**Lab 12 – Develop a simulation of Tetris Game**

1. Open Unity Hub → Click New Project - Select 2D Core Template.
2. In the **Hierarchy**, right-click and create an **Empty GameObject**. Rename it to **"GameBoard"**. Attach the following new script:

*using UnityEngine;*

*public class GameBoard : MonoBehaviour*

*{*

*public static int width = 10; // Number of columns*

*public static int height = 20; // Number of rows*

*public static Transform[,] grid = new Transform[width, height];*

*public static bool InsideBorder(Vector2 pos)*

*{*

*return (int)pos.x >= 0 && (int)pos.x < width && (int)pos.y >= 0;*

*}*

*public static void DeleteRow(int y)*

*{*

*for (int x = 0; x < width; x++)*

*{*

*Destroy(grid[x, y].gameObject);*

*grid[x, y] = null;*

*}*

*}*

*}*

1. In Hierarchy, create a new empty GameObject. Rename it "Tetromino". Attach a new script called Tetromino.cs.

using UnityEngine;

*public class Tetromino : MonoBehaviour*

*{*

*private float fallTime = 0.8f;*

*private float previousTime;*

*void Update()*

*{*

*if (Time.time - previousTime > fallTime)*

*{*

*transform.position += new Vector3(0, -1, 0);*

*previousTime = Time.time;*

*}*

*if (Input.GetKeyDown(KeyCode.LeftArrow))*

*{*

*transform.position += new Vector3(-1, 0, 0);*

*}*

*else if (Input.GetKeyDown(KeyCode.RightArrow))*

*{*

*transform.position += new Vector3(1, 0, 0);*

*}*

*else if (Input.GetKeyDown(KeyCode.DownArrow))*

*{*

*transform.position += new Vector3(0, -1, 0);*

*}*

*else if (Input.GetKeyDown(KeyCode.UpArrow))*

*{*

*transform.Rotate(0, 0, 90);*

*}*

*}*

*}*

1. In Hierarchy, create a new empty GameObject. Add 4 Square Sprites as children (representing the Tetrimino). Name it Tetrimino\_L, Tetrimino\_T, etc. Save each shape as a Prefab in the Assets folder.
2. Create a **new GameObject** in Hierarchy. Name it **TetrominoSpawner**. Create a new **TetrominoSpawner.cs** script and attach it to the **TetrominoSpawner** object.

*using UnityEngine;*

*public class TetrominoSpawner : MonoBehaviour*

*{*

*public GameObject[] tetrominoes;*

*void Start()*

*{*

*SpawnTetromino();*

*}*

*public void SpawnTetromino()*

*{*

*int index = Random.Range(0, tetrominoes.Length);*

*Instantiate(tetrominoes[index], transform.position, Quaternion.identity);*

*}*

*}*

1. Modify GameBoard.cs to check for **full lines** and clear them:

*public static void CheckForCompleteLines()*

*{*

*for (int y = 0; y < height; y++)*

*{*

*bool isLineFull = true;*

*for (int x = 0; x < width; x++)*

*{*

*if (grid[x, y] == null)*

*{*

*isLineFull = false;*

*break;*

*}*

*}*

*if (isLineFull)*

*{*

*DeleteRow(y);*

*}*

*}*

*}*

1. Modify Tetromino.cs to check if a new piece **collides at spawn**

*private void CheckGameOver()*

*{*

*foreach (Transform block in transform)*

*{*

*if (block.position.y >= GameBoard.height - 1)*

*{*

*Debug.Log("Game Over!");*

*Time.timeScale = 0;*

*}*

*}*

*}*

1. Create a UI Canvas (GameObject → UI → Canvas). Add a Text UI object for displaying Score. Modify GameBoard.cs to increase score when a line clears:

*public static int score = 0;*

*public static Text scoreText;*

*public static void AddScore(int linesCleared)*

*{*

*score += linesCleared \* 100;*

*scoreText.text = "Score: " + score;*

*}*

1. Click Play in Unity to test. Ensure Tetrominoes fall, move, rotate, and clear lines properly.