



UNIVERSITI
TEKNOLOGI
PETRONAS

Object Oriented Programming Semester Project Proposal

Group OOP Paling Awesome

<u>Name</u>	<u>Student ID</u>	<u>Programme</u>
Muhammad Ammar Haziq bin Abdul Malek (Leader)	22010458	Computer Engineering
Faatin Nur Husna binti Izmir	22010085	Computer Engineering
Mohamad Aiman Ta bin Muhammad Adam Ta Kuan Hen	22010327	Computer Engineering
Munifah Syaafiyah binti Md Daud	22010126	Computer Engineering
Muhammad Isfahann Syakir bin Shahrum	22010486	Computer Engineering
Luqman Null Hakiem bin Abdul Bari Arbee	22010352	Computer Science

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1.0 Introduction

Object-Oriented Programming (OOP) is a widely used approach in software development, providing a structured method to design and manage complex systems. This proposal aims to apply Object-Oriented Programming principles in the creation of a Swarm Attack Game, a project designed to demonstrate the effectiveness of OOP in developing applications. The project will focus on creating a well-organized game structure that is both scalable and maintainable. Through this project, the aim is to showcase how OOP can be utilized to develop dynamic, interactive software while ensuring efficient system design and long-term flexibility.

2.0 Problem Statement

Without proper use of Object-Oriented Programming (OOP) principles, many existing game development projects lack a structured approach, resulting in difficulties for expansions or modifications over time. This is due to the system that often become unwieldy, with code that is hard to manage, test, and scale as new features or changes are introduced.

This project proposes the development of a Swarm Attack Game to address these challenges by demonstrating the effective use of OOP concept and integrating best practices for code organization, testing, and documentation.

3.0 Objectives

The main objectives of our project are:

1. **Demonstrate OOP Concepts:** To apply core OOP concepts to showcase their effectiveness in game development, enhancing code reusability and clarity
2. **Develop an Interactive Gameplay System:** To create a dynamic and engaging game where the player faces waves of enemy swarms with increasing difficulty
3. **Ensure Scalability:** To build a system that allows for easy addition of new features, levels, enemy types, and game mechanics without requiring significant rework of the game's core structure
4. **Prioritize Maintainability:** To develop maintainable code that enables easy updates, modifications, or expansions of the game, ensuring long-term flexibility and ease of maintenance.
5. **Focus on Accessibility:** To ensure that the game is usable by a diverse range of users, considering varying levels of technical skill

4.0 App Choice

Unity Games Dev – Swarm Attack Games

4.1 Research on Similar Apps

1. Space Invader:

A game where the player will play in a space-like environment to shoot the aliens (or invader) thus will gain points for each destroyed invader. Both the player and the invader can move horizontally while shooting projectiles. The goal of the game is to destroy all the invader's ship to move to the next level, consequently increasing difficulty. The game will end if the player is hit by the alien projectiles.

2. Survivor.io:

Survivor.io is a swarm game where the player will have to fend off against large hordes of monsters for as long as they can. As the level goes on, it will get harder and harder and at a certain point will face a boss. The player will also get power-ups along the way during a single run. But before each run, the player is allowed to set up their loadout such as what weapon to bring or which character to choose. These weapons and characters can also be upgraded.

3. Archero:

A popular mobile action game where players control a hero who battles through various stages filled with enemies. The gameplay is centred around shooting and dodging enemy attacks while collecting power-ups and abilities. Key features include procedurally generated levels a variety of unique weapons and equipment, and the ability to combine abilities to create powerful synergies. The game also offers diverse heroes, each with their own unique skills, and a progression system that allows players to upgrade their gear and skills over time.

4.2 Proposed Features

Features	Description
Power Ups	Give players temporary boosts like stronger attacks, faster shooting, or shields. Usually collected during gameplay and help players survive difficult enemy waves by offering a tactical advantage when used at the right time.
Difficulty Level	Often scale with the number and strength of enemies in each wave. As the difficulty increases, enemies become more numerous, faster, and tougher to defeat. Players must adapt by upgrading weapons, using power-ups strategically, and improving their defensive tactics.
Scoreboard	Tracks players' progress and performance by displaying key metrics like total score, number of enemies defeated, and highest wave reached. It often includes rankings, allowing players to compare their scores with others, whether globally or among friends.
Level System	Typically progresses as players defeat waves of enemies. Each level presents increasingly difficult challenges, with more enemies, tougher bosses, or new attack patterns. Players advance by clearing levels, and as they progress, they can unlock new abilities, weapons, or upgrades.
Different Maps	A diverse array of map locations makes players can explore a range of distinct environments. Different maps often incorporate unique elements that significantly enhance the challenge, such as varying terrain types, environmental obstacles, and strategic features to carefully crafted to elevate the level of difficulty and engage players more effectively.
User-friendly Interface	An intuitive user interface (UI) that enhances the player experience, including clear menus, HUD (heads-up display), and easy-to-navigate controls

5.0 Conclusion

This proposal for the development of the Swarm Attack Game demonstrates an approach to address the common challenges in software development through the application of Object-Oriented Programming (OOP) principles. By focusing on creating a scalable and maintainable game architecture, this project aims to provide a practical example of how OOP can enhance the development and management of complex systems

The objectives outlines, highlights a commitment in building a system that is both effective and adaptable. The integration of best practices for documentation, testing, and user interface design further underscores the project's dedication in creating a high-quality and user-friendly application.

Ultimately, this proposal aims to demonstrate the advantages of Object-Oriented Programming (OOP) in creating structured and adaptable systems. Successful implementation of the Swarm Attack Game will not only provide engaging interactive experience but also serve as a practical example of how OOP can enhance the scalability and maintainability of software.