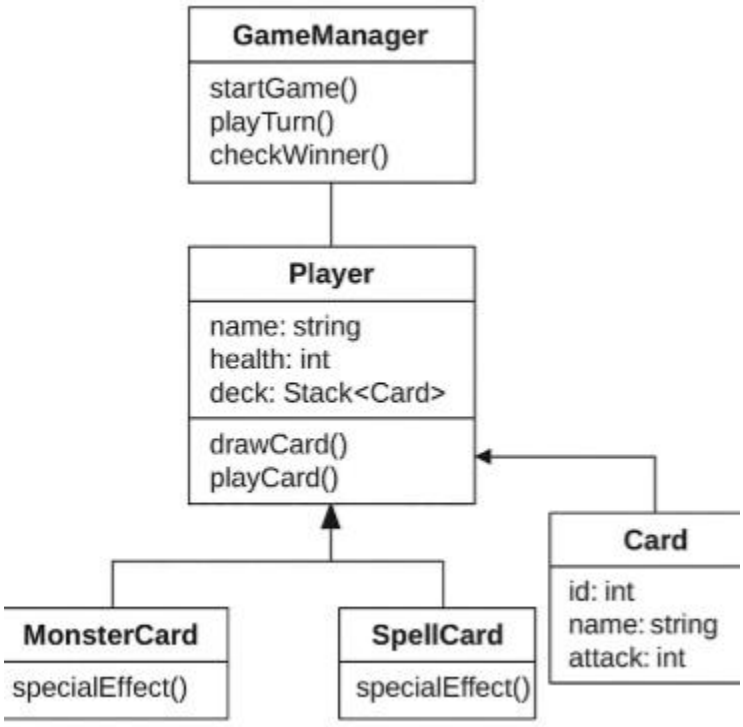
1. Group Members Task Division

Name of Students	Sap ID	Program	Role
Eman Aleem	62395	BSCS-3	Interface Design & Display
Arfa Zain	64255	BSCS-3	Game Logic, Data Structures Implementation
Sundas Ambreen	58822	BSCS-4	Testing & Documentation

2. Project Title

"Card Battle Game" – A Turn-Based Strategy Game Using Data Structures in C++

3. Diagram (Structure)



4. Project Description

Overview
The Card Battle Game is a console-based, turn-based strategy game developed in C++. It demonstrates the practical implementation of Data Structures and Algorithms (DSA) along with Object-Oriented Programming (OOP) principles.

Each player has a deck of cards, where every card contains a name and a power value. Players take turns drawing cards from their decks, and the player with the higher power value wins that round. After all the cards have been played, the total scores are calculated to determine the winner.

Game Logic / Working

1. Each player's deck is implemented using a queue, following the FIFO (First In, First Out) principle.
2. Cards are generated and assigned randomly using arrays or vectors.
3. Players take turns drawing and comparing cards in a turn-based system.
4. The card comparison logic uses conditional statements to determine the winner of each round.
5. The winning cards are pushed into a stack that represents the discarded pile.
6. The game continues until all cards are used, and the player with the highest total wins.

Key Features

- Random card deck generation using arrays or vectors.
- Queue structure for each player's deck.
- Stack structure for managing discarded cards.
- Turn-based gameplay logic implemented through loops and conditions.
- Text-based console interface for simple and clear output.
- Designed to be extendable for additional players or AI-based opponents.

Objectives

- To apply DSA and OOP concepts in a practical project.
- To implement and manipulate queues, stacks, and vectors efficiently.
- To improve understanding of algorithmic design, randomization, and comparison logic.
- To create a simple yet scalable console game in C++.

Future Enhancements

- Support for more than two players using a circular queue.
- Addition of special cards with unique power effects.
- Integration of AI or multiplayer functionality.
- Development of a graphical user interface (GUI) using libraries such as SFML or SDL.

5. List of Components / Tools

Category	Tools/Components
Programming Language	C++
Compiler / IDE	Code::Blocks / Dev C++ / Visual Studio / VS Code
Data Structures Used	Queue, Stack, Vector, Classes (OOP)
Algorithmic Concepts	Random shuffling, Conditional comparison, Iteration
Optional Libraries	<queue>, <stack>, <vector>
Version Control (optional)	Git / GitHub
Output Type	Console-based application (text display)

Summary

The Card Battle Game is a simple, console-based, two-player (or multi-player) project designed using C++. It effectively demonstrates the use of queues, stacks, and OOP concepts. This project is engaging, educational, and perfectly suited for a Data Structures and Algorithms (DSA) course.