LAPORAN TUGAS KOMPUTASI MULTIMEDIA

Modul 15
Controlling 3D Animations

Disusun Oleh :

Nama : Hunayn Risatayn
NIM : 1841720148
Kelas : TI-3E

Program Studi D-IV Teknik Informatika
Jurusan Teknologi Informasi
Politeknik Negeri Malang
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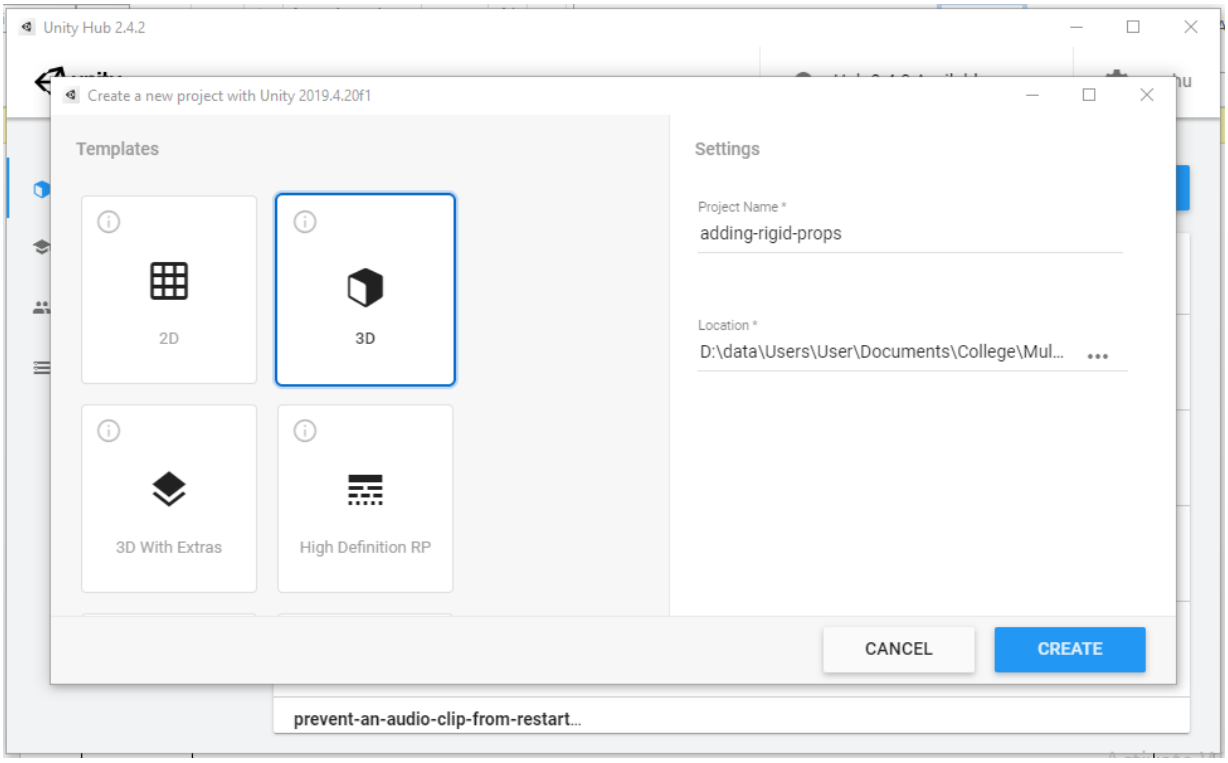
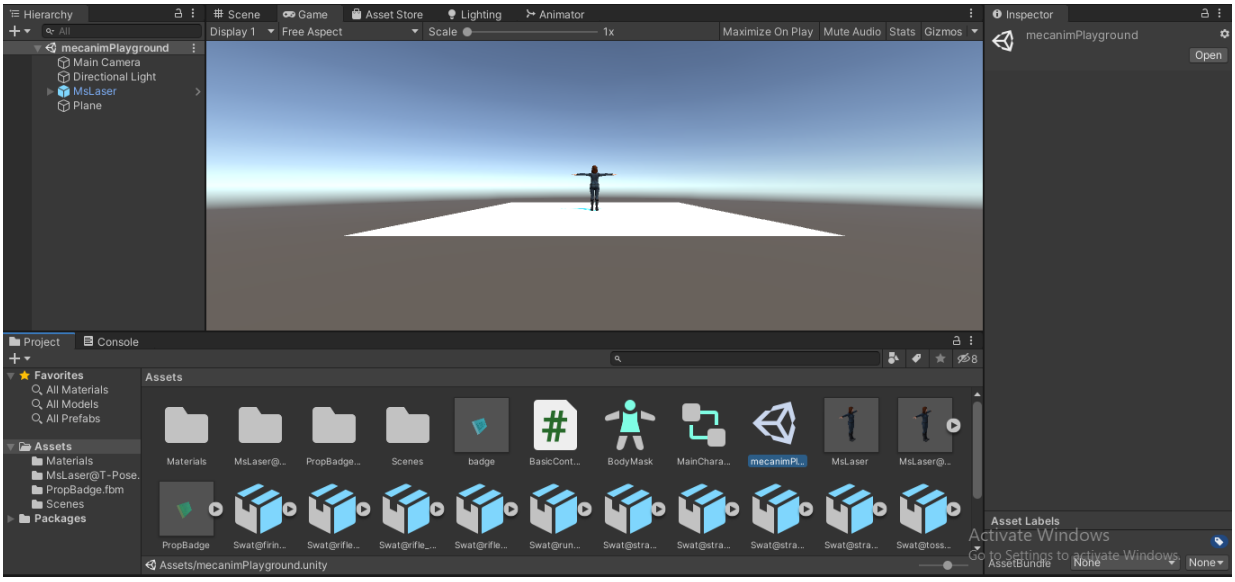
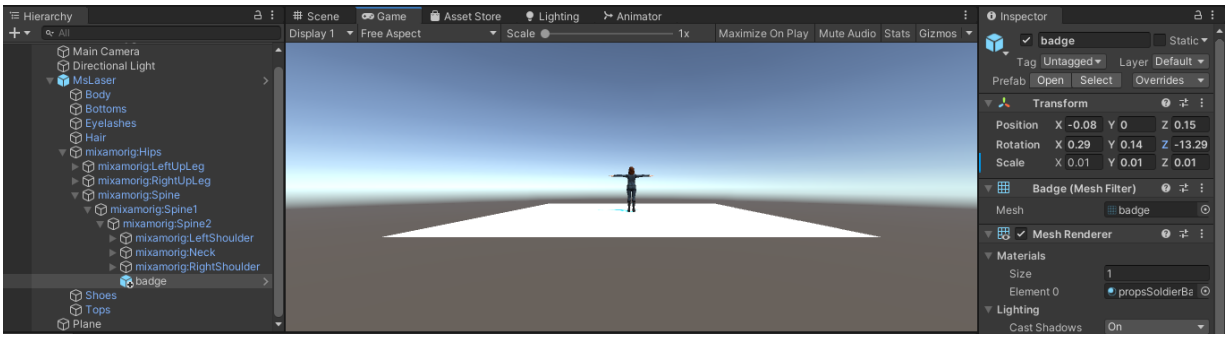
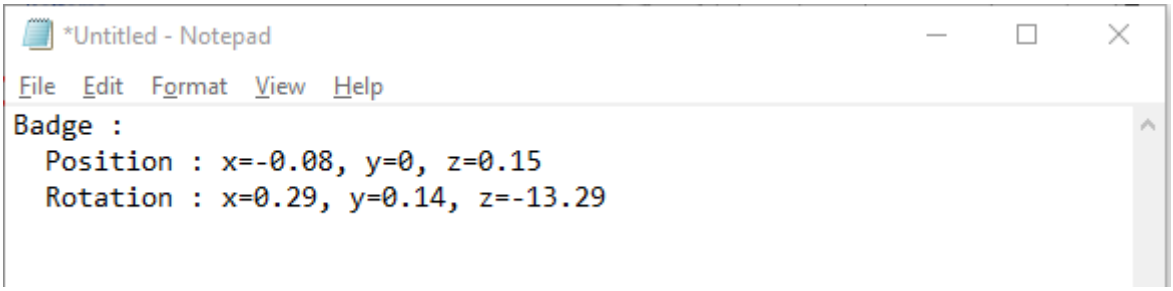
Praktikum – Bagian 1: Menambahkan rigid props ke dalam karakter animasi

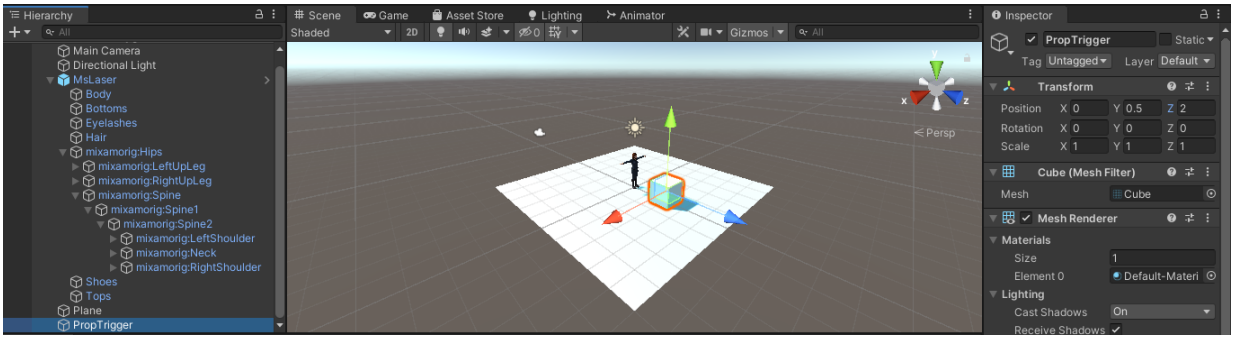
Langkah	Keterangan
1	Buatlah projek baru unity 3D. Import paket Props.unitypackage. Kemudian dari Project view, buka mecanimPlayground.   Dari project view, masukkan badge prop kescene dengan cara drag kedalam hierarchy view. Kemudian, jadikan badge tersebut sebagai child dari mixamorig:Spine2. Kemudian, ubahlah position dan rotationnya seperti gambar berikut ini :



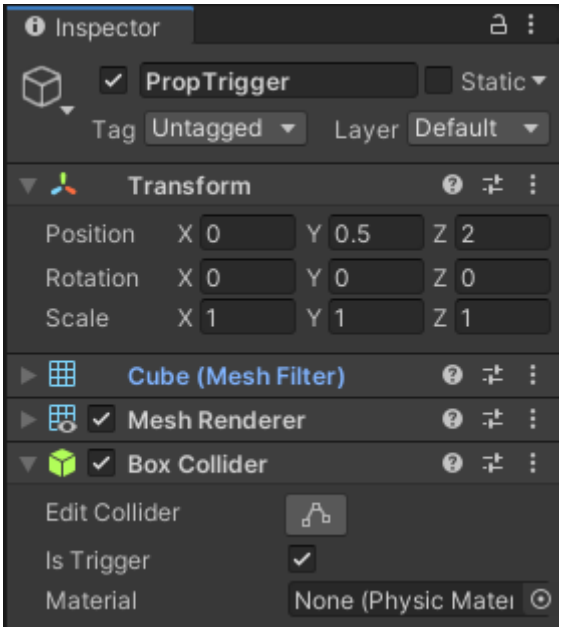
Catatlah nilai position dan rotation dari badge di dalam notepad, kemudian hapus objek badge dari hierarchy.



Tambahkan Cube baru (Create→3D Object→Cube), ganti nama menjadi PropTrigger dan ubah position menjadi X = 0; Y = 0.5; Z = 2.



Pada Inspector dari PropTrigger, centangkan Is Trigger dari komponen Box Collider.



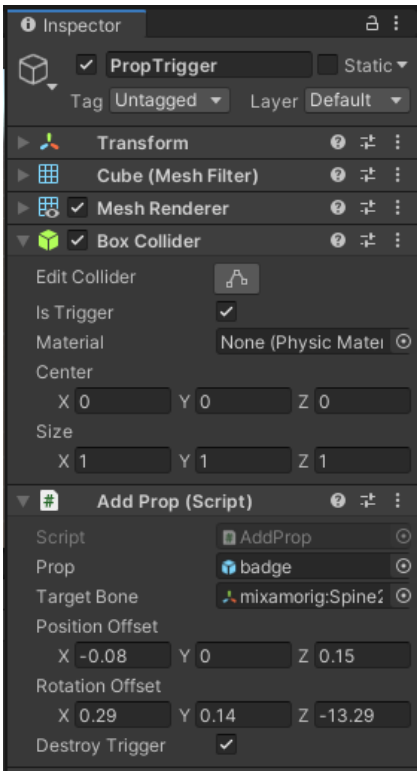
Buatlah C# Script dan masukkan code dibawak ini. Kemudian, ubahlah namanya menjadi AddProp.cs dan drag kedalam PropTrigger.

Assets > Scripts > AddProp.cs > AddProp > onTriggerEnter(Collider collision)

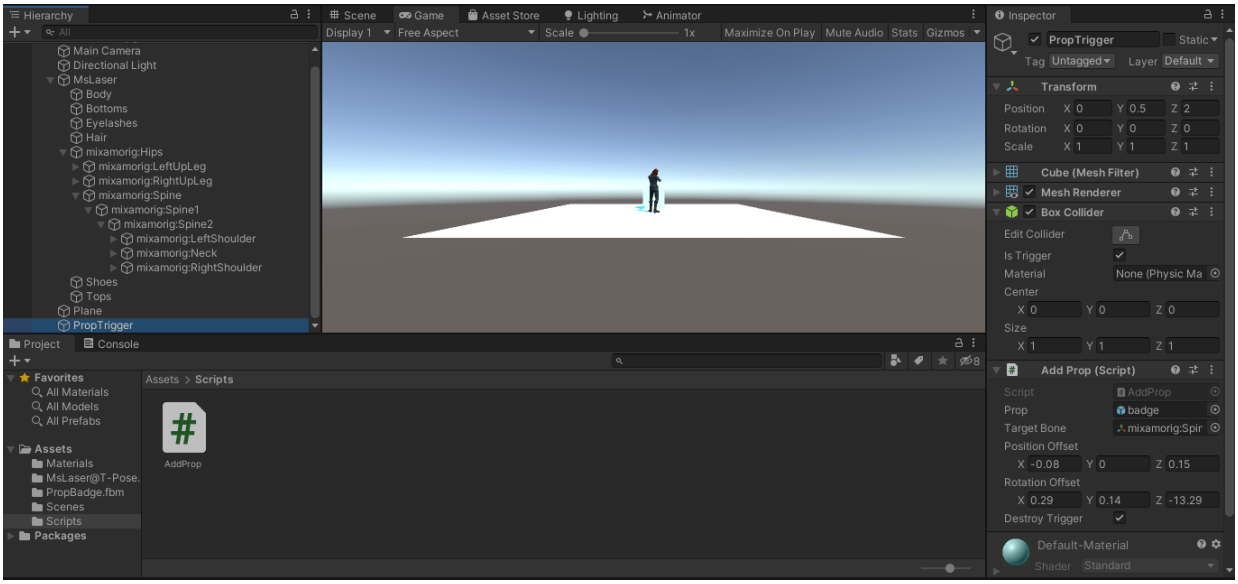
```
using System.Collections;
using UnityEngine;

0 references
public class AddProp : MonoBehaviour
{
    3 references
    public GameObject prop;
    5 references
    public Transform targetBone;
    1 reference
    public Vector3 positionOffset;
    1 reference
    public Vector3 rotationOffset;
    1 reference
    public bool destroyTrigger = true;

    0 references
    void onTriggerEnter(Collider collision)
    {
        if (targetBone.IsChildOf(collision.transform))
        {
            bool checkProp = false;
            foreach (Transform child in targetBone)
```

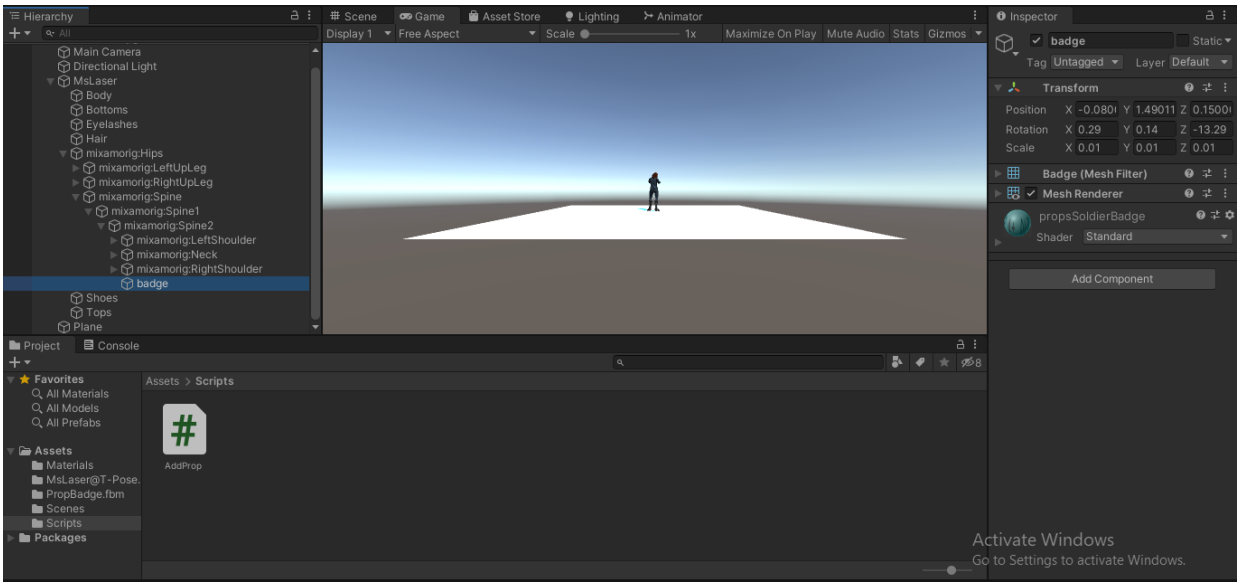
```
    {
        if (targetBone.IsChildOf(collision.transform))
        {
            bool checkProp = false;
            foreach (Transform child in targetBone)
            {
                if (child.name == prop.name)
                    checkProp = true;
            }

            if (!checkProp)
            {
                GameObject newprop;
                newprop = Instantiate(prop, targetBone.position, targetBone.rotation) as GameObject;
                newprop.name = prop.name;
                newprop.transform.parent = targetBone;
                newprop.transform.localPosition += positionOffset;
                newprop.transform.localEulerAngles += rotationOffset;
                if (destroyTrigger)
                    Destroy(gameObject);
            }
        }
    }
}
```

Pilih PropTrigger pada Hierarchy, kemudian ubahlah seperti gambar dibawah ini :



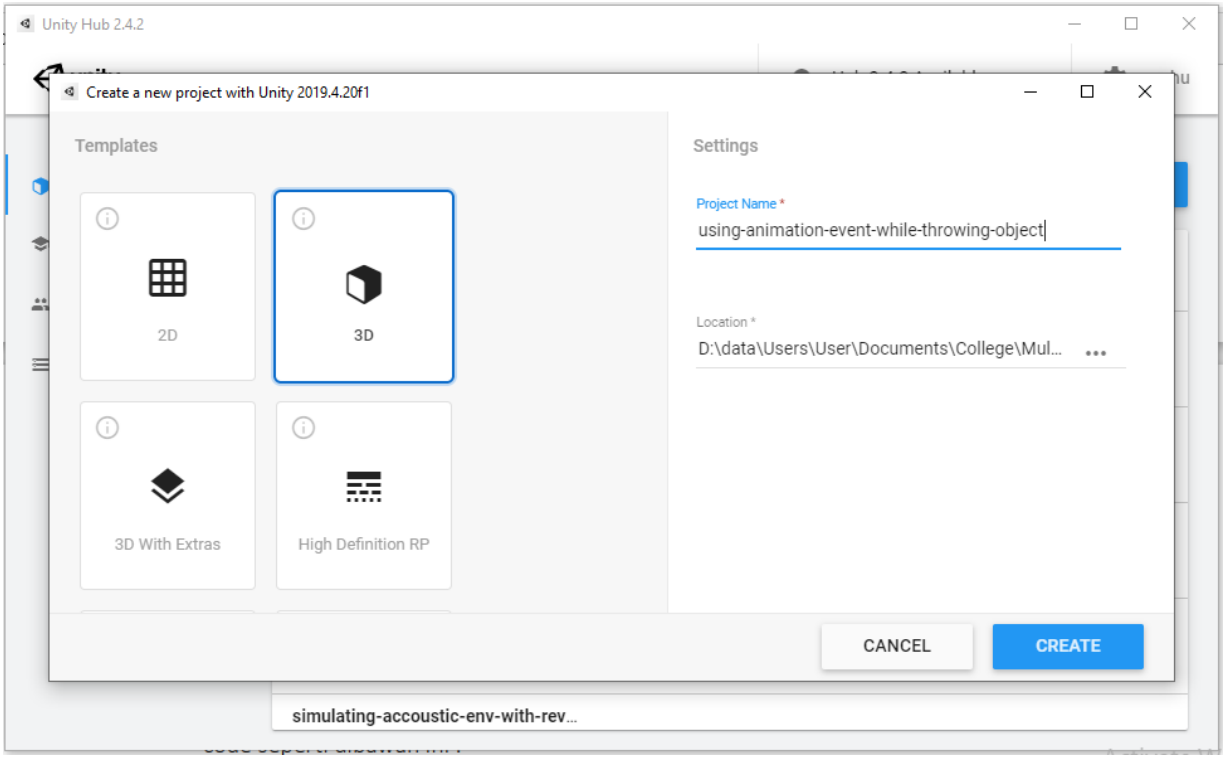
Play scene. Gunakan tombol ‘WASD’ untuk berjalan menuju PropTrigger. Jika PropTrigger ditabrak, maka badge (yang tadi dihapus) akan muncul dan PropTrigger akan hilang → cek Hierarchy.



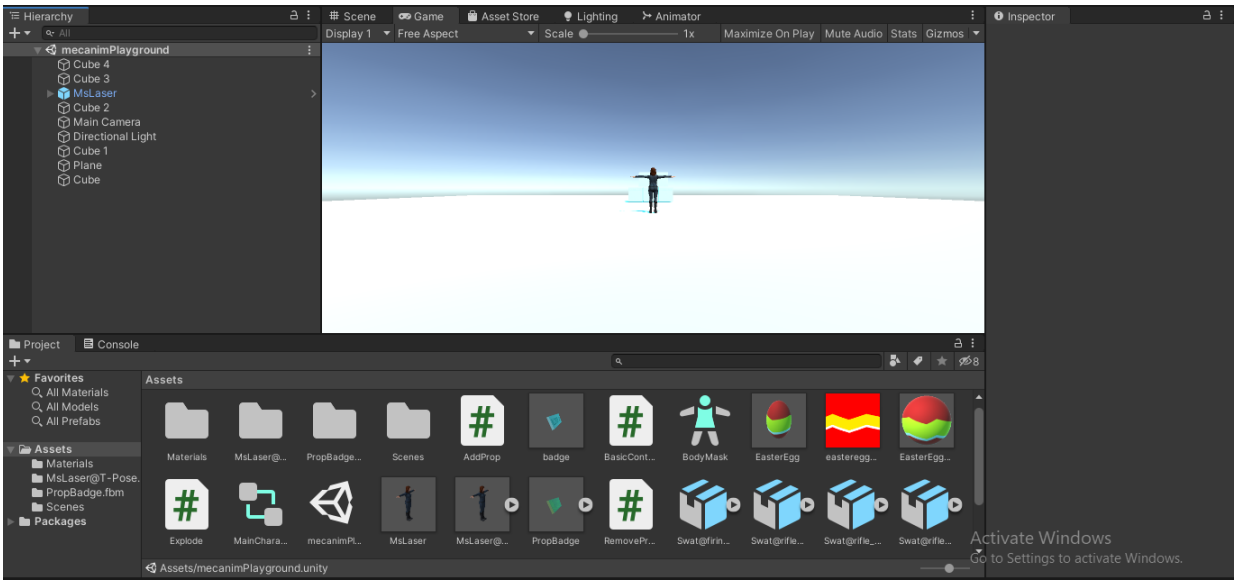


Menggunakan Animation Event untuk melempar sebuah objek

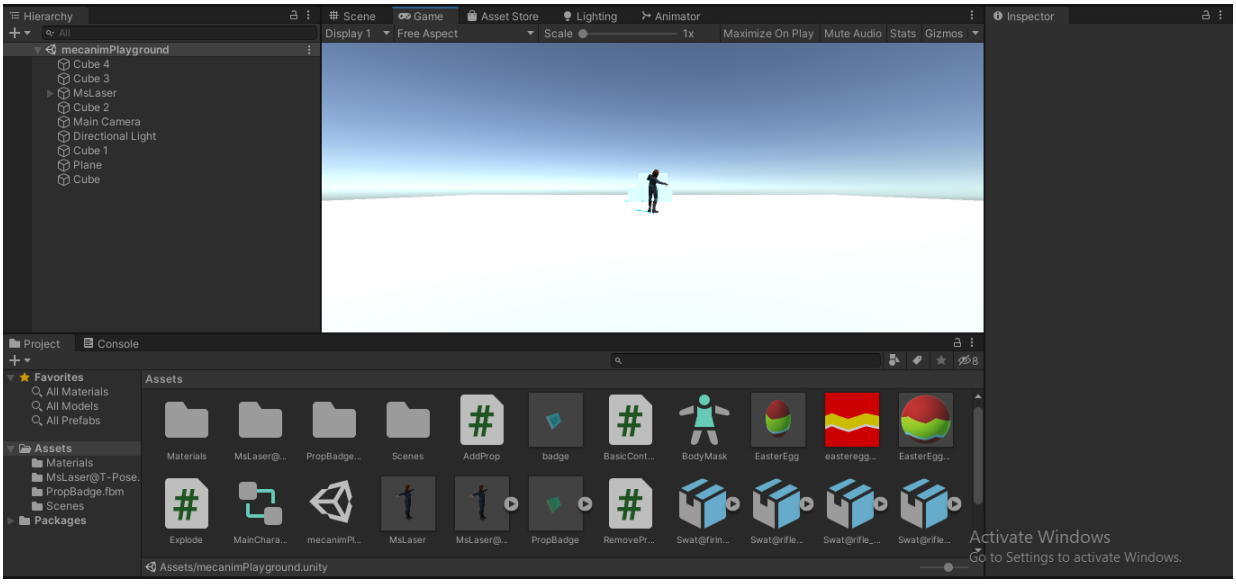
Buat project baru unity 3D.



Import Throwing.unitypackage dari folder asset. Kemudian, buka mecanimPlayground.



Play scene dan tekan tombol ‘F’ pada keyboard. Karakter akan bergerak ketika melempar sesuatu dengan tangan kanannya.

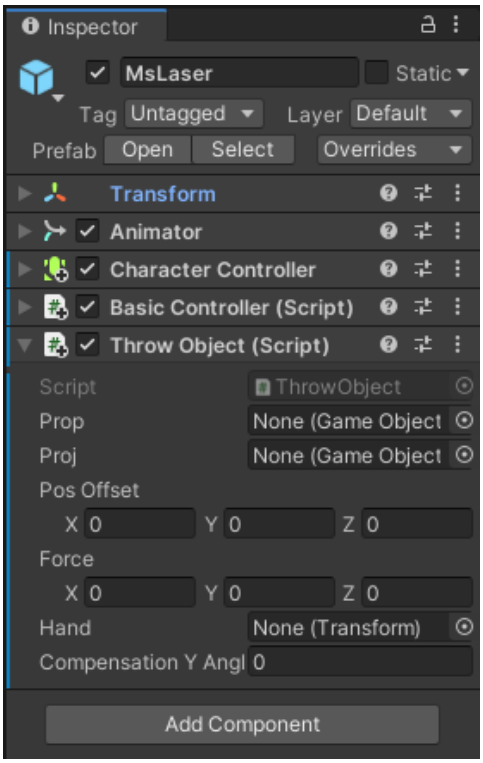


Buatlah script C# baru dengan nama ThrowObject.cs. Kemudian, masukkan source code seperti dibawah ini :

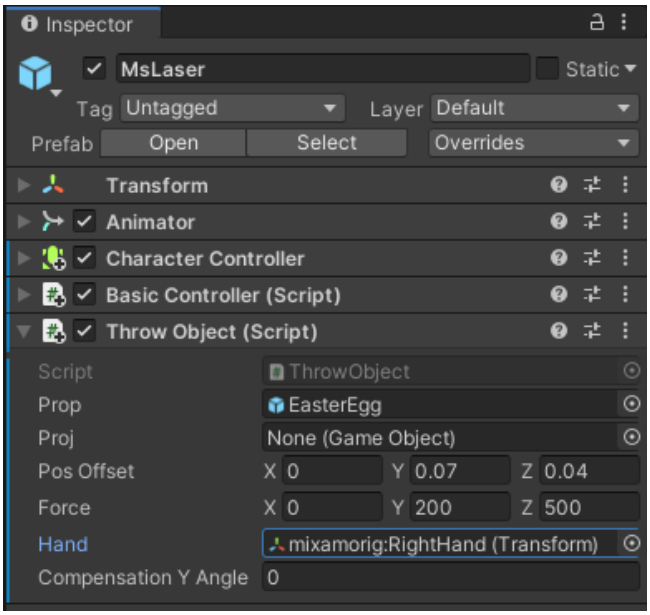
Assets > Scripts > ThrowObject.cs > ThrowObject > Throw()

```
using System.Collections;
using UnityEngine;

0 references
public class ThrowObject : MonoBehaviour
{
    1 reference
    public GameObject prop;
    13 references
    public GameObject proj;
    1 reference
    public Vector3 posOffset;
    1 reference
    public Vector3 force;
    3 references
    public Transform hand;
    1 reference
    public float compensationYAngle = 0f;

    0 references
    public void Prepare()
    {
        proj = Instantiate(prop, hand.position, hand.rotation) as GameObject;
        if (proj.GetComponent<Rigidbody>())
            Destroy(proj.GetComponent<Rigidbody>());
        proj.GetComponent<SphereCollider>().enabled = false;
        proj.name = "projectile";
        proj.transform.parent = hand;
        proj.transform.localPosition = posOffset;
        proj.transform.localEulerAngles = Vector3.zero;
    }

    0 references
    public void Throw()
    {
        Vector3 dir = transform.rotation.eulerAngles;
        dir.y += compensationYAngle;
        proj.transform.rotation = Quaternion.Euler(dir);
        proj.transform.parent = null;
        proj.GetComponent<SphereCollider>().enabled = true;
        Rigidbody rig = proj.AddComponent<Rigidbody>();
        Collider projCollider = proj.GetComponent<Collider>();
        Collider col = GetComponent<Collider>();
        Physics.IgnoreCollision(projCollider, col);
        rig.AddRelativeForce(force);
    }
    // Start is called before the first frame update
    0 references
    void Start()
    {

    }

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

    }
}
```

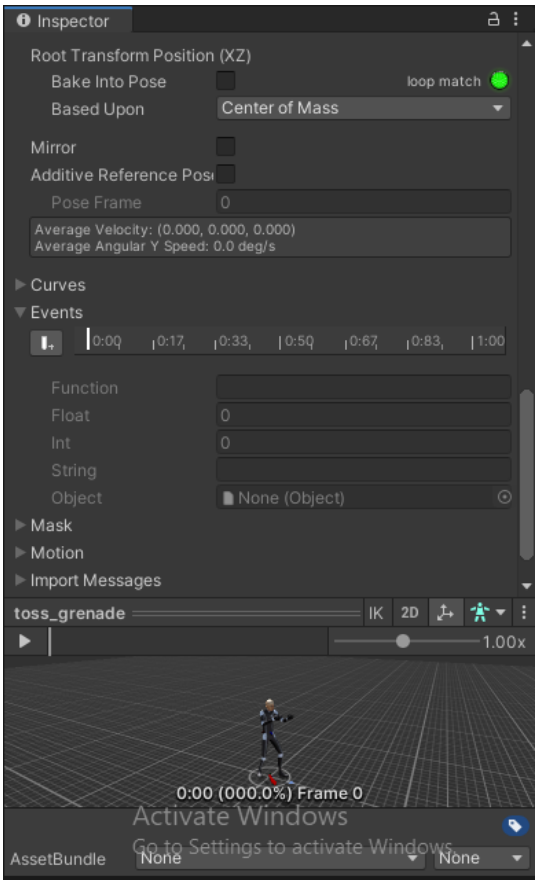

Drag ThrowObject.cs kedalam MsLaser pada Hierarchy.



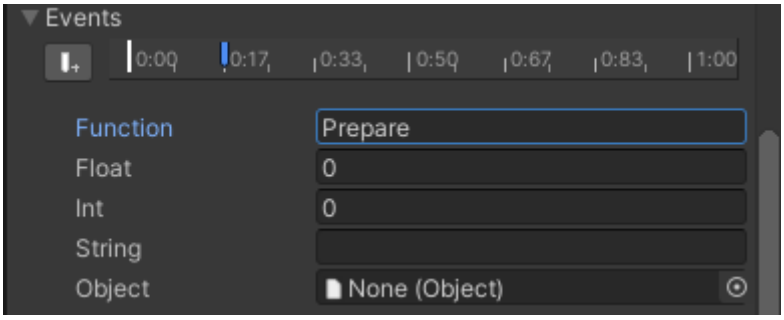
Buka Inspector dari MsLaser. Kemudian, ubahlah seperti berikut ini :



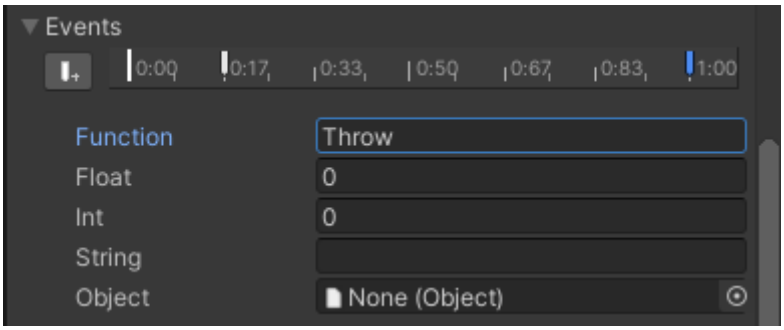
Pada project view, pilih file Swat@toss_grenade. Kemudian, pada Inspectornya, pilih bagian Animation dan expand bagian Event.



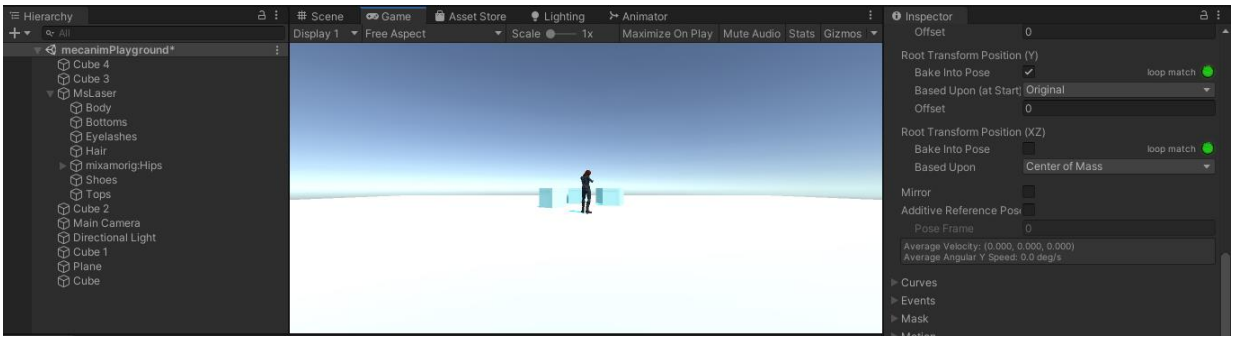
Klik tombol '+' untuk menambahkan animasi. Ubahlah playhead menuju detik 0:17. Kemudian, ubahlah Function menjadi Prepare dan klik tombol Apply.



Klik tombol '+' untuk menambahkan animasi. Ubahlah playhead menuju detik 1:00. Kemudian, ubahlah Function menjadi Throw dan klik tombol Apply.

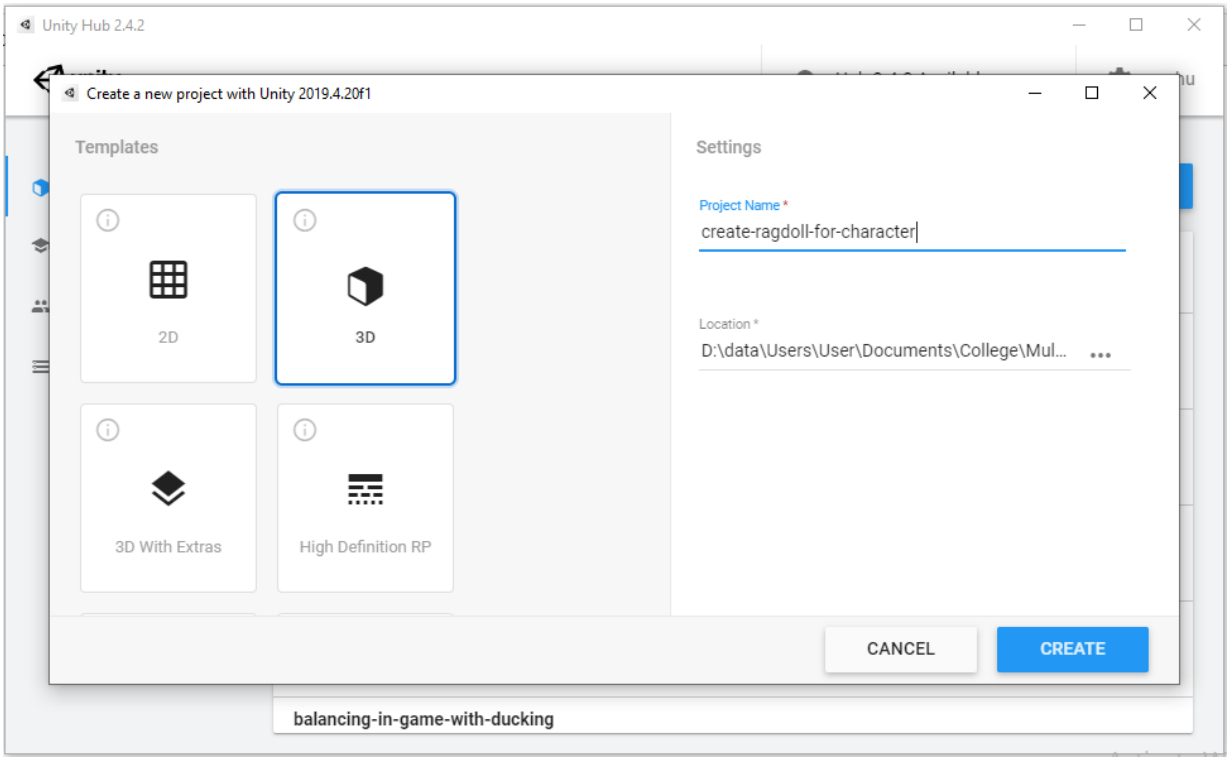


Play scene. Karakter akan melempar Easter Egg ketika tombol 'F' ditekan. Karakter akan bersiap untuk melempar pada detik ke 0.17 (Prepare) dan mulai melempar pada menit ke 1.00 (Throw).

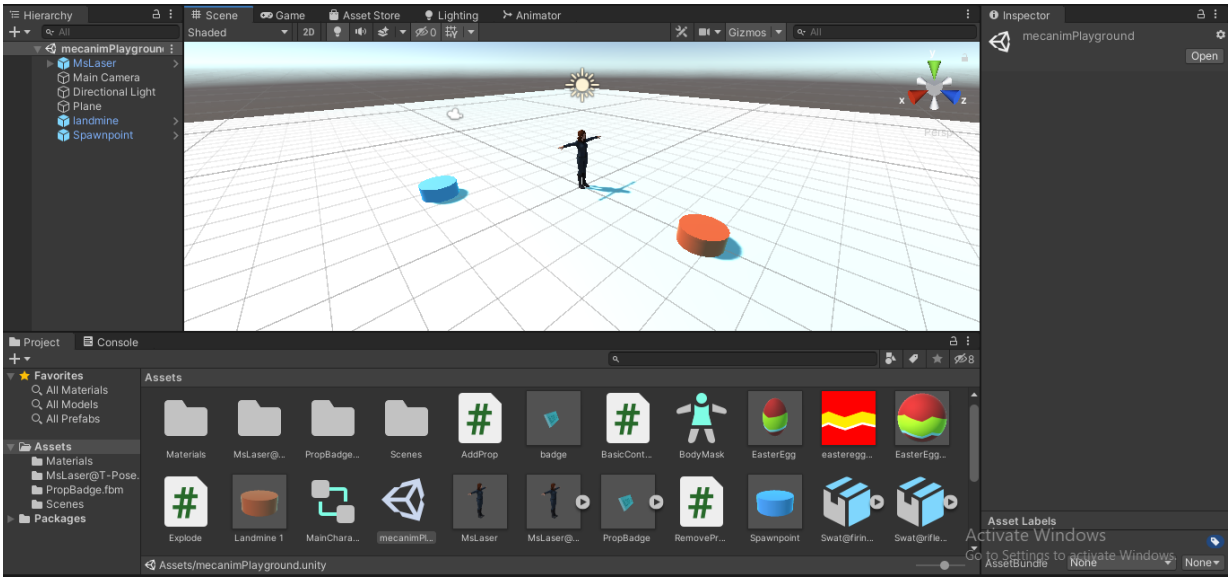


Membuat Ragdoll untuk sebuah karakter

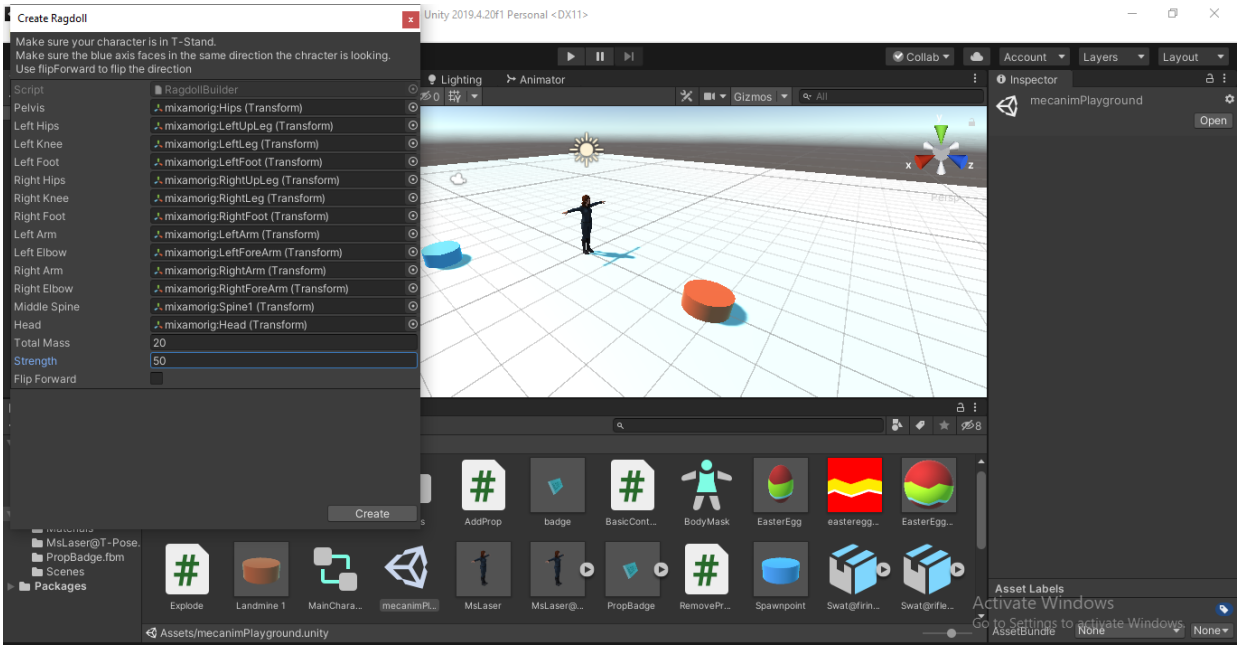
Buatlah project baru unity 3D.



Import Ragdoll.unitypackage. Kemudian, buka mecanimPlayground.



Buatlah objek Ragdoll (GameObject→3D Object→Ragdoll…). Kemudian, pilih transform seperti berikut ini :



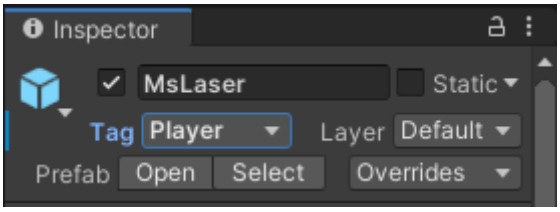
Buatlah script C# baru dengan nama RagdollCharacter.cs. Kemudian, isikan source code seperti dibawah ini dan drag kedalam MsLaser.

Assets > Scripts > RagdollCharacter.cs > RagdollCharacter > Restore()

```
using System.Collections;
using UnityEngine;

0 references
public class RagdollCharacter : MonoBehaviour
{
    // Start is called before the first frame update
    0 references
    void Start()
    {
        DeactivateRagdoll();
    }

    0 references
    public void ActivateRagdoll()
    {
        gameObject.GetComponent<CharacterController>().enabled = false;
        gameObject.GetComponent<BasicController>().enabled = false;
        gameObject.GetComponent<Animator>().enabled = false;
        foreach (Rigidbody bone in GetComponentsInChildren<Rigidbody>())
        {
            bone.isKinematic = false;
            bone.detectCollisions = true;
        }
        foreach (Collider col in GetComponentsInChildren<Collider>())
        {
            col.enabled = true;
        }
        StartCoroutine(Restore());
    }

```

```
28
        2 references
29      public void DeactivateRagdoll()
30      {
31          gameObject.GetComponent<BasicController>().enabled = true;
32          gameObject.GetComponent<Animator>().enabled = true;
33          transform.position = GameObject.Find("Spawnpoint").transform.position;
34          transform.rotation = GameObject.Find("Spawnpoint").transform.rotation;
35          foreach (Rigidbody bone in GetComponentsInChildren<Rigidbody>())
36          {
37              bone.isKinematic = true;
38              bone.detectCollisions = false;
39          }
40          foreach (CharacterJoint joint in GetComponentsInChildren<CharacterJoint>())
41          {
42              joint.enableProjection = true;
43          }
44          foreach (Collider col in GetComponentsInChildren<Collider>())
45          {
46              col.enabled = false;
47          }
48          gameObject.GetComponent<CharacterController>().enabled = true;
49      }
50
        1 reference
51      IEnumerator Restore()
52      {
53          yield return new WaitForSeconds(5);
54          DeactivateRagdoll();
55      }
56  }
57
```


Pilih MsLaser. Kemudian, pada Inspector view, ubahlah tag menjadi Player.



Buatlah script C# baru dengan source code seperti dibawah ini. Ubahlah namanya menjadi Landmine.cs. Kemudian, drag kedalam Landmine pada Hierarchy.

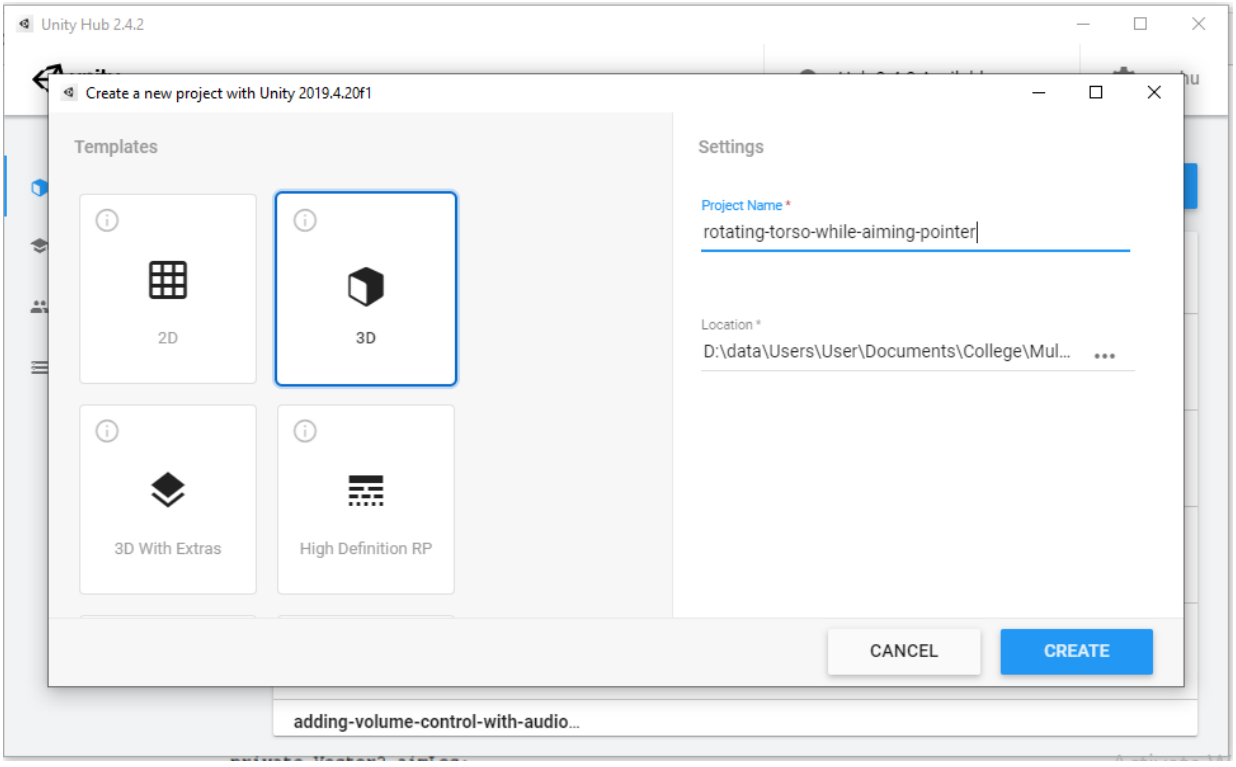
```
Assets > Scripts > Landmine.cs > Landmine > Reactivate()
1   using System.Collections;
2   using UnityEngine;
3
        0 references
4   public class Landmine : MonoBehaviour
5   {
        2 references
6       public float range = 2f;
        1 reference
7       public float force = 2f;
        1 reference
8       public float up = 4f;
        3 references
9       private bool active = true;
10
        0 references
11      void OnTriggerEnter(Collider collision)
12      {
13          if (collision.gameObject.tag == "Player" && active)
14          {
15              active = false;
16              StartCoroutine(Reactivate());
17              collision.gameObject.GetComponent<RagdollCharacter>().ActivateRagdoll();
18              Vector3 explosionPos = transform.position;
19              Collider[] colliders = Physics.OverlapSphere(explosionPos, range);
20              foreach (Collider hit in colliders)
21              {
22                  if (hit.GetComponent<Rigidbody>())
23                      hit.GetComponent<Rigidbody>().AddExplosionForce(force, explosionPos, range, up);
24              }
25          }
26      }
```

```
13          if (collision.gameObject.tag == "Player" && active)
14          {
15              active = false;
16              StartCoroutine(Reactivate());
17              collision.gameObject.GetComponent<RagdollCharacter>().ActivateRagdoll();
18              Vector3 explosionPos = transform.position;
19              Collider[] colliders = Physics.OverlapSphere(explosionPos, range);
20              foreach (Collider hit in colliders)
21              {
22                  if (hit.GetComponent<Rigidbody>())
23                      hit.GetComponent<Rigidbody>().AddExplosionForce(force, explosionPos, range, up);
24              }
25          }
26      }
27
        1 reference
28      IEnumerator Reactivate()
29      {
30          yield return new WaitForSeconds(2);
31          active = true;
32      }
33  }
34
```

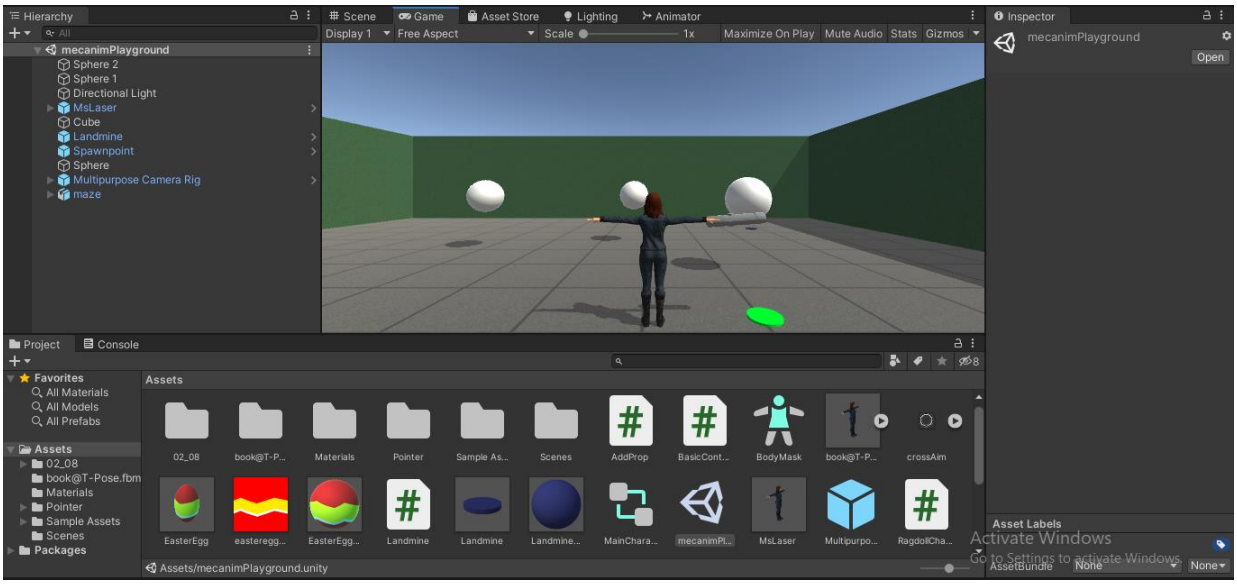
Play scene. Gunakan tombol ‘WASD’ pada keyboard untuk menjalankan karakter. Jika karakter menabrak Landmine, maka akan terjadi sebuah ledakan sehingga karakter akan terlempar menjauh. Selain itu, menyebabkan pergerakan badan akan mirip seperti ragdoll saat terjatuh.

Membuat putaran torso pada karakter untuk mengarahkan senjata

Buatlah project baru unity 3D.



Import AimPointer.unitypackage. Kemudian, buka mecanimPlayground.



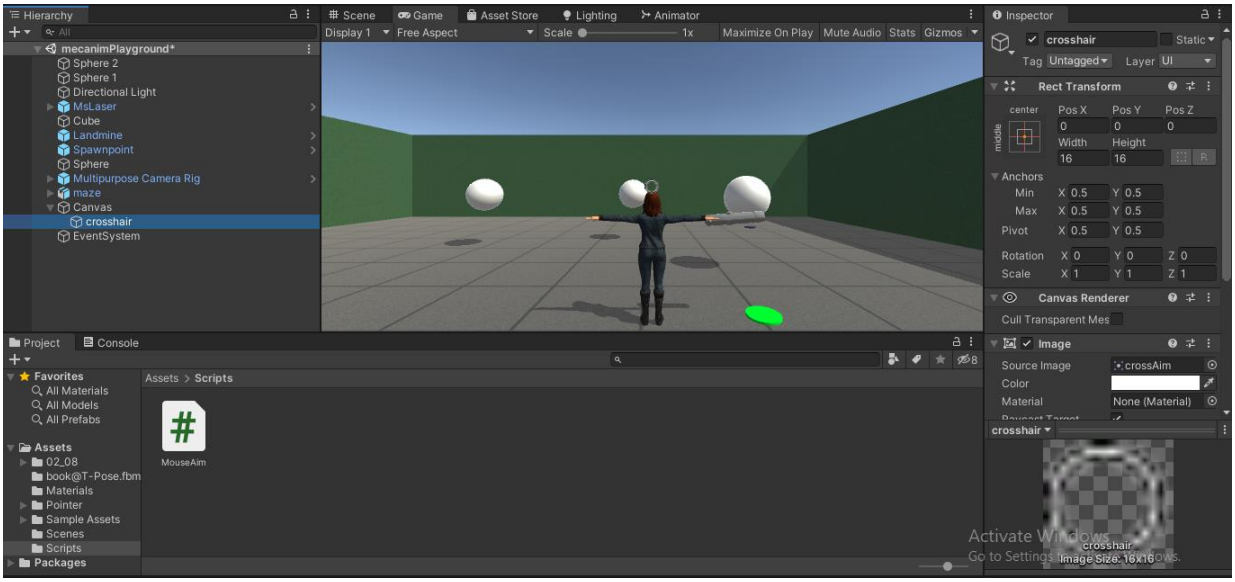
Buat script C# baru dengan nama MouseAim.cs dengan source code seperti dibawah ini. Kemudian, drag kedalam MsLaser.

Assets > Scripts > MouseAim.cs > MouseAim > LateUpdate()

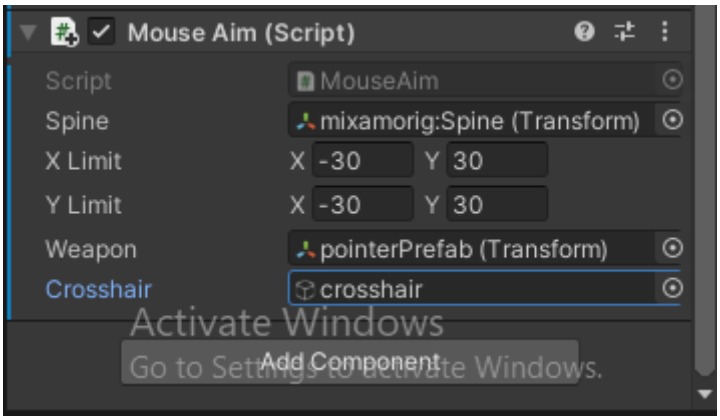
```
using System.Collections;
using UnityEngine;

0 references
public class MouseAim : MonoBehaviour
{
    2 references
    public Transform spine;
    4 references
    private float xAxis = 0f;
    4 references
    private float yAxis = 0f;
    2 references
    public Vector2 xLimit = new Vector2(-30f, 30f);
    2 references
    public Vector2 yLimit = new Vector2(-30f, 30f);

    3 references
    public Transform weapon;
    3 references
    public GameObject crosshair;
    2 references
    private Vector2 aimLoc;

    0 references
    public void LateUpdate()
    {
        yAxis += Input.GetAxis("Mouse X");
        yAxis = Mathf.Clamp(yAxis, yLimit.x, yLimit.y);
        xAxis -= Input.GetAxis("Mouse Y");
        xAxis = Mathf.Clamp(xAxis, xLimit.x, xLimit.y);
        Vector3 corr = new Vector3(xAxis, yAxis, spine.localEulerAngles.z);
```

```
0 references
public void LateUpdate()
{
    yAxis += Input.GetAxis("Mouse X");
    yAxis = Mathf.Clamp(yAxis, yLimit.x, yLimit.y);
    xAxis -= Input.GetAxis("Mouse Y");
    xAxis = Mathf.Clamp(xAxis, xLimit.x, xLimit.y);
    Vector3 corr = new Vector3(xAxis, yAxis, spine.localEulerAngles.z);
    spine.localEulerAngles = corr;
    RaycastHit hit;
    Vector3 fwd = weapon.TransformDirection(Vector3.forward);
    if (Physics.Raycast(weapon.position, fwd, out hit))
    {
        print(hit.transform.gameObject.name);
        aimLoc = Camera.main.WorldToScreenPoint(hit.point);
        crosshair.SetActive(true);
        crosshair.transform.position = aimLoc;
    }
    else
    {
        crosshair.SetActive(false);
    }
    Debug.DrawRay(weapon.position, fwd, Color.red);
}
}
```

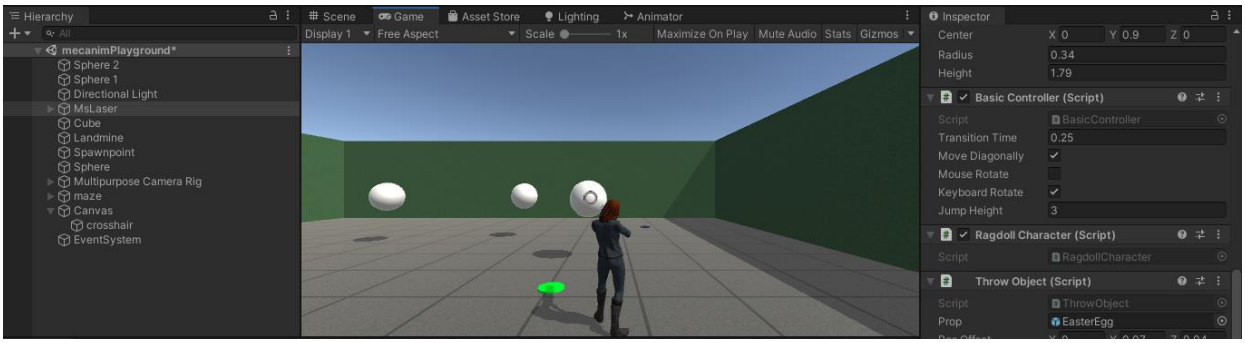
Buatlah objek Image baru (Create→UI→Image). Ubah namanya menjadi crosshair. Pada Inspector, ubah Width dan Height menjadi 16. Kemudian ubah Source Image menjadi crossAim.



Buka Inspector dari MsLaser, kemudian ubahlah beberapa komponen seperti berikut ini :



Play scene. Torso dari karakter dapat digerakkan dengan cara menggerakkan mouse. Selain itu, crosshair GUI texture ditampilkan diatas objek yang bertujuan sebagai pointer.



Link Github : https://github.com/hunaynr/komputasi_multimedia/tree/main/15thWeek

Link Youtube : https://www.youtube.com/channel/UCEMbyDYShjWXJyjoQok4nxw