



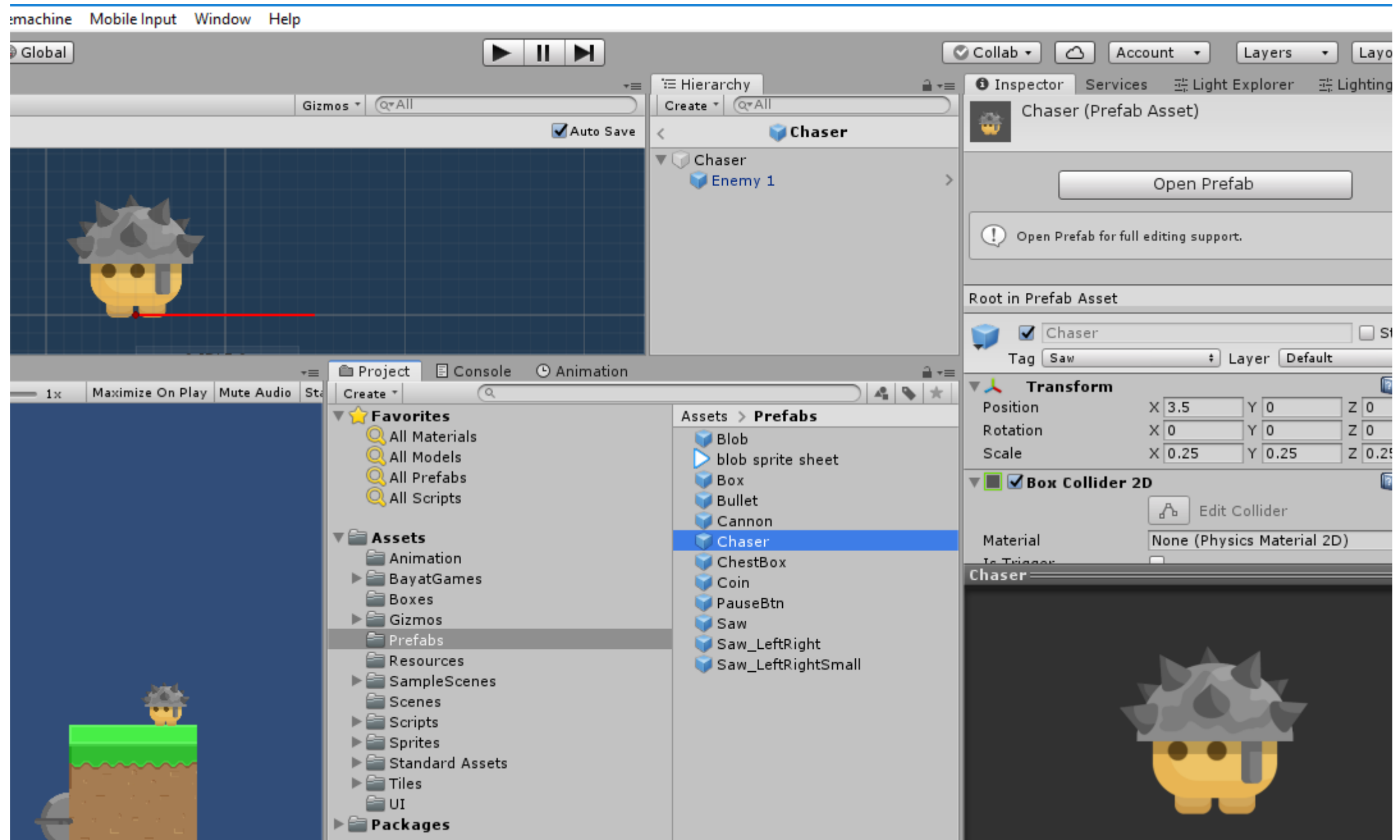
DIVISION OF
DIGITAL CONTENTS
DONGSEO UNIVERSITY

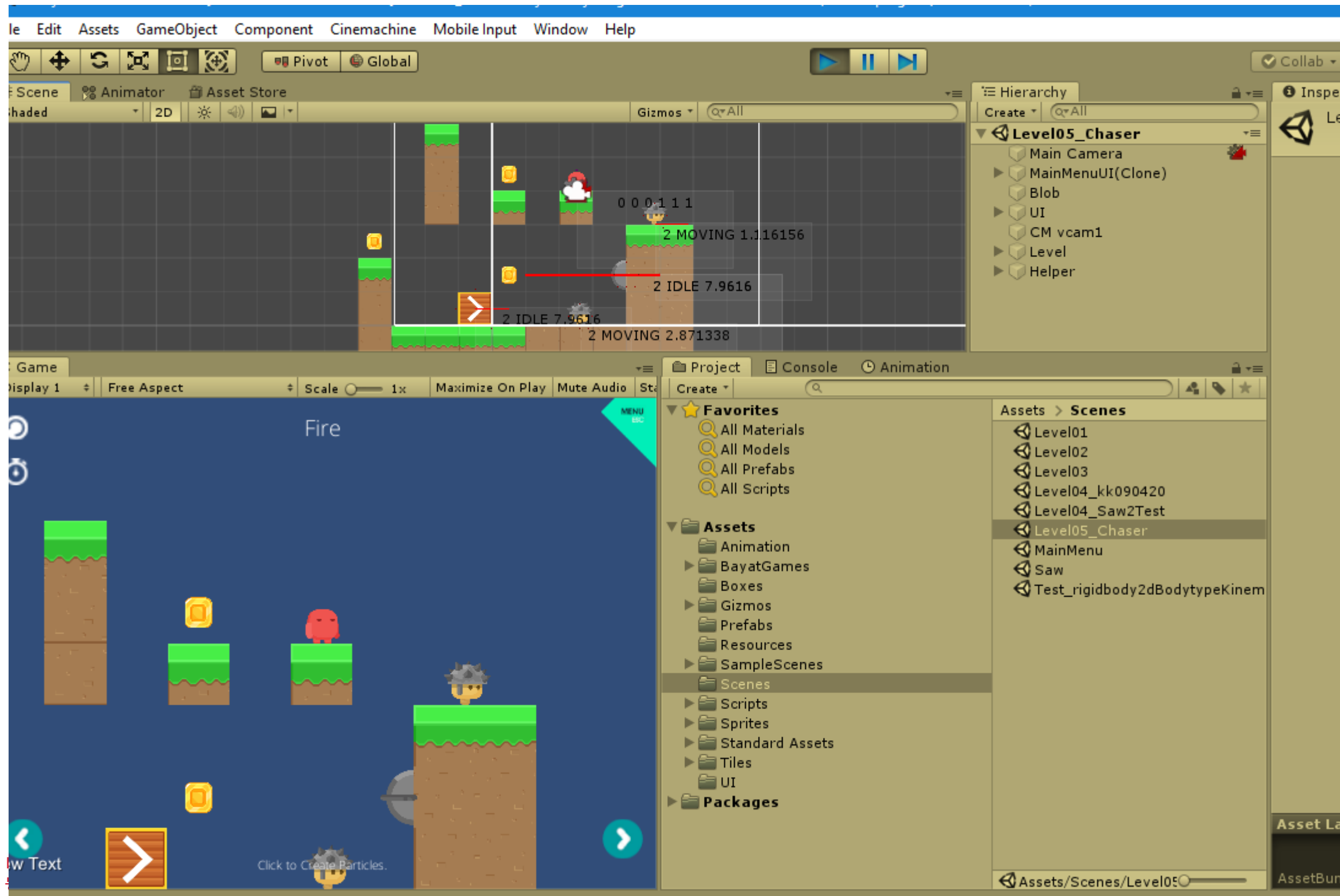
Dangerous Kave 14

Chaser Mechanic (work in progress)

jintaeks@dongseo.ac.kr

May, 2020





ChaserController

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

public class ChaserController : BoxBehaviour
{
    void _Flip()
    {
        Vector3 scale = transform.localScale;
        scale.x *= -1;
        transform.localScale = scale;
    }

    override public void OnStart()
    {
        //_mechanicType = EMechanicType.GROUND_MECHANIC;
        OnVelocityChanged();
        SetState(EState.MOVING);
    }
}
```

```

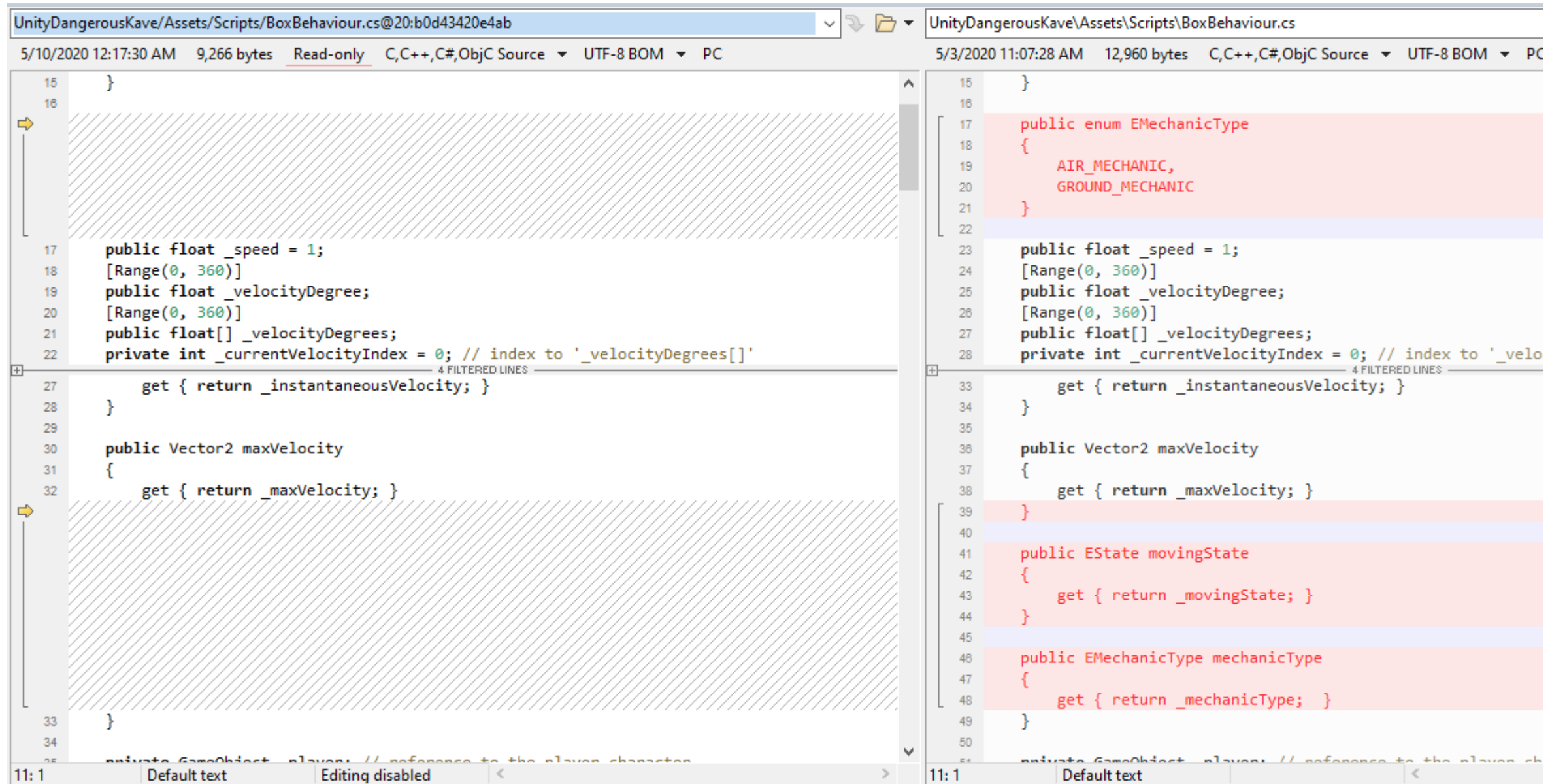
override public void OnOverlapped(Collider2D hit, ColliderDistance2D colliderDistance)
{
    if (hit.gameObject.IsMovingObject())
    {
        hit.transform.Translate(colliderDistance.pointB - colliderDistance.pointA);
        base.TryDoChangeVelocity();
    }
    else
    {
        if (base.movingState == EState.MOVING)
            transform.Translate(colliderDistance.pointA - colliderDistance.pointB);
    }
}
override protected void OnVelocityChanged()
{
    if (maxVelocity.x < 0.0f)
    {
        if (transform.localScale.x < 0.0f)
            _Flip();
    }
    else
    {
        if (transform.localScale.x > 0.0f)
            _Flip();
    }
}
}

```

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BoxBehaviour



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UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs@20:b0d43420e4ab
5/10/2020 12:17:30 AM 9,266 bytes Read-only C,C++,C#,ObjC Source UTF-8 BOM PC

15 }
16
17 public float _speed = 1;
18 [Range(0, 360)]
19 public float _velocityDegree;
20 [Range(0, 360)]
21 public float[] _velocityDegrees;
22 private int _currentVelocityIndex = 0; // index to '_velocityDegrees[]'
23
24 get { return _instantaneousVelocity; }
25
26
27 public Vector2 maxVelocity
28 {
29     get { return _maxVelocity; }
30 }
31
32
33
34
35 private GameObject _player; // reference to the player character

UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs
5/3/2020 11:07:28 AM 12,960 bytes C,C++,C#,ObjC Source UTF-8 BOM PC

15 }
16
17 public enum EMechanicType
18 {
19     AIR_MECHANIC,
20     GROUND_MECHANIC
21 }
22
23 public float _speed = 1;
24 [Range(0, 360)]
25 public float _velocityDegree;
26 [Range(0, 360)]
27 public float[] _velocityDegrees;
28 private int _currentVelocityIndex = 0; // index to '_velocityDegrees[]'
29
30 get { return _instantaneousVelocity; }
31
32
33 public Vector2 maxVelocity
34 {
35     get { return _maxVelocity; }
36 }
37
38
39
40
41 public EState movingState
42 {
43     get { return _movingState; }
44 }
45
46 public EMechanicType mechanicType
47 {
48     get { return _mechanicType; }
49 }
50
51 private GameObject _player; // reference to the player character
```

```

49
50 private EState _movingState = EState.IDLE;
51 private float _stateTimer = 0.0f;
52 private CircularQueue<Vector2> _posQueue = new CircularQueue<Vector2>(10);
53 private float _posQueueInsertTimer = 0.0f; // insert position for every 0.1 second.
54
55 public EState movingState
56 {
57     get { return _movingState; }
58 }
59
60 private void Awake()
61 {
62     _player = GameObject.FindGameObjectWithTag("Player");
63     CharacterController2D cc2d = _player.GetComponent<CharacterController2D>();
64     //cc2d.OnCollision += OnCollisionCallback;
65 }
66
67 public virtual void Start()
68 {
69     _boxCollider = GetComponent<BoxCollider2D>();
70     Debug.Assert(_boxCollider != null);
71
72     if( _boxArrow == null )
73         _boxArrow = transform.Find("Box Arrow");
74 }

```

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→ ... {

```

65
66 private EState _movingState = EState.IDLE;
67 private float _stateTimer = 0.0f;
68 private CircularQueue<Vector2> _posQueue = new CircularQueue<Vector2>(10);
69 private float _posQueueInsertTimer = 0.0f; // insert position for every 0.
70 [SerializeField]
71 protected EMechanicType _mechanicType = EMechanicType.AIR_MECHANIC;
72
73 private CornerData[] _cornerData = new CornerData[6];
74
75 protected virtual void Awake()
76 {
77     _player = GameObject.FindGameObjectWithTag("Player");
78     CharacterController2D cc2d = _player.GetComponent<CharacterController2D>();
79     //cc2d.OnCollision += OnCollisionCallback;
80     _InitializeCornerData();
81 }
82
83 protected virtual void Start()
84 {
85     _boxCollider = GetComponent<BoxCollider2D>();
86     Debug.Assert(_boxCollider != null);
87
88     if( _boxArrow == null )
89         _boxArrow = transform.Find("Box Arrow");
90 }

```

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```

public virtual void Update()
{
    Vector3 oldPos = transform.position;

    //////////////////////////////////////

    _stateTimer += Time.deltaTime;
    if (_movingState == EState.IDLE)
    {
        _Update_StateIDLE();

        SetArrowSpriteColor(Color.white);

        Gizmos.DrawRay(transform.position, _maxVelocity);

        // draw state
        //
        string text = string.Format("{0} {1} {2}", _numCollision, _movingState, _stateTimer);
        Util.DrawTextInSceneView(transform.position, text, Color.white);

        //////////////////////////////////////

        Gizmos.color = oldColor; // restore original Gizmos color
    }
}

```

```

98
[ 99     protected virtual void Update()
100     {
101         Vector3 oldPos = transform.position;
102
103         _UpdatePointCollInfo();
104         _stateTimer += Time.deltaTime;
105         if (_movingState == EState.IDLE)
106         {
107             _Update_StateIDLE();
108
109             SetArrowSpriteColor(Color.white);

110             Gizmos.DrawRay(transform.position, _maxVelocity);

111             // draw state
112             //
113             string text = string.Format("{0} {1} {2}", _numCollision, _movingState, _stateTimer);
114             Util.DrawTextInSceneView(transform.position, text, Color.white);

115             //////////////////////////////////////

116             foreach (CornerData c in _cornerData)
117             {
118                 Vector2 pos = transform.position;
119                 Gizmos.DrawSphere(pos + c.cornerOffset, 0.02f);
120             }

121             Gizmos.color = oldColor; // restore original Gizmos color

122         }

123         void _InitializeCornerData()
124     }
125

```

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Default text

UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs@20:b0d43420e4ab

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UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs

5/3/2020 11:07:28 AM 12,960 bytes C,C++,C#,ObjC Source UTF-8 BOM PC

```
155 void _InitializeCornerData()
156 {
157     BoxCollider2D boxCollider = GetComponent<BoxCollider2D>();
158
159     if (boxCollider != null)
160     {
161         float leftCollOffset = boxCollider.offset.x - boxCollider.size.x / 2;
162         float rightCollOffset = boxCollider.offset.x + boxCollider.size.x / 2;
163         float topCollOffset = boxCollider.offset.y + boxCollider.size.y / 2;
164         float bottomCollOffset = boxCollider.offset.y - boxCollider.size.y / 2;
165
166         leftCollOffset *= transform.localScale.x;
167         rightCollOffset *= transform.localScale.x;
168         topCollOffset *= transform.localScale.y;
169         bottomCollOffset *= transform.localScale.y;
170
171         leftCollOffset -= 0.1f;
172         rightCollOffset += 0.1f;
173         topCollOffset += 0.1f;
174         bottomCollOffset -= 0.1f;
175
176         Vector2 offset = boxCollider.offset * transform.localScale;
177         _cornerData[0].cornerOffset = new Vector2(leftCollOffset, offset.y); // left
178         _cornerData[1].cornerOffset = new Vector2(rightCollOffset, offset.y); // right
179         _cornerData[2].cornerOffset = new Vector2(offset.x, topCollOffset); // top
180         _cornerData[3].cornerOffset = new Vector2(offset.x, bottomCollOffset); // bott
181         _cornerData[4].cornerOffset = new Vector2(leftCollOffset + 0.1f, bottomCollOff
182         _cornerData[5].cornerOffset = new Vector2(rightCollOffset - 0.1f, bottomCollOf
183     }
184 }
185
186 void _UpdatePointCollInfo()
187 {
```

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```
129 }
130
131 void _Update_StateIDLE()
132 {
```

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... {

... {

<

UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs

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```
183 }
184 }
185
186 void _UpdatePointCollInfo()
187 {
188     //_numBottomColl = 0;
189     for (int i = 0; i < ( int )CornerId.MAX; ++i)
190     {
191         Vector2 pos = transform.position;
192         _cornerData[i].isCornerColl
193             = LevelManager.IsOverlapWithWorld(pos + _cornerData[i].cornerOffset
194                 , transform, ref _cornerData[i].cornerCollider2D);
195         //if (_cornerData[i].isCornerColl)
196         //{
197             Collider2D coll2d = _cornerData[i].cornerCollider2D;
198             if (_IsBottomCornerId(i))
199                 _numBottomColl += 1;
200             if (coll2d)
201             {
202                 InternalEvent ie = new InternalEvent()
203                 {
204                     eventType = InternalEventType.CornerCollision,
205                     go = coll2d.gameObject,
206                     iParam = i
207                 };
208                 _AddInternalEvent(ie);
209             }
210         //}
211     } //for
212 }
213
214 void _Update_StateIDLE()
215 {
```

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... {

... {

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```
132 {
133     // Retrieve all colliders we have intersected after velocity has been applied.
134     RaycastHit2D[] hits = Physics2D.BoxCastAll(transform.position, _boxCollider.size, 0, transform.rotation, this);
```

```
210
211 void _Update_StateMOVING()
212 {
213     // process collision response
214     _StateMOVING_UpdateCollision();
215 }
```

```
216 // check possible next state
217 _posQueueInsertTimer += Time.deltaTime;
218 if (_posQueueInsertTimer >= 0.1f)
219 {
220     Vector2 pos = transform.position;
221     _posQueue.Insert(pos);
```

```
231 {
232     float dist = Vector2.Distance(vFront, vRear);
233     if (dist <= 0.2f)
234     {
235         if (_velocityDegrees.Length >= 1)
236         {
237             _currentVelocityIndex += 1;
```

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```
215 {
216     // Retrieve all colliders we have intersected after velocity has been applied.
217     RaycastHit2D[] hits = Physics2D.BoxCastAll(transform.position, _boxCollider.size, 0, transform.rotation, this);
```

```
293
294 void _Update_StateMOVING()
295 {
296     // process collision response
297     _StateMOVING_UpdateCollision();
298 }
```

```
299 bool bChangeVelocity = false;
300 if (_mechanicType == EMechanicType.GROUND_MECHANIC)
301 {
302     if (_cornerData[4].isCornerColl == false || _cornerData[5].isCornerColl == false)
303     {
304         if( _stateTimer >= 0.5f )
305             bChangeVelocity = true;
306     }
307 }
```

```
309 // check possible next state
310 _posQueueInsertTimer += Time.deltaTime;
311 if (_posQueueInsertTimer >= 0.1f)
312 {
313     Vector2 pos = transform.position;
314     _posQueue.Insert(pos);
```

```
324 {
325     float dist = Vector2.Distance(vFront, vRear);
326     if (dist <= 0.2f)
327     {
328         if (_velocityDegrees.Length >= 1)
329         {
```

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```
221 _posQueue.Insert(pos);
231 {
232     float dist = Vector2.Distance(vFront, vRear);
233     if (dist <= 0.2f)
234     {
235         if (_velocityDegrees.Length >= 1)
236         {
237             _currentVelocityIndex += 1;
238             _currentVelocityIndex %= _velocityDegrees.Length;
239             //if (_currentVelocityIndex >= _velocityDegrees.Length)
240             //    _currentVelocityIndex = 0;
241             _velocityDegree = _velocityDegrees[_currentVelocityIndex];
242             _curVelocity = new Vector2(0, 0);
243             UpdateMaxVelocity();
244             _stateTimer = 0.0f;
245             _posQueue.ClearAll();
246             /*virtual*/OnVelocityChanged();
247         }
248         else
249         {
250             _movingState = EState.IDLE;
251             _posQueue.ClearAll();
252             _stateTimer = 0.0f;
253         }
254     }
255 }
256 }
```

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```
...{
...{
```

UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs

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```
314 _posQueue.Insert(pos);
324 {
325     float dist = Vector2.Distance(vFront, vRear);
326     if (dist <= 0.2f)
327     {
328         if (_velocityDegrees.Length >= 1)
329         {
330             bChangeVelocity = true;
331         }
332         else
333         {
334             _movingState = EState.IDLE;
335             _posQueue.ClearAll();
336             _stateTimer = 0.0f;
337         }
338     }
339 }
340 }
341 if( bChangeVelocity )
342 {
343     DoChangeVelocity();
344 }
345 }
```

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```
...{
...{
```

UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs@20:b0d43420e4ab

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255 }
256 }

257 }
258
259 void UpdateMaxVelocity()
260 {
261 _maxVelocity = Util.Rotate(Vector2.right, _velocityDegree * Mathf.Deg2Rad) * _speed;
262 Quaternion q = Quaternion.AngleAxis(_velocityDegree, Vector3.forward);

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UnityDangerousKave/Assets/Scripts/BoxBehaviour.cs

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339 }
340 }
341 if(bChangeVelocity)
342 {
343 DoChangeVelocity();
344 }
345 }

346
347 protected void DoChangeVelocity()
348 {
349 _currentVelocityIndex += 1;
350 _currentVelocityIndex %= _velocityDegrees.Length;
351 //if (_currentVelocityIndex >= _velocityDegrees.Length)
352 // _currentVelocityIndex = 0;
353 _velocityDegree = _velocityDegrees[_currentVelocityIndex];
354 _curVelocity = new Vector2(0, 0);
355 UpdateMaxVelocity();
356 _stateTimer = 0.0f;
357 _posQueue.ClearAll();
358 /*virtual*/OnVelocityChanged();
359 }
360

361 protected void TryDoChangeVelocity()
362 {
363 if (_stateTimer >= 0.5f)
364 DoChangeVelocity();
365 }
366

367 void UpdateMaxVelocity()
368 {
369 _maxVelocity = Util.Rotate(Vector2.right, _velocityDegree * Mathf.Deg2Rad) * _speed;
370 Quaternion q = Quaternion.AngleAxis(_velocityDegree, Vector3.forward);

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CharacterController2D

UnityDangerousKave/Assets/Scripts/CharacterController2D.cs@20:b0d43420e4ab

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```
2 using System.Collections.Generic;
3 using KaveUtil;
4
5 [RequireComponent(typeof(BoxCollider2D))]
6 public class CharacterController2D : MonoBehaviour
7 {
8     enum CornerId
9     {
10         Left,
11         Right,
12         Top,
13         Bottom, // 3
14         LeftBottom, // 4
15         RightBottom, // 5
16         MAX
17     }
18
19     enum InternalEventType
20     {
21         DestroyCharacter,
22         CornerCollision,
23         MAX
24     }
25
26     struct InternalEvent
27     {
28         public InternalEventType eventType;
29         public GameObject go;
30         public int iParam;
31     }
32
33     struct CornerData
34     {
```

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using System.Collections.Generic;

UnityDangerousKave/Assets/Scripts/CharacterController2D.cs

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```
2 using System.Collections.Generic;
3 using KaveUtil;
4
5 [RequireComponent(typeof(BoxCollider2D))]
6 public class CharacterController2D : MonoBehaviour
7 {
8
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14
15
16
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UnityDangerousKave/Assets/Scripts/CharacterController2D.cs@20:b0d43420e4ab

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30 public int iParam;

31 }

32

33 struct CornerData

34 {

35 public Vector2 cornerOffset;

36 public bool isCornerColl;

37 public Collider2D cornerCollider2D;

38 }

39

40 [SerializeField, Tooltip("Max speed, in units per second, that the character moves.")]

41 float _speed = 2;

42 [SerializeField, Tooltip("Acceleration while grounded.")]

43 float _walkAcceleration = 8;

44

222 , _cornerData[2].isCornerColl ? 1 : 0

223 , _cornerData[3].isCornerColl ? 1 : 0

224 , _cornerData[4].isCornerColl ? 1 : 0

225 , _cornerData[5].isCornerColl ? 1 : 0);

226

227 Util.DrawTextInSceneView(transform.position, text, Color.white);

228

229 Gizmos.color = oldColor; // restore original Gizmos color

230 }

231 private void OnGUI()

232 {

233 GUI.Label(new Rect(0, 0, 100, 64), RuntimeGameDataManager.gameData.coinCounter.ToSt

1 Identifier Editing disabled

using System.Collections.Generic;

UnityDangerousKave/Assets/Scripts/CharacterController2D.cs

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207 , _cornerData[5].isCornerColl ? 1 : 0);

208

209 Util.DrawTextInSceneView(transform.position, text, Color.white);

210

211 foreach (CornerData c in _cornerData)

212 {

213 Vector2 pos = transform.position;

214 Gizmos.DrawSphere(pos + c.cornerOffset, 0.02f);

215 }

216 Gizmos.color = oldColor; // restore original Gizmos color

217 }

218

219 private void OnGUI()

220 {

221 GUI.Label(new Rect(0, 0, 100, 64), RuntimeGameDataManager.gameData.coinCounter.ToS

2: 1 Identifier

using System.Collections.Generic;

16

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223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330

```
, _cornerData[3].isCornerColl ? 1 : 0
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, _cornerData[5].isCornerColl ? 1 : 0);

Util.DrawTextInSceneView(transform.position, text, Color.white);

Gizmos.color = oldColor; // restore original Gizmos color
}

private void OnGUI()
{
    GUI.Label(new Rect(0, 0, 100, 64), RuntimeGameDataManager.gameData.coinCounter.ToSt

float topCollOffset = _boxCollider.offset.y + _boxCollider.size.y / 2 + 0.1f;
float bottomCollOffset = _boxCollider.offset.y - _boxCollider.size.y / 2 - 0.1f;
_cornerData[0].cornerOffset = new Vector2(leftCollOffset, _boxCollider.offset.y);
_cornerData[1].cornerOffset = new Vector2(rightCollOffset, _boxCollider.offset.y);
_cornerData[2].cornerOffset = new Vector2(_boxCollider.offset.x, topCollOffset);
_cornerData[3].cornerOffset = new Vector2(_boxCollider.offset.x, bottomCollOffset);
_cornerData[4].cornerOffset = new Vector2(leftCollOffset + 0.2f, bottomCollOffset);
_cornerData[5].cornerOffset = new Vector2(rightCollOffset - 0.2f, bottomCollOffset);
}

void Flip(float moveInput)
{
    Vector3 scale = transform.localScale;
    if ((scale.x > 0.0f && moveInput < 0) || (scale.x < 0.0f && moveInput > 0))
```

83 FILTERED LINES

2:1 Identifier Editing disabled

using System.Collections.Generic;

using System.Collections.Generic;

UnityDangerousKave/Assets/Scripts/CharacterController2D.cs

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```
, _cornerData[3].isCornerColl ? 1 : 0
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Util.DrawTextInSceneView(transform.position, text, Color.white);

foreach (CornerData c in _cornerData)
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    Vector2 pos = transform.position;
    Gizmos.DrawSphere(pos + c.cornerOffset, 0.02f);
}

Gizmos.color = oldColor; // restore original Gizmos color
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float topCollOffset = _boxCollider.offset.y + _boxCollider.size.y / 2 + 0.1f;
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_cornerData[1].cornerOffset = new Vector2(rightCollOffset, _boxCollider.offset.y);
_cornerData[2].cornerOffset = new Vector2(_boxCollider.offset.x, topCollOffset);
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using System.Collections.Generic;

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CharacterController

The image displays two side-by-side screenshots of a code editor, likely Visual Studio, showing the `ChaserController.cs` script. The left window shows the original code, and the right window shows the modified code.

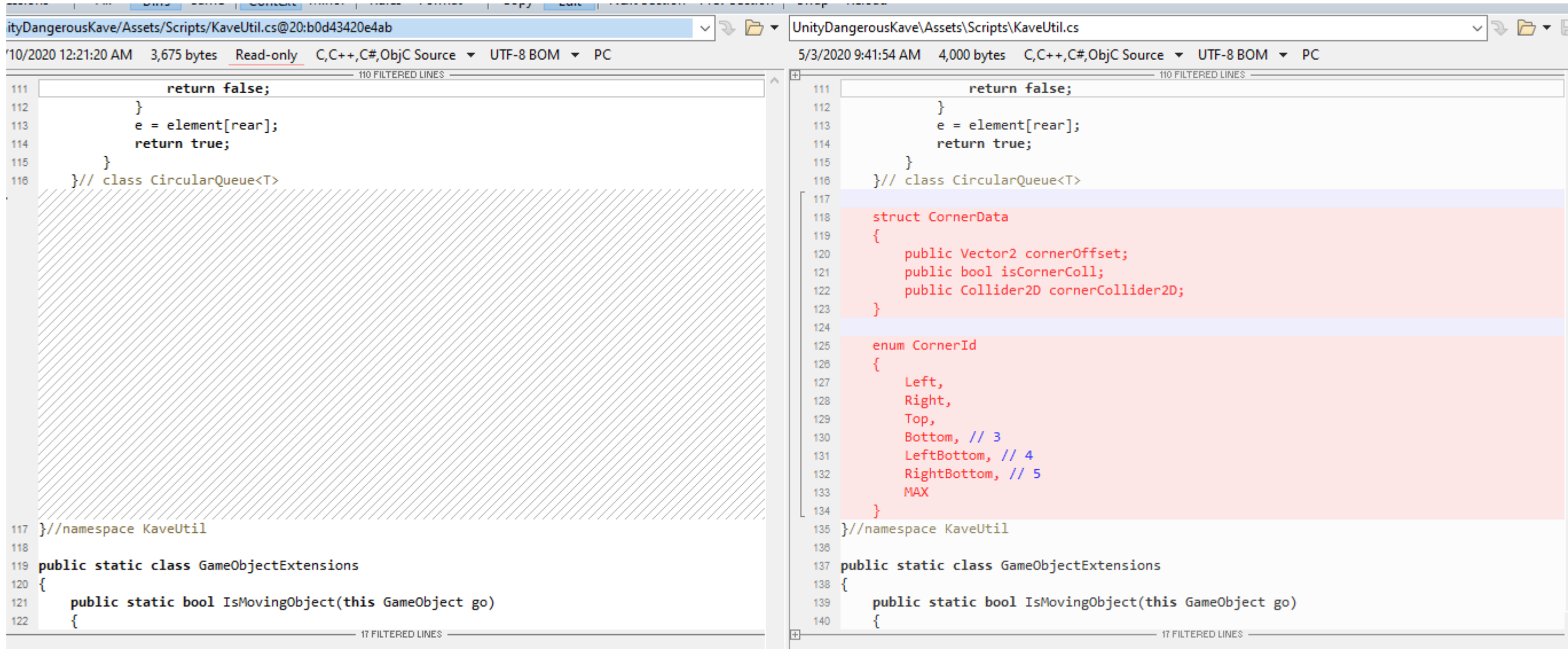
Left Window (Original Code):

```
10 scale.x *= -1;
11 transform.localScale = scale;
12 }
13
14 override public void OnStart()
15 {
16 // OnVelocityChanged();
17 SetState(EState.MOVING);
18 }
19
20 override public void OnOverlapped(Collider2D hit, ColliderDistance2D colliderDistance)
21 {
22 if (hit.gameObject.IsMovingObject())
23 {
24 hit.transform.Translate(colliderDistance.pointB - colliderDistance.pointA);
25 }
26 else
27 {
28 if (base.movingState == EState.MOVING)
29 transform.Translate(colliderDistance.pointA - colliderDistance.pointB);
30 }
}
```

Right Window (Modified Code):

```
10 scale.x *= -1;
11 transform.localScale = scale;
12 }
13
14 override public void OnStart()
15 {
16 // _mechanicType = EMechanicType.GROUND_MECHANIC;
17 OnVelocityChanged();
18 SetState(EState.MOVING);
19 }
20
21 override public void OnOverlapped(Collider2D hit, ColliderDistance2D colliderDistance)
22 {
23 if (hit.gameObject.IsMovingObject())
24 {
25 hit.transform.Translate(colliderDistance.pointB - colliderDistance.pointA);
26 base.TryDoChangeVelocity();
27 }
28 else
29 {
30 if (base.movingState == EState.MOVING)
31 transform.Translate(colliderDistance.pointA - colliderDistance.pointB);
32 }
}
```

KaveUtil



```
111         return false;
112     }
113     e = element[rear];
114     return true;
115 }
116 }// class CircularQueue<T>
117 }//namespace KaveUtil
118
119 public static class GameObjectExtensions
120 {
121     public static bool IsMovingObject(this GameObject go)
122     {
123     }
124 }
125
126 struct CornerData
127 {
128     public Vector2 cornerOffset;
129     public bool isCornerColl;
130     public Collider2D cornerCollider2D;
131 }
132
133 enum CornerId
134 {
135     Left,
136     Right,
137     Top,
138     Bottom, // 3
139     LeftBottom, // 4
140     RightBottom, // 5
141     MAX
142 }
143
144 }//namespace KaveUtil
145
146 public static class GameObjectExtensions
147 {
148     public static bool IsMovingObject(this GameObject go)
149     {
150     }
151 }
```

MY **BRIGHT** FUTURE

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