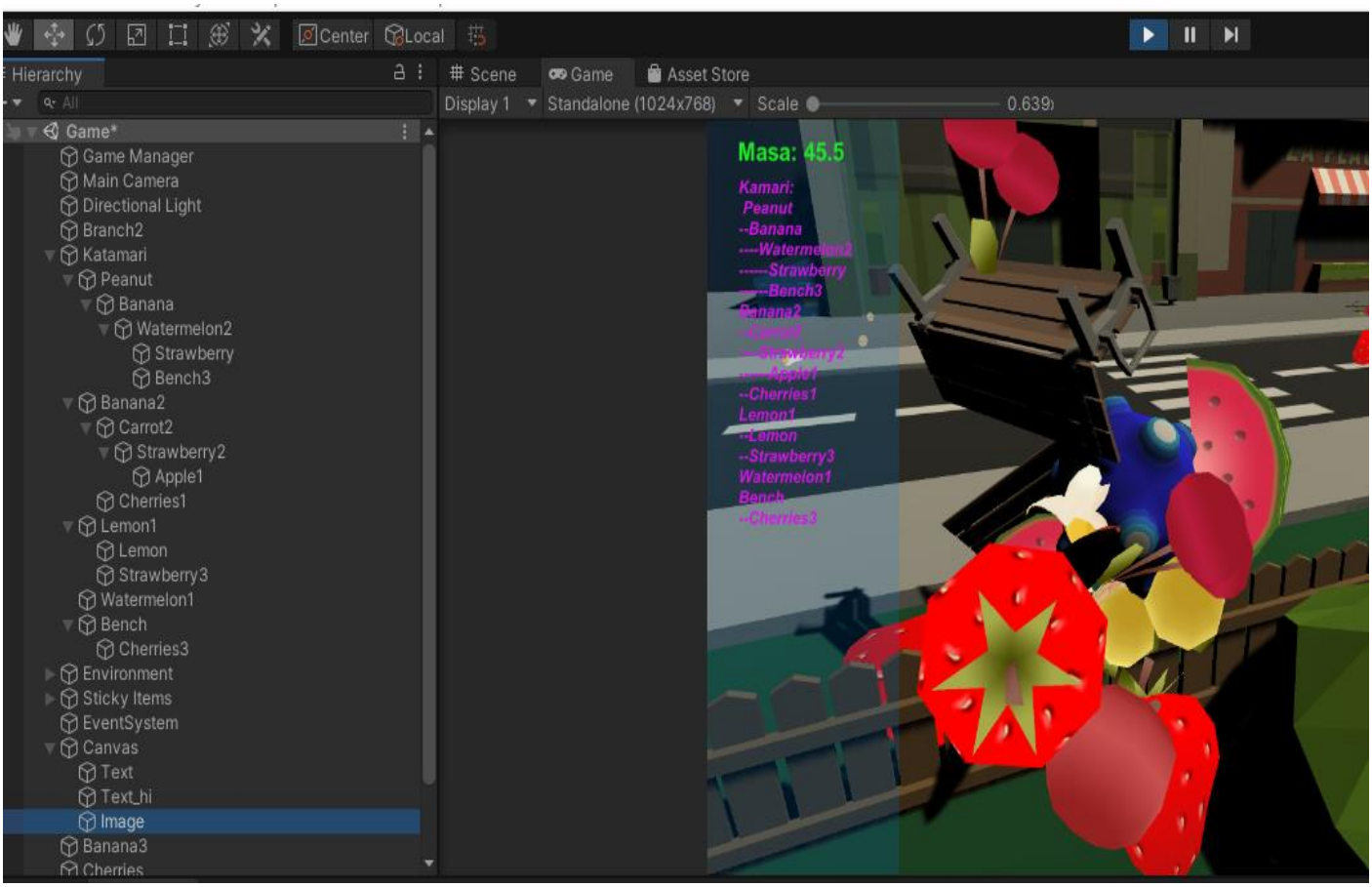
Leonardo Roy Sabolić, 0036538682

Osnove virtualnih okruženja Vježba 3



- Implementirano lijepljenje objekata
- Implementirano opadanje objekata
- Implementirana hijerarhija objekata
- Implementiran prikaz hijerarhije

Leonardo Roy Sabolić, 0036538682

Implementacija lijepljenja / dopadanja objekata

- Kod: PlayerColision.cs

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


/// <summary>
/// Class that implements actions during a collision.
/// </summary>
public class PlayerCollision : MonoBehaviour
{
    private List<(float, (float, float, float, bool), string, Transform, GameObject)> lastChlist = new List<(float,
(float, float, float, bool), string, Transform, GameObject)>();


    [SerializeField] private GameObject _stickyItems = null;
    private Dictionary<string, float> _oldMassesOfStickyItems = null;

    /// <summary>
    /// Start is called before the first frame update.
    /// Initialize storage for masses of sticky items.
    /// </summary>
    private void Start()
    {
        _oldMassesOfStickyItems = new Dictionary<string, float>();
    }

    /// <summary>
    /// On a collision check if the collision object has a tag "Sticky", otherwise ignore it.
    /// If an object has a tag "Sticky" and has a smaller mass than katamari ball, add it to the katamari ball,
    /// store it's mass to the storage and add it to the katamari ball's mass.
    /// If an object has a tag "Sticky" and has a greater mass than katamari ball, get its previous mass and
    /// substract katamari ball's mass by it and remove the object with it's previous mass.
    /// </summary>
    /// <param name="collision">Object that katamari ball has collided with.</param>
    private void OnCollisionEnter(Collision collision)
    {
        // float lastChildMass = null;
        // Rigidbody lastChildRb = null;
        // string lastChildName = null;
        // Transform lastChildParrent = null;
        // GameObject lastChild = null;

        float childMass = collision.gameObject.GetComponent<Rigidbody>().mass;
        Rigidbody childRb = collision.gameObject.GetComponent<Rigidbody>();
        string childName = collision.gameObject.name;
```

```
        float katamariMass = GetKatamariMass();

        // consider the collision only if the object is sticky, its mass is smaller than katamariMass and if the
sticky object is not already stuck on the ball
        // Consider the collision only if the object is sticky, its mass is smaller than katamariMass and if the
sticky object is not already stuck on the ball
        if (collision.gameObject.CompareTag("Sticky") && !_oldMassesOfStickyItems.ContainsKey(childName))
        {
            Debug.Log($"Object: {childName}, Mass: {childMass}");
            if (katamariMass > childMass)
            {
                // save last child data
                lastChlist.Add((childMass, (childRb.mass, childRb.drag, childRb.angularDrag, childRb.useGravity),
childName, collision.transform, collision.gameObject));
                // Add the collided object to the _oldMassesOfStickyItems
                _oldMassesOfStickyItems.Add(childName, childMass);
                // Extract the Collider component from the collision object with GetContact(...)
                Collider collidedObjectCollider = collision.GetContact(0).thisCollider;
                // Set the parent of the collided object
                collision.transform.SetParent(collidedObjectCollider.transform);
                // Update the Katamari mass
                UpdateKatamariMass(childMass, "add");
                // after merging the ball with the collided object, it is necessary to destroy the RigidBody component
to facilitate their movement as a singular entity
                Destroy(childRb);


            }
            else{
                if (lastChlist.Count > 0)
                {
                    // Revert the mass and re-parent the last child object
                    var lastCh = lastChlist[lastChlist.Count - 1];
                    lastChlist.RemoveAt(lastChlist.Count - 1);
                    UpdateKatamariMass(lastCh.Item1, "substract");
                    lastCh.Item5.transform.SetParent(null);
                    // _oldMassesOfStickyItems.Remove(lastCh.Item3);
                    StartCoroutine(DetachAndRevert(lastCh));

                }
            }
        }
    }

    private IEnumerator DetachAndRevert((float, (float, float, float, bool), string, Transform, GameObject) lastCh)
    {
        // Short delay to ensure detachment

        UpdateKatamariMass(lastCh.Item1, "subtract");
        lastCh.Item5.transform.SetParent(null);
        // Add a Rigidbody back to the last child object
        Rigidbody rb = lastCh.Item5.AddComponent<Rigidbody>();
        rb.mass = lastCh.Item2.Item1;
```

```
        rb.drag = lastCh.Item2.Item2;
        rb.angularDrag = lastCh.Item2.Item3;
        rb.useGravity = lastCh.Item2.Item4;
        yield return new WaitForSeconds(1.5f);
        _oldMassesOfStickyItems.Remove(lastCh.Item3);

    }

    /// <summary>
    /// A helper function to get katamari ball's current mass.
    /// </summary>
    /// <returns>Mass of the katamari ball</returns>
    private float GetKatamariMass()
    {
        return gameObject.GetComponent<Rigidbody>().mass;
    }

    /// <summary>
    /// A helper function to change katamari ball's mass.
    /// </summary>
    /// <param name="mass">Mass to be added to katamari ball.</param>
    /// <param name="operation">Determines the type of operation that will be performed (substraction or
addition)</param>
    private void UpdateKatamariMass(float mass, string operation)
    {
        if (operation == "add")
            gameObject.GetComponent<Rigidbody>().mass += mass;
        else if (operation == "substract")
            gameObject.GetComponent<Rigidbody>().mass -= mass;
        else
            Debug.Log("Error while doing operation.");
    }
}
```

- Koristi se Lista za pohranu svojstava svih objekata spojenih na igraća, te se pomoću nje miču objekti prilikom sudara težom stvari.
- U listi su sva svojstva tog predmeta koja se potom njemu ponovo pridodaju te je moguće opet pokupiti predmet nakon opadanja.
- Parent od objekta se postavlja na transform od colidera te mu predmet s kojim je sudaren postaje roditelj i time se dobije hijerarhija.
- Implementirana je pomoćna funkcija za micanje objekta u kojoj je delay od 1.5s kako se objekt koji se odvoji ne bi opet odmah spojio. (`private IEnumerator DetachAndRevert`)

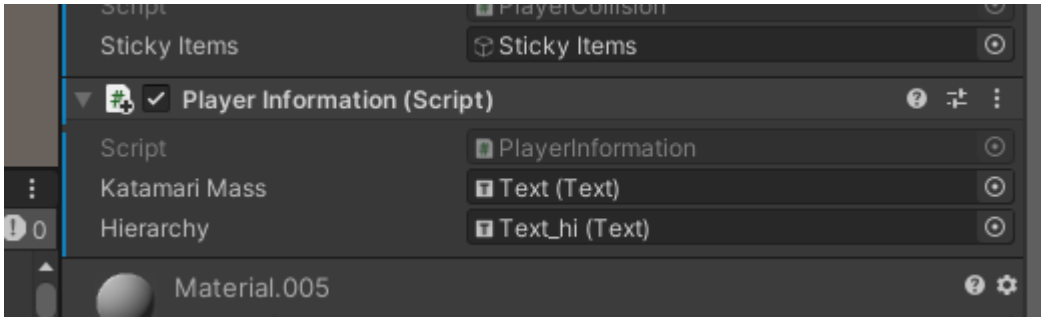
Leonardo Roy Sabolić, 0036538682

Prikaz mase i hijerarhija na ekranu

- Kod: PlayerInformation.cs

```
using UnityEngine;
using UnityEngine.UI;

namespace Assets.Scripts
{
    /// <summary>
    /// Class for viewing information about hierarchy and katamari mass
    /// </summary>
    public class PlayerInformation : MonoBehaviour
    {
        [SerializeField] private Text _katamariMass = null;
        [SerializeField] private Text _hierarchy = null;
        private Rigidbody _katamari = null;
        private Renderer [] _renderers = null;

        /// <summary>
        /// Start is called before the first frame update.
        /// Initialize Rigidbody component.
        /// </summary>
        private void Start()
        {
            _katamari = GetComponent<Rigidbody>();
        }

        /// <summary>
        /// Update is called once per frame.
        /// Get rendered objects and update the view of hierarchy and katamari ball mass
        /// </summary>
        private void Update()
        {
            _katamariMass.text = $"Masa: {_katamari.mass}";
            string hir = hierarchyText(_katamari.transform, 0);
            _hierarchy.text = $"Kamari: \n {hir}";
        }

        private string hierarchyText(Transform current, int depth){
            string ret="";
            // Debug.Log($"djeca : {current.GetComponentsInChildren<Transform>()}");
            if(current.childCount>0){
                for(int x=0;x<current.childCount;x++){
                    Transform child=current.GetChild(x).transform;
                    Debug.Log($":transform_ch: {child}");
                    for (int i=0;i<depth;i++){
                        ret=ret+"--";
                    }
                    ret=ret + child.name + "\n";
                    if(child.childCount>0){
                        ret=ret + hierarchyText(child, depth+1);
                    }
```

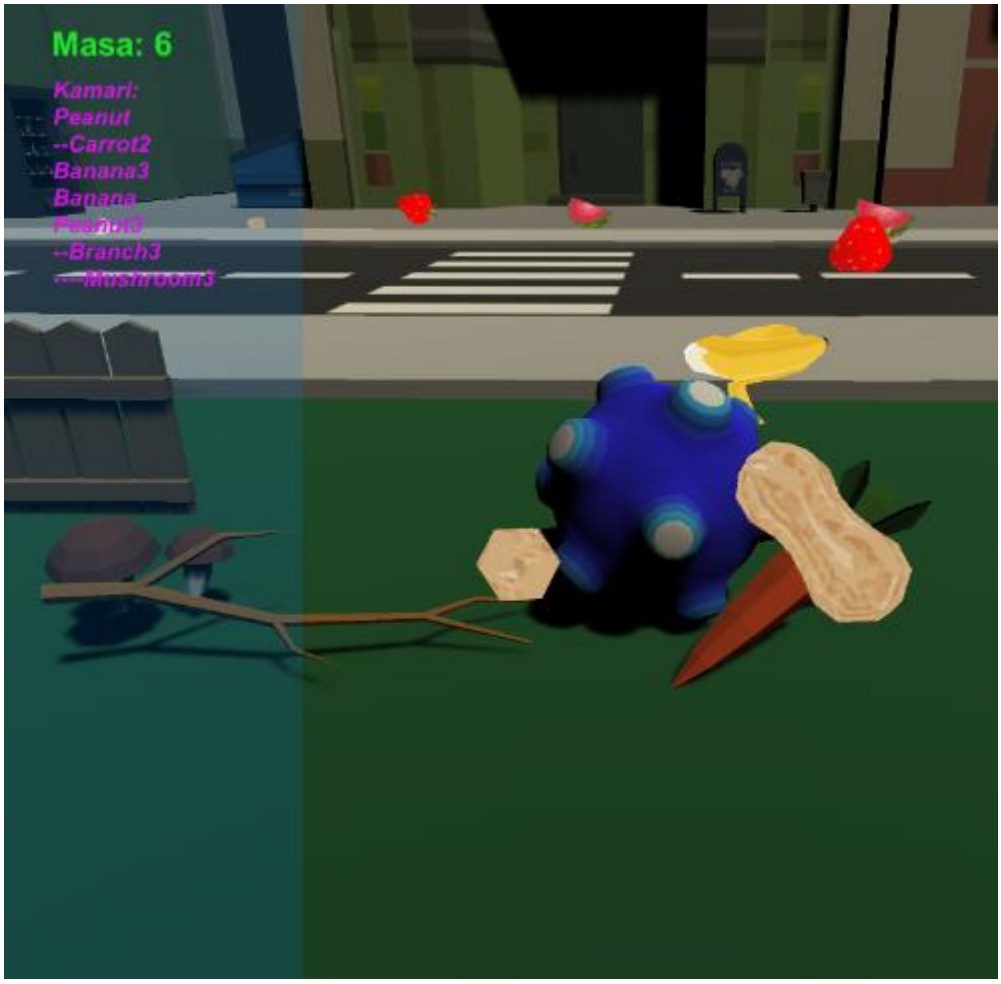
```
            }
            Debug.Log($":: {ret}");
            return ret;
        }
        else{
            return ret;
        }
    }


}
}
```

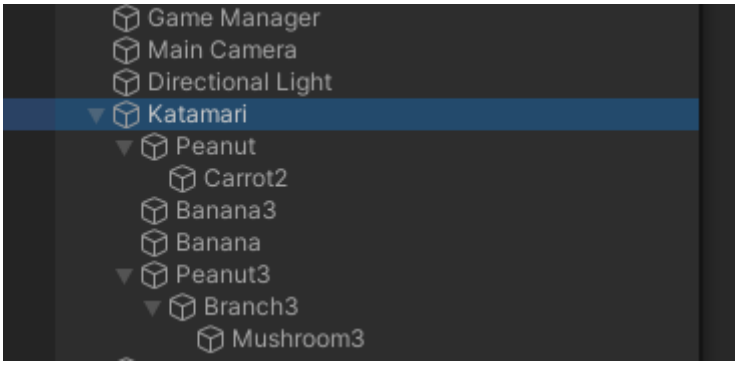
- Implementirana je Rekurzivna funkcija (`private string hierarchyText`) koja prima transform objekta i vraća imena djece tog objekta te dodaje -- za svaku dodatnu dubinu kao prefiks, za svako dijete provjerava ima li djecu te ako ima povećava dubinu i ponavlja to.
- 

- Tu je prikaz ta dva Text objekta kojima skripta mijenja tekst.
- Masa se samo dobije od samog objekta od Rigidbody komponente.

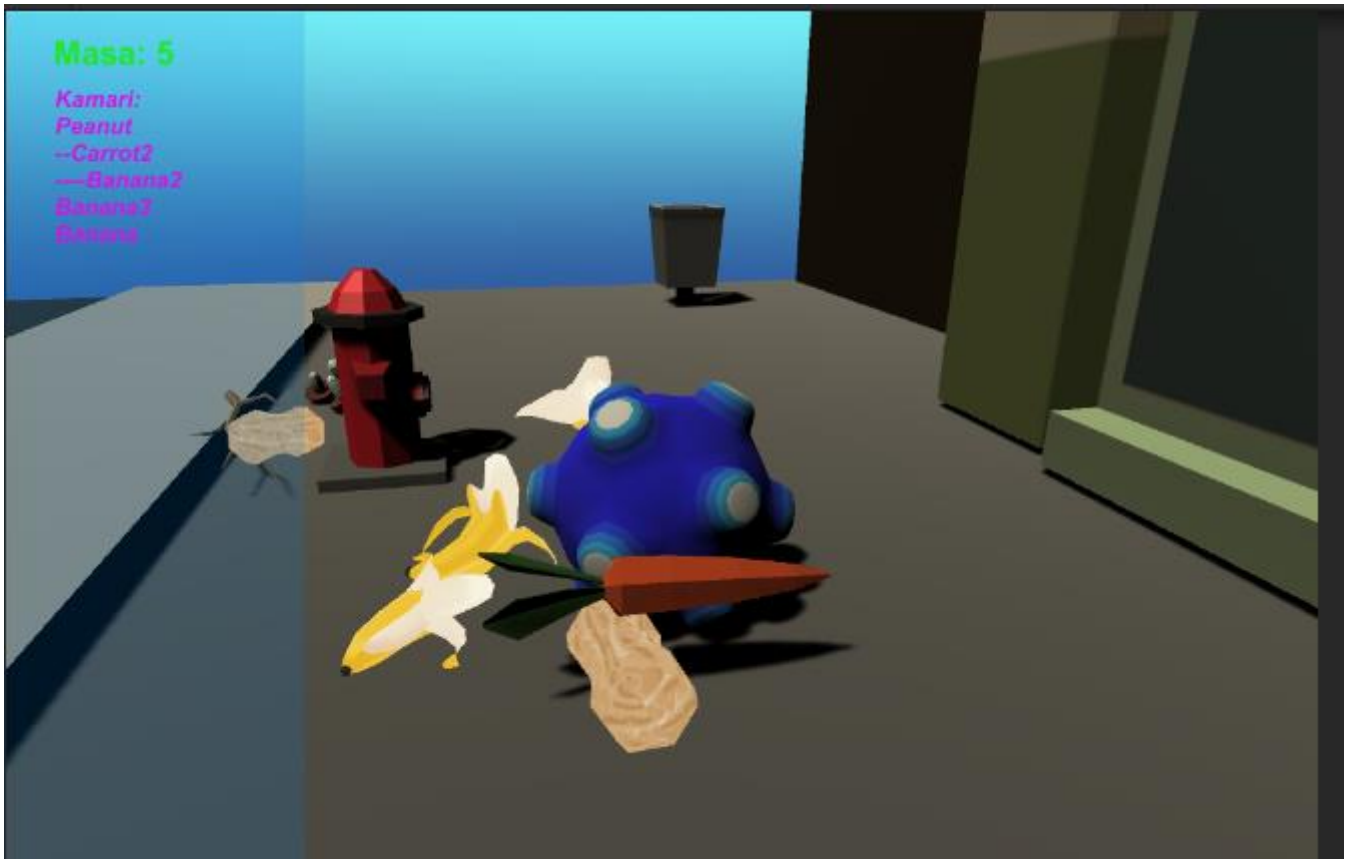
Leonardo Roy Sabolić, 0036538682

Dodatne slike:





Leonardo Roy Sabolić, 0036538682



Opadanje stvari