**OOP Project Report**

Shape:

Shape is a class made to obtain x and y coordinates along with the color with which a specific child class shape is to be created. It is a concrete but its instance is not made, rather it is used to create specific shape and gems.

*Gem:*

Gem is an abstract class that has spatial 2D coordinates and a color, and has only one function, that is for showing the gem. But since instances of specific gems of different attributes are created in the game, **void ShowGem()** is made a virtual function, that is overridden by all the child classes of ***Gem*** class.

DIFFERENT GEM CLASSES

Level:

Has information about the current level of game, level mode chosen, score. This class implements the setter and getter functions for these 3 variables. Further, it displays chosen level mode, current level, the progress of player by displaying the current score at a specific level(which is same as player score) in the form of a rectangle filling up the progress bar.

Width of progress bar is set to be 240. When levelScore == 80, progress bar has been filled up, level in Class **Level** and playerLevel in Class **Player** are incremented.

UserOptions:

This class is created to contain the information about which button is clicked on, to control display options, such as menu, settings, play, pause, etc. Further, it has a member variable, called name. A member function called void **InOutName()** (short for input and output respectively) asks player on blank screen to enter his name and input will be used to set name of **Level** class (It will also be stored as Player class instance’s playerName). Then in the same function, getName() is used to display player’s input using DrawString() function of util.h.

At start of game, player is told to enter her/his name. Player is then given a screen with options: Menu, Start New Game, Resume Game.

If Menu is clicked, new screen is shown. Options will now include levels, level modes, Highest Scores and Settings.

If Start New Game is clicked, player’s previously saved currentStatus is destroyed from Binary File and new record is being made.

If Resume Game is clicked, player’s previous score is updated.

On game window, two buttons are displayed: **Hint** (represented by ‘H’), and play/pause button. When game is playing, the playing symbol ‘**||**’ is shown, while when paused, another button is drawn in its place, with a triangular symbol, generally understood as paused state.

When game is playing, and play/pause button is clicked, button switches to paused button, and a new screen shows, with a label of **“Paused”** in which several options (buttons) show up. These include ‘Menu’, ‘Quit’, ‘Play’.

→ If Menu is clicked, new screen pops up, with a box of options and ‘Levels’, ‘Level Modes’, ‘Highest Scores’ and ‘Settings’ are displayed.

→ If Settings is clicked, new screen pops up, with a box of options and ‘Player profile’ and ‘How to Play’ are displayed.

**Board:**

Board class is composed of pointer to 2D array of abstract gem class, and this is done to apply Polymorphism, that is instantiating specialized gems form abstract gem class pointer. This is necessary for randomly generating new and different types of gems to fill up space as soon as a gem is removed off the board (Player has scored by matching adjacent gems). For being able to identify which type of gem is placed at which coordinates, each gem type is assigned a character(as member variable of gem). A Following is how I made the assignments in constructors of the gems:-

**Type** **Character Assigned**

*Gem* ‘0’

CandyGem ‘1’

DiamondGem ‘2’

FlowerGem ‘3’

LollipopGem ‘4’

LadyBugGem ‘5’

There was only a getter function so the type of gem is identified, but it should not be changed, so there is no setter function for changing the variable **type** of the gem classes.