Game Engine Development – OOP

Purpose of work

Implement the game engine component, which contains the key logic of the game.

Task

In this assignment, you are going to implement the game engine, which you previously designed in Assignment #4. You can implement the engine in 2 ways: with Graphic User Interface (GUI) stubs or with a Command Line Interface that will be integrated with GUI in Assignment #6.

Task milestones

The implementation of the game engine would be different depending on the game you have chosen. But here are things you should consider (if the game has these features):

- **Player movement**. You should create a method for handling player movement (keyboard events) and update a game state respectively.
- **Physics**. Some game objects may require some physics logic in order to move correctly. It may be a gravity force, acceleration, velocity, reflection, etc. There are great materials about how to implement the basic physics for your game, which you can find here (don't be scared of the programming language the author uses, you just need to understand the math behind it).
- **Updating the frame**. In most games, you'll need to update the frame frequently to get smooth animation. If your game has some flying particles or projectiles it would be helpful to have an *update()* method, where you'll recalculate the position of all moving objects.
- **Win/Lose condition**. Don't forget to check the win/lose condition after the update event in your game. You can check it after the *update()* method (if you have it) or after player input events, etc.

Control questions

1. How OOP principles are used in your program? Show some examples.
2. Did you use any design pattern, e.g. Singleton? Why do we need design patterns?

Evaluation

Applying OOP concepts and design patterns	5
Game Engine logic	5
Extra: Additional game features (depending on their complexity)	Up to 2 points
Extra: Overloaded operator usage	1
Total	10+2+1

Please note that to get the evaluation point will be reduced because of incorrect answers on the questions, wrong program output and logic, in case of Git project absence etc.

Links

C++ Primer 5th Edition: Theoretical part
GoF: Design Patterns
https://www.sfml-dev.org/ : Framework for Game GUI development