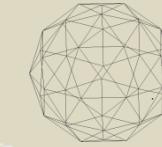


Basic 3D animation using Blender

SKANI101x



Ball animation using animation principle

Dr. Sameer Sahasrabudhe

Nitin Ayer and Sneha Sanglikar

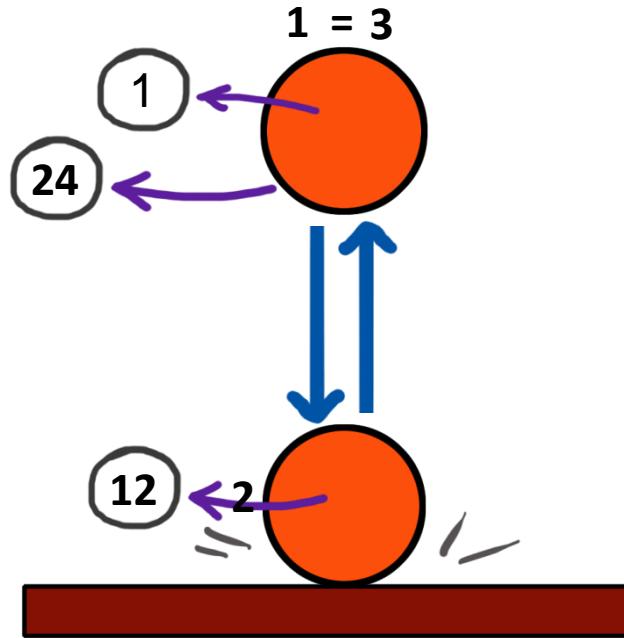
IIT Bombay

Outline

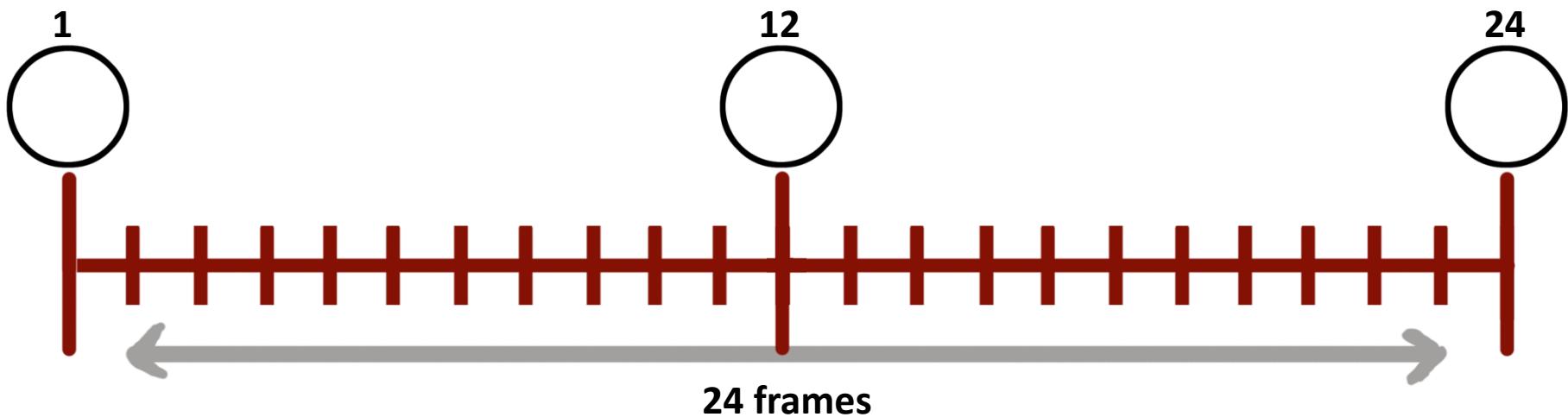
- Animation timing
- Adding objects
- Adding transformations (key frames)
 - Setup key frames position
 - Stretch effect
 - Squash effect
- Reviewing animation
- Rendering
- File saving

Animation timing

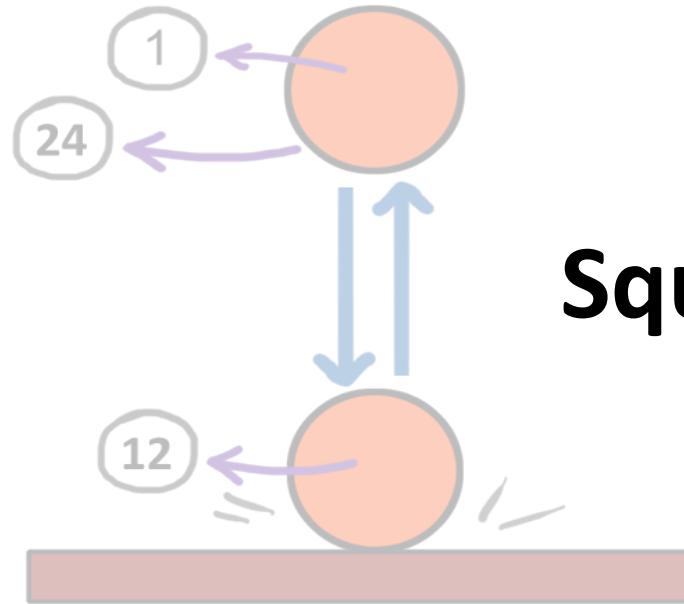
Animation planning:



Animation planning: Timeline

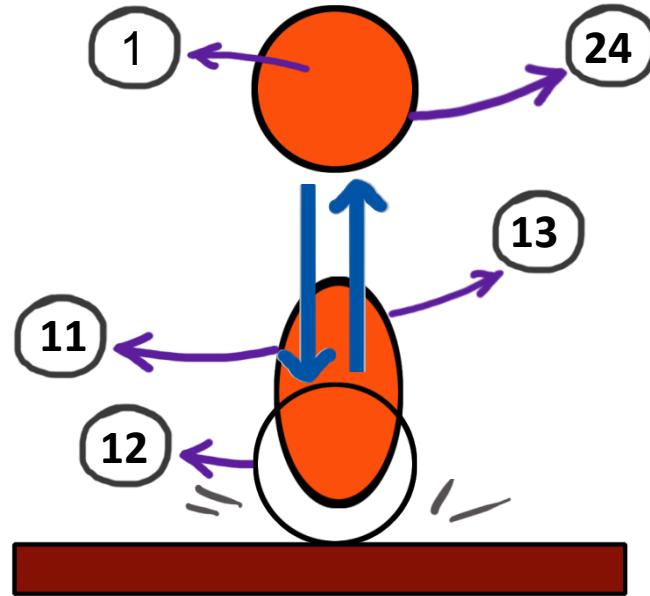


Animation planning: Animation Principle

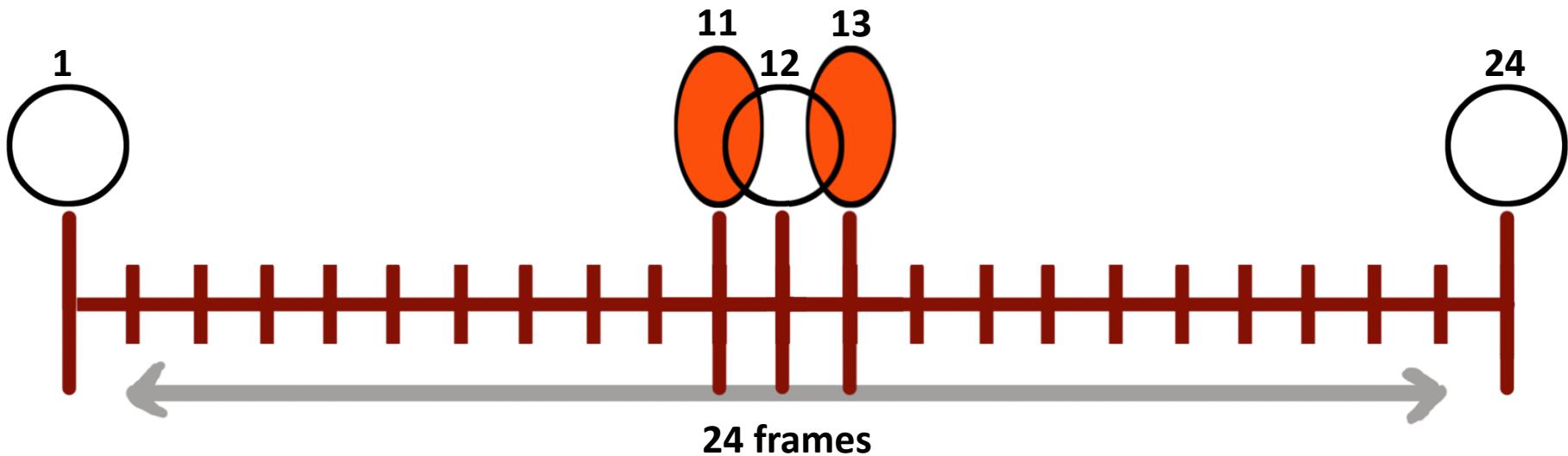


Squash & Stretch

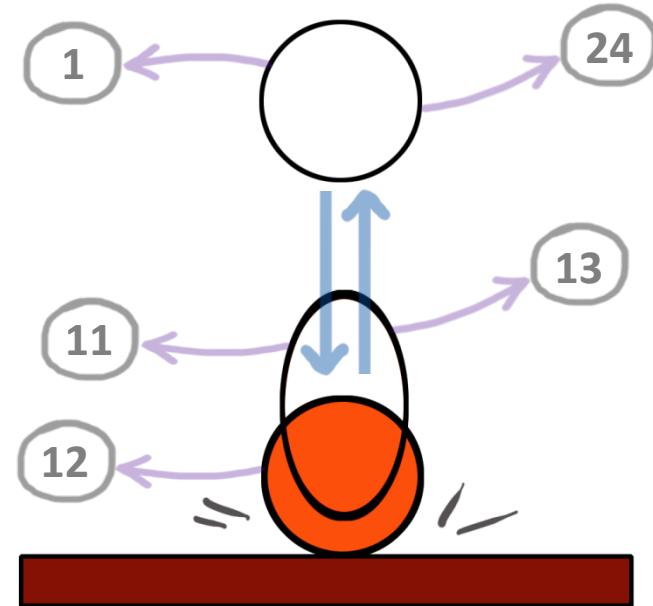
Animation planning: Stretch



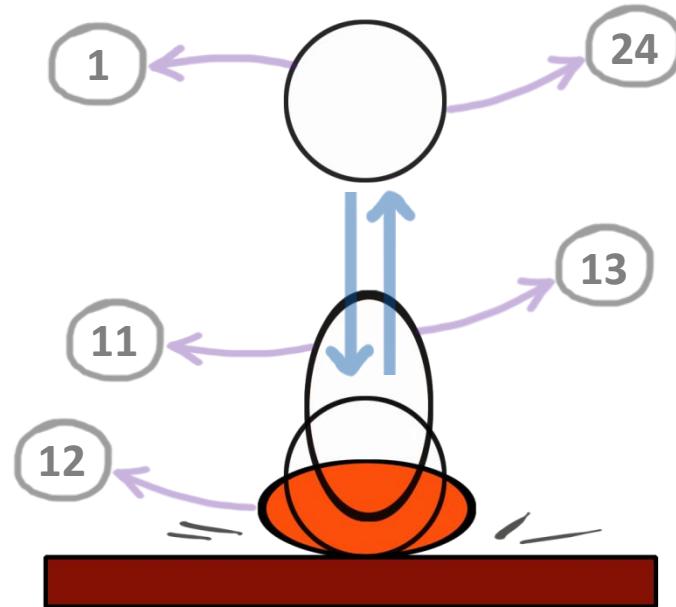
Animation planning: Timeline



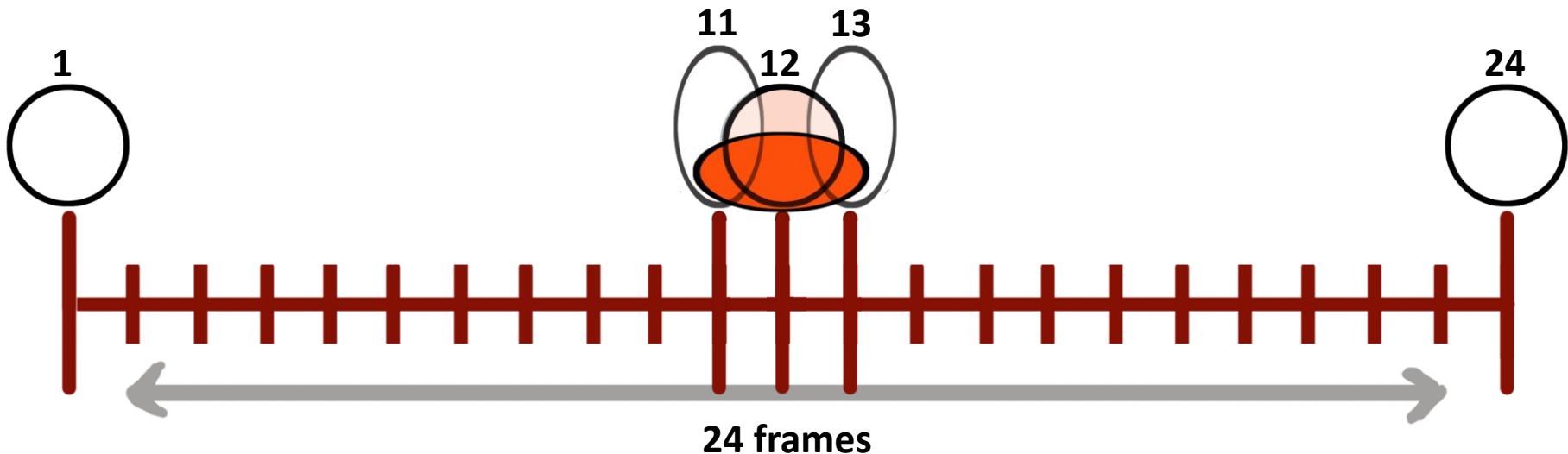
Animation planning: Squash



Animation planning: Squash



Animation planning: Timeline

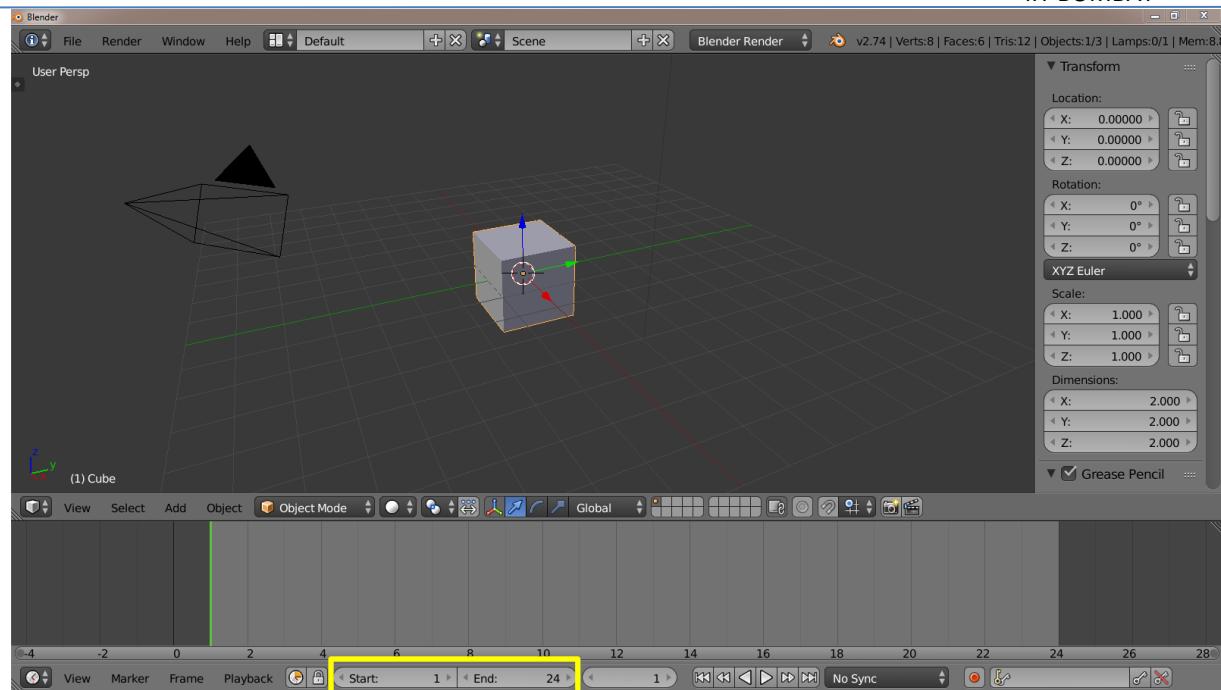


Change default duration

Total duration of animation is 24 frames.
Default duration is 250 frames.

To change the duration:

- Set start frame as 1 and end frame as 24

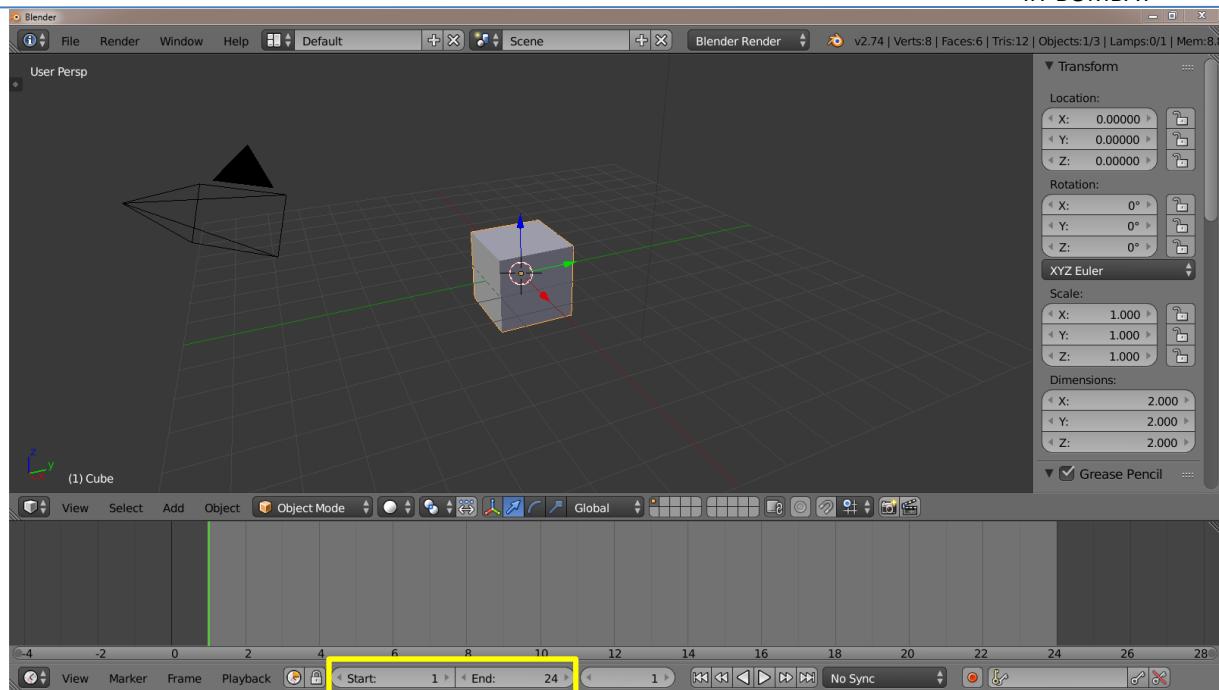


* Keyboard and mouse shortcuts are written in **(blue)**

Change default duration

In timeline window:

- To zoom in: Scroll up
- To zoom out: Scroll down
- To pan: Press and drag scroll button



* Keyboard and mouse shortcuts are written in **(blue)**

Adding objects

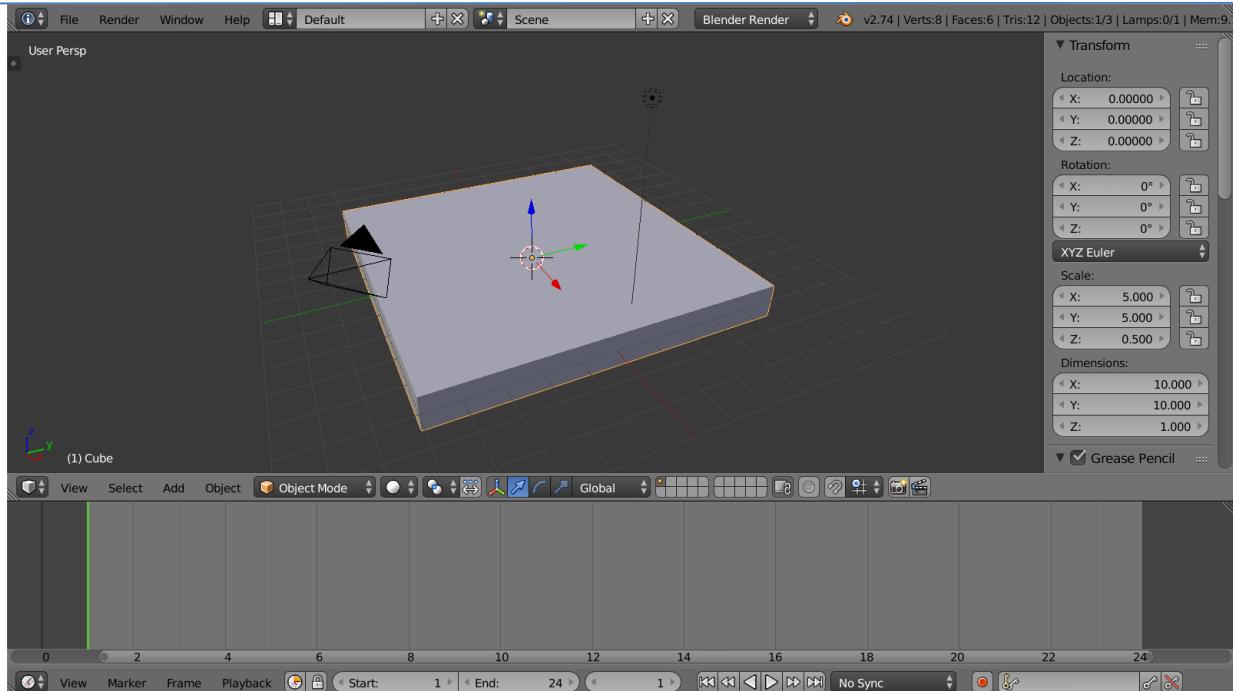


IIT BOMBAY

Create a surface

Convert the default cube into a surface, for ball to bounce upon:

- Scale the cube four times ($S + 5$)
- Scale down the cube ($S + Z + 0.1$)



* Keyboard and mouse inputs are written in (blue)

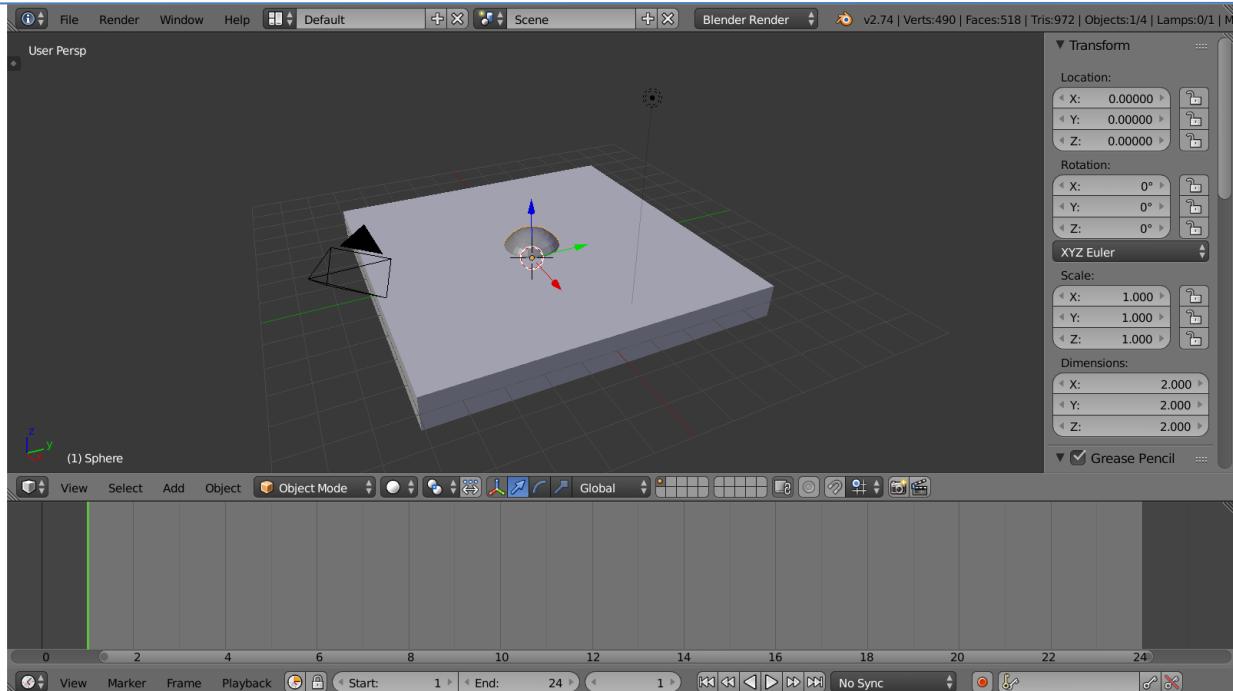


IIT BOMBAY

Add UV Sphere

UV sphere will act as ball

- Add UV Sphere
(Shift + A)



* Keyboard and mouse inputs are written in (blue)



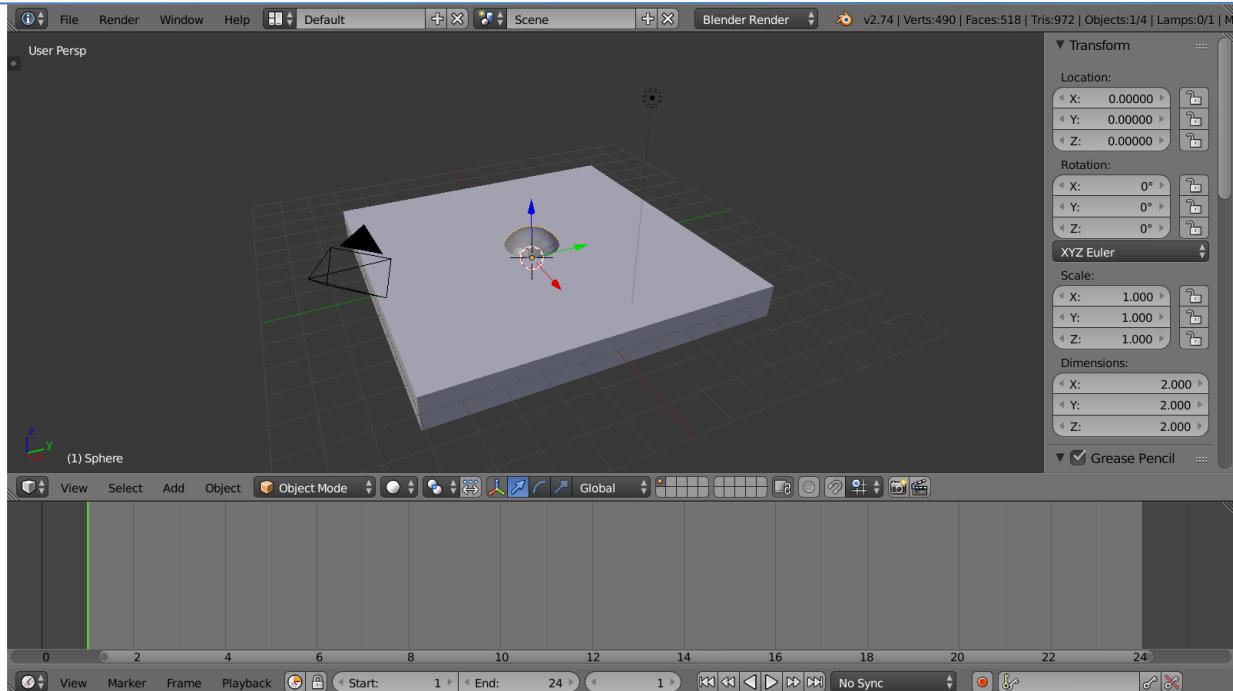
IIT BOMBAY

Add UV Sphere

Tip -

Check the position of
the 3D cursor, it should
be at origin

- Move 3D cursor to
origin (**Shift + C**)

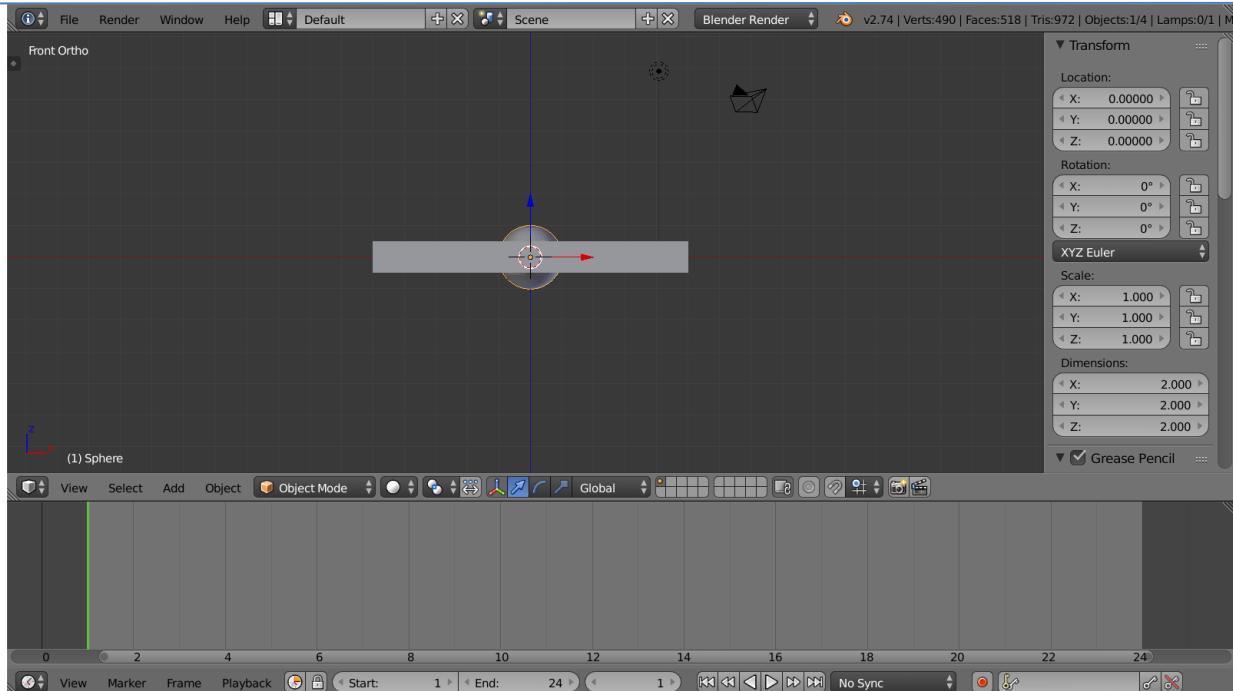


* Keyboard and mouse inputs are written in (blue)

Change view

For better view of the sphere, switch to front orthographic view port

- Front Ortho view
(NUM1 + NUM5)



* Keyboard and mouse inputs are written in **(blue)**

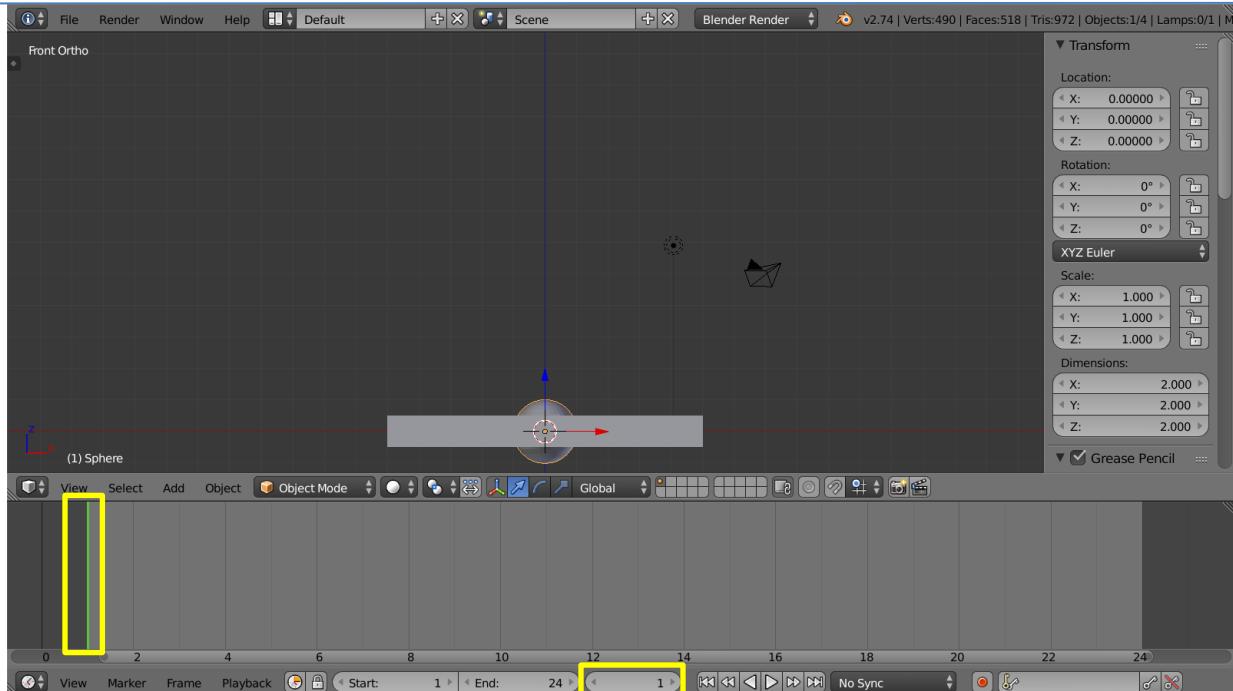
Adding transformations (key frames)

Setup key frame position, Stretch and Squash

Set current frame (Initial position)

Animation will start from frame 1

- Set current frame as frame 1 (Enter 1 in current frame box)

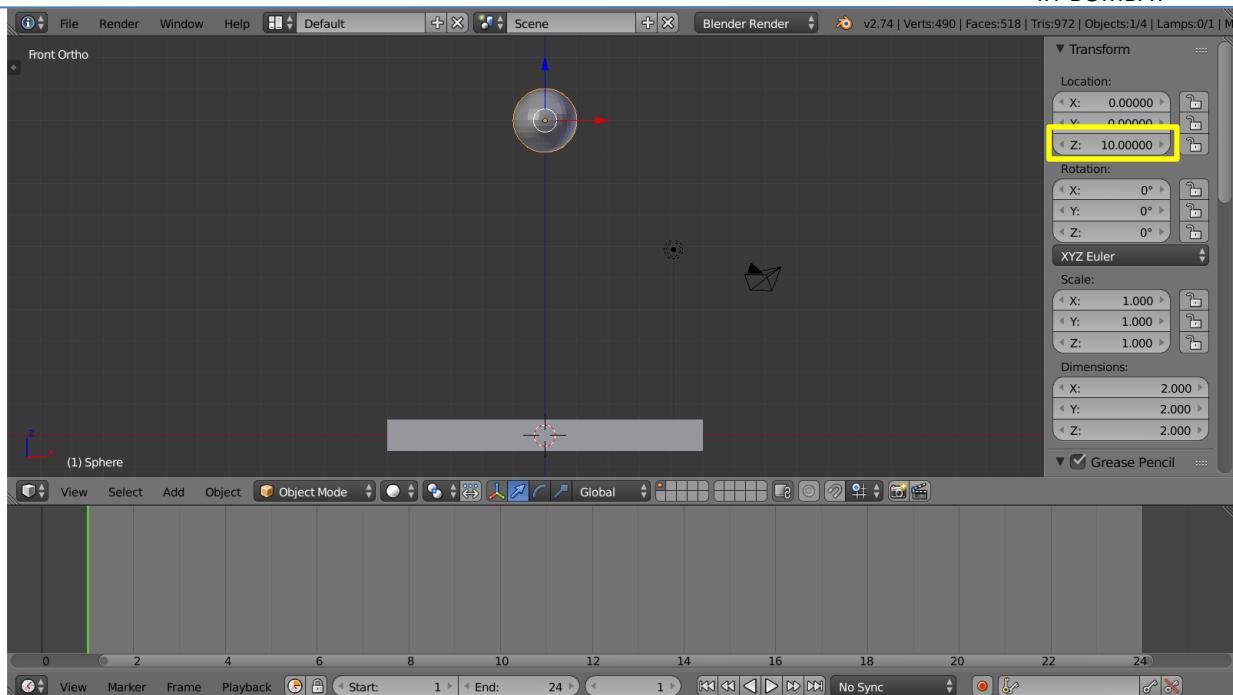


* Keyboard and mouse inputs are written in (blue)

Set initial state of the object

The ball will be dropped from some height

- Move UV Sphere up in Z axis (**G+ Z**)

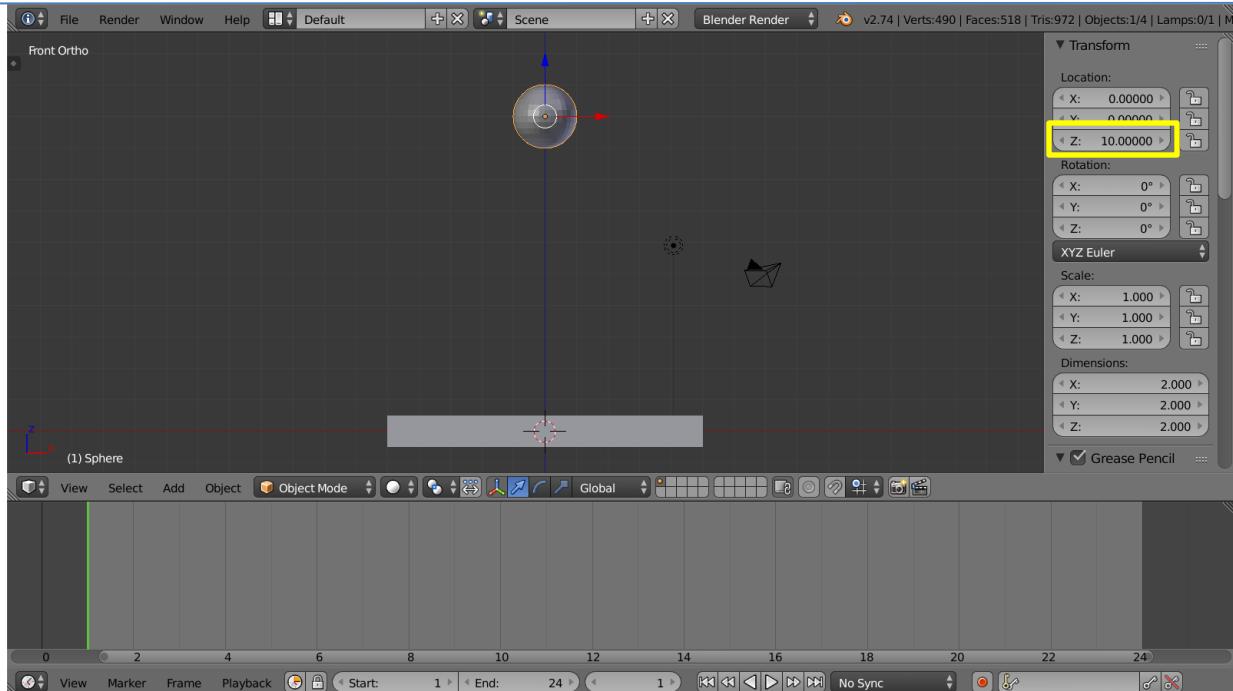


* Keyboard and mouse inputs are written in (blue)

Set initial state of the object

For accuracy use transform panel

- Insert Z axis value (ex.: 10) in location tab in transform panel

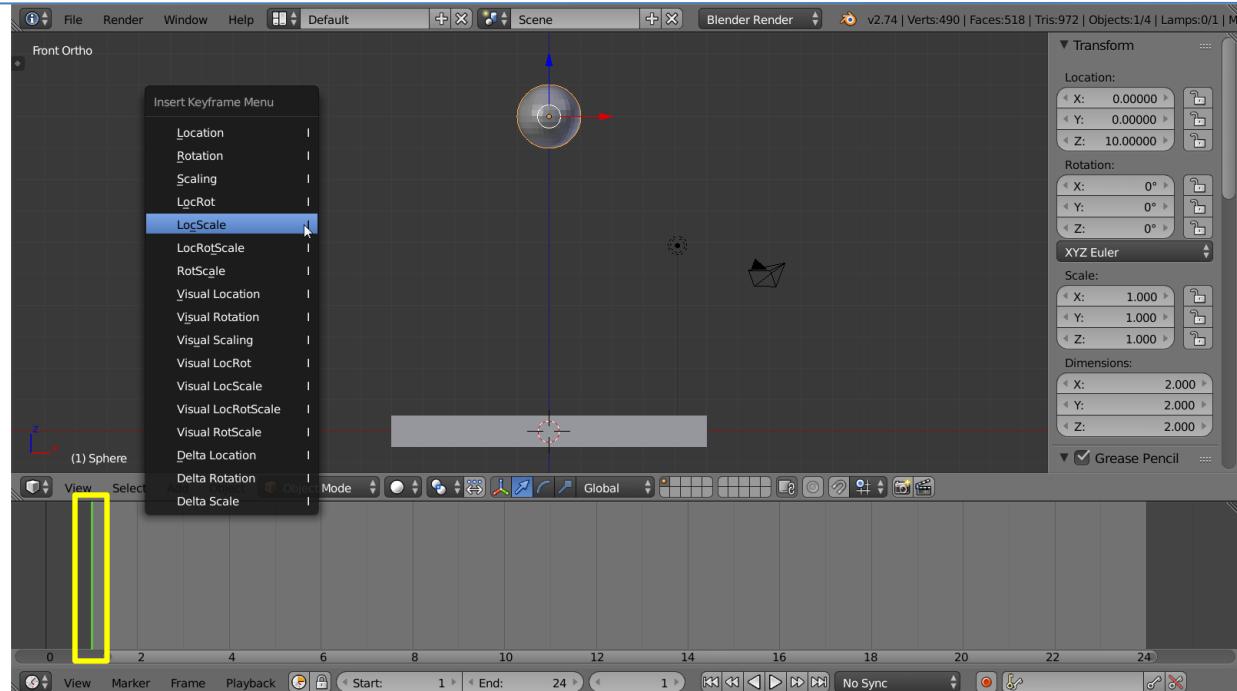


* Keyboard and mouse inputs are written in (blue)

Add key frame (Initial position)

Make this as initial position of the UV Sphere

- Add key frame in location and scale (I)



* Keyboard and mouse inputs are written in (blue)

Transform panel

- When a key frame is added the transform panel data turns yellow in colour
- Ex: Image 1 shows location and scale data in yellow colour as location and scale key frame has been added for sphere

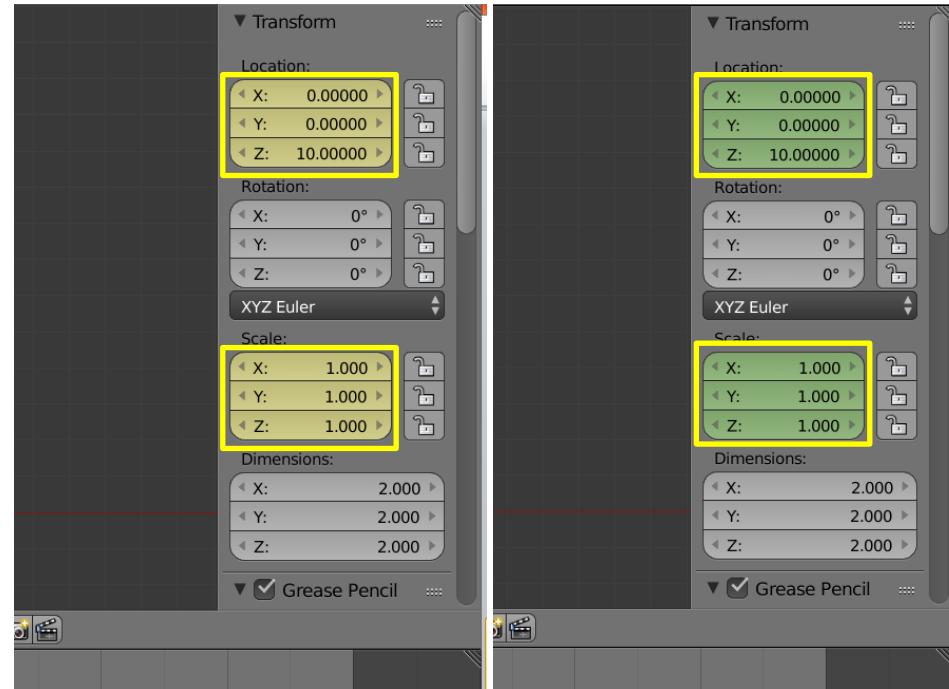


Image 1

Image 2

Transform panel

- In-between frames data is shown in green colour
- Ex: Image 2 shows location and scale data in green for in-between frames

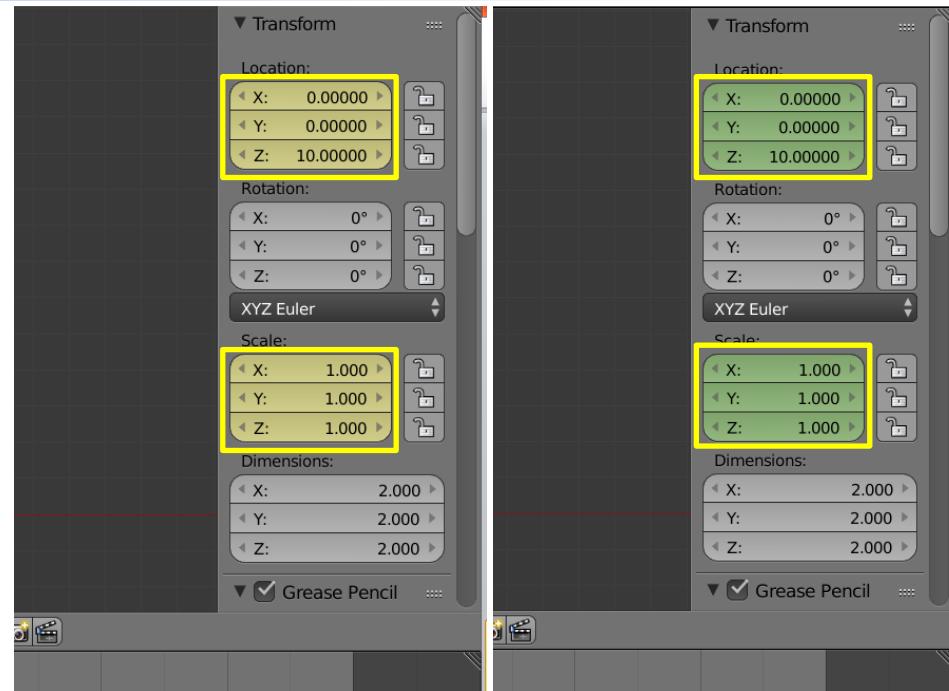


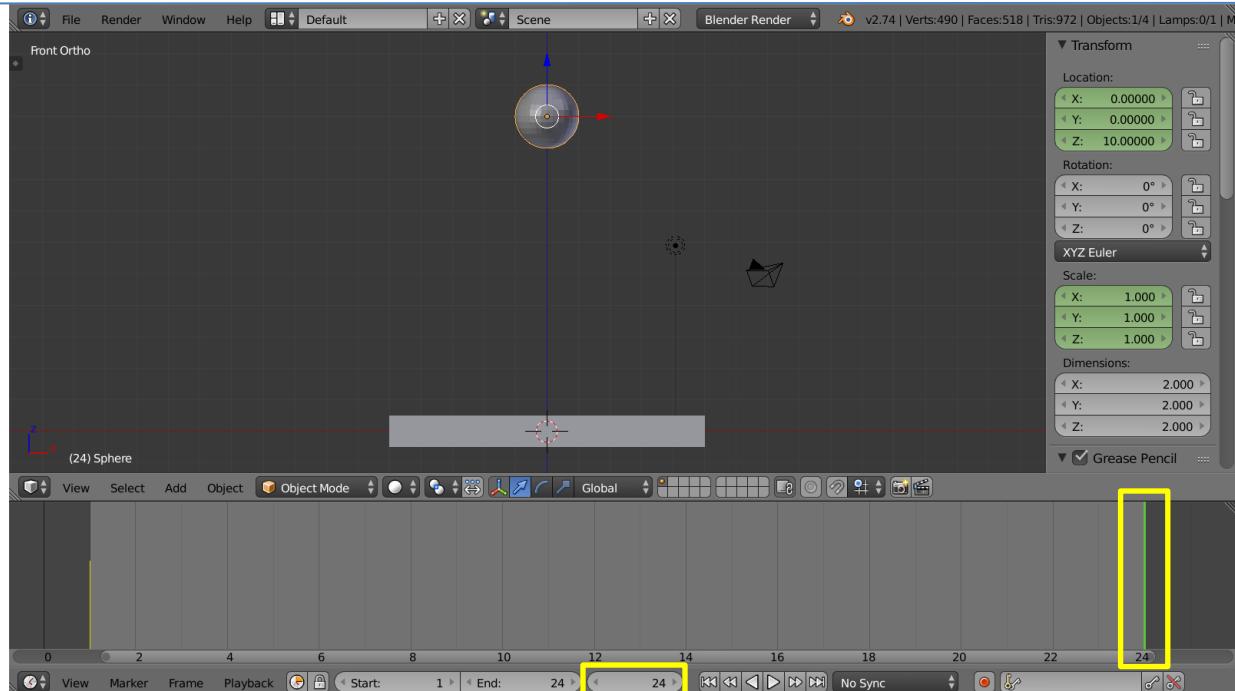
Image 1

Image 2

Change current frame (end position)

The ball will take 24 frames to go back to the initial position. (24 frames to complete one bounce)

- Set current frame as frame 24 (Enter 24 in current frame box)

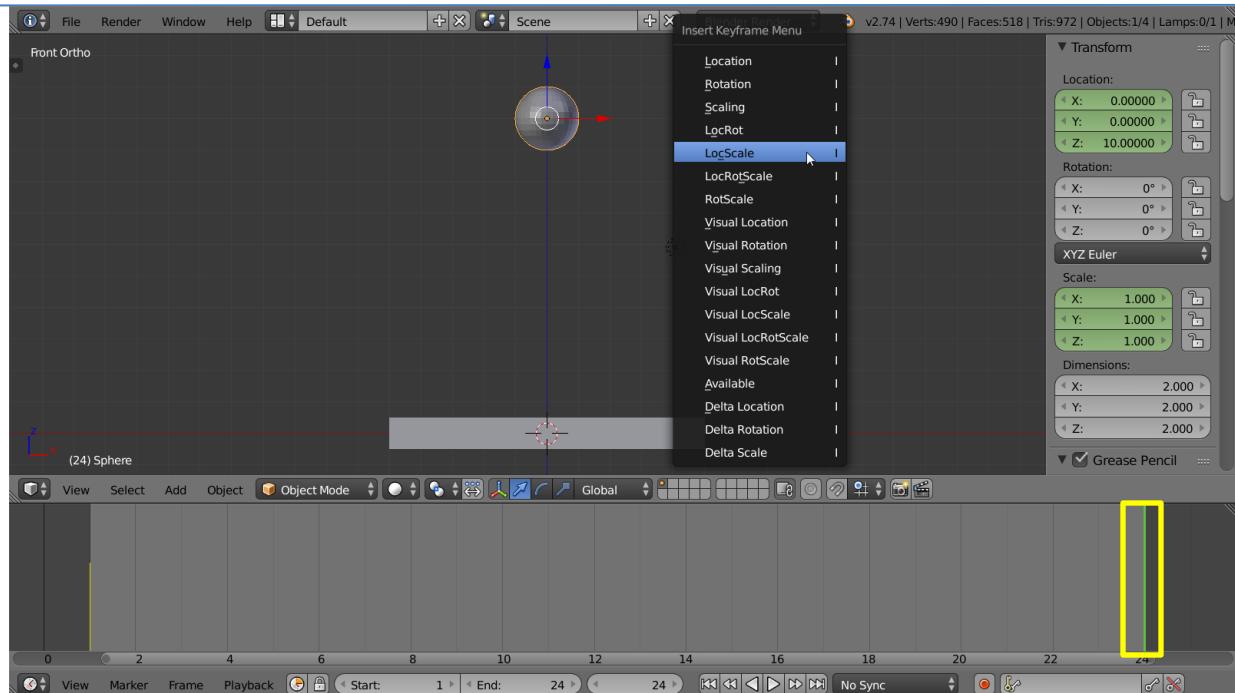


* Keyboard and mouse inputs are written in (blue)

Add key frame (end position)

Lock position of the UV Sphere

- Add key frame in location and scale (I)



* Keyboard and mouse inputs are written in (blue)

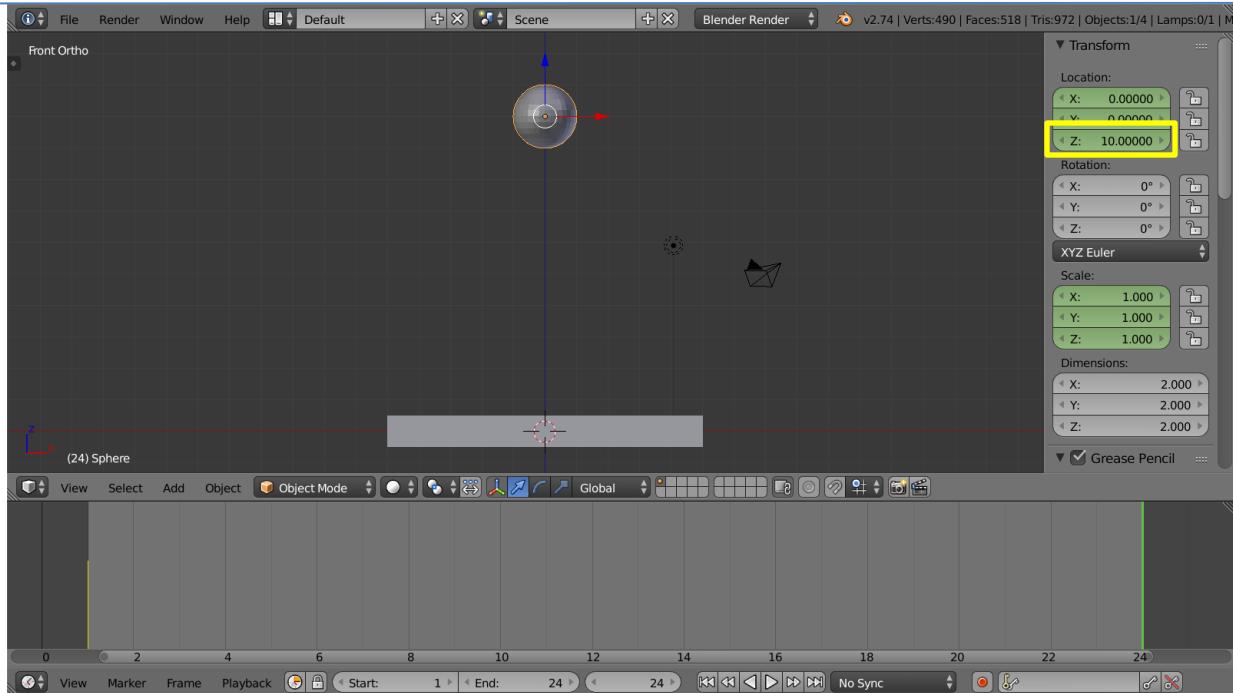


IIT BOMBAY

Set the end frame

Initial position and end position is same

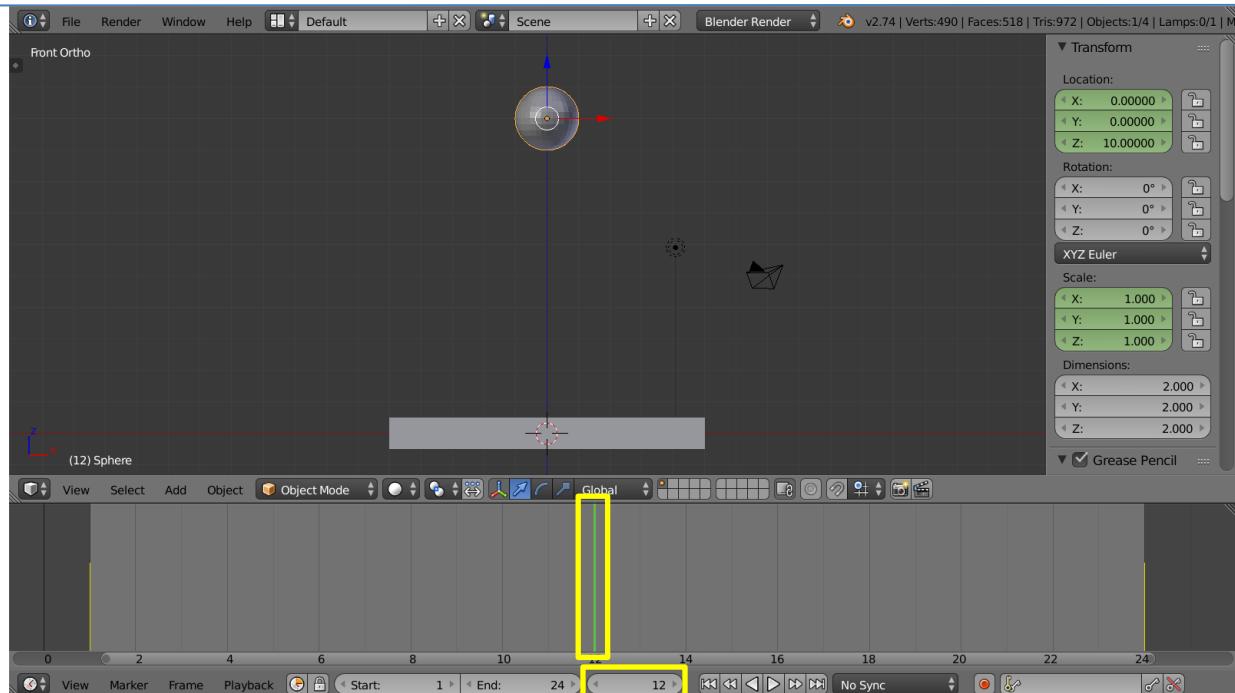
- No need to move the sphere



Change current frame (ball at surface)

The ball will touch the surface on frame 12

- Set current frame as frame 12 (Enter 12 in current frame box)

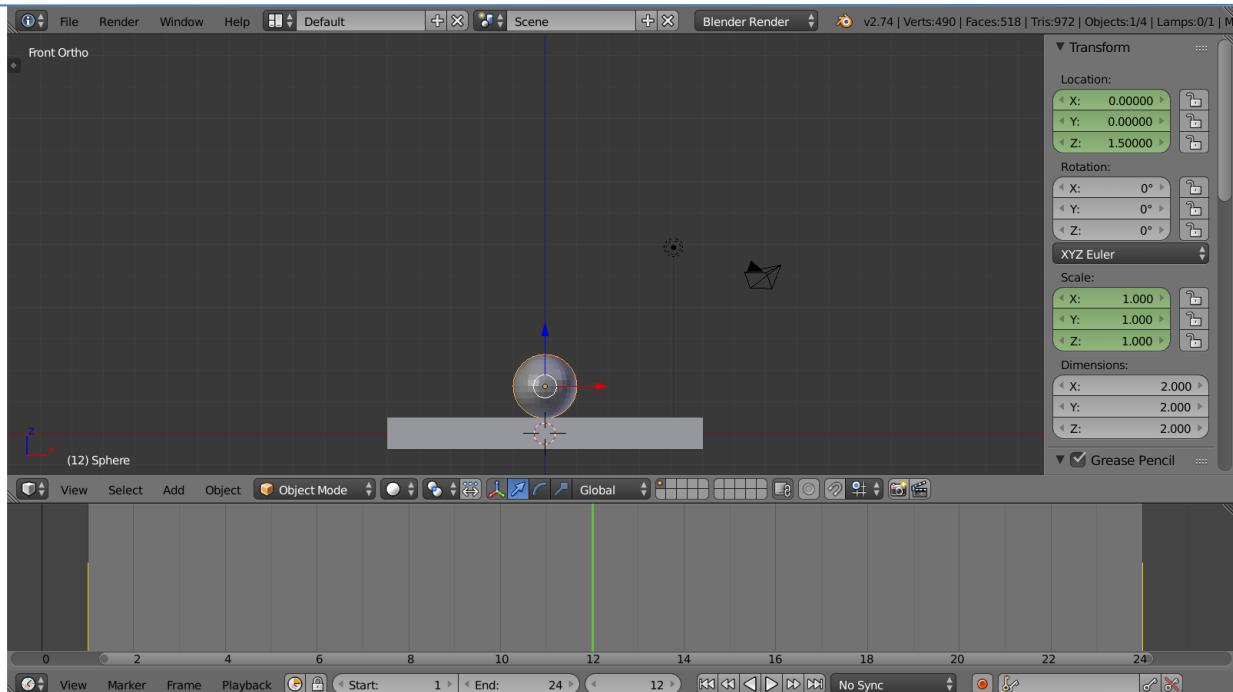


* Keyboard and mouse inputs are written in (blue)

Apply transformation (ball at surface)

Ball touches the surface

- Move UV Sphere down in Z axis, so that it touches the surface (G)

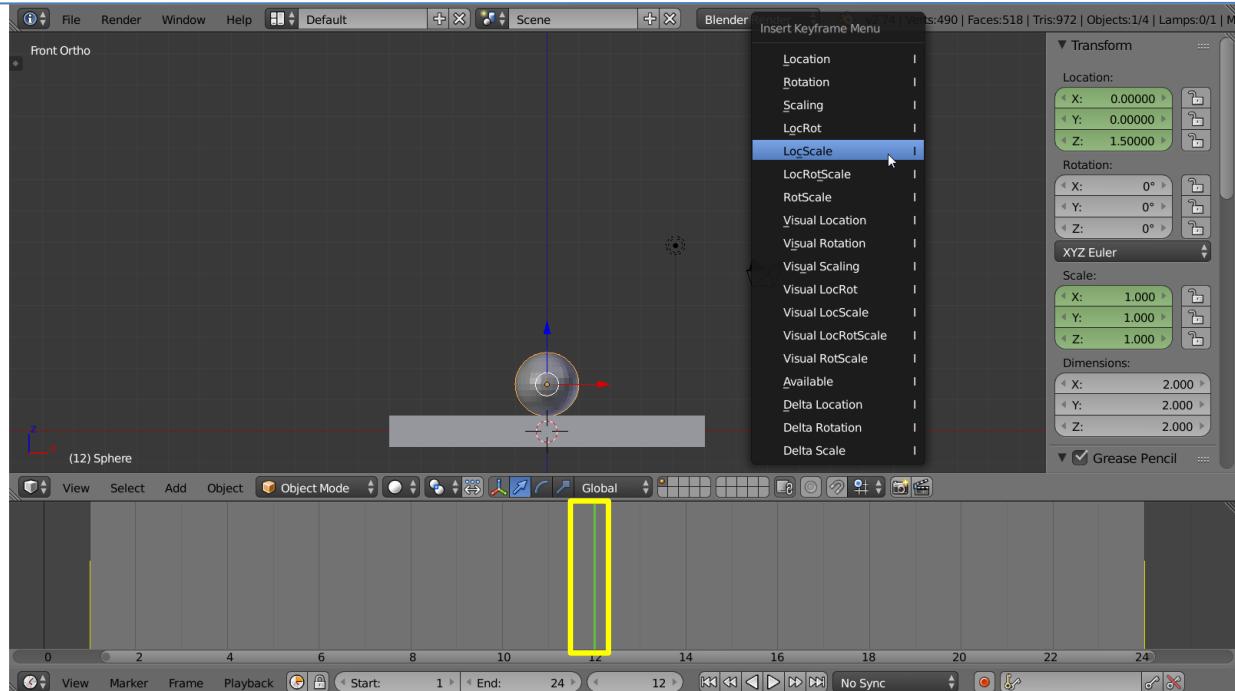


* Keyboard and mouse inputs are written in (blue)

Add key frame (ball at surface)

Lock position of the UV Sphere

- Add key frame in location and scale (I)



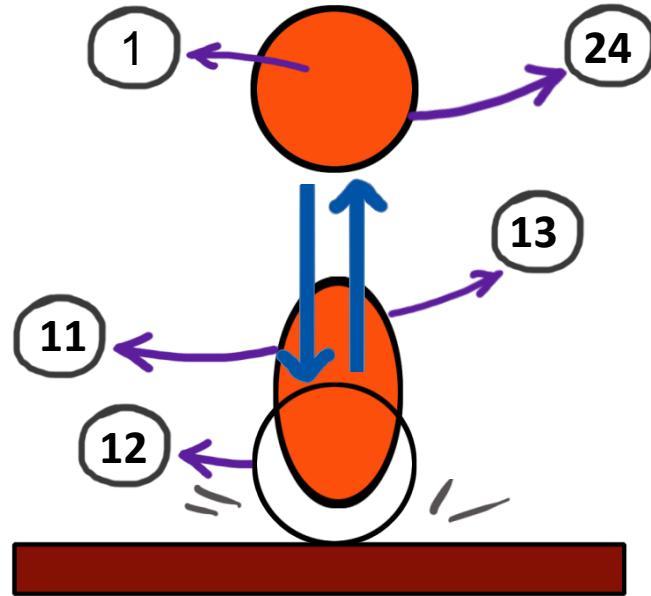
* Keyboard and mouse inputs are written in (blue)

Stretch & Squash principle

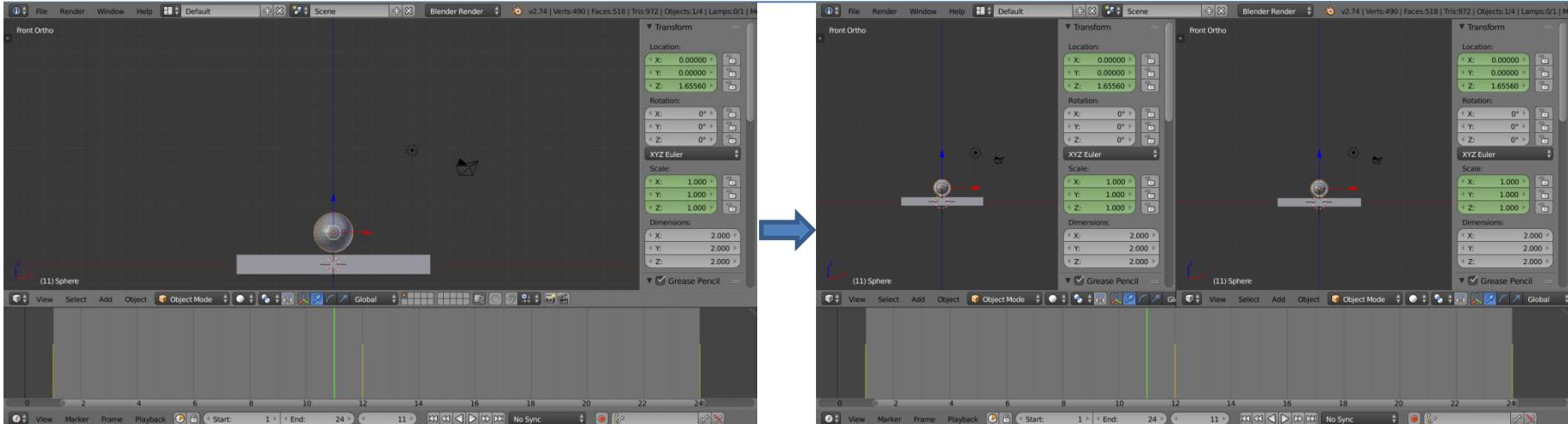
The process till now explains the basic ball bounce animation, further slides will explain how to add stretch and squash principles of animation

Stretch effect

Animation planning: Stretch



Split 3D viewport

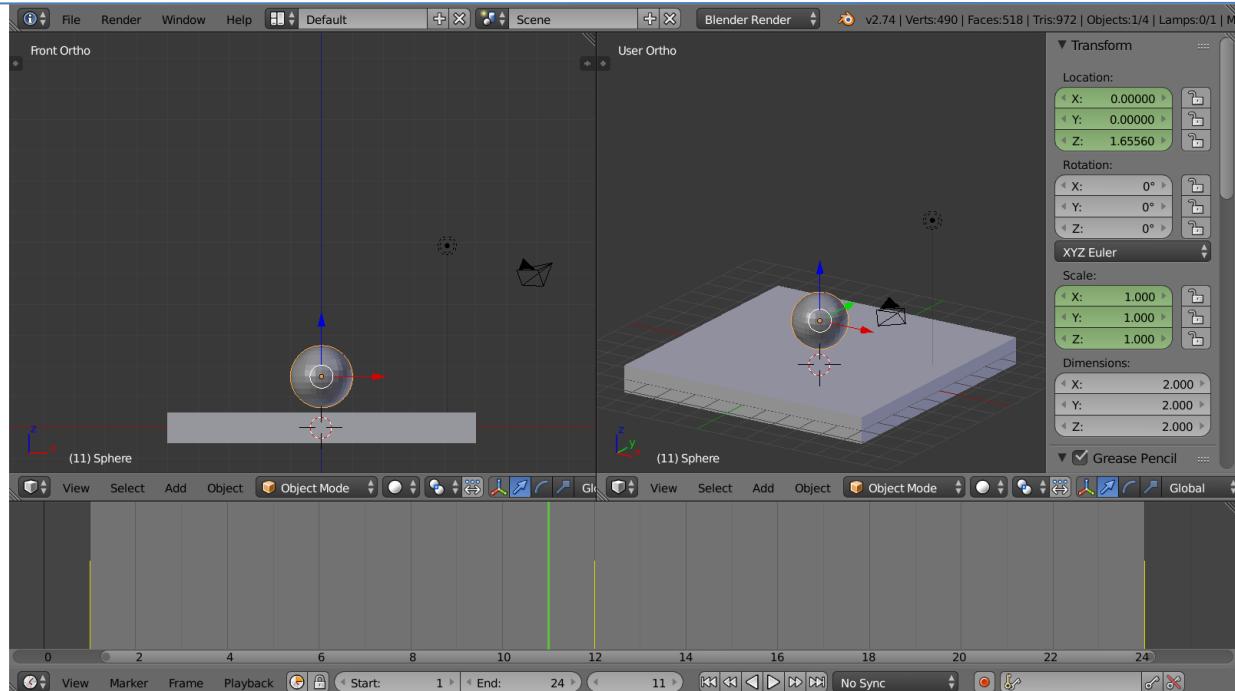


Split 3D view window in two parts, for better view while doing stretch and squash effect.

Adjust 3D view window

For better view angle,
while doing
transformation adjust
the 3D view window

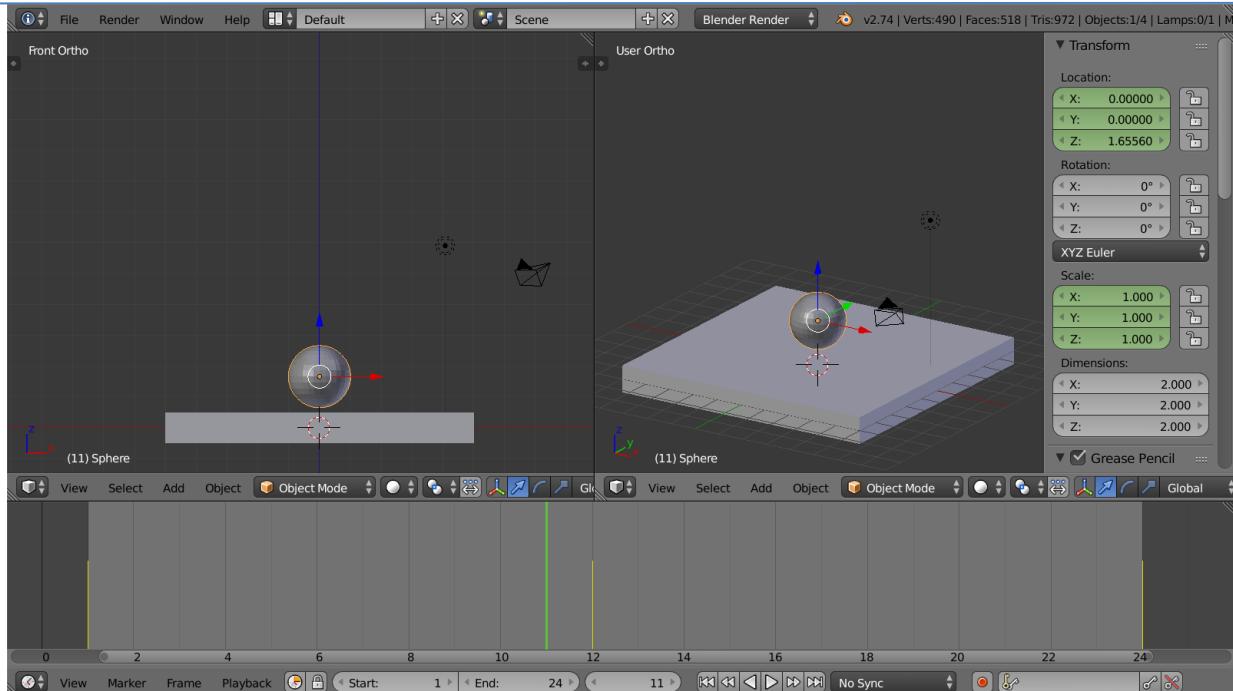
- Close transform
panel in one of the
3D view windows (**N**)



* Keyboard and mouse inputs are written in (blue)

Adjust 3D view window

- Adjust the other 3D view window to get a better 3D viewing angle
(Hold and move scroll button)

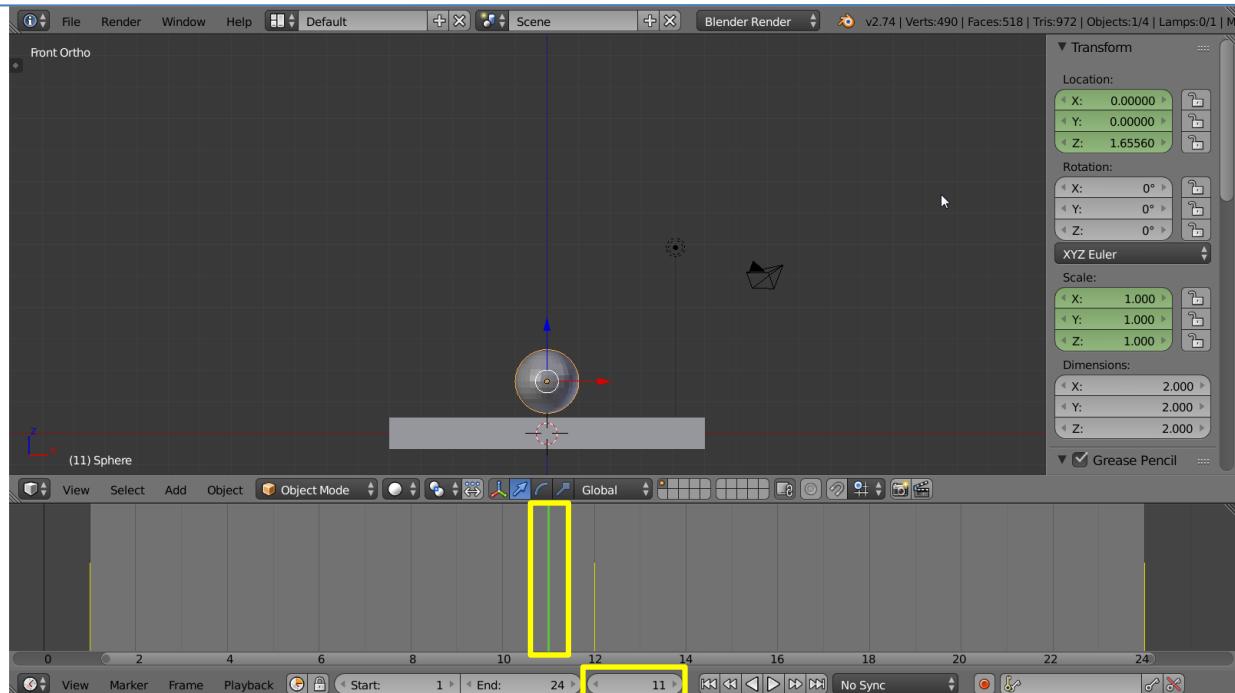


* Keyboard and mouse inputs are written in **(blue)**

Change current frame (Stretch effect)

Stretch effect will happen at frame 11 and 13 respectively

- Set current frame as frame 11 (**Enter 11 in current frame box**)

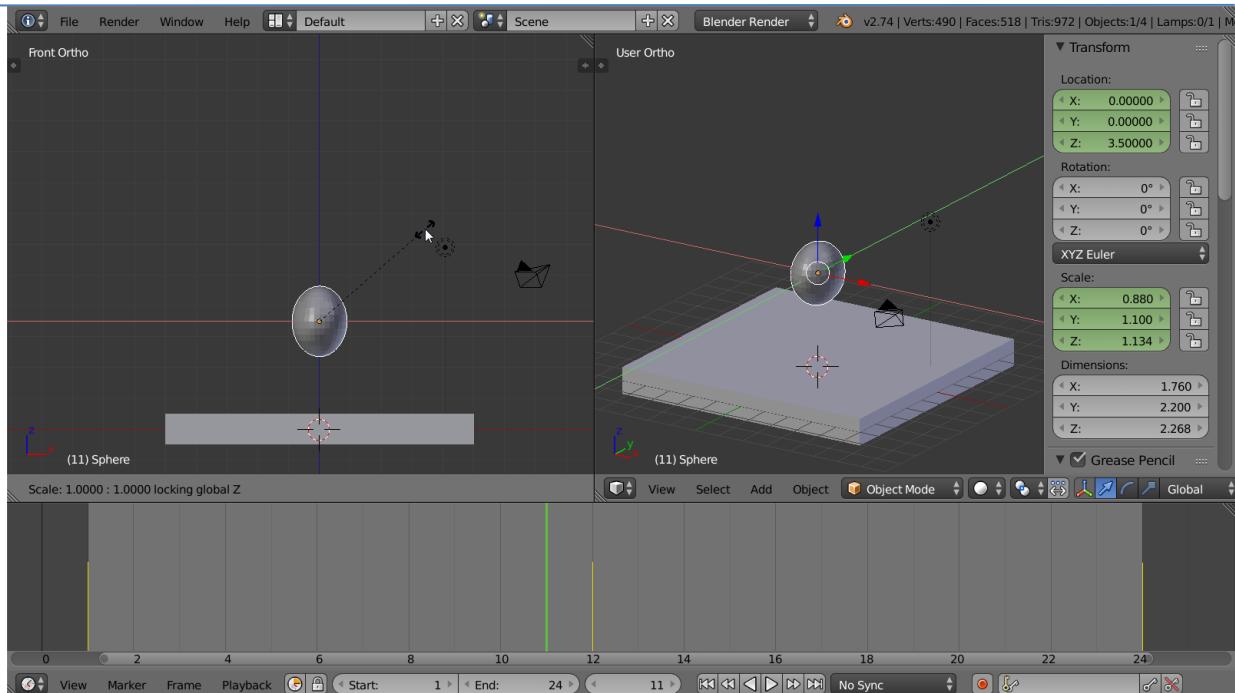


* Keyboard and mouse inputs are written in (blue)

Apply transformation (stretch effect)

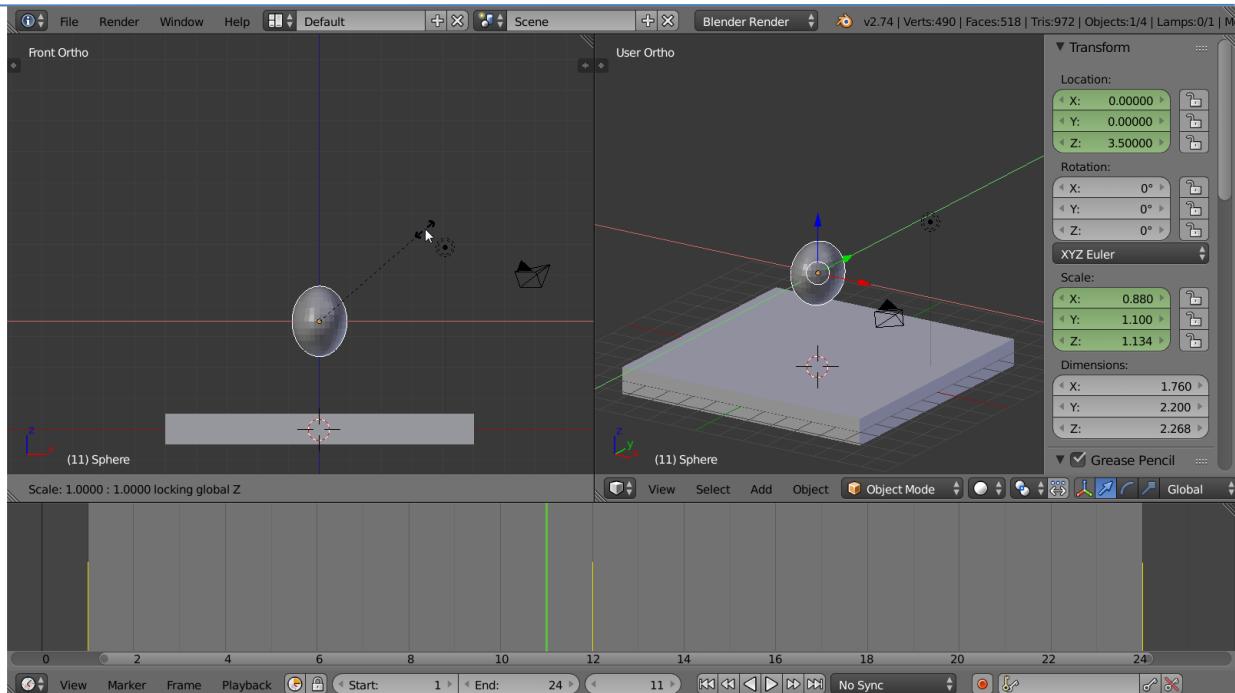
Stretch effect

- Scale UV sphere in Z axis
- Scale in the sphere in X, Y axis
(S and Shift +Z)



Apply transformation (stretch effect)

- Move UV Sphere upwards in Z axis to keep distance between surface and ball (G)



Tip

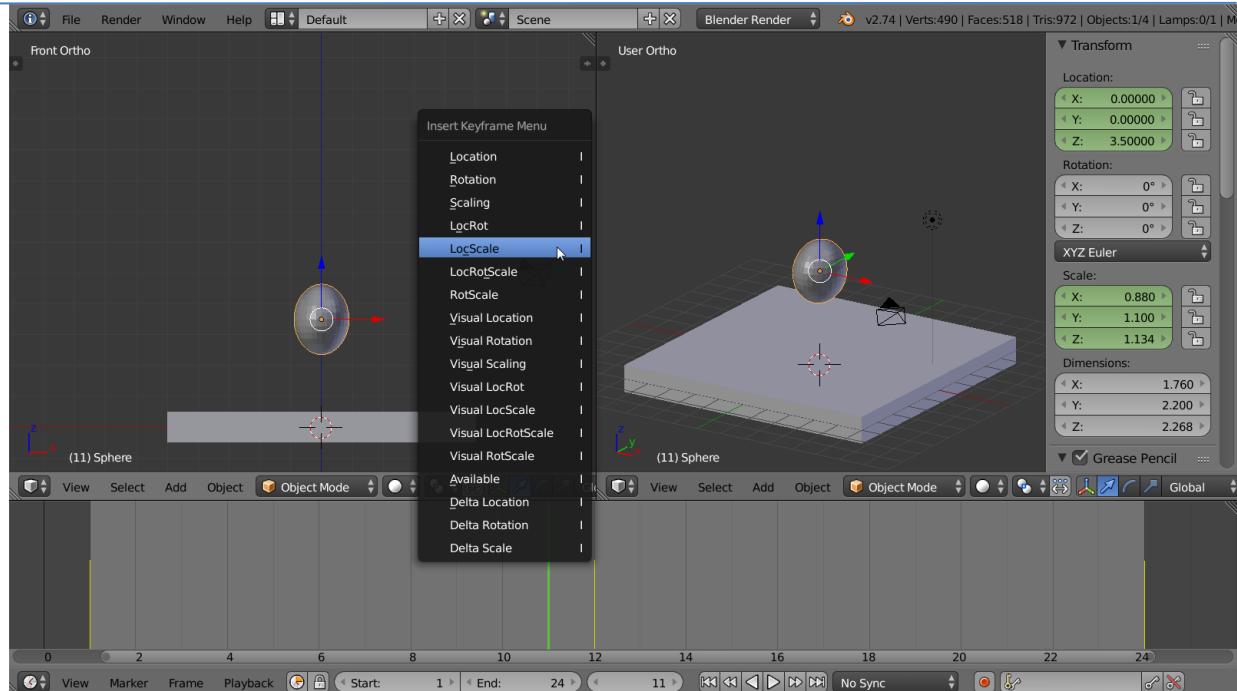


- X, Y and Z are used to allow transformation along a particular axis.
- Shift + X / Y /Z are used to restrict transformation along a particular axis.

Add key frame

Lock position of the UV Sphere

- Add key frame in location and scale (I)

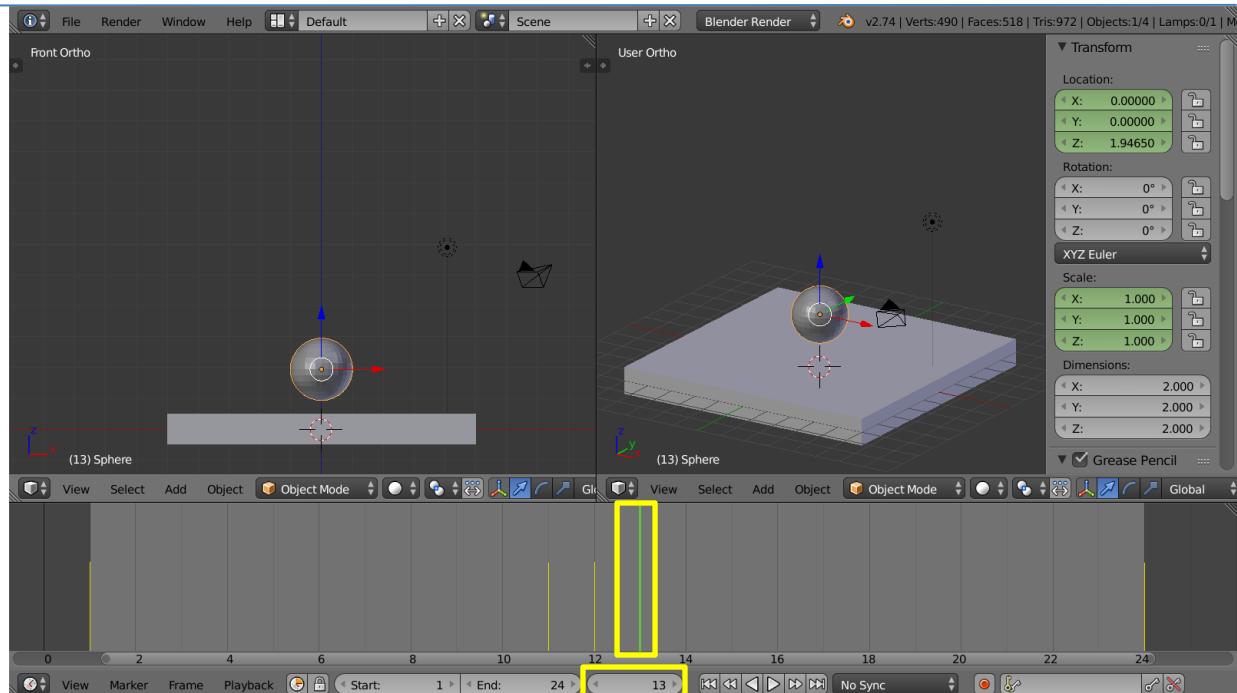


* Keyboard and mouse inputs are written in (blue)

Change current frame (stretch effect)

Stretch effect at
frame 13

- Set current frame as
frame 13 (Enter 13 in
current frame box)

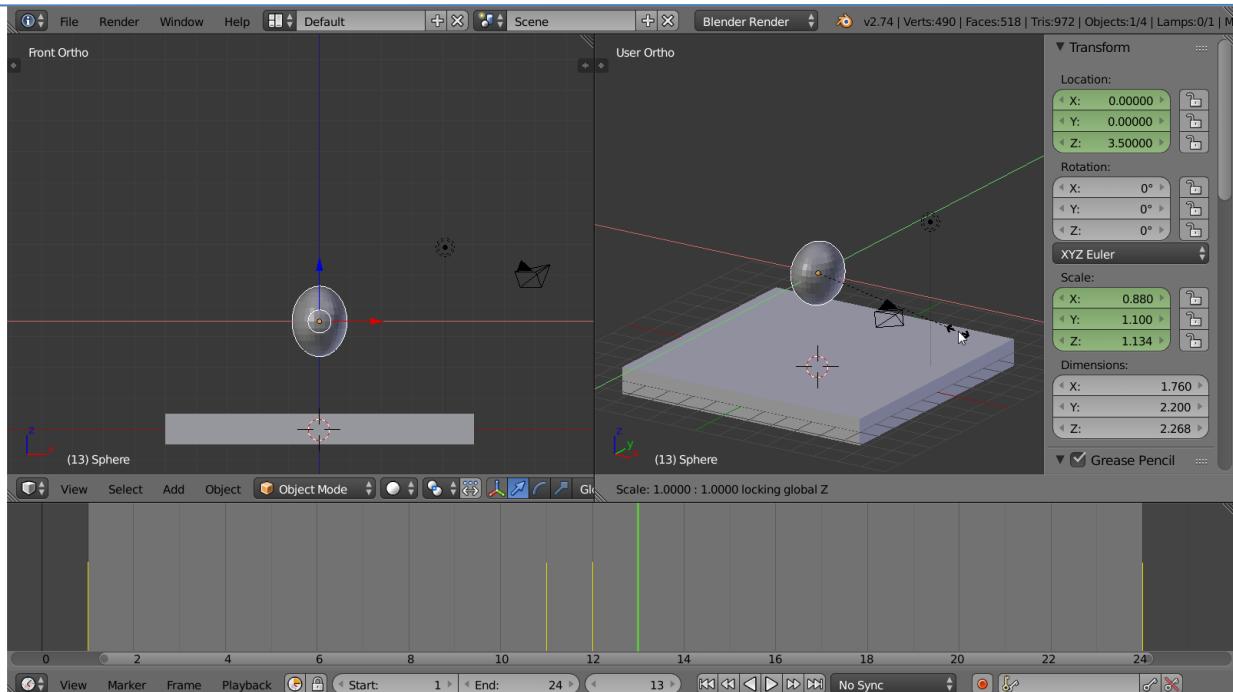


* Keyboard and mouse inputs are written in (blue)

Apply transformation (stretch effect)

Stretch effect

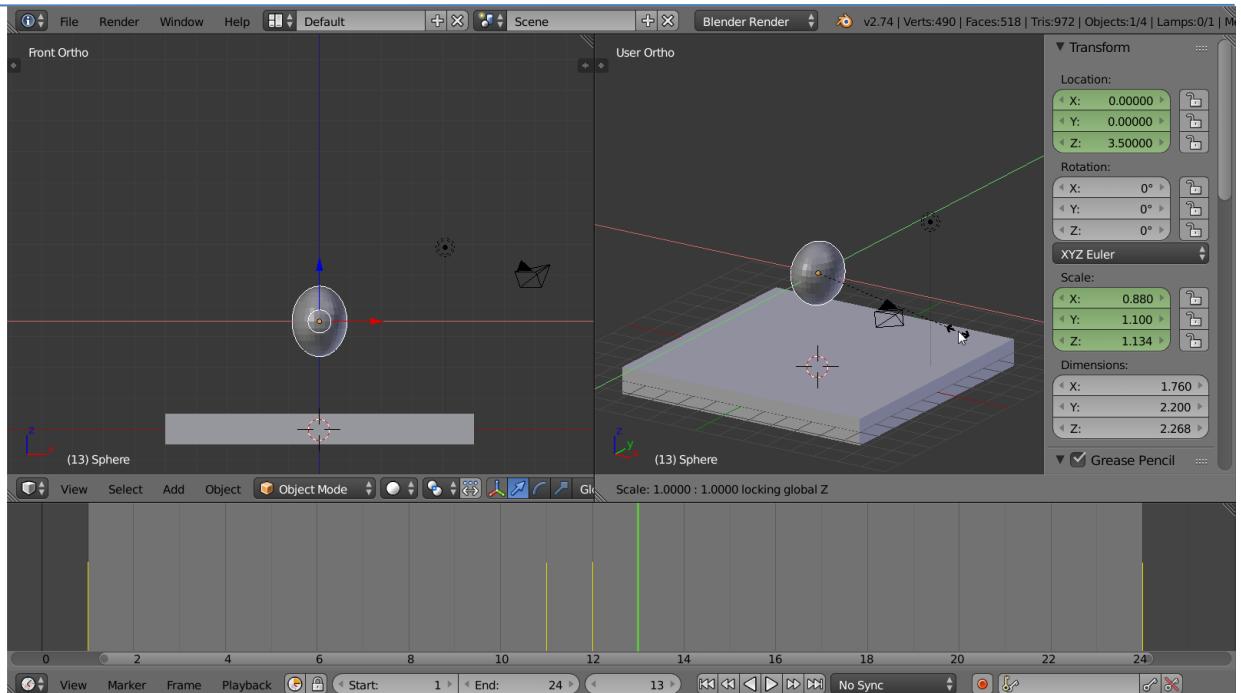
- Scale UV sphere in Z axis
- Scale in the sphere in X, Y axis
(S and Shift +Z)



* Keyboard and mouse inputs are written in **(blue)**

Apply transformation (stretch effect)

- Move UV Sphere upwards in Z axis to keep distance between surface and ball (G)

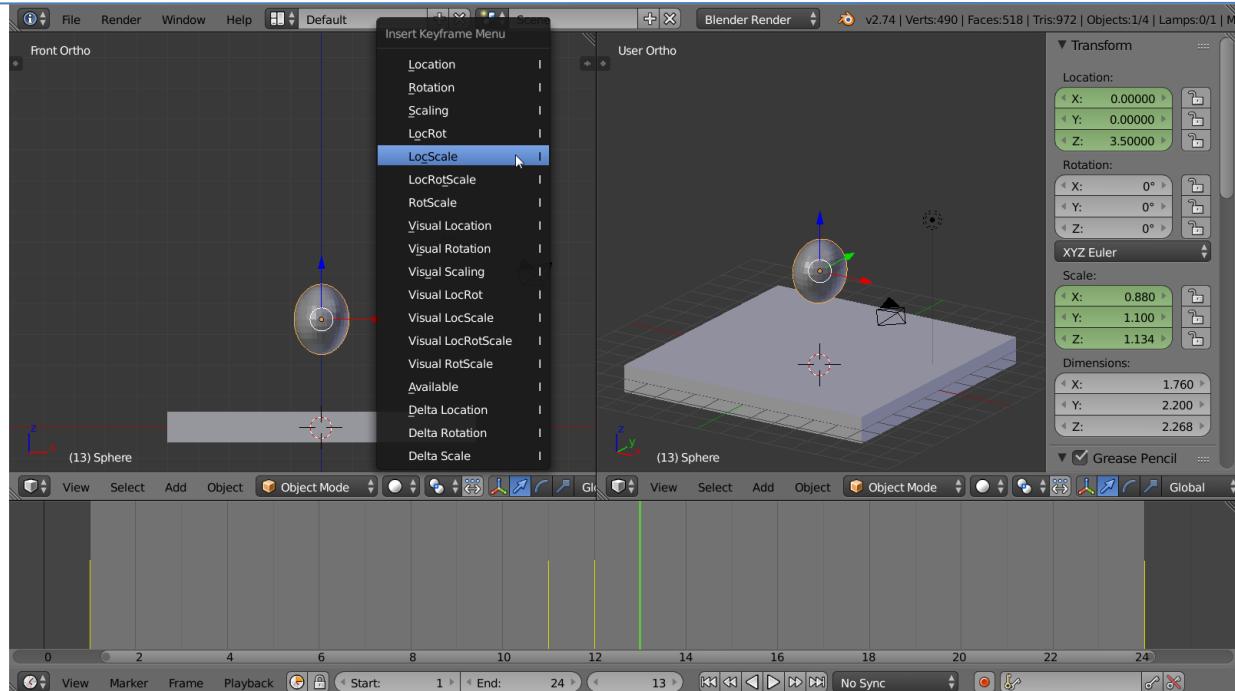


* Keyboard and mouse inputs are written in (blue)

Add key frame (stretch effect)

Lock position of the UV Sphere

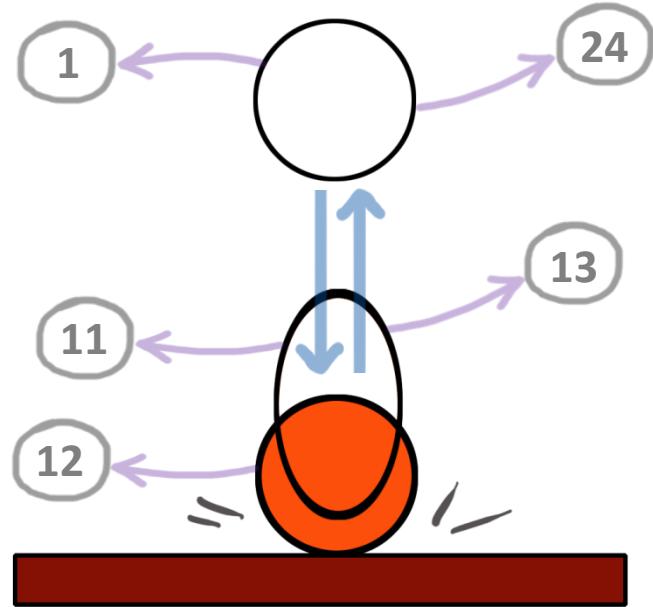
- Add key frame in location and scale (I)



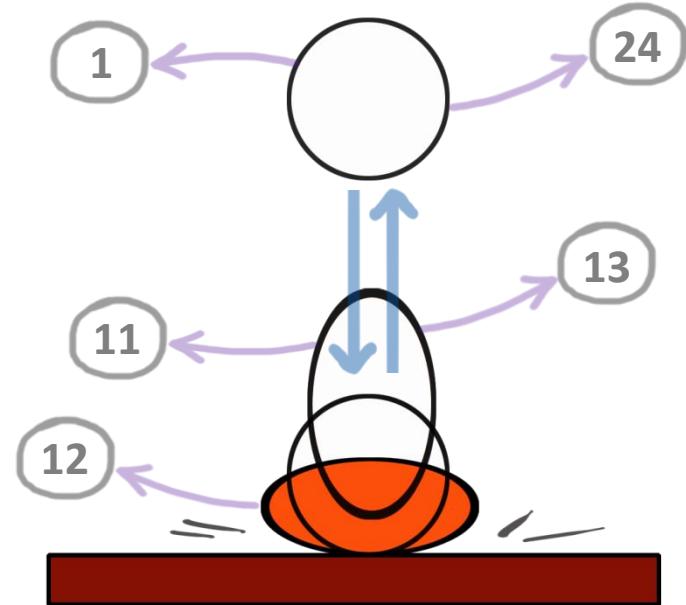
* Keyboard and mouse inputs are written in (blue)

Squash effect

Animation planning: Squash



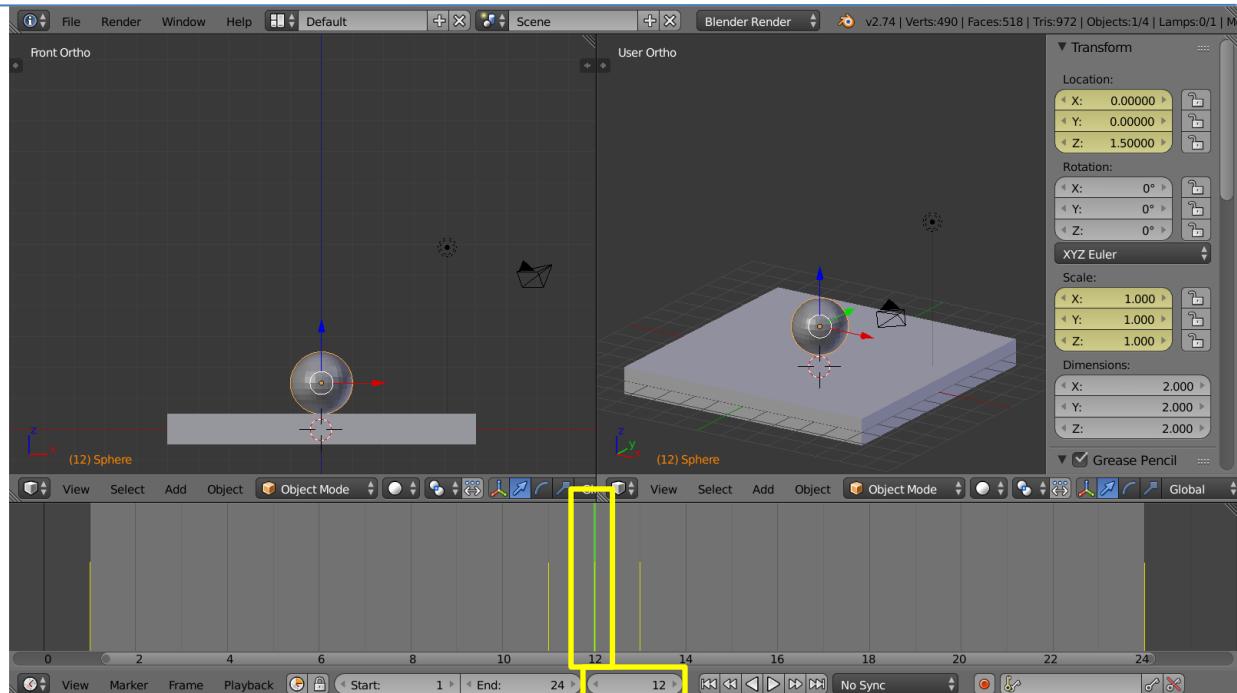
Animation planning: Squash



Change current frame (Squash effect)

Ball would deform (squash) after colliding with the surface.
Squash effect will happen as frame 12.

- Set current frame as frame 12 (Enter 12 in current frame box)



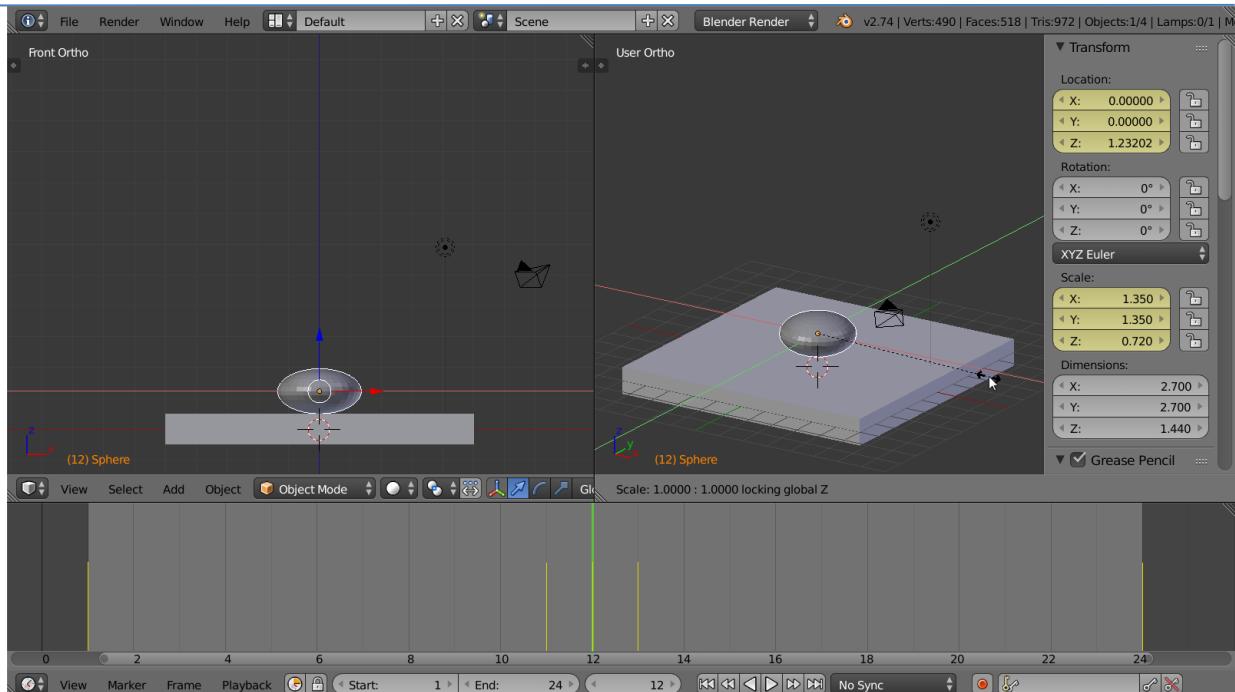
* Keyboard and mouse inputs are written in (blue)

Apply transformation (Squash effect)

Need to transform in X, Y and Z axes

1. Squash effect

- Scale out the sphere in X,Y axis (**S and Shift +Z**)
- Scale in the sphere in Z axis (**S**)

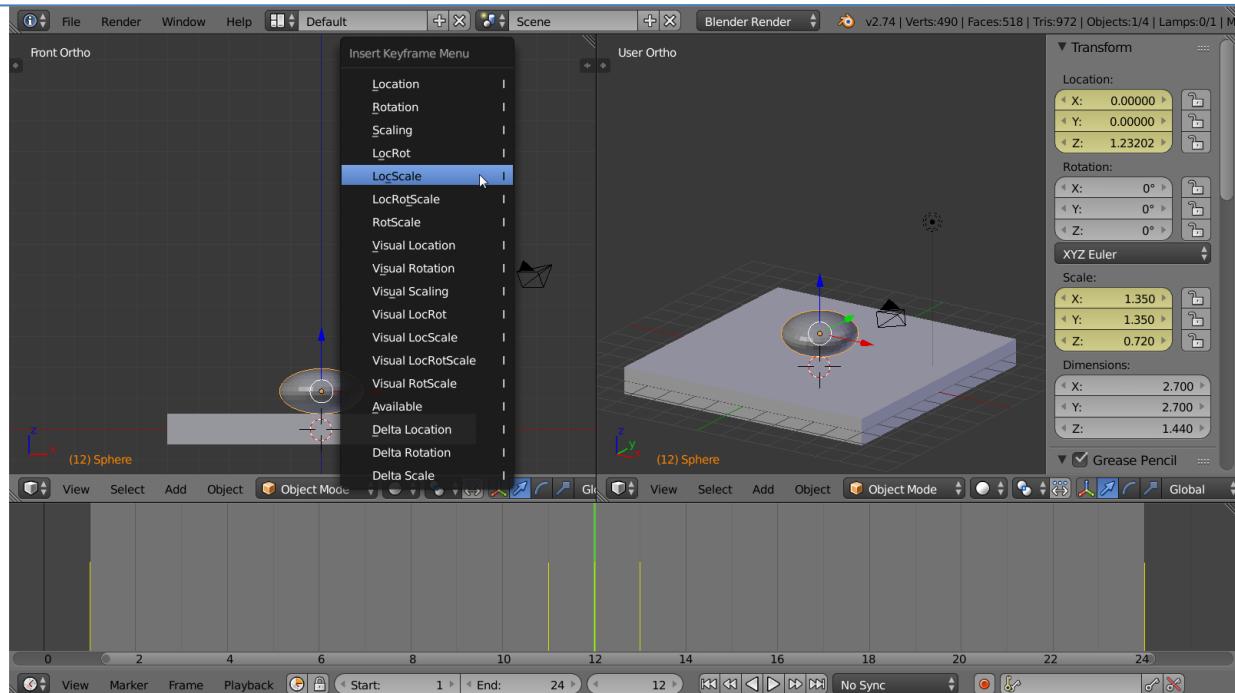


* Keyboard and mouse inputs are written in (blue)

Add key frame (Squash effect)

Lock position of the UV Sphere

- Add key frame in location and scale (I)



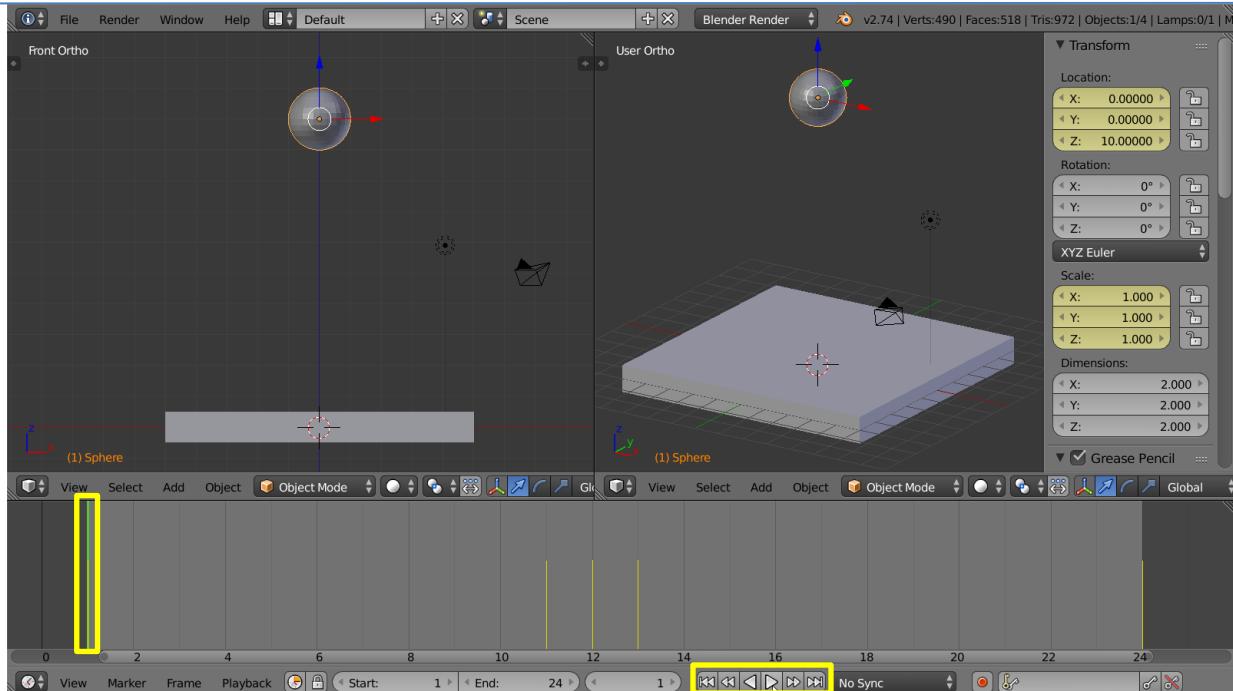
* Keyboard and mouse inputs are written in (blue)

Reviewing animation

Play animation

Review animation

- Move time cursor back to the first frame
- Play the animation
(Alt + A OR
Play button in the Timeline window)



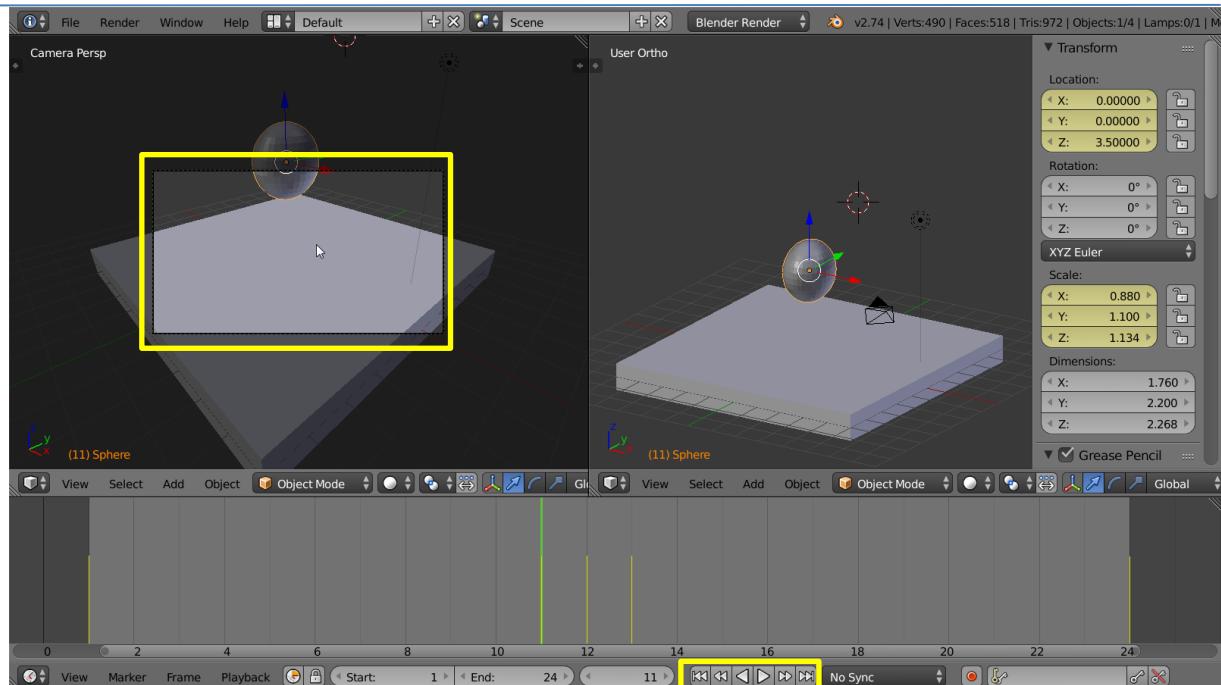
* Keyboard and mouse shortcuts are written in **(blue)**

Rendering

Camera mode

Before rendering the animation, check if camera frame covers the entire animation or not

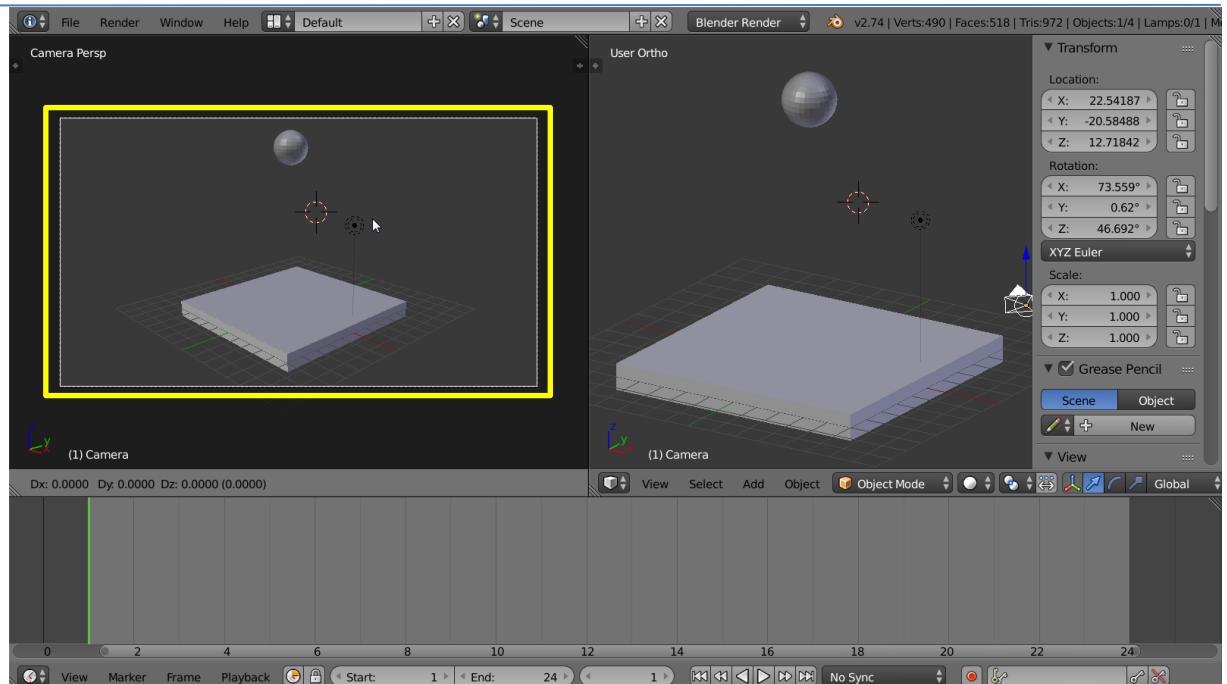
- Go to camera view
(NUM 0)
- Play the animation
(Alt + A OR
Play button in the
Timeline window)



Set camera

Set the camera:

- Select camera
(right click)
- Camera as active view
(**Ctrl + Alt + 0**)
- Fine adjustment
(**G** and **R** + mouse movement)

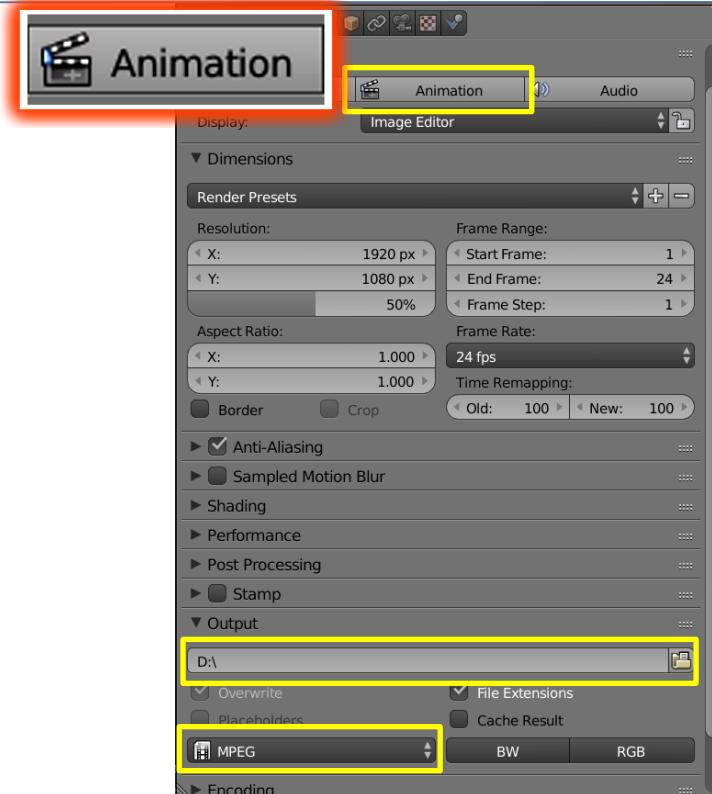


Render animation

Render settings :

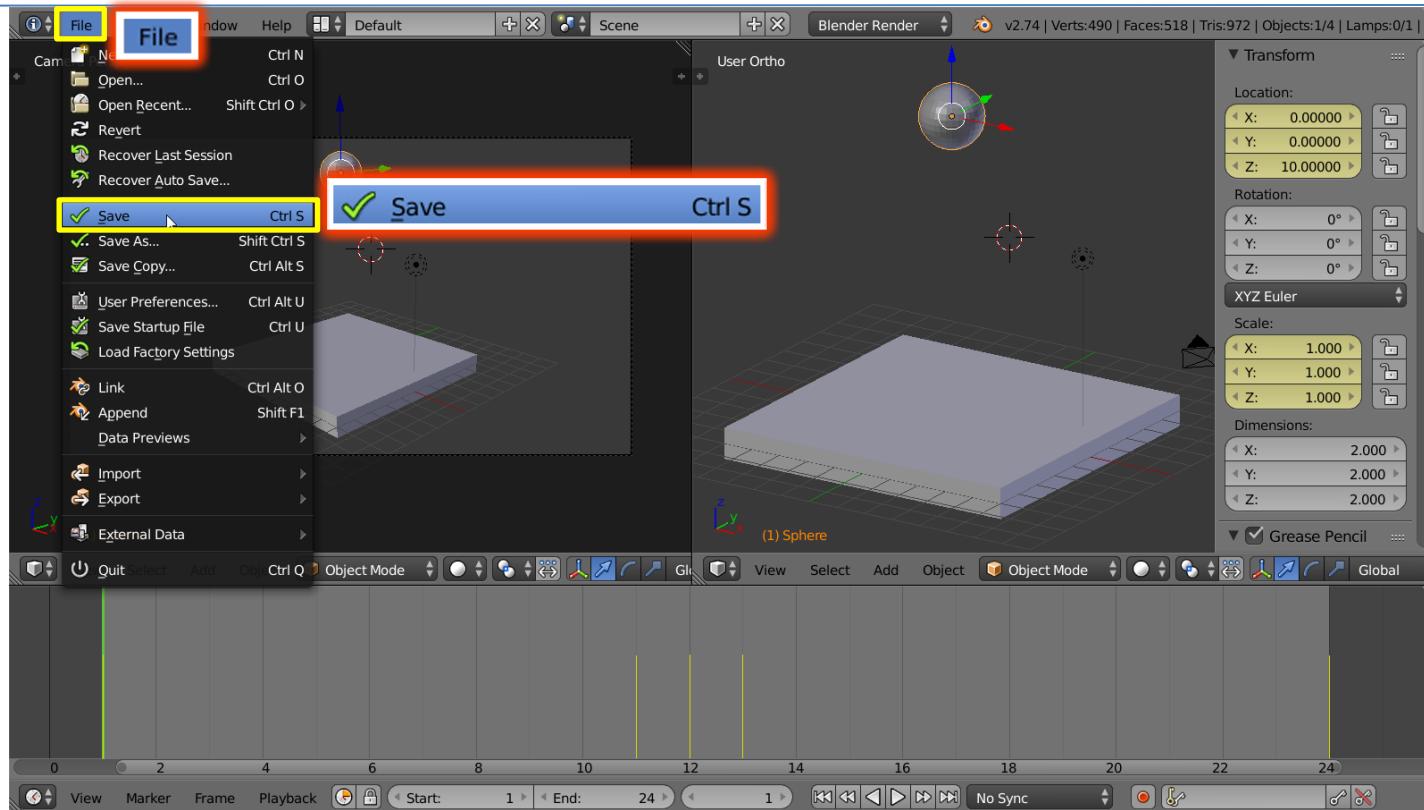
- Output : set file path
- File format : MPEG
- Render animation :

(Ctrl + F12 OR Animation
button in Properties window)

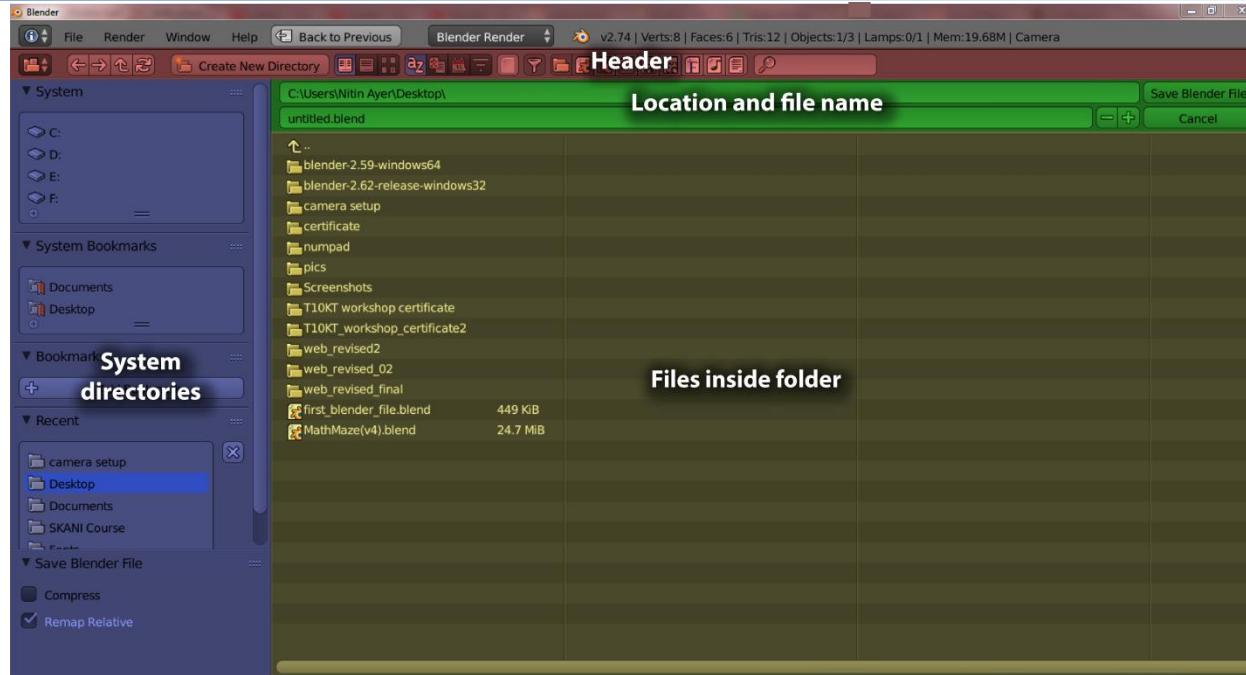


File saving

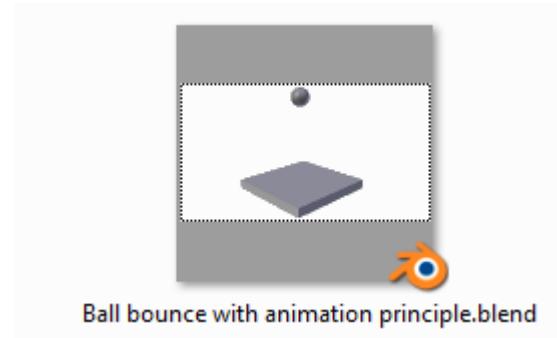
Saving Blender file



Select file path and name



Blender file .blend extension



Next session

Timing and spacing