

VIRTUAL ANIMAL BIOTECHNOLOGY LAB

**Submitted in partial fulfillment of the requirements for the award of
Bachelor of Technology degree in Biotechnology.**

By

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**DEPARTMENT OF BIOTECHNOLOGY
SCHOOL OF BIO & CHEMICAL ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI-600119**

MAY-2022



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DEPARTMENT OF BIOTECHNOLOGY

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Potti Bhoomika Lekhya (39230006), Winnie Prahelika W(39230059), K.Jananitha (39230061)** who carried out the project entitled "Virtual Animal Biotechnology Lab" under my/our supervision from **07/02/2022 to 28/04/2022.**

Dr. S. Sudha

Internal Guide

(Name in Capital letters
with Signature)

External Guide

(Name in Capital letters
with signature)

Dr. Ramesh Kumar

Head of the Department

(Name in Capital letters with Seal & Signature)

Submitted for Viva voce Examination held on _____

Internal Examiner

(Name in Capital letters
with Signature)

External Examiner

(Name in Capital letters
with signature)

DECLARATION

I, **K .Jananitha** hereby declare that the Project Report entitled “**Virtual Animal Biotechnology Lab**”

done by me under the guidance of **Dr.S.Sudha** (Internal) and **Dr.V.Maria Anu** (External) at Sathyabama Institute of Science and Technology, Chennai is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in **Biotechnology**.

DATE: 28/04/2022

PLACE:Chennai

A handwritten signature in blue ink, reading 'Jananitha', with a stylized flourish at the end.

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

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I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Biotechnology who were helpful in many ways for the completion of the project.

ABSTRACT

A gaming app was developed using Maya software and Unity Software for the Animal Biotechnology Lab experiments. Maya Software provides tools for 3D modelling, 3D animation, 3D rendering and shading. It is widely used in the development of video games and animated films. The models were developed using a wide range of tools like Boolean, Extrude, Bevel, Multi-cut, Deform etc., and various polygon meshes. Unity is a Game Development Software, which helps to create both 2D and 3D games. It also allows the users to animate the Game objects. The codes are used on particular game objects to change its position, scale or moving to the next scene. The language used in unity is C# and Java. It is an object-oriented scripting language. Different scripts were given for each Scenes. The 3D models from Maya Software were successfully incorporated into the UNITY SOFTWARE and the game was built by coding on a scene-to-scene basis.

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LIST OF ABBREVIATIONS

C# - C-Sharp

3D - 3-Dimensional

2D - 2-Dimensional

FBX- Filmbox

MEL- Minimum Equipment List

MB – Maya Binary

CHAPTER-1 INTRODUCTION

Virtual Animal Biotechnology Lab app was created by designing the 3D models of the lab equipments and lab room using “MAYA SOFTWARE”. The project was further proceeded by incorporating the 3D models in “UNITY SOFTWARE”. The Experiment designed in Unity is “Cell Counting using Haemocytometer”.

This app includes,

- **Practice mode:** It is an interactive learning session with step-by-step instructions on how to perform the experiment and equips the player for the Gaming mode.
- **Gaming mode:** The player can try performing the experiments without instructions from the computer but with minimum hints. Timer can be set if required.

CHAPTER-2 LITERATURE

Autodesk Maya 2020 Basics Guide:

In this Guide, Kelly Murdock explains the basics of Maya Software, right from designing the models and Exporting them for use in various other softwares. Some of the important topics include controlling the view panel which helps us view different perspectives of the 3D model, Working with objects using tools like Scale, move, Rotate, extrude, combine, separate, Boolean, Bevel, Smooth, Multi-cut. It also contains instructions on creating and editing polygon objects like cube, sphere, plane, cylinder, cone, torus, Disc. Another topic of importance is Assigning materials and

textures like ai Standard surface, Standard surface, Surface shader, Blinn, PhongE etc.,

Unity Game Development Essentials:

In this book, Will Goldstone explains about the various features available in Unity software which includes importing the models and assets, Assigning new materials and Textures, adding an audio source, coding using C# language and Java language and also adding Components. The Components include Physics, rigid body, Box collider, Capsule collider, Box Collider 2D, Mesh Collider, Mesh Renderer, Audio Listener.

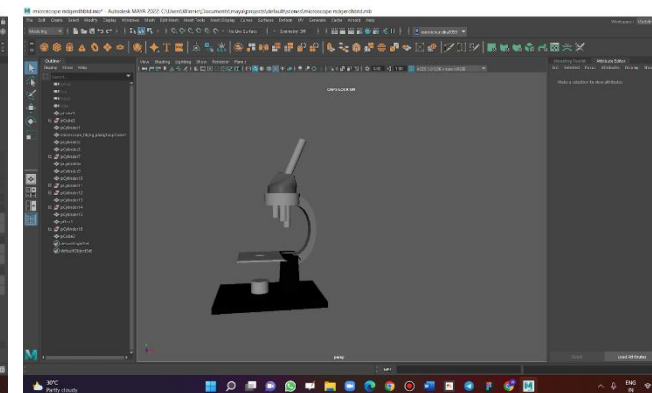
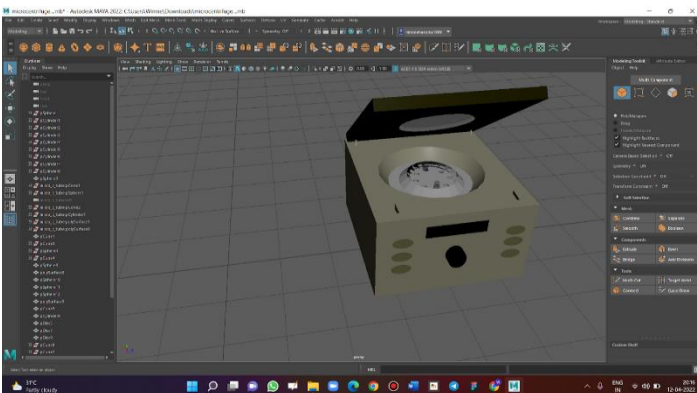
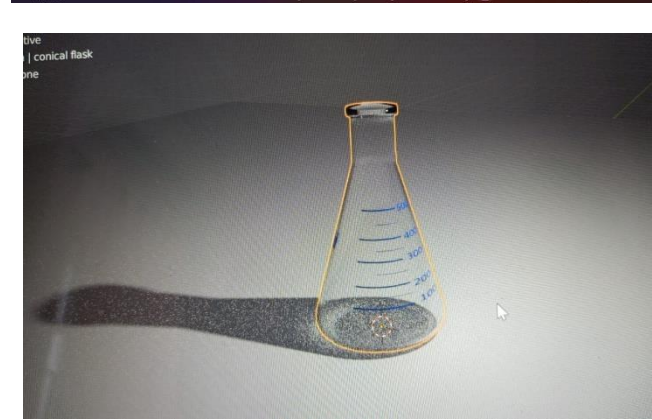
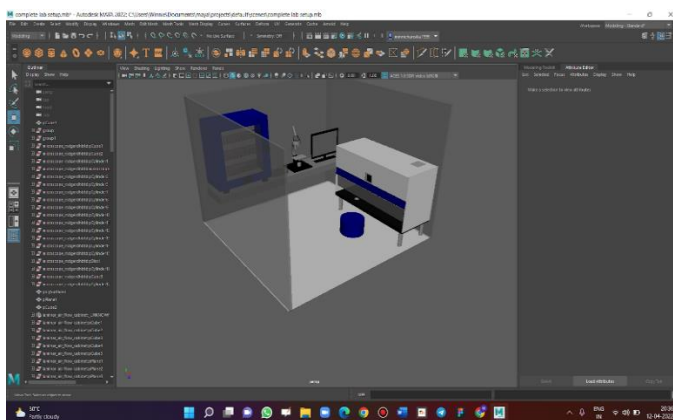
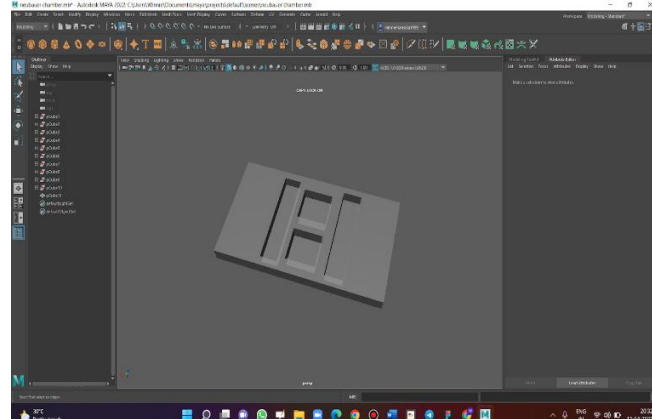
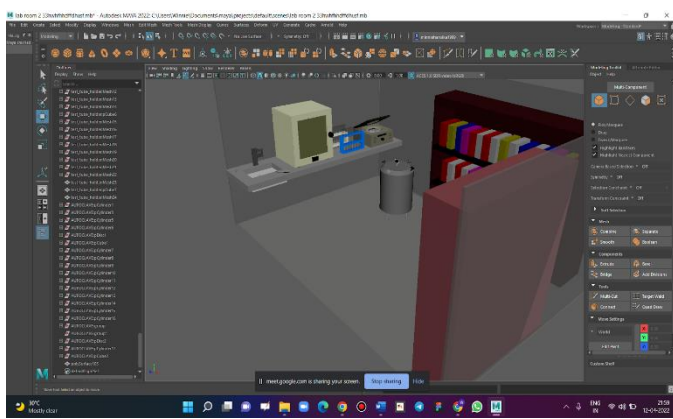
CHAPTER-3 AIM AND SCOPE OF THE PRESENT INVESTIGATION

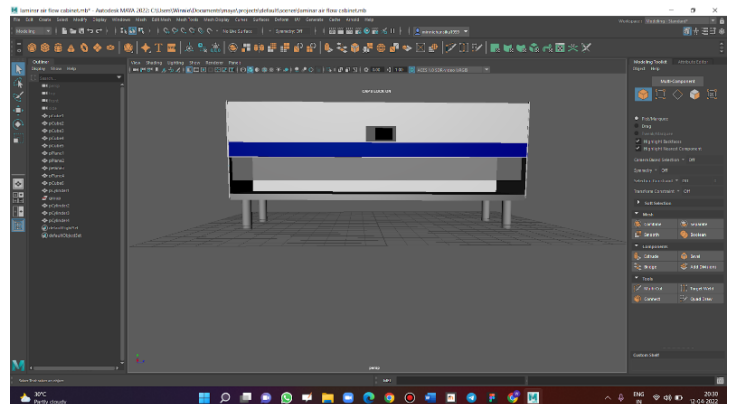
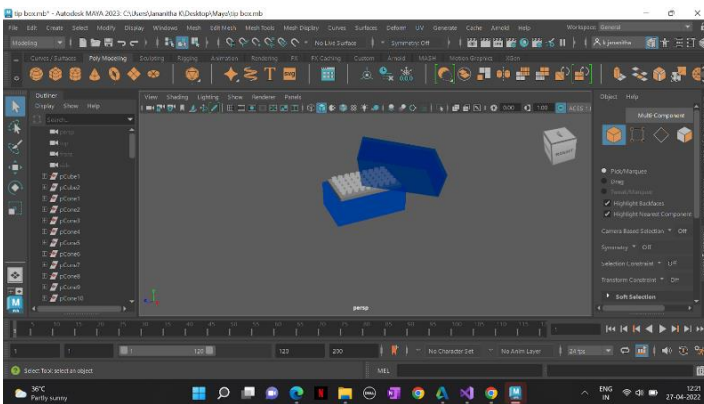
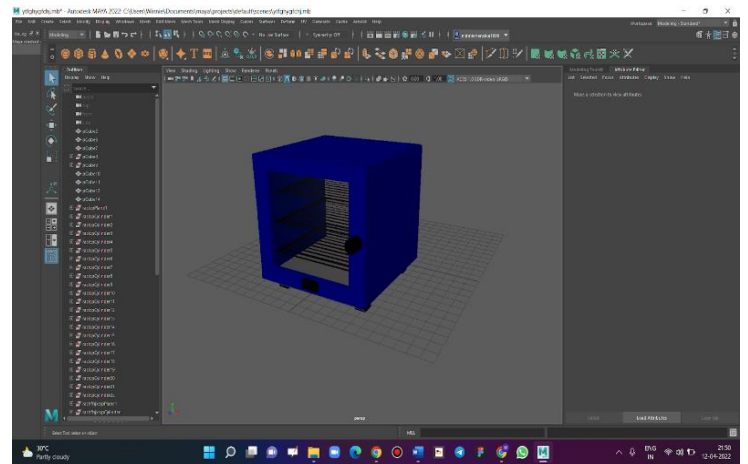
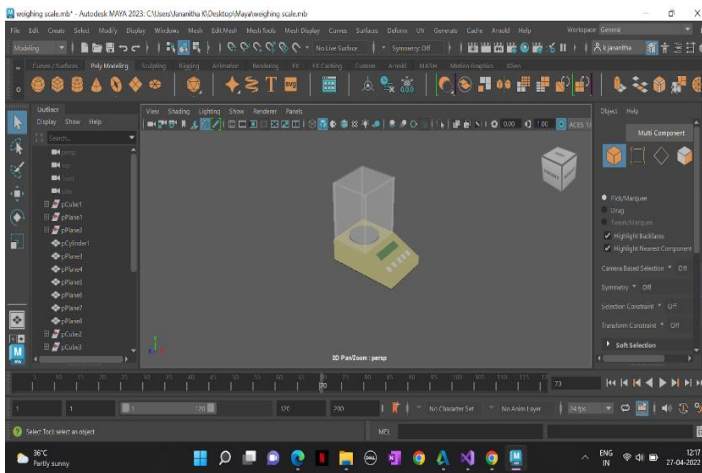
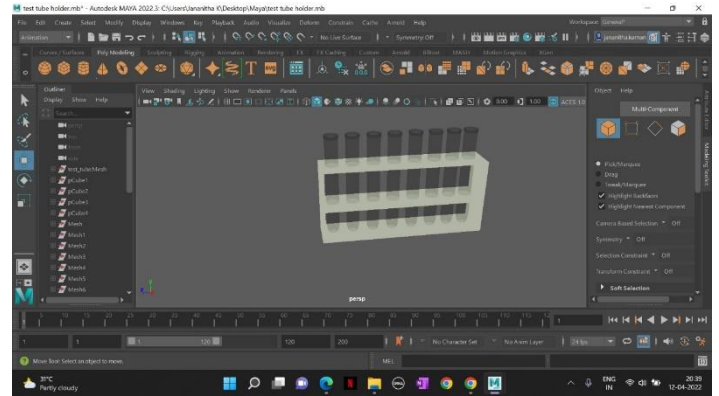
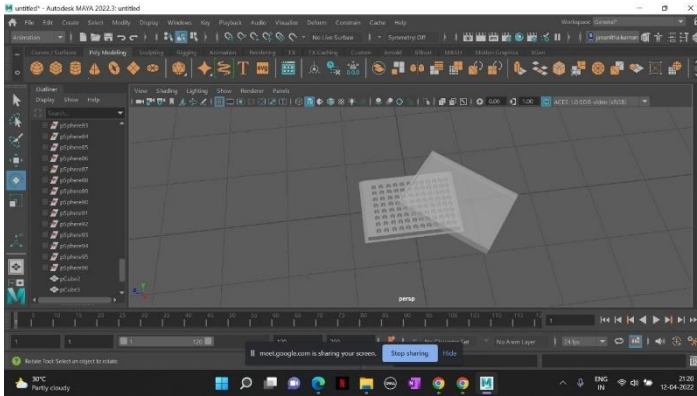
The aim of the project is to create a gaming app to solve the problem of lack of basic knowledge regarding the laboratory experiments for the Life science students due to the pandemic. It is a new approach to education which will encourage the students to gain interest in performing experiments, it prevents errors in experiments performed, avoids wastage of reagents in the lab, it can save a lot of time and can be accessed anywhere. It can also be used as an evaluation tool during practical examinations.

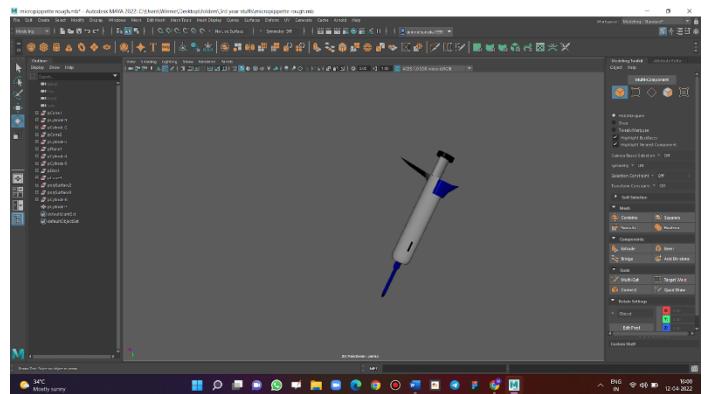
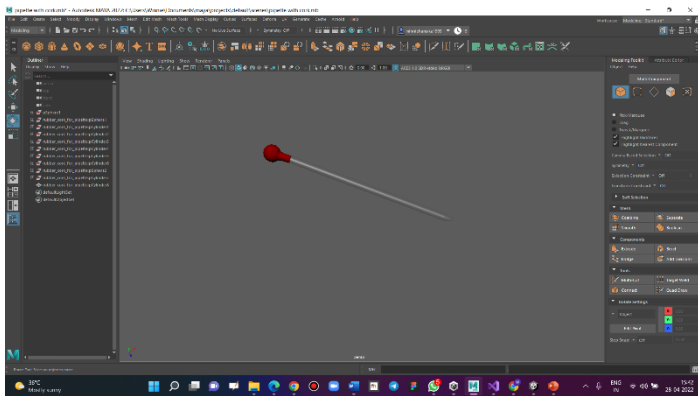
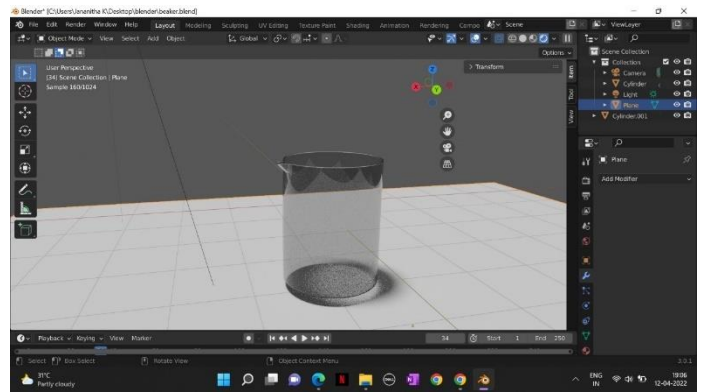
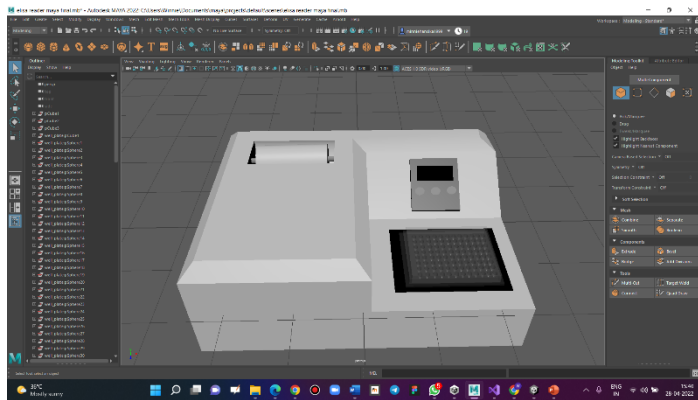
CHAPTER-4 METHODOLOGY

The Procedure:

MAYA SOFTWARE: 3D Models were designed.

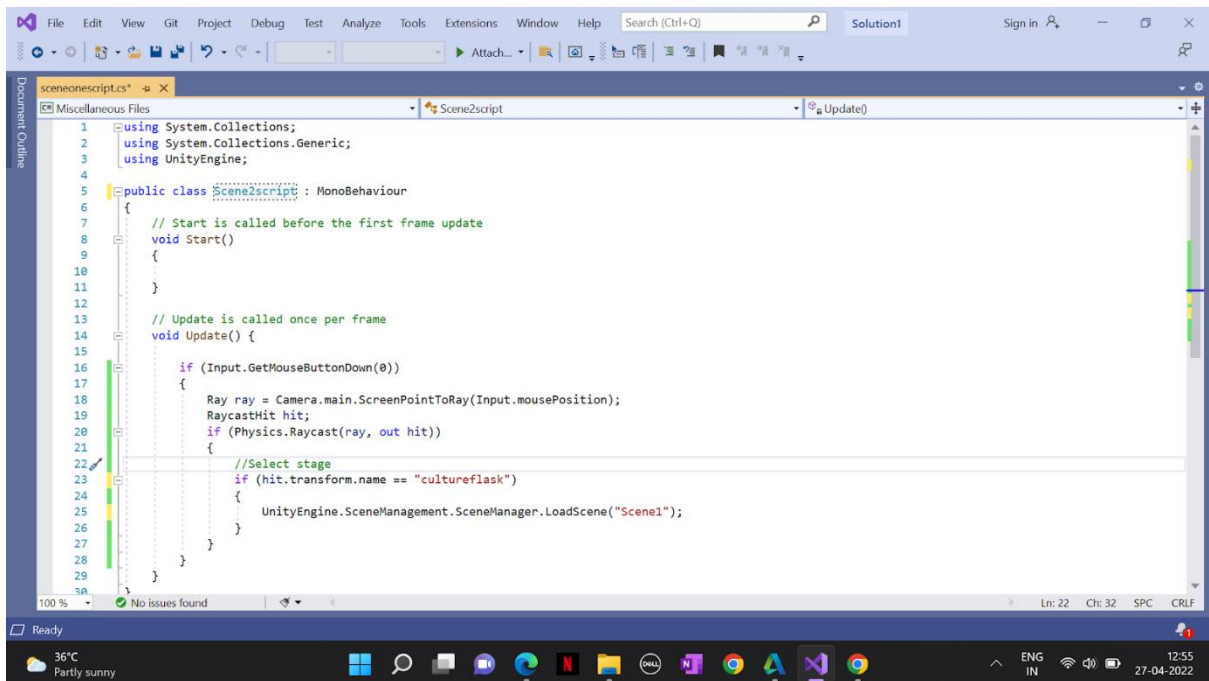






UNITY:

The models were imported and the app was designed (for cell counting experiment).



The Game for Cell Counting Experiment from the Animal Biotechnology Lab Syllabus of our University was created using the following codes:

1.Debug:

To check if the 3D object gets detected.

```
Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
RaycastHit hit;
```

```
if (Physics.Raycast(ray,out hit))
```

```
{
```

```
    Debug.Log(hit.transform.name);
```

```
    //Select Stage
```

```
    if (hit.transform.name == "laboratory final")
```

```
{
```

```
}  
}
```

2.Start Script:

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Startscript : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "Plane")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene1");
```

```
                }
```

```
            }
```

```
        }
```

```
}  
}
```

3.Scene1: (Click on the incubator to open it)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene1script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene2");
```

```
                }
```

```
            }
```

```
        }
```

```
}  
}
```

4.Scene 2: (click on the culture flask to take it out from the incubator)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene2script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "lbr")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene3");
```

```
                }
```

```
            }
```

```
        }
```

```
}  
}
```

5.Scene3: (Click on the microscope to place the flask)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene3script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene4");
```

```
                }
```

```
            }
```

```
        }
```

```
}  
}
```

6.Scene4: (Click on the microscope to view the cells and to check for confluency and contamination)

```
using System.Collections;  
using System.Collections.Generic;  
using UnityEngine;
```

```
public class Scene4script : MonoBehaviour  
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene5");
```

```
                }
```

```
            }
```

```

    }
}
}

```

7.Scene5: (click on the picture of cells to move to the labroom)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene5script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "plane")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene6");
                }
            }
        }
    }
}

```

```

    }
}
}

```

8.Scene6: (click on the laminar hood)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene6script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene7");
                }
            }
        }
    }
}

```

```

    }
}
}

```

9.Scene7: (click on the flask)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

```

```

public class Scene7script : MonoBehaviour
{

```

```

    // Start is called before the first frame update

```

```

    void Start()

```

```

    {

```

```

    }

```

```

    // Update is called once per frame

```

```

    void Update() {

```

```

        if (Input.GetMouseButtonDown(0))

```

```

        {

```

```

            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);

```

```

            RaycastHit hit;

```

```

            if (Physics.Raycast(ray, out hit))

```

```

            {

```

```

                //Select stage

```

```

                if (hit.transform.name == "polySurface14")

```

```

                {

```

```

                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene8");

```

```

                }

```

```

            }

```

```

    }
}
}

```

10.Scene8: (Click on the beaker to discard the media)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene8script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene9");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

11.Scene9: (click on trypsin solution)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene9script : MonoBehaviour
```

```
{
    // Start is called before the first frame update
```

```
void Start()
```

```
{
```

```
}
```

```
// Update is called once per frame
```

```
void Update() {
```

```
    if (Input.GetMouseButtonDown(0))
```

```
    {
```

```
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
        RaycastHit hit;
```

```
        if (Physics.Raycast(ray, out hit))
```

```
        {
```

```
            //Select stage
```

```
            if (hit.transform.name == "polySurface14")
```

```
            {
```

```
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene10");
```

```
            }
```

```

    }
}
}
}

```

12.Scene10: (Click on the flask)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene10script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene11");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

13.Scene11: (click on the flask to add trypsin)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene11script : MonoBehaviour
```

```

{
    // Start is called before the first frame update
    void Start()
    {

    }
}

```

```
// Update is called once per frame
```

```

void Update() {

    if (Input.GetMouseButtonDown(0))
    {
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
        RaycastHit hit;
        if (Physics.Raycast(ray, out hit))
        {
            //Select stage
            if (hit.transform.name == "polySurface14")
            {
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene12");
            }
        }
    }
}

```

```

    }
}
}
}

```

14.Scene12: (click anywhere to move to the labroom)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene12script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene13");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

15.Scene13: (click on the incubator to incubate for 3 minutes)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene13script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "lbr")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene14");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

16.Scene14: (click on the flask to take it out from the incubator)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene14script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene15");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

17.Scene15: (click on the flask)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene15script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene16");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

18.Scene16: (click on the beaker to discard trypsin)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene16script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene17");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

19.Scene17: (click on the medium)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene17script : MonoBehaviour
```

```

{
    // Start is called before the first frame update
    void Start()
    {

    }
}

```

```
// Update is called once per frame
```

```

void Update() {

    if (Input.GetMouseButtonDown(0))
    {
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
        RaycastHit hit;
        if (Physics.Raycast(ray, out hit))
        {
            //Select stage
            if (hit.transform.name == "polySurface14")
            {
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene18");
            }
        }
    }
}

```

```

    }
}
}
}

```

20.Scene18: (click on the pipette to pipette-out the media)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene18script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene19");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

21.Scene19: (click on the flask)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene19script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene20");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

22.Scene20: (click on the flask to add the media)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene20script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene21");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

23.Scene21: (click anywhere to move to the labroom)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene21script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene22");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

24.Scene22: (click on the microscope to place the flask)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene22script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene23");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

25.Scene23: (click on the microscope to view the cells after trypsinization)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene23script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene24");
```

```
                }
```

```

    }
}
}
}

```

26.Scene24: (click on the image to move to the labroom)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene24script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "Plane")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene25");
```

```
                }
```

```

    }
}
}
}

```

27.Scene25: (click on the laminar hood)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene25script : MonoBehaviour
```

```

{
    // Start is called before the first frame update
    void Start()
    {

    }
}

```

```
// Update is called once per frame
```

```

void Update() {

    if (Input.GetMouseButtonDown(0))
    {
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
        RaycastHit hit;
        if (Physics.Raycast(ray, out hit))
        {
            //Select stage
            if (hit.transform.name == "labfinal")
            {
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene26");
            }
        }
    }
}

```

```

    }
}
}
}

```

28.Scene26: (click on the tip box)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene26script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "polySurface14")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene27");
```

```
                }
```

```

    }
}
}
}

```

29.Scene27: (click on the micropipette to attach the tip)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene27script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene28");
```

```
                }
```

```

    }
}
}
}

```

30.Scene28: (click on the micropipette with tip)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene28script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "polySurface14")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene29");
```

```
                }
```

```

    }
}
}
}

```

31.Scene29: (click on the flask to load the sample into the petriplate)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene29script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "polySurface14")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene30");
```

```
                }
```

```

    }
}
}
}

```

32.Scene30: (click on micropipette)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene30script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene31");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

33.Scene31: (click on the trypan blue dye to pipette it out)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene31script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene32");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

34.Scene32: (click on the petriplate to add the dye)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene32script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene33");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

35.Scene33: (click on the tip box)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene33script : MonoBehaviour
```

```

{
    // Start is called before the first frame update
    void Start()
    {

    }
}

```

```
// Update is called once per frame
```

```

void Update() {

    if (Input.GetMouseButtonDown(0))
    {
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
        RaycastHit hit;
        if (Physics.Raycast(ray, out hit))
        {
            //Select stage
            if (hit.transform.name == "polySurface14")
            {
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene34");
            }
        }
    }
}

```

```

    }
}
}
}

```

36.Scene34: (click on the pipette to attach the tip)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene34script : MonoBehaviour
```

```

{
    // Start is called before the first frame update
    void Start()
    {

    }
}

```

```
// Update is called once per frame
```

```

void Update() {

    if (Input.GetMouseButtonDown(0))
    {
        Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
        RaycastHit hit;
        if (Physics.Raycast(ray, out hit))
        {
            //Select stage
            if (hit.transform.name == "labfinal")
            {
                UnityEngine.SceneManagement.SceneManager.LoadScene("Scene35");
            }
        }
    }
}

```

```

    }
}
}
}

```

37.Scene35: (click on the petriplate to pipette out the sample)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene35script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "polySurface14")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene36");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

38.Scene36: (click on Neubauer chamber with coverslip to load the sample)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene36script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene37");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

39.Scene37: (Click anywhere to move to the labroom)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene37script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene38");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

40.Scene38: (click on the microscope to place the haemocytometer)

```
using System.Collections;
```

```
using System.Collections.Generic;
```

```
using UnityEngine;
```

```
public class Scene38script : MonoBehaviour
```

```
{
```

```
    // Start is called before the first frame update
```

```
    void Start()
```

```
    {
```

```
    }
```

```
    // Update is called once per frame
```

```
    void Update() {
```

```
        if (Input.GetMouseButtonDown(0))
```

```
        {
```

```
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
```

```
            RaycastHit hit;
```

```
            if (Physics.Raycast(ray, out hit))
```

```
            {
```

```
                //Select stage
```

```
                if (hit.transform.name == "labfinal")
```

```
                {
```

```
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene39");
```

```
                }
```

```

    }
}
}
}

```

41.Scene39: (click on the microscope to view the cells)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene39script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Scene40");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

42.Scene40: (click on the microscopic image showing live and dead cells)

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Scene40script : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("End");
                }
            }
        }
    }
}

```

```

    }
}
}
}

```

43.End Script:

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Endscript : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update() {

        if (Input.GetMouseButtonDown(0))
        {
            Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            RaycastHit hit;
            if (Physics.Raycast(ray, out hit))
            {
                //Select stage
                if (hit.transform.name == "labfinal")
                {
                    UnityEngine.SceneManagement.SceneManager.LoadScene("Start");
                }
            }
        }
    }
}

```

```
}  
}  
}  
}
```

CHAPTER-5 RESULTS AND DISCUSSION

The Game for cell counting experiment has been developed. The game has 42 scenes with their respective codes.

The link to the video demonstration of the game:

https://drive.google.com/file/d/1CzertBleXv9bCYC8PbtN_BtLwgRepQCg/view?usp=sharing

CHAPTER-6 SUMMARY AND CONCLUSIONS

The cell counting experiment was performed using “Virtual Animal Biotechnology Lab App”. Other Animal Biotechnology Lab experiments will be developed in the near future.

References:

- <https://www.udemy.com/course/learnunity3d/>
- <https://www.udemy.com/course/introduction-to-autodesk-maya-2016/>
- https://books.google.co.in/books?hl=en&lr=&id=HxTUDwAAQBAJ&oi=fnd&pg=PP3&dq=Autodesk+Maya&ots=arQRZ1Ol8X&sig=MtAlyH56e8vMa5qxKYbQXz8CiCw&redir_esc=y#v=onepage&q=Autodesk%20Maya&f=false
- https://books.google.co.in/books?hl=en&lr=&id=WfAWzVW9IK0C&oi=fnd&pg=PT16&dq=unity+game+development&ots=AV7NAXLGAE&sig=-O2X1sfI7WXRpHAnWcENMligc4k&redir_esc=y#v=onepage&q=unity%20game%20development&f=false
- Sathyabama Animal Biotechnology Lab Manual



Virtual Animal Biotechnology Lab

School of Bio & Chemical Engineering

Colloborated with: Computer Science Department

MENTORS : Dr.S.Sudha (BTE Department)
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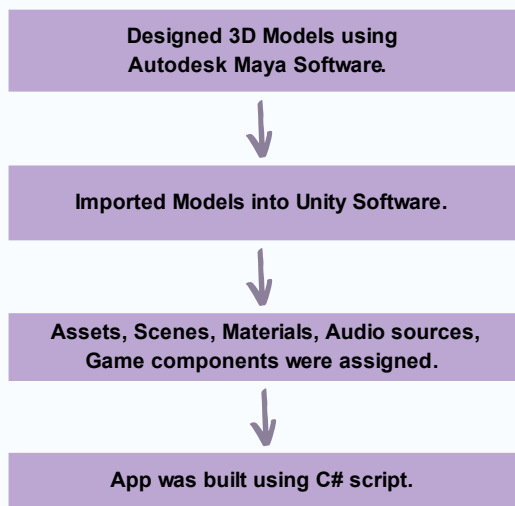
Objective

Problem Statement:
Lack of Practical lab skills due to Online Education.

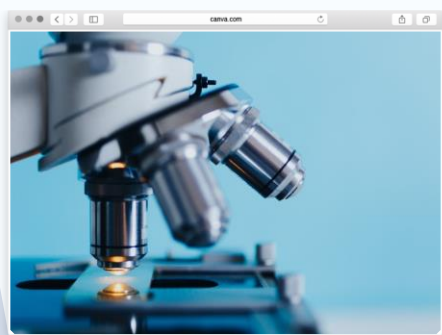
Solution:
Building a Gaming App to get a virtual experience of the Labs.



METHODOLOGY

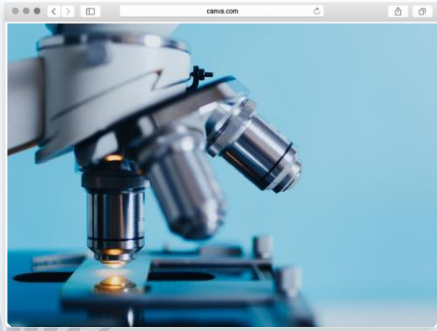


Applications



01.
It is a new approach to education which will encourage the students to gain interest in performing experiments .
02.
It prevents errors in experiments performed.
03.
It avoids wastage of reagents in the lab.

Applications



04.

It can save a lot of time

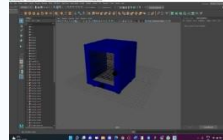
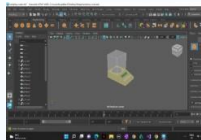
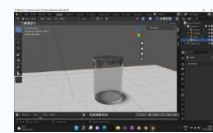
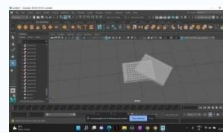
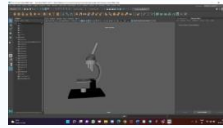
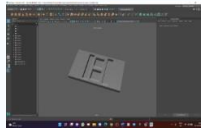
05.

It can also be used as an evaluation tool during practical examinations.

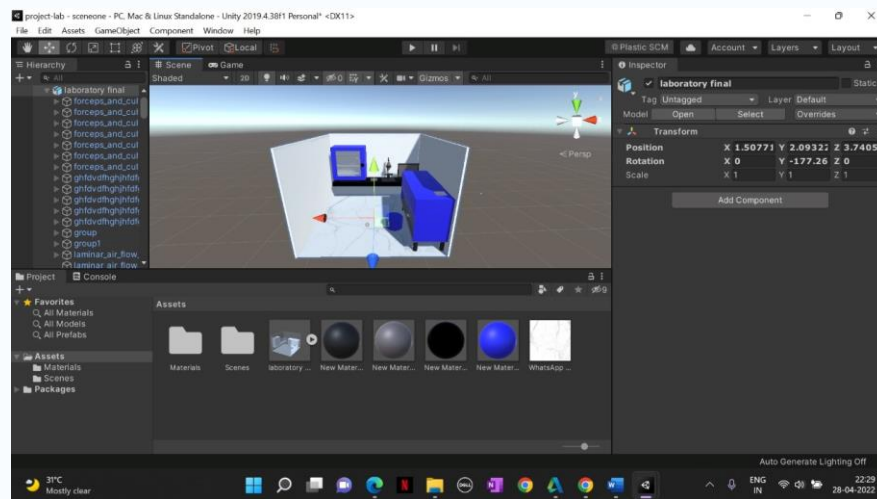
06.

It can be accessed anywhere

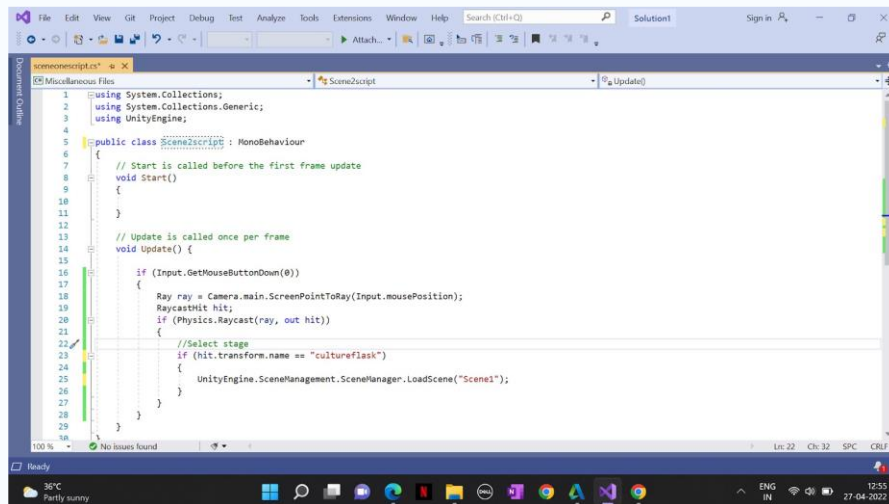
Few 3D models



Models incorporated into Unity

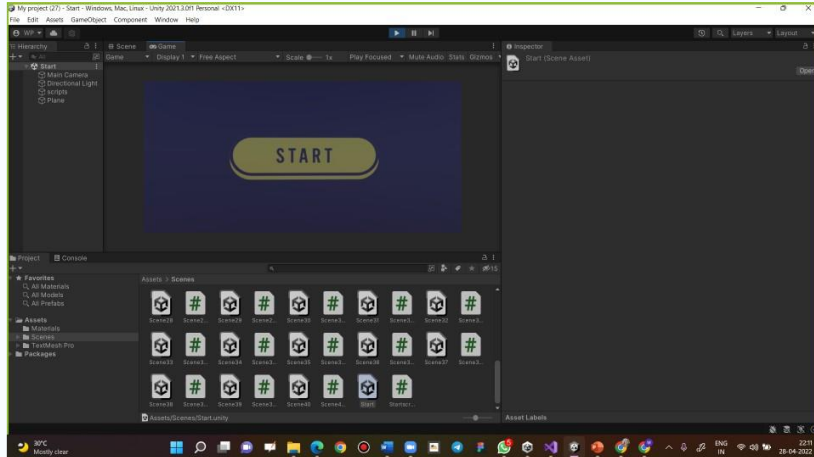


Coding in Unity



Outcome of the work

https://drive.google.com/file/d/1CzertBleXv9bCYC8PbtN_BtLwgRepQCg/view?usp=sharing



Thank you!