



King Abdulaziz University
Faculty of Computing and Information Technology
Department of Computer Science
CPCS 391 Computer Graphics

Project Report



coClean Game

For House Cleaning

Group Number: 6

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Team Members:

Name	ID
Shaima Abdullah Bashammakh	1914892
Roa'a Abdullah Alzhrani	2005863
Hanin Suleiman Alhaj	2010269
Alaa Emad Alhamzi	2010304

Introduction

Keeping a clean house is a priority, as we must try to keep our houses clean all the times. It's important issue since keeping the house clean helps in avoiding sickness, infections, and allergies. Teaching children how to do household chores especially cleaning will help them to learn many skills they can use in their adult lives. As helping in chores will give the child many social skills, such as communication, responsibility, and working as a team. The goal of our game is to help children to develop a habit of keeping their houses clean, and to change their perspective of house chores so they can find it fun and joyful. So, they can help the adults in keeping the environments clean all the time.

Project Objectives

- *Develop children skills through searching.
- *Improve children's behavior through playing.
- *Enhance the children's imagination through an interactive environment.
- *Improve visual children abilities through attention and focus.
- *Enhance children's creativity, by displaying the graphics and the various designs.

Project Deliverable

We will produce some deliverables. Firstly, produce an interactive game for children to improve their behavior and expand their knowledge about house cleanliness and its importance. Produce report contains the project's implementation details, and a presentation to present the idea of the game.

System and Software

System:

Processor: Intel core i7

CPU: 1.50GHz, RAM:16.0 GB

System type: 64-bit operating system

Operating system: Windows 11

Software:

Unity: we used unity to create the 3D character, environment and interactive game.

Visual Studio: we used Visual Studio to write c# code

OpenGL: we used OpenGL to create one of the main object in our environment –we don't use it-

Description

In this project, we develop a game called "coClean", and it is for house cleaning. It is a game developed for a specific category of society, who are children. coClean game helps to improve children's behavior and to make children love cleaning their houses in enjoyable way through playing.

The coClean game contains 3D environment, 3D main character and many 3D objects. The game's environment is house consists of 5 rooms, one bathroom, one kitchen and a small garden. The rooms are bedroom, office room, dining room, living room and guest room. Each of above contains furniture and decoration. The main character in coClean game is a girl, she can move through all house's area. In addition to that, there are scattered papers in different rooms in the house, timer and counter to count the scores.

The game will provide a stimulating environment to make the place clean as quickly as possible by having a timer and a counter to calculate character's winning points. The main character will search for papers in the house to increase the score points of her to win, and after find each paper the character will be encouraged to clean all house through the displayed messages.

The player of coClean game will be inside the house environment. The player will move to search for five papers that found in different rooms in the house and collect them within 2 minutes. When the player finds a paper, the score of his will increase by one and a specific message will display to him to encourage his to clean all house. The player will win if he found the 5 papers in 2 minutes, otherwise he will loss and the game will end.

Abstraction

Our game mainly focuses in developing the children's thinking and social skills, and enhancing their creativity and curiosity. We developed one character which is the main character (the child). The main character has to search for the hidden papers around the house, in order to make the house cleaner. The player can move the character forward, backward right, and left. Whenever the main character finds a new hidden paper, there is an encouraging image appears to encourage her to continue and collect more papers.

Features we include:

- In the first scene when the game starts, there is a text that shows which buttons are used to play the game and which to quit.
- There is a timer that increases every time the player founds a new paper until it succeeds in finding all of the five papers and win the game.

Features we exclude:

- The game is one player game, as it doesn't allow multiple players.
- We wanted to make the player to collect the papers after finding them and put them in the garbage, but we excluded this feature to simplify the game for children.

Scenes

First scene:

Start menu with two main buttons:

1. START:
To start the game.
2. QUIT:
To quit the game.

Second scene:

Once the player presses the start button, he will get to the main game. The main game includes many objects, including the main character (the child) in the house.

OBJECTS	DESCRIPTION
The girl (The main character)	Made using Unity
3D Objects for Bed room	Made using Unity
3D Objects for Living Room	Made using Unity
3D Objects for Kitchen	Made using Unity
3D Objects for Bathroom	Made using Unity
3D Objects for Office room	Made using Unity

Third scene:

win screen:

This screen will only appear if the player collects the 5 papers that are distributed at the house successfully before the time runs out (time = 2 minutes).

Forth scene:

Game Over:

This screen will appear if the player failed in collecting all of the five papers before the time runs out.

Executive Summary

The project focuses on providing a game that will help in encouraging the children's responsibility towards their houses and their environment in general. As it will aware the children to the importance of helping adults in doing house chores and keeping their houses clean. Also, the game will help in making house cleaning fun for kids, so they can enjoy doing it and do it more.

Algorithms/Computational Implementation

```
package org.yourorghere;
import com.sun.opengl.util.Animator;
import com.sun.opengl.util.GLUT;
import java.awt.Frame;
import java.awt.event.WindowAdapter;
import java.awt.event.WindowEvent;
import javax.media.opengl.GL;
import javax.media.opengl.GLAutoDrawable;
import javax.media.opengl.GLCanvas;
import javax.media.openglGLEventListener;
import javax.media.opengl.glu.GLU;

public class CPCS391Project implements GLEventListener {

    public static void main(String[] args) {
        Frame frame = new Frame("ProjectCPCS391");
        GLCanvas canvas = new GLCanvas();
        canvas.addGLEventListener(new CPCS391Project());
        frame.add(canvas);
        frame.setSize(640, 480);
        final Animator animator = new Animator(canvas);
        frame.addWindowListener(new WindowAdapter() {

            @Override
            public void windowClosing(WindowEvent e) {
                // Run this on another thread than the AWT event queue to
                // make sure the call to Animator.stop() completes before
                // exiting
                new Thread(new Runnable() {
                    public void run() {
                        animator.stop();
                        System.exit(0);
                    }
                }).start();
            }
        });
    }
}
```

```

        // Center frame
        frame.setLocationRelativeTo(null);
        frame.setVisible(true);
        animator.start();
    }

    public void init(GLAutoDrawable drawable) {
        // Use debug pipeline
        // drawable.setGL(new DebugGL(drawable.getGL()));

        GL gl = drawable.getGL();
        System.err.println("INIT GL IS: " + gl.getClass().getName());

        // Enable VSync
        gl.setSwapInterval(1);

        // Setup the drawing area and shading mode
        gl.glClearColor(0.0f, 0.0f, 0.0f, 0.0f);
        gl.glShadeModel(GL.GL_SMOOTH); // try setting this to GL_FLAT and see what happens.

        gl.glEnable(GL.GL_TEXTURE_2D); //activate texture mapping for 2D
    }

    public void reshape(GLAutoDrawable drawable, int x, int y, int width, int height) {
        GL gl = drawable.getGL();
        GLU glu = new GLU();

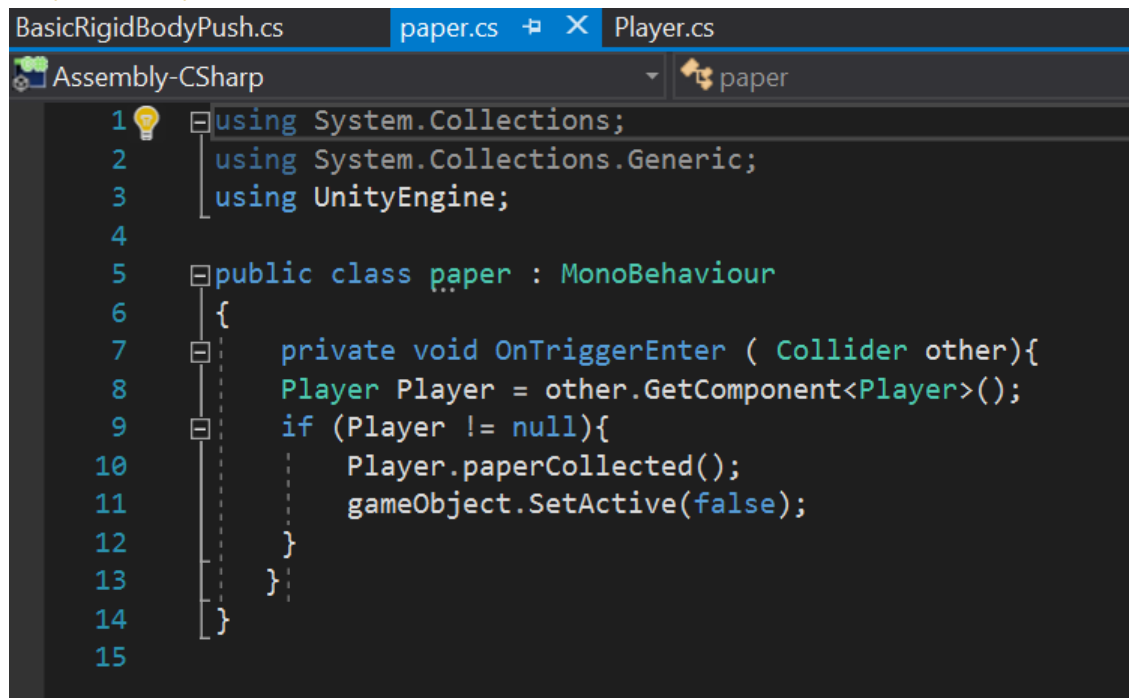
        if (height <= 0) { // avoid a divide by zero error!
            height = 1;
        }
        final float h = (float) width / (float) height;
        gl.glViewport(0, 0, width, height);
        gl.glMatrixMode(GL.GL_PROJECTION);
        gl.glLoadIdentity();
        glu.gluPerspective(45.0f, h, 1.0, 20.0);
        gl.glMatrixMode(GL.GL_MODELVIEW);
        gl.glLoadIdentity();
    }

    public void display(GLAutoDrawable drawable) {
        GL gl = drawable.getGL();
        GLUT glut = new GLUT();
        gl.glTranslatef(-1.5f, 1.0f, -6.0f);
        gl.glClear(GL.GL_COLOR_BUFFER_BIT | GL.GL_DEPTH_BUFFER_BIT);
        gl.glLoadIdentity();
        gl.glColor3f(1.0f, 0.60f, 1.0f);
        gl.glTranslatef(0.0f, 0.0f, -6.0f);
        glut.glutSolidCube(1.0f);
        gl.glFlush();
    }

    public void displayChanged(GLAutoDrawable drawable, boolean modeChanged, boolean deviceChanged) {
    }
}

```


Paper Script



```
1 using System.Collections;
2 using System.Collections.Generic;
3 using UnityEngine;
4
5 public class paper : MonoBehaviour
6 {
7     private void OnTriggerEnter ( Collider other){
8         Player Player = other.GetComponent<Player>();
9         if (Player != null){
10             Player.paperCollected();
11             gameObject.SetActive(false);
12         }
13     }
14 }
15
```

Player Script

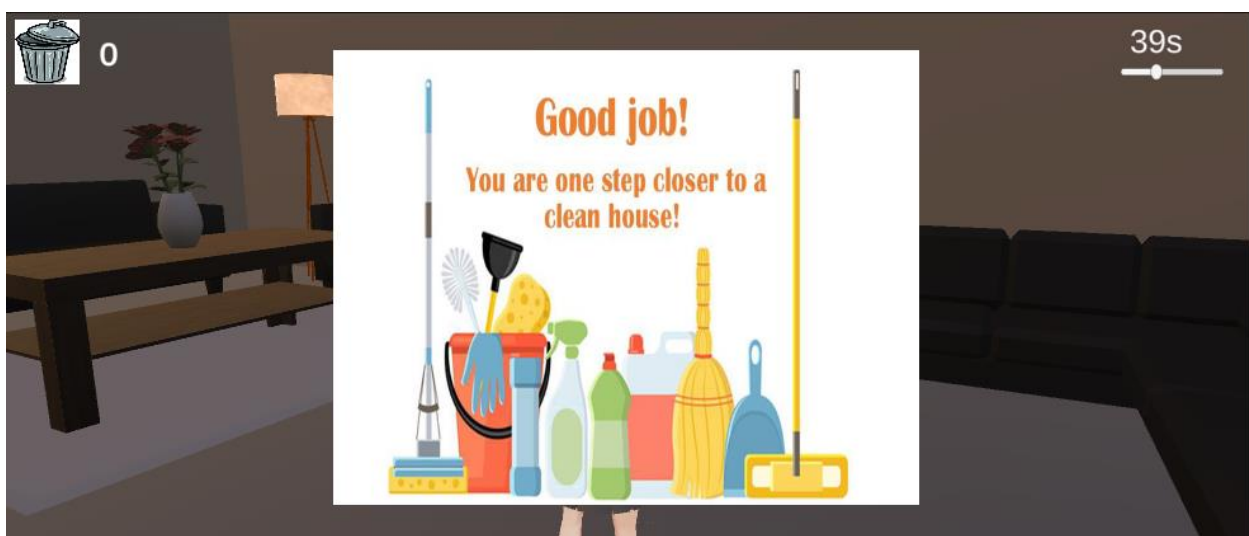
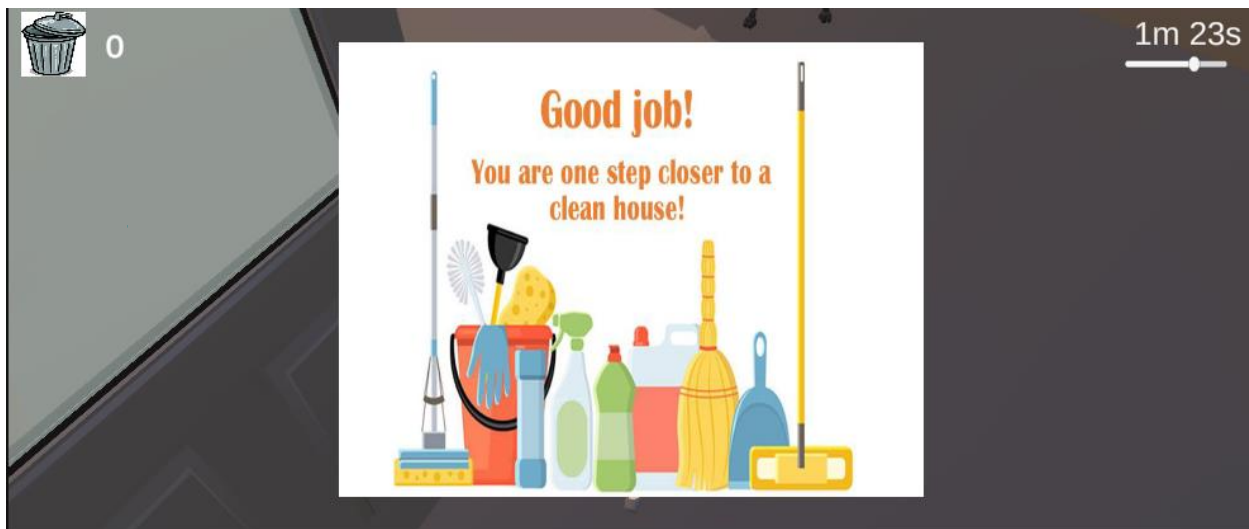
```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4  using UnityEngine.Events;
5  using UnityEngine.SceneManagement;
6
7  public class Player : MonoBehaviour
8  {
9      // Start is called before the first frame update
10     public int numberOfPapers { get; private set; }
11
12     public UnityEvent<Player> onPaperCollected;
13
14     public void paperCollected(){
15         numberOfPapers ++;
16         onPaperCollected.Invoke(this);
17         if(numberOfPapers == 5)
18             win();
19     }
20
21     public void win(){
22         SceneManager.LoadScene("winScene");
23     }
24
25 }
26
27
```

Results

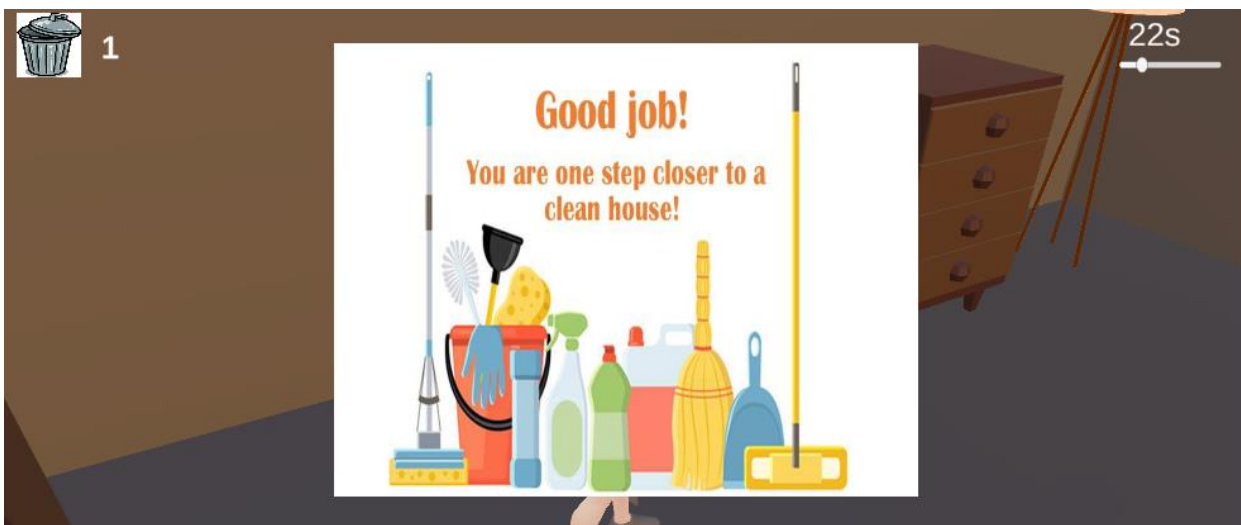


When a player wins





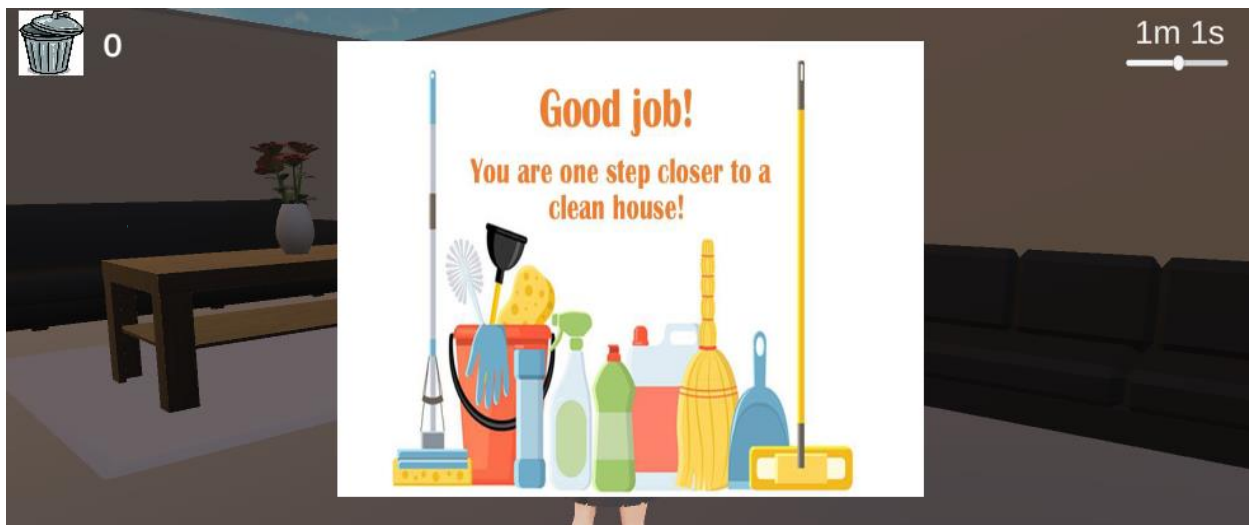






When a player loses:





Conclusion

In conclusion, we used Unity, Visual studio and OpenGL. we used OpenGL to create an object that can be used to create the coClean game environment but we used a Unity editor to create our game environment, objects and character.

The main advantage of this project are improved the user strategic thinking and planning. But, one drawback we took a long time to learn how to create our game.

In the end, we hope you have a fun time when you play our game. And we hope our coClean game will improve children's behavior and expand their knowledge about general cleanliness and its importance.