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What is 2D Soft Body?

This is an easy-to-use asset, which allows you to create 2D jelly physics objects with only two components. All you need is to add two scripts on your GameObject:
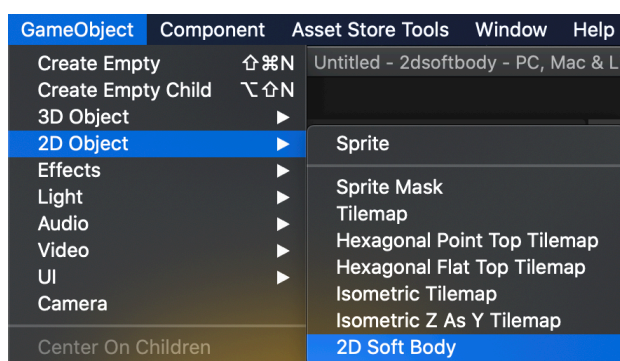
- **SoftObject**
- **SoftSprite**

and choose the sprite to set your jelly-physics object.

This works on Personal and Pro Unity, suitable for Web, Standalone, Android and iOS platforms.

Quick Start

To create jelly-physics object: create a new GameObject, from Menu «GameObject/2D Object/2D Soft Body» and choose Sprite in Inspector window for «SoftSprite» component.

That is all. Now you can try to set different parameters of «SoftObject». For example - set Joint Radius, Distance, Frequency and Mass as 0.25, 0.1, 20, 5 and jelly object will have other physic behaviour!

Another way to create soft body object is to drag and drop sprite to the scene or hierarchy window and click on Context Menu item -> Make 2D Soft Body:
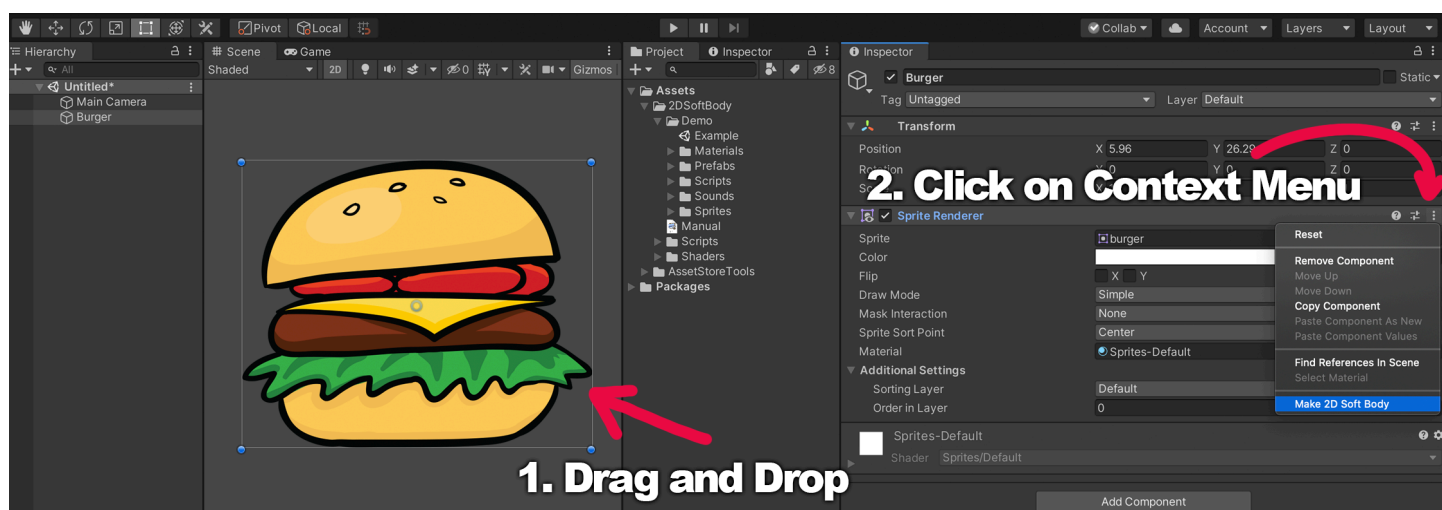
Afterwards the soft body object appears on the scene, user enter the play mode and test the deform physics using collisions with other objects.

How does it works?

2D Soft Body changes vertices positions of <u>MeshFilter</u> according the changed positions of children joints.

The SoftSprite class creates a mesh using the <u>MeshFilter</u> and <u>MeshRenderer</u>.

The SoftObject class creates <u>joints</u> with <u>colliders</u> and configure its parameters. SoftObject modifies <u>MeshFilter</u> vertices accordingly changed joints positions.

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SoftSprite component

SoftSprite component creates and configures image on scene, using <u>MeshFilter</u>.

SoftSprite component has parameters:
- **Sprite** - sprite, which is used to create a sprite on scene;
- **Scale** - size of Sprite;
- **Material** - Material of <u>MeshRenderer</u>;
- **SortingOrder** and **SortingLayer** - <u>sort by layer and depth</u>;
- **Pixel Per Meter** - analogue Sprite's pixelPerMeter;
- **Density** - how ofter mesh quads will be repeated;
- **Color** - color of the sprite.

Also if you need to update your sprite, press the button «Update».

<u>SoftSprite script has public method:</u>

```
public void ForceUpdate()  - updates mesh.
```

SoftObject component

SoftObject component creates and configures joints to make jelly-physics effect.

SoftObject script has parameters:
- **Fill Type** - type of filling by <u>CircleCollider2D</u>'s with joints, can be <u>Physics Shape</u>, Rectangle or Ellipse. Physics Shape provides best shape accuracy and is recommended to use;
- **Joints Count** - joints count for Physics Shape Fill Type;
- **Path Offset** - offset for physical shape path for Physics Shape Fill Type;
- **Colliders Offset** - offset for joints positions for Physics Shape Fill Type;
- **Physics Material** - physics material for joints;
- **Use Auto Mass** - automatically calculate mass value, instead manual settings;

- **Mass** - mass of the joints;
- **LinearDrag** - joints drag coefficient affecting positional movement;
- **AngularDrag** - joints drag coefficient affecting rotational movement;
- **Joint Radius** - joints CircleCollider2D radius;
- **Joints Layer** - layer of joints;

SpringJoint2D parameters:

- **Enable Collision** - can the two connected objects collide with each other;
- **Auto Configure Connected Anchor** - check this box to automatically set the anchor location for the other object this joint connects to. (Check this instead of completing the Connected Anchor fields);
- **Auto Configure Distance** - check this box to automatically detect the distance between the two objects and set it as the distance that the joint keeps between the two objects.
- **Distance** - the distance that the spring should attempt to maintain between the objects;
- **Damping Ratio** - the degree to which you want to suppress spring oscillation: In the range 0 to 1, the higher the value, the less movement;
- **Frequency** - the frequency at which the spring oscillates while the objects are approaching the separation distance you want (measured in cycles per second): In the range 0 to 1,000,000 - the higher the value, the stiffer the spring;
- **Joints** - joints list;

Also if you need to regenerate your joints, press the button «Generate Joints». If joints were not generated, they will be created in play mode.

SoftObject script has public methods:

`public void GenerateJoints()` - cache components, initialise and configure joints;

`public void UpdateParams()` - updates joints parameters;

`public void DestroyJoints()` - removes all joints;

`public void ForceUpdate()` - cache components and creates joints;

`public float GetPhysicalShapeLength()` - returns physical shape total length.

Tips

- Choose SoftObject.FillType for different jelly objects forms: Sprite Physics Shape, rectangle or ellipse form. Physical Shape can be edited in Unity Editor;
- You can also choose different value for SoftSprite.Density to change Mesh vertex count and SoftBody behaviour;
- Unusable joints GameObjects can be removed in Editor for better performance;
- Joints positions can be changed manually after generating to better fit colliders to sprite shape;
- To reduce CPU usage and providing better performance you can set joints layer that ignores collisions with each other. For that add new layer and setup Physics 2D in «Projects Settings» as in screenshots. Note that this recommended if you use only one active soft body object at the same time, for the couple of objects this may ignore soft body collisions.
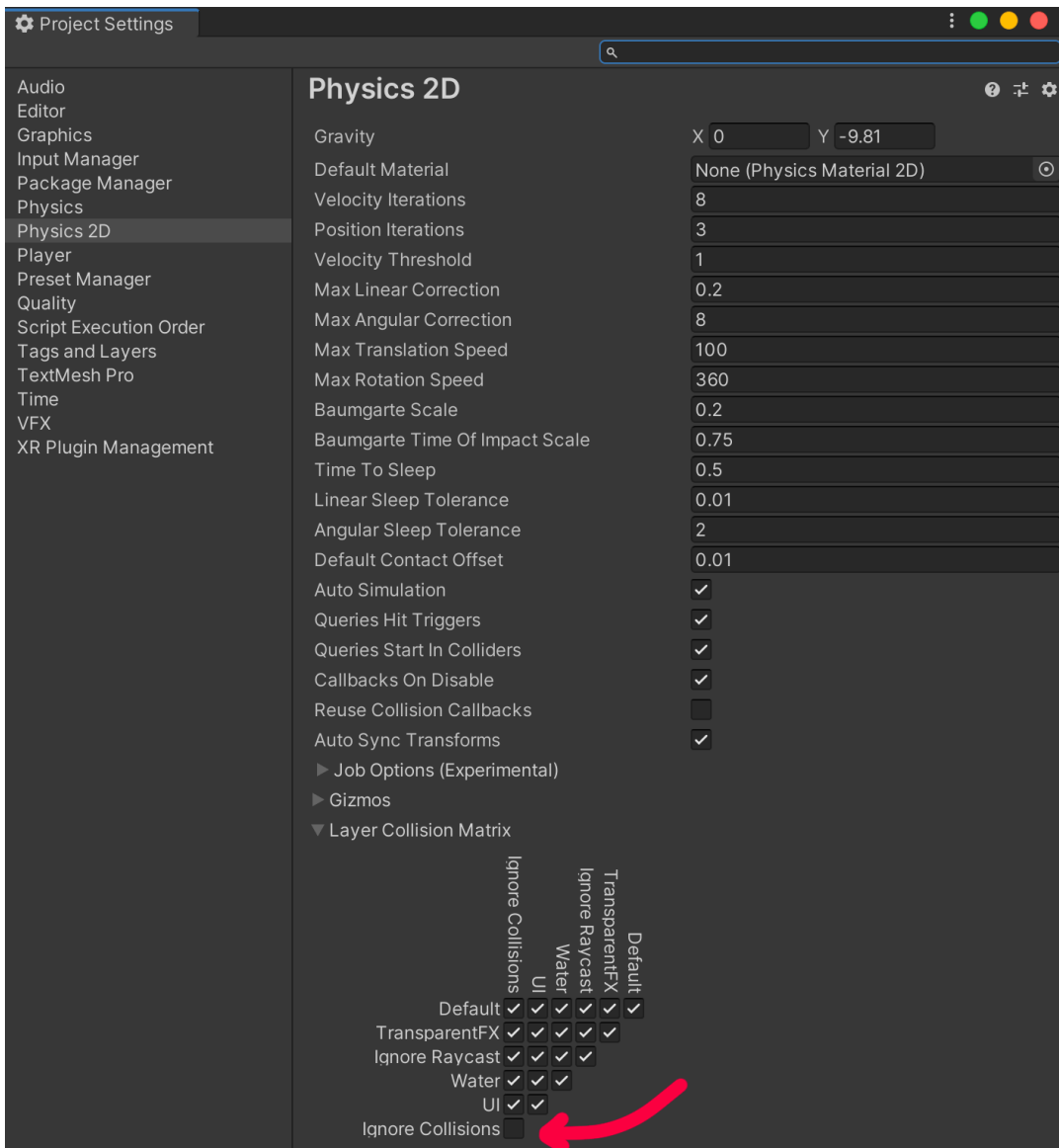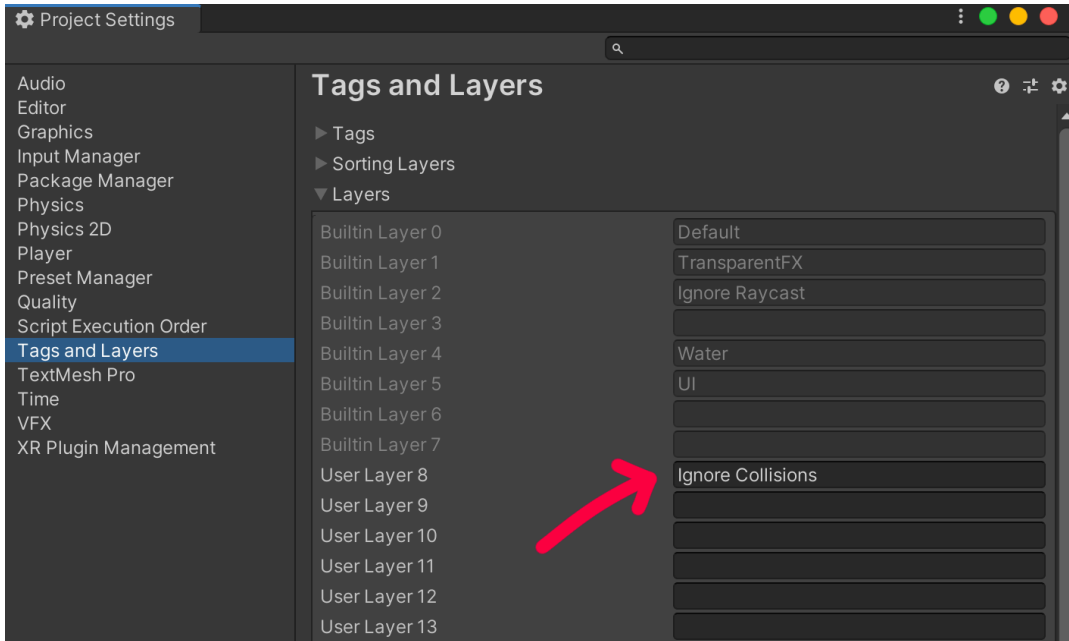
Please let me know if you have any questions.
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