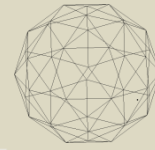


# Basic 3D animation using Blender

SKANI101x



## Key frame animation – Part I

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IIT Bombay

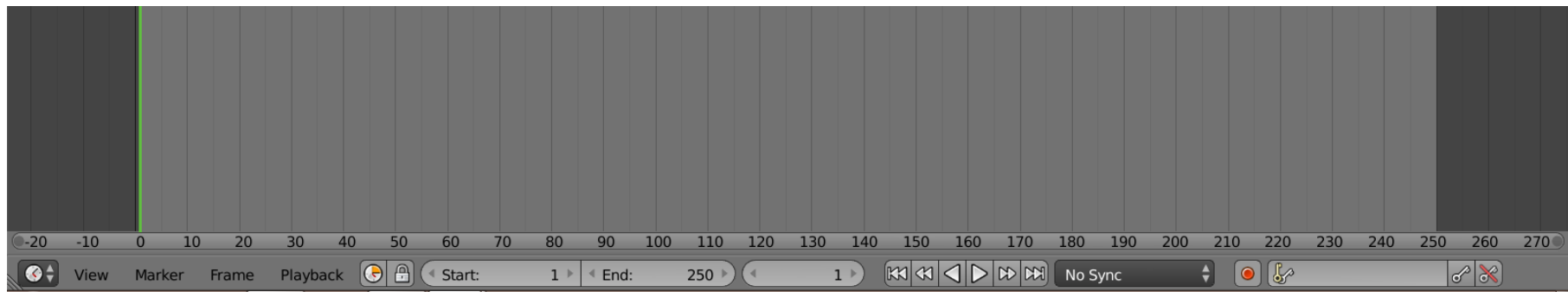
# Outline

- Timeline window
  - Properties
  - Components
- Animation planning
  - Initial state and final state (key frames)
  - Add/delete key frames
  - Animation using transformations
    - Location
    - Rotation
    - Scaling
  - Alternate method to add/delete key frames

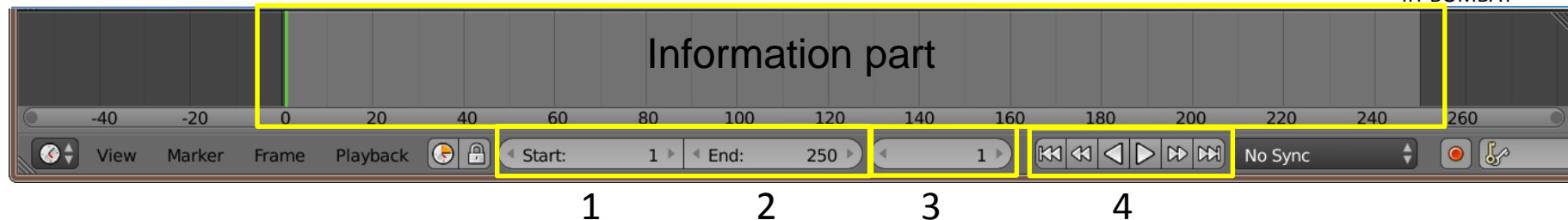
# Timeline window – properties

## ■ Properties:

- Display current time frame (in frames / seconds), start, end frame and Location of key frames
- Time cursor (green line) – to set and display the current time frame
- Offers player controls, to play, pause, rewind, forward and stop animation



# Timeline window – components



## Information area

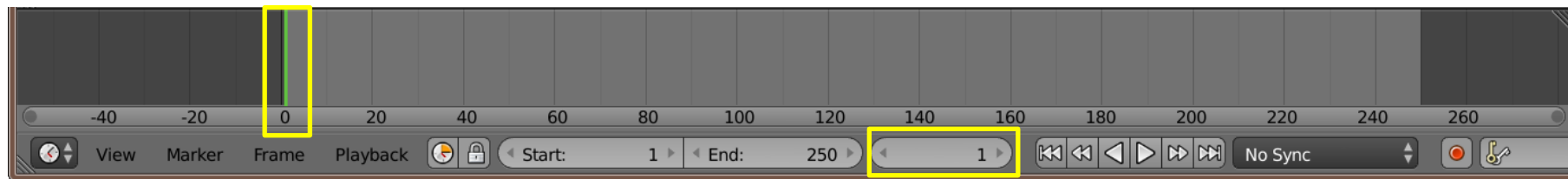
1. Visual representation of the total duration of the animation. Displays key frames

## Control area

1. Start frame of the animation
2. End frame of the animation
3. Current frame of the animation
4. Player

# Current frame

- To change the current frame
  - Use left arrow and right arrow keys on keyboard
  - Or you can drag the time cursor using left click of the mouse
  - Or you can left click on the current frame box and enter the value using keyboard



# Animation planning

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# Initial state and final state

Animation	Is a motion or change between initial and final state of the object over period of time
Initial state	State of the object at the start of the animation
Final state	State of the object at the end of the animation
Key frame	It's a marker which stores the property data such as location, rotation and scaling of the object

*Key frames are used to lock the initial and final state of the object*

# Add/delete key frames

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Steps to add and delete key frames



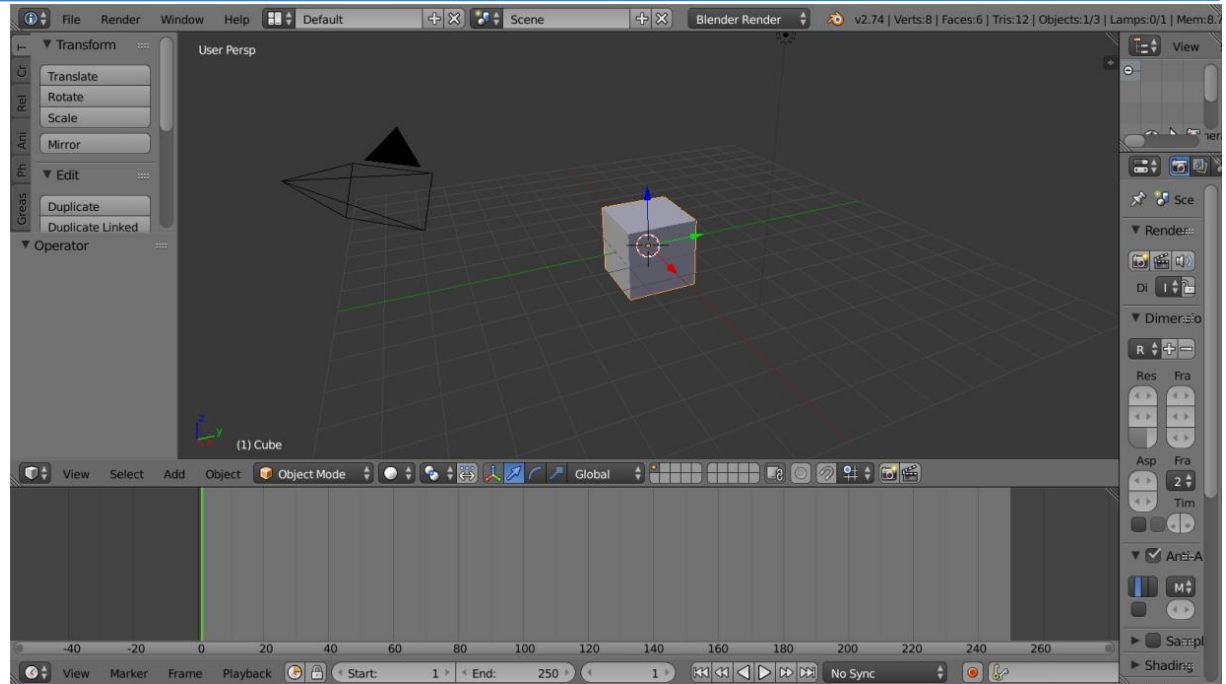
# Steps to add key frame

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1. Set current frame
2. Apply transformation (Grab, rotate, scale)
3. Add key frame to lock transformation

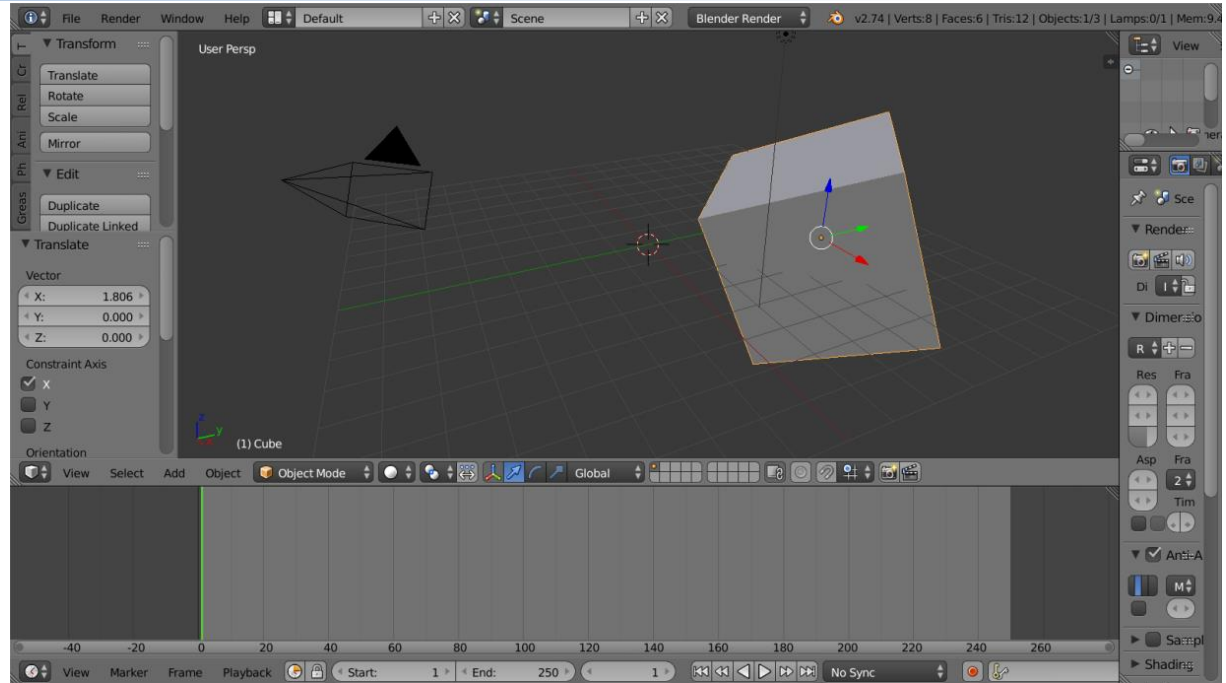
# 1. Set current frame

- Set current frame on timeline window
- Use left arrow and right arrow button on keyboard
- Drag the time cursor using left click of the mouse
- Left click on the current frame box and enter the value using keyboard



## 2. Apply transformation

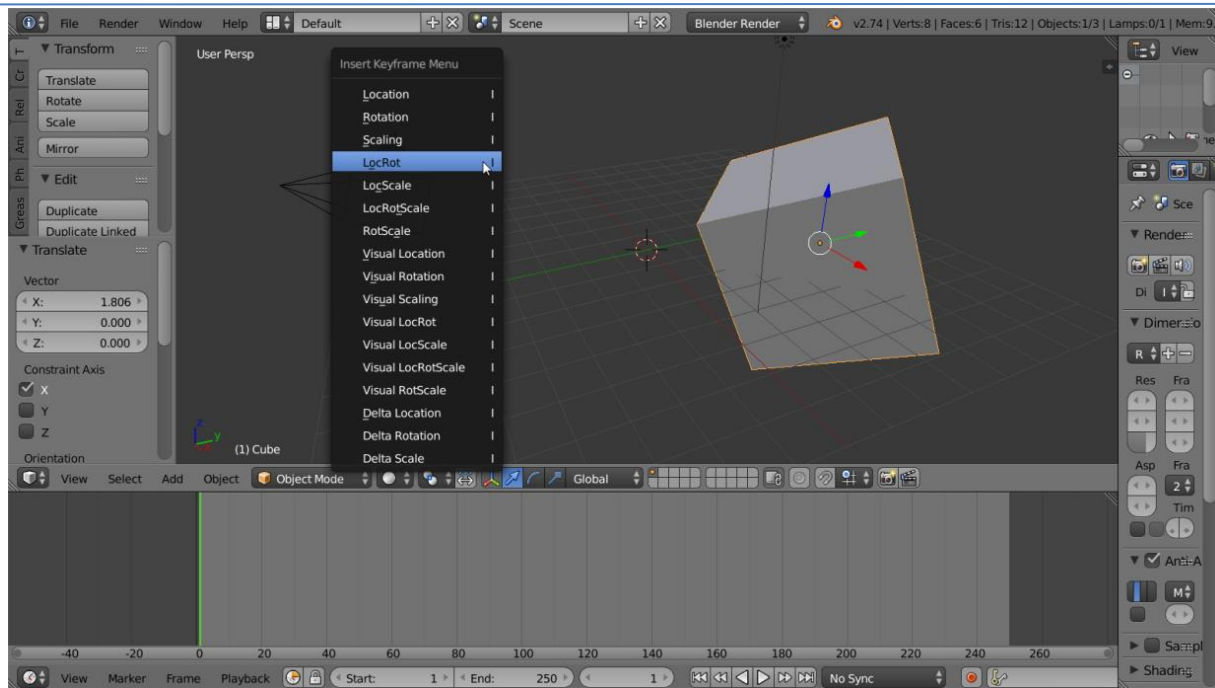
- Select object (right click)
- Set initial state of the object, use basic transformation (S, R and G)



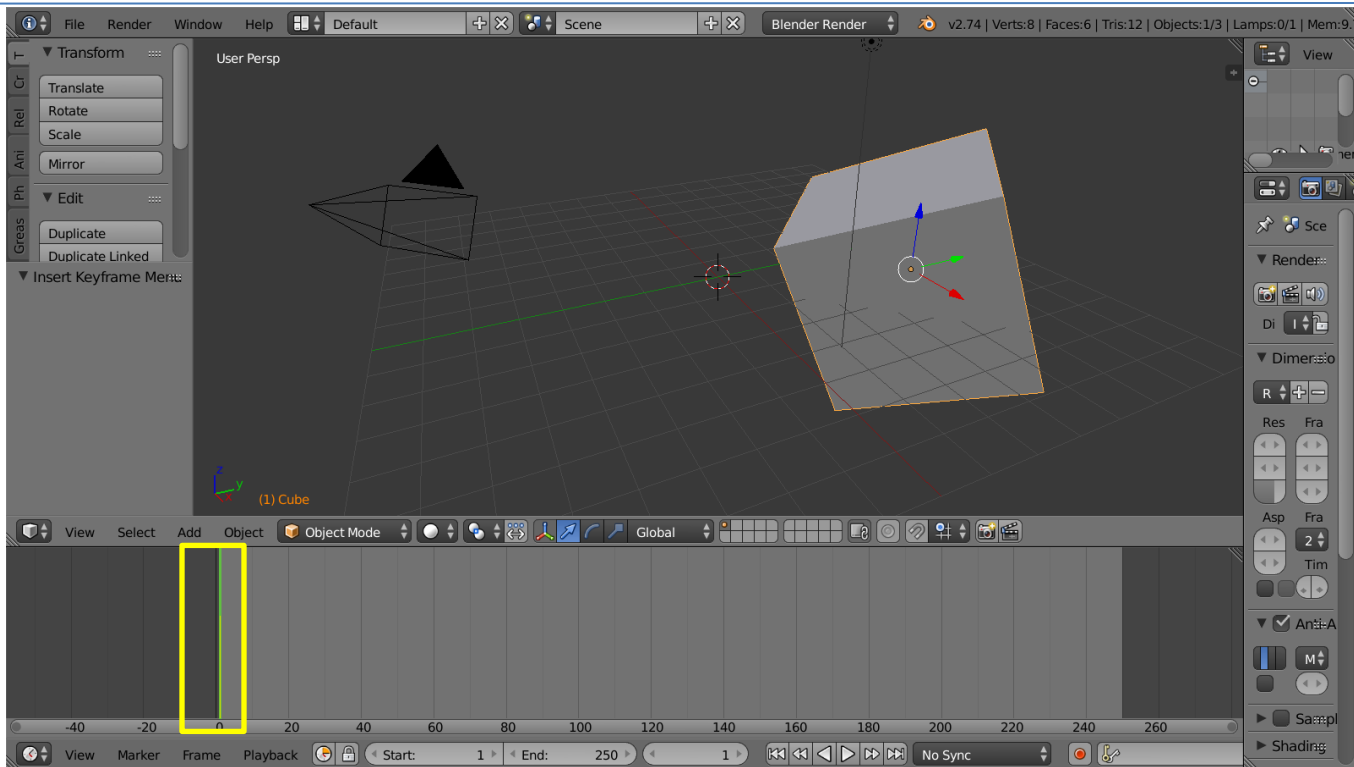
### 3. Add key frame to lock transformation

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear

Adding key frame means locking the state of the object

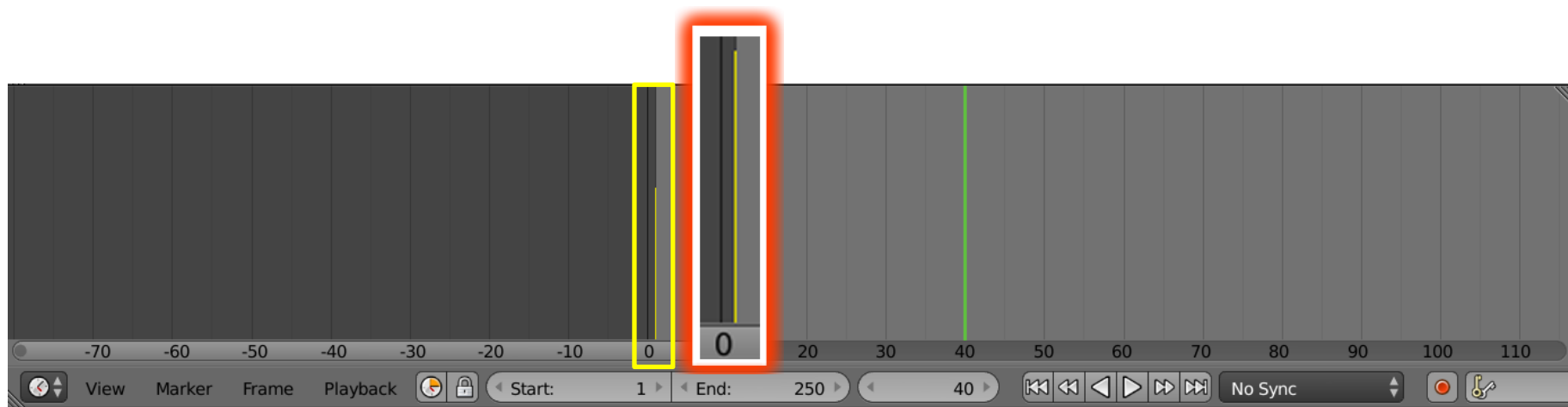


# Key frame



# Key frame

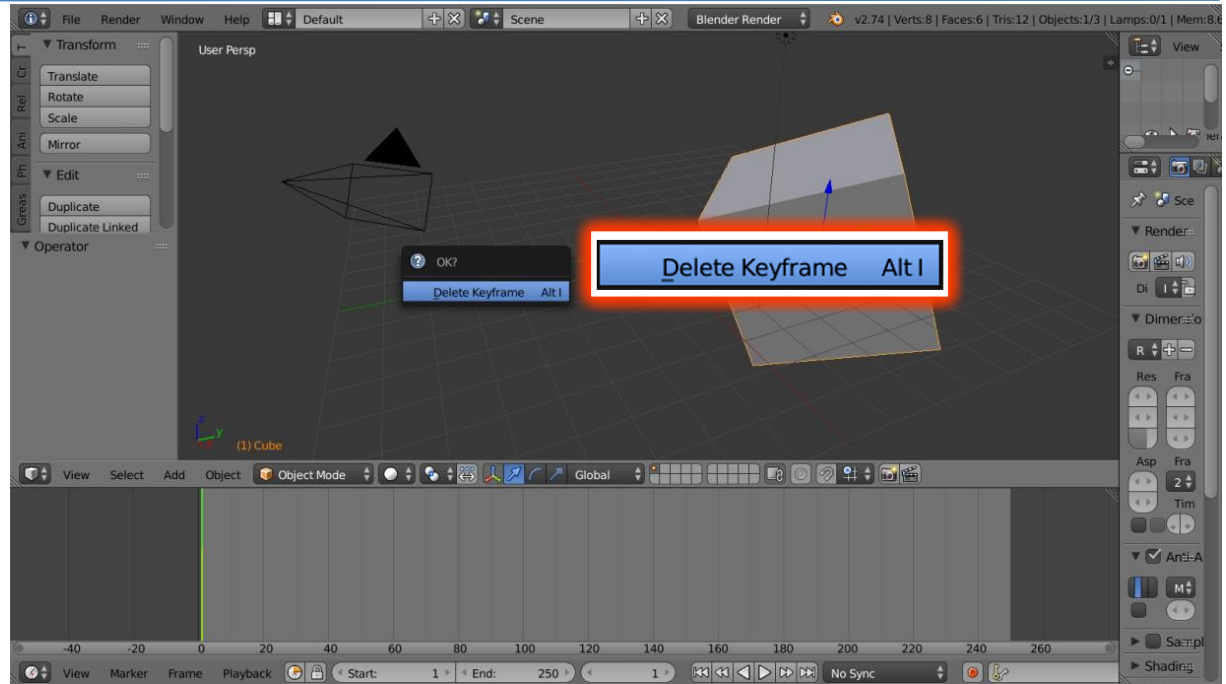
It's a marker which stores the property data such as location, rotation and scaling of the object



Key frame

# Deleting key frames

- Set the current frame to the frame which has the key frame added
- Enable Delete key frame pop-up (**Alt + I**)
  - Pop-up 'Delete keyframe' will appear
- Select 'OK' option to delete the key frame for object



# Animation using transformation

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Location

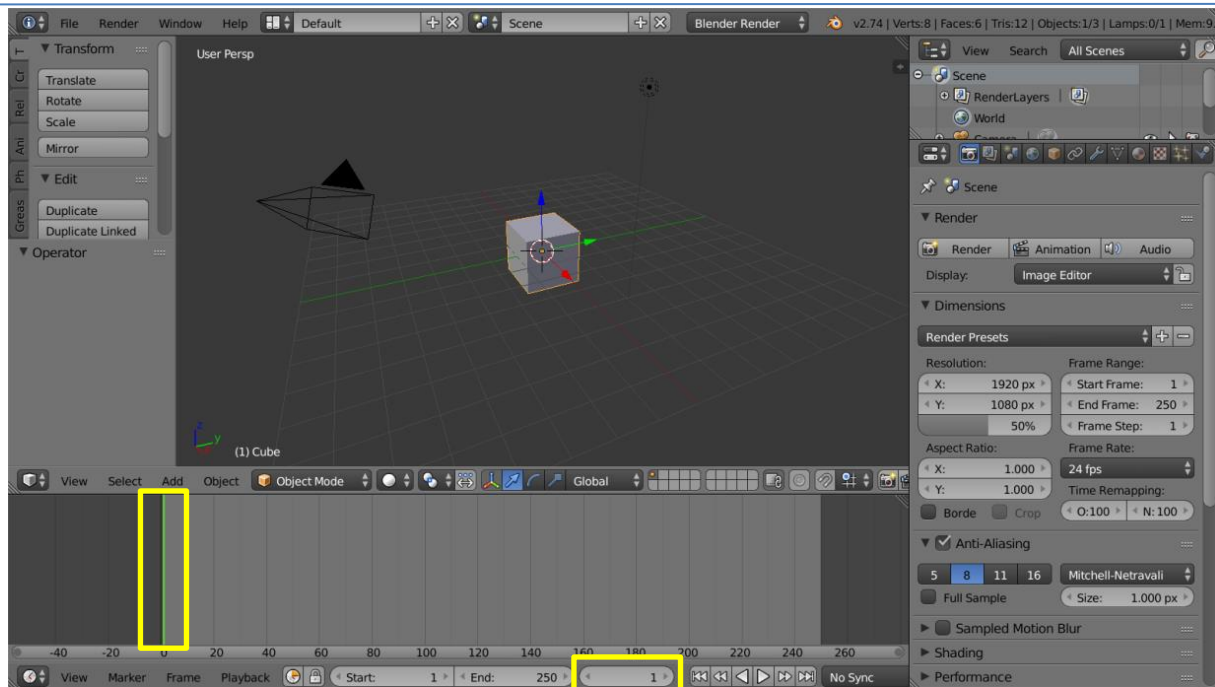


# 1. Set current frame (Initial state)

Animation will start from frame 1

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

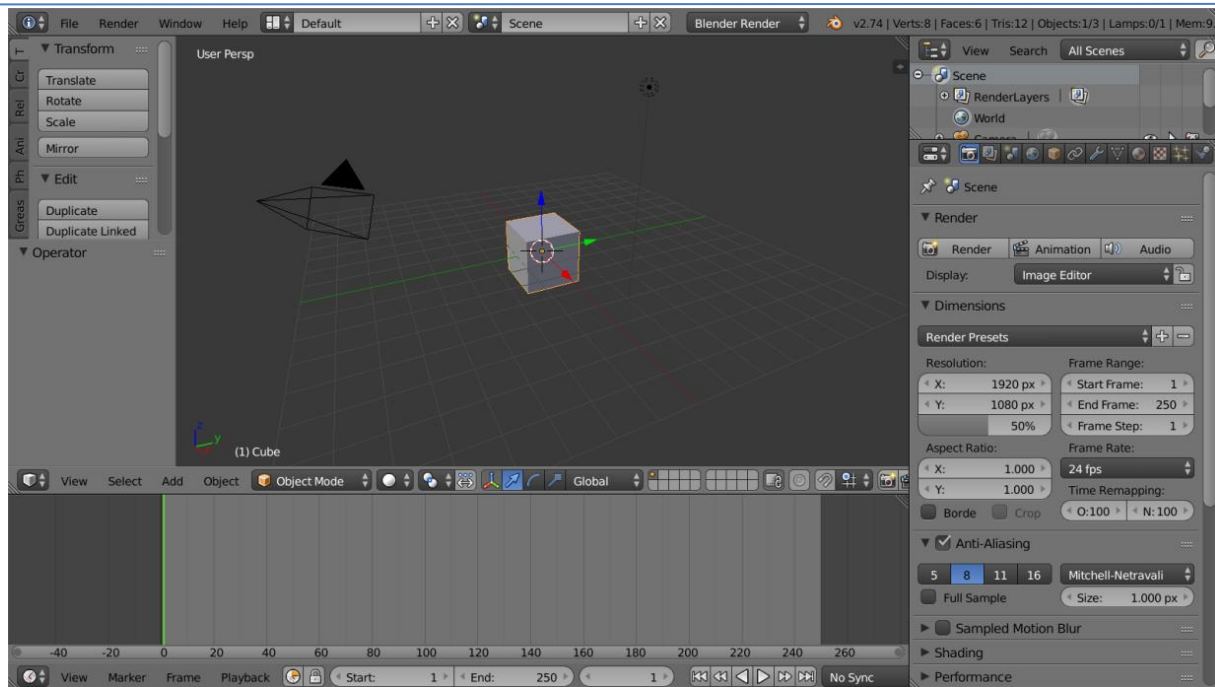
Setting current frame means defining the starting frame of the animation



## 2. Apply transformation (Initial state)

- Select object (right click)
- Set initial state of the object, use basic transformation (S, R and G)

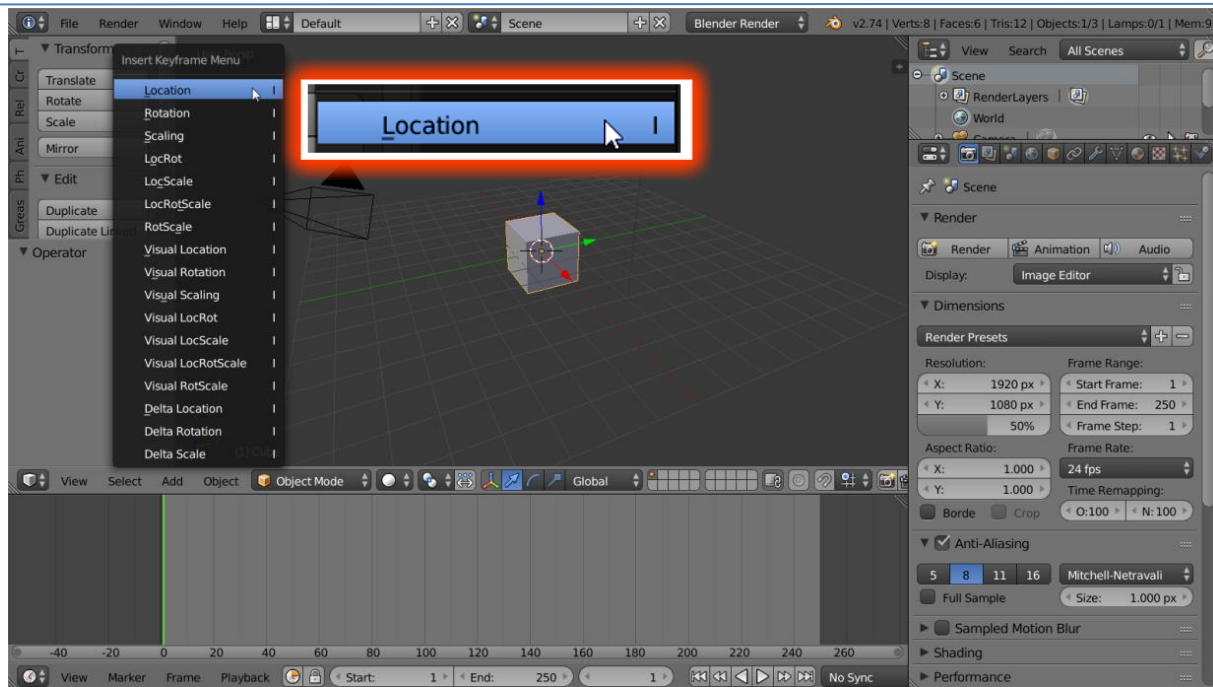
Setting initial state of the object means setting object state at the start of animation



### 3. Add key frame (Initial state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Location' option to add key frame for object's location

Adding key frame means locking the state of the object



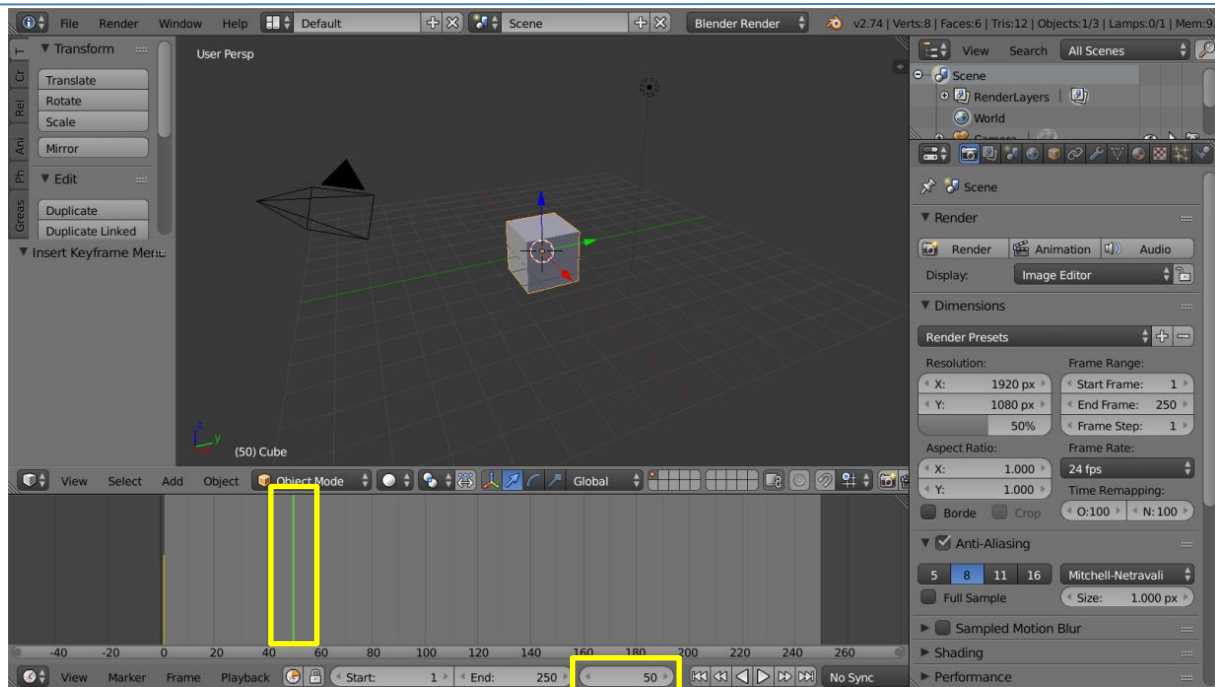
# Set Final state

*Initial state of the object is defined, now set final state of the object by repeating the same three steps*

# 1. Set current frame (Final state)

- Set current frame to 50  
(Enter 50 in current frame box)

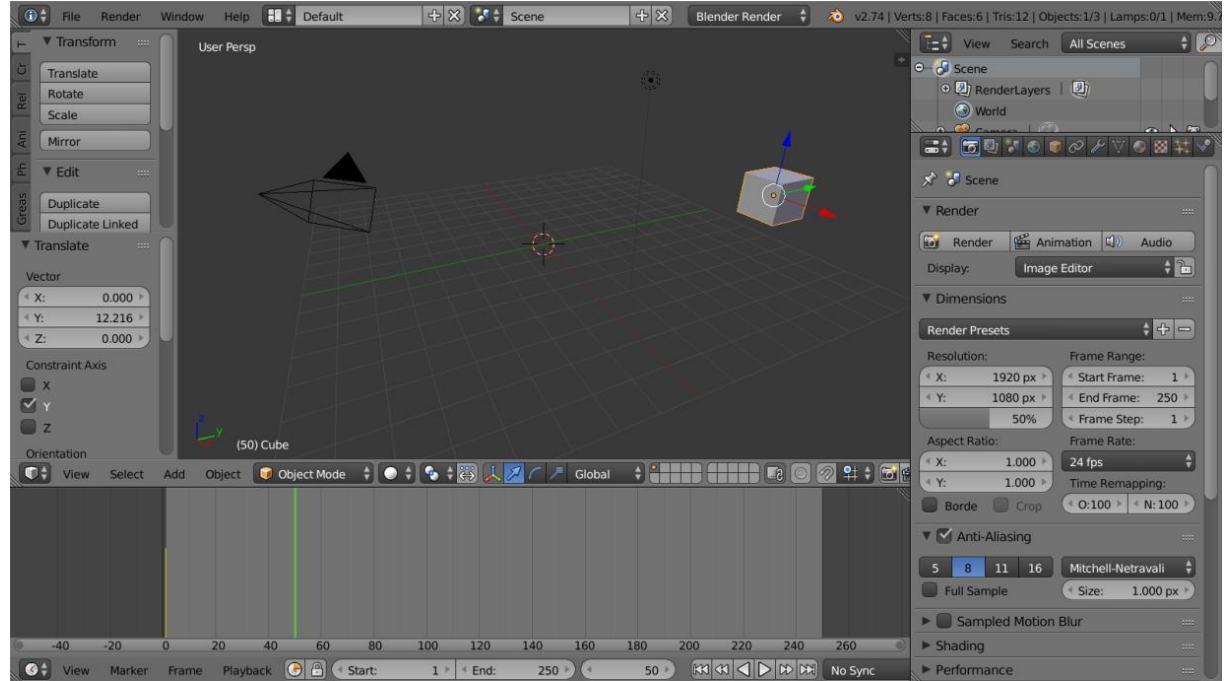
Changing the current frame means deciding the time of the animation



## 2. Apply transformation (Final state)

- Move object in any direction (**G + mouse movement**)

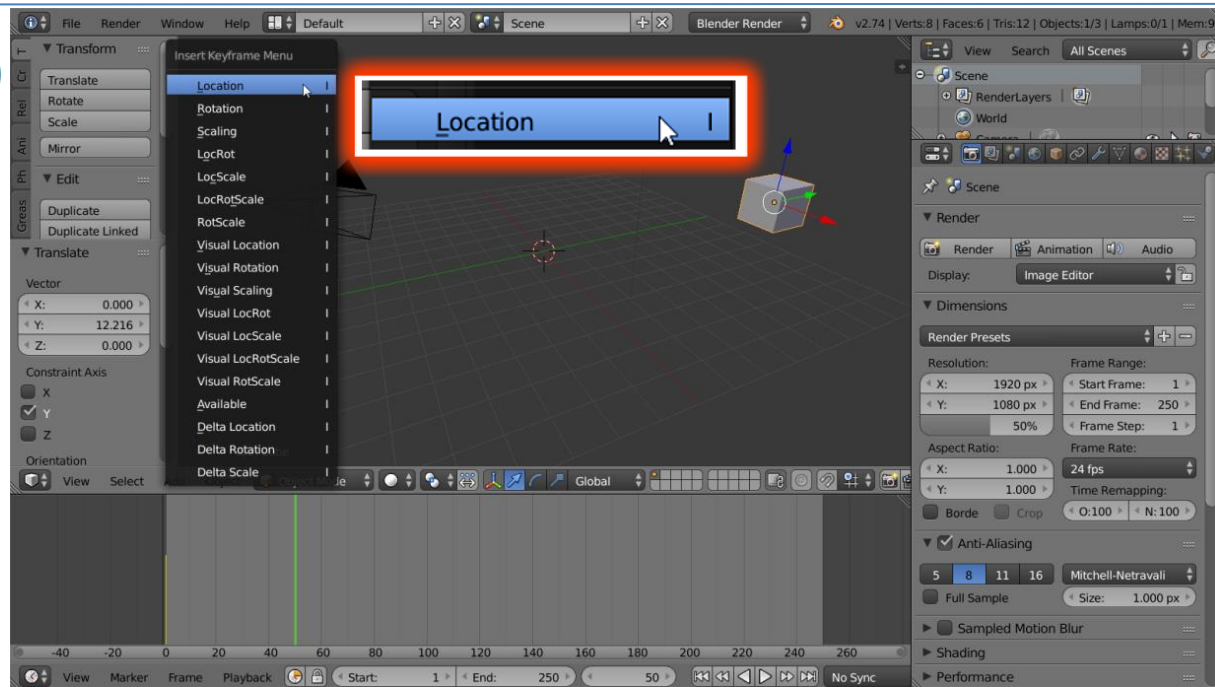
Applying transformation decides the action performed by object during the animation



### 3. Add key frame (Final state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Location' option to add key frame for object's location

Adding key frame means locking the final state of object



# Animation using transformation

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## Rotation

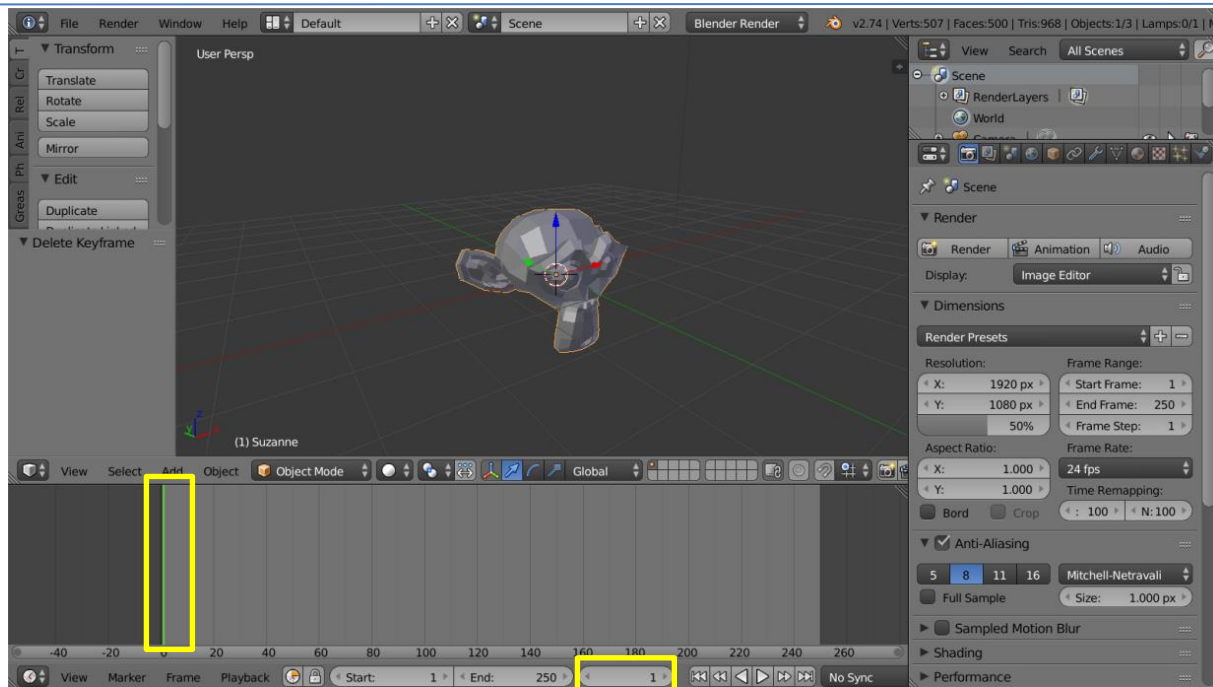


# 1. Set current frame (Initial state)

Animation will start from frame 1

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

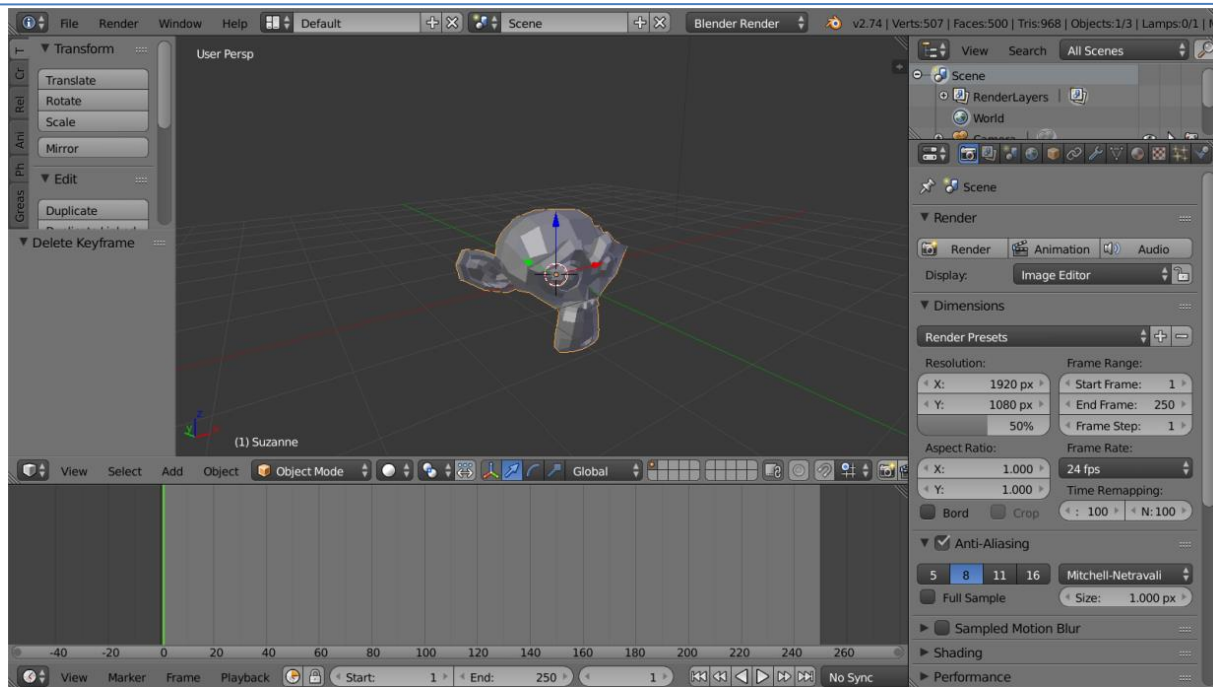
Setting current frame means defining the starting frame of the animation



## 2. Apply transformation (Initial state)

- Select object (right click)
- Set initial state of the object, use basic transformation (S, R and G)

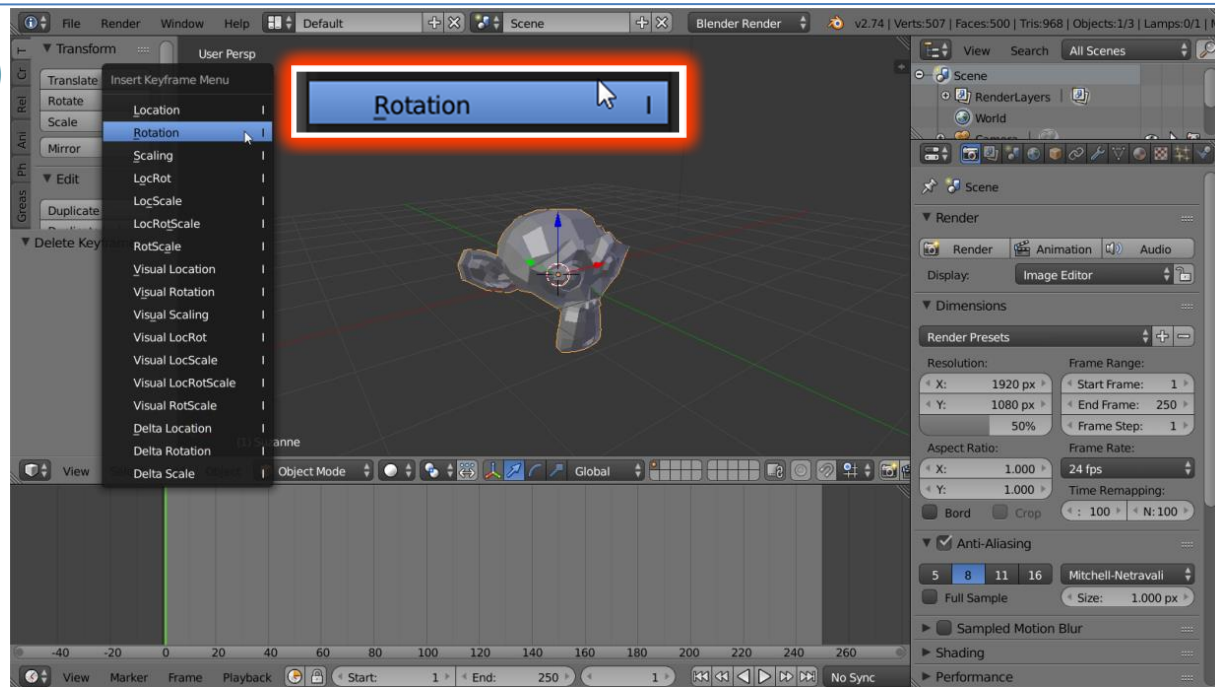
Setting initial state of the object means setting object state at the start of animation



### 3. Add key frame (Initial state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Rotation' option to add key frame for object's rotation

Adding key frame means locking the state of the object



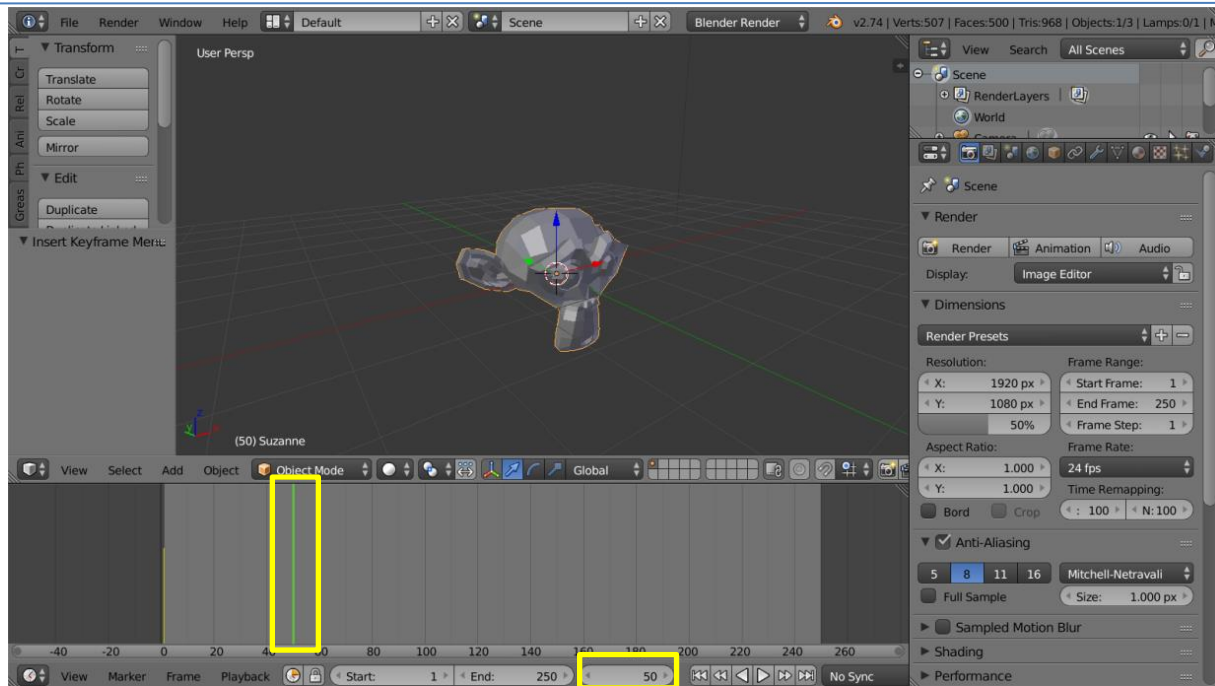
# Set Final state

*Initial state of the object is defined, now set final state of the object by repeating the same three steps*

# 1. Set current frame (Final state)

- Set current frame to 50  
(Enter 50 in current frame box)

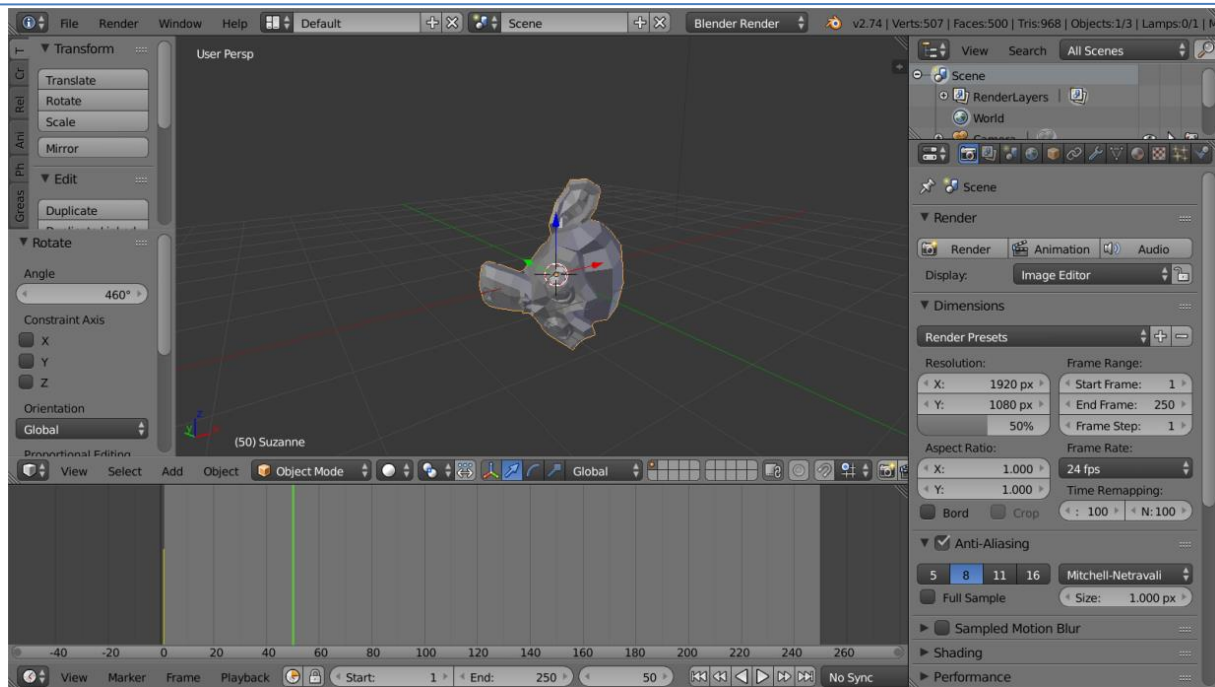
Changing the current frame means deciding the time of the animation



## 2. Apply transformation (Final state)

- Rotate object in any direction (R + mouse movement)

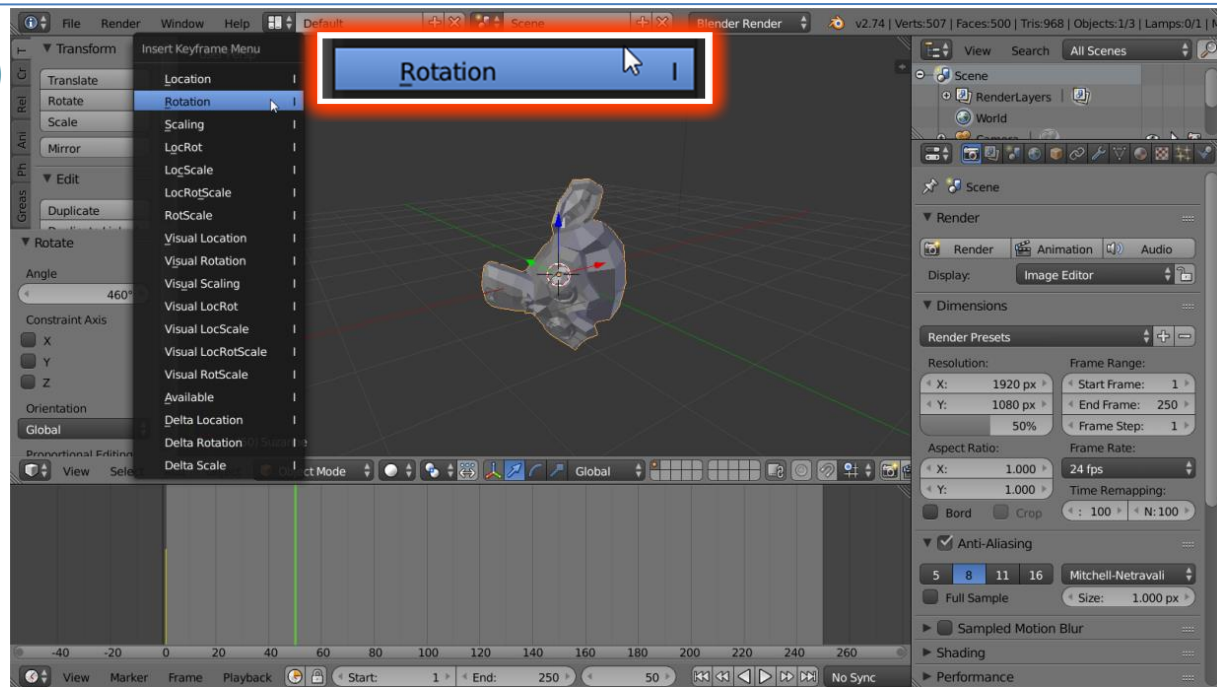
Applying transformation decides the action performed by object during the animation



### 3. Add key frame (Final state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Rotation' option to add key frame for object's rotation

Adding key frame means locking the final state of object



# Animation using transformation

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## Scaling

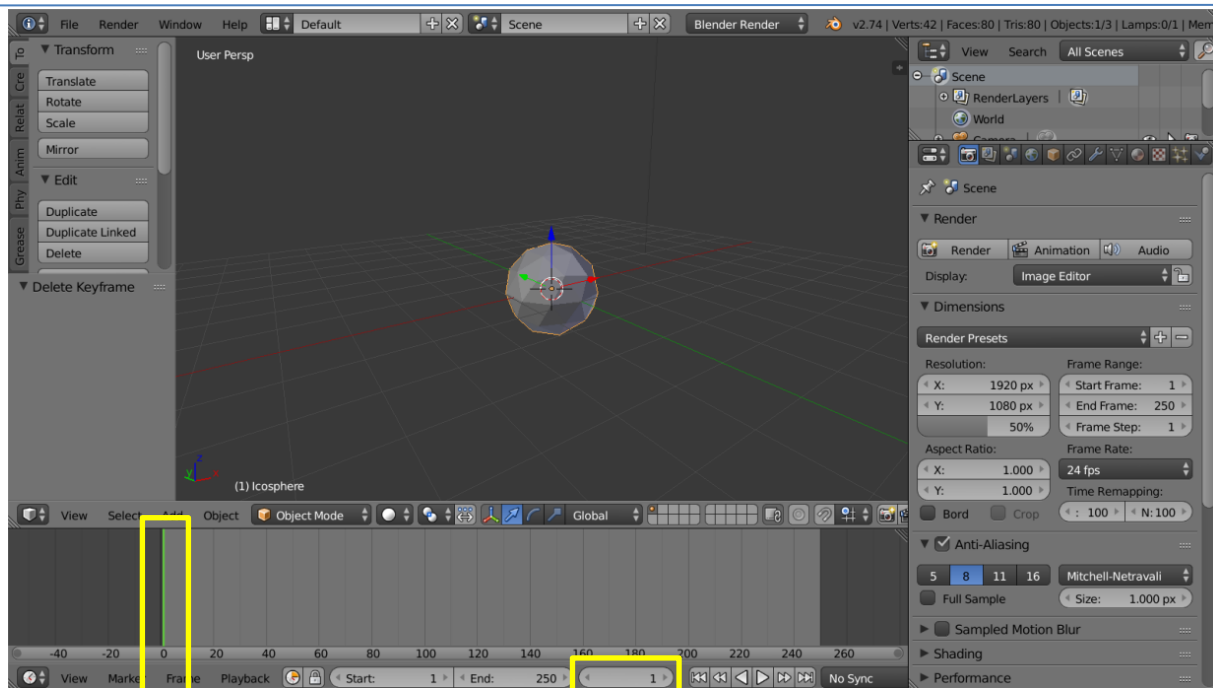


# 1. Set current frame (Initial state)

Animation will start from frame 1

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

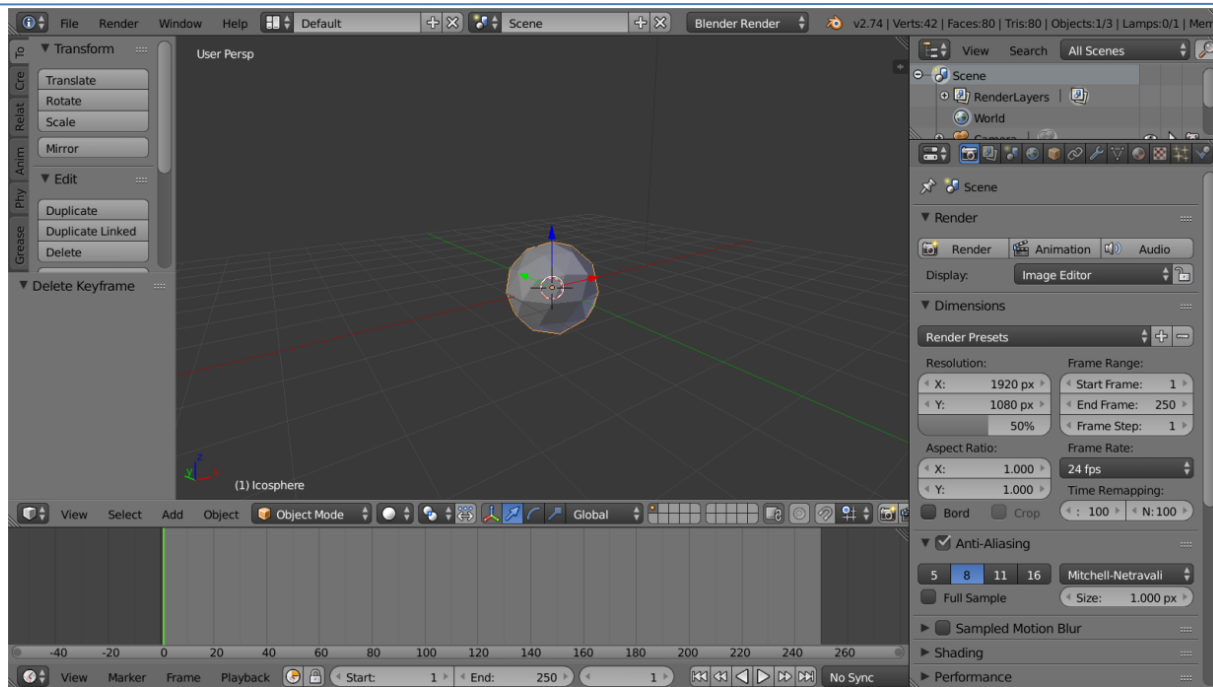
Setting current frame means defining the starting frame of the animation



## 2. Apply transformation (Initial state)

- Select object (right click)
- Set initial state of the object, use basic transformation (S, R and G)

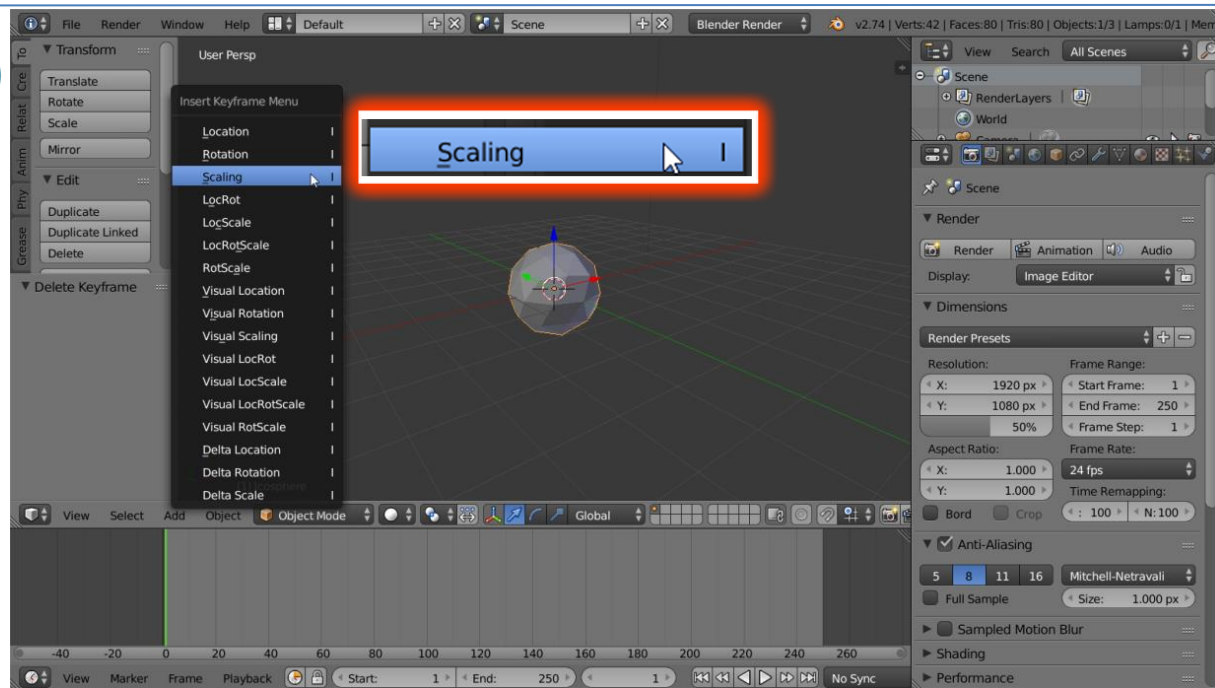
Setting initial state of the object means setting object state at the start of animation



### 3. Add key frame (Initial state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Scaling' option to add key frame for object's size

Adding key frame means locking the state of the object



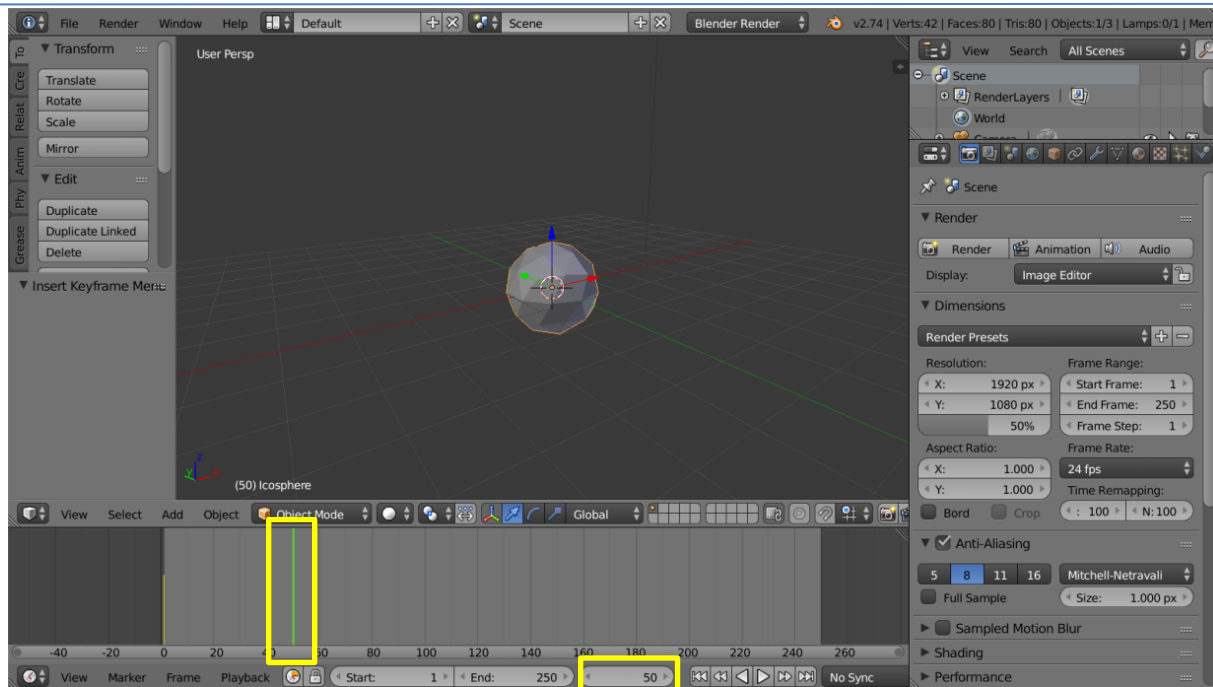
# Set Final state

*Initial state of the object is defined, now set final state of the object by repeating the same three steps*

# 1. Set current frame (Final state)

- Set current frame to 50  
(Enter 50 in current frame box)

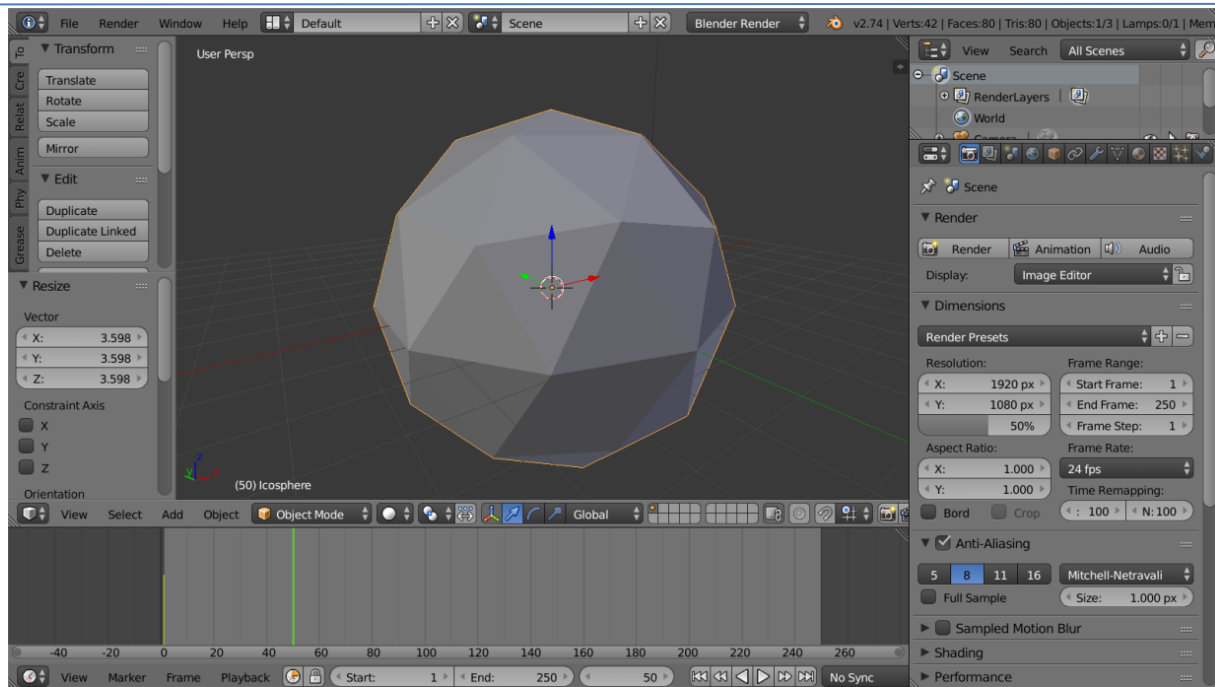
Changing the current frame means deciding the time of the animation



## 2. Apply transformation (Final state)

- Scale object in any direction ( $S + \text{mouse movement}$ )

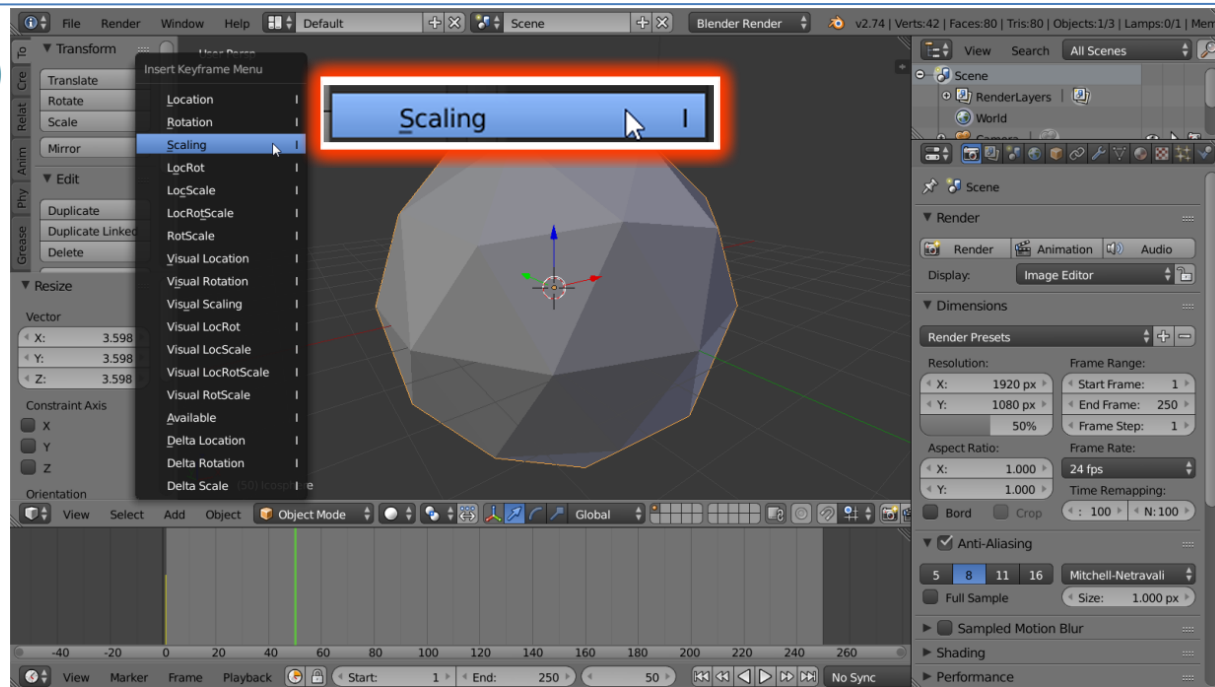
Applying transformation decides the action performed by object during the animation



### 3. Add key frame (Final state)

- Enable key frame pop-up (I)
  - Pop-up 'Insert key frame menu' will appear
- Select 'Scaling' option to add key frame for object's size

Adding key frame means locking the final state of object



# Reviewing animation

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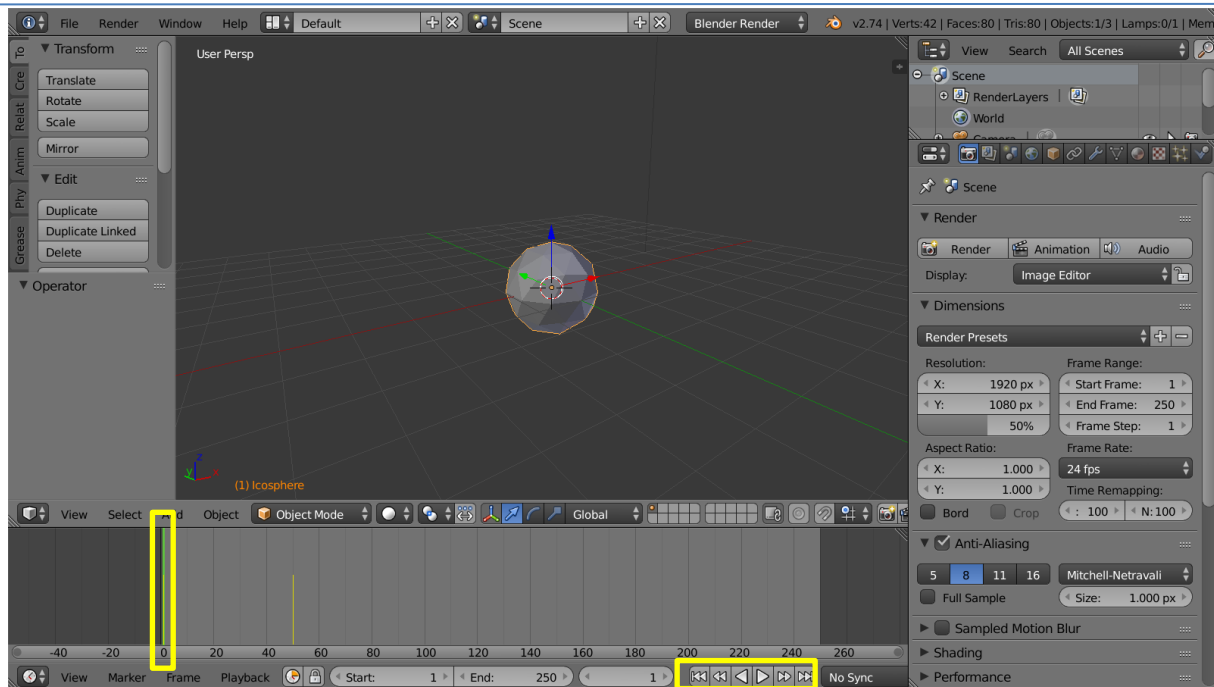
# Play animation



IIT BOMBAY

## 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)

# Alternate methods

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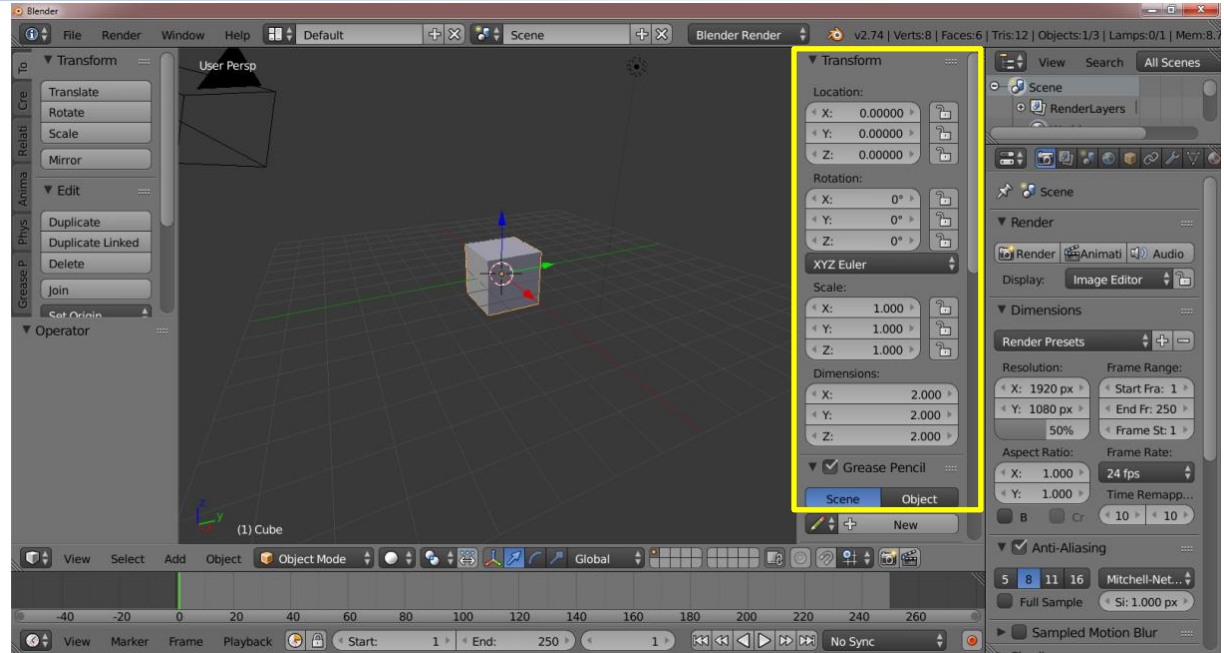
Add and delete key frames

# Transform panel

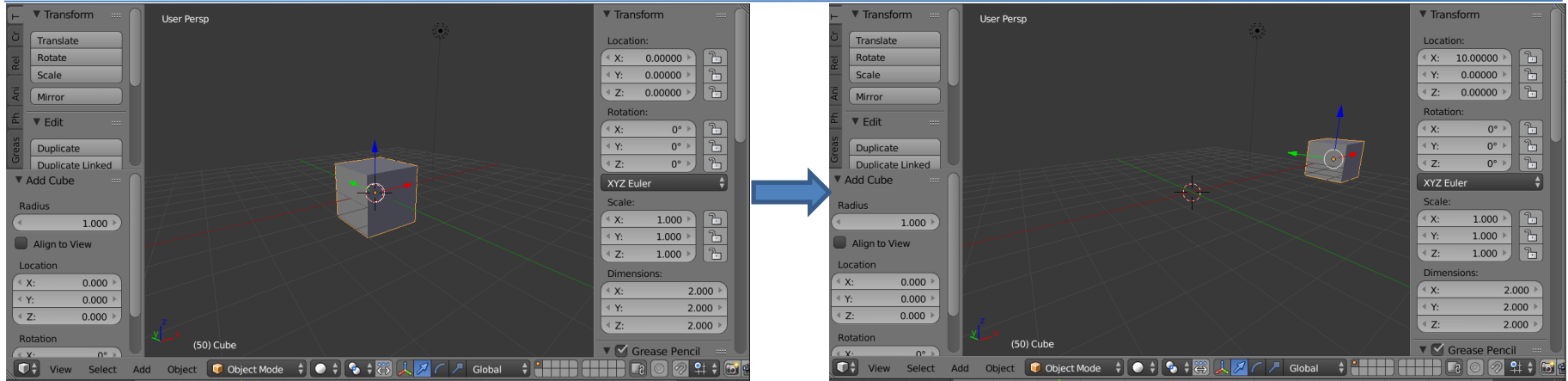
## ■ Transform panel (N)

Allows you to view and manually/numerically control properties of an object, such as -

- Location
- Rotation
- Scale
- Dimensions



# Basic transformation



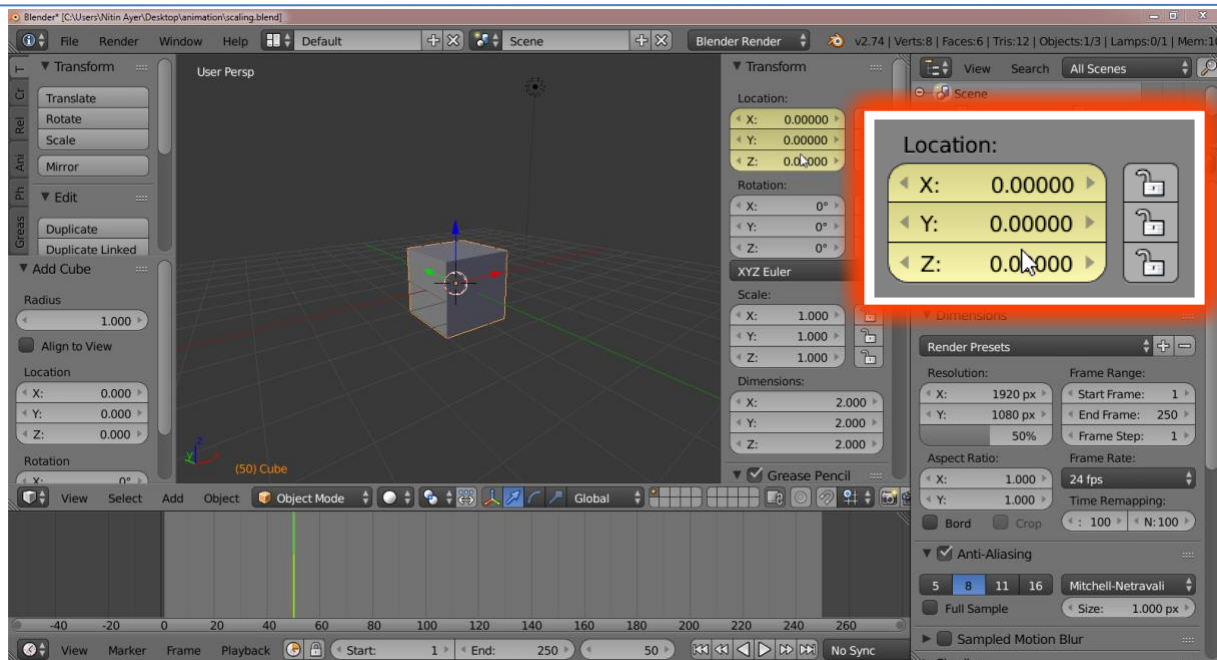
Basic transformation (grab, rotate scale), can be also done using transform panel

# Alternate method 1 – Adding key frame

- Select object (right click)
- Hover mouse on location property in transform panel
- Add key frame (I)

After adding the key frame object property colour turns yellow

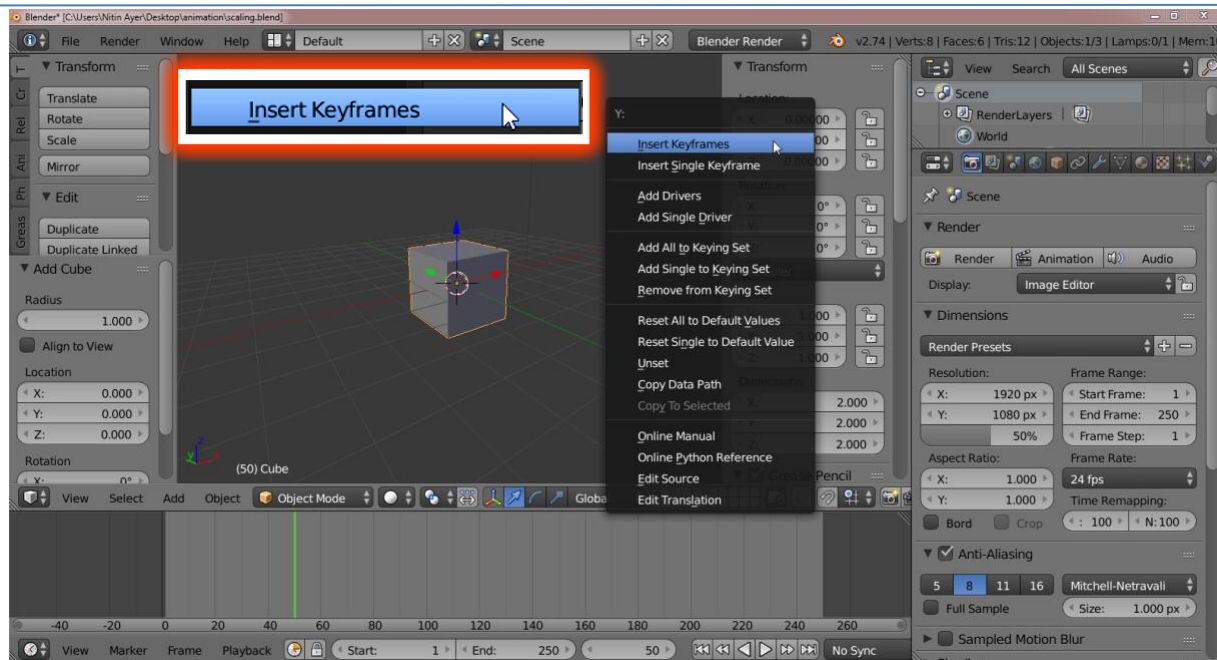
Similarly add key frames for rotation and scaling properties



# Alternate method 2 – Adding key frame

- Select object (right click)
- Hover mouse on location property in transform panel
- Enable pop-up (right click)
  - Pop-up will appear
- Select 'Insert Keyframe' option to add key frame for object's location

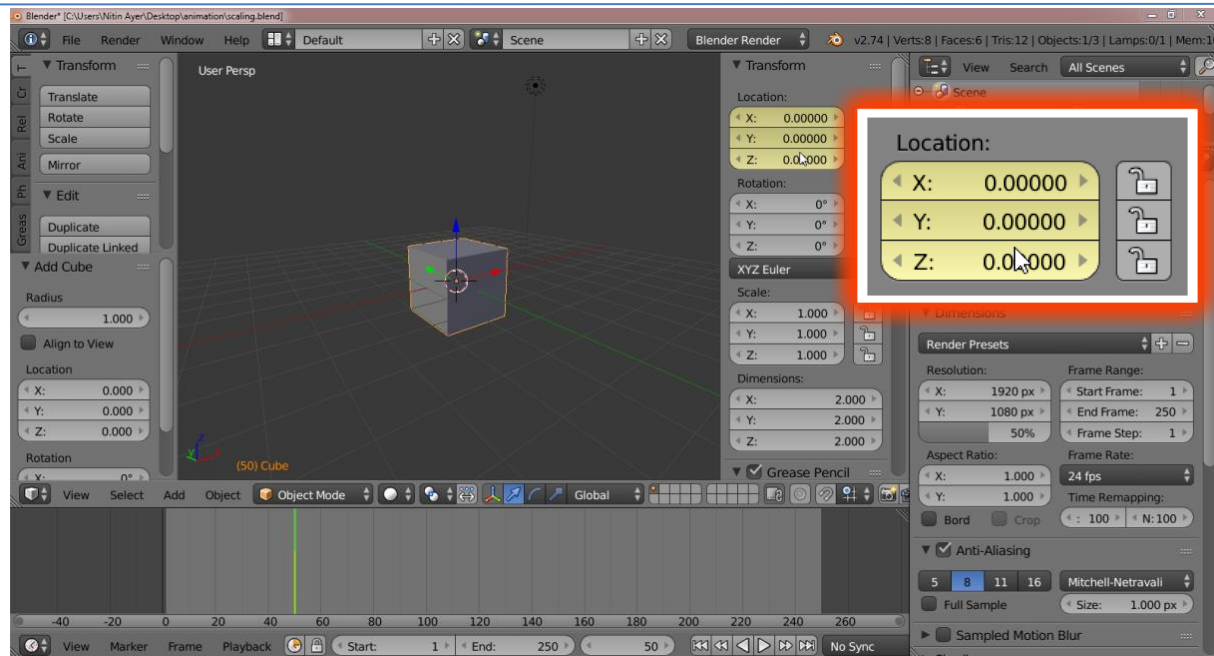
Similarly add key frames for rotation and scaling properties



# Alternate method 1 – Deleting key frame

- Select object (right click)
- Hover mouse on location property in transform panel
- Delete key frame (Alt + I)

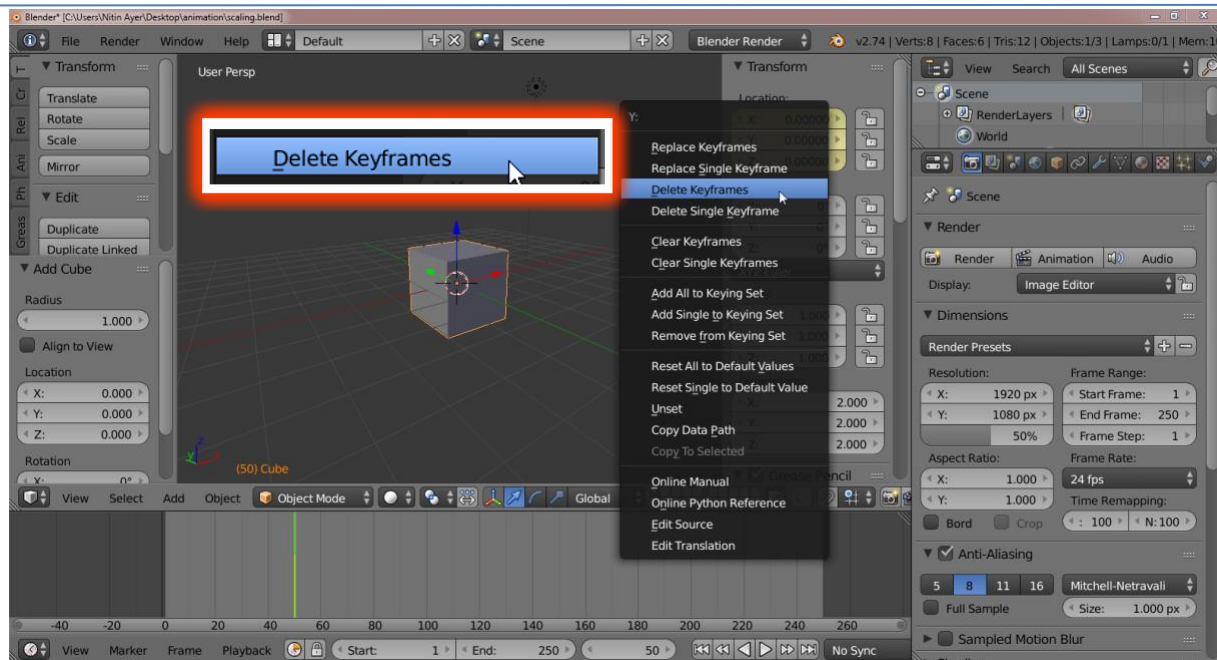
Similarly delete key frames for rotation and scaling properties



# Alternate method 2 – Deleting key frame

- Select object (right click)
- Hover mouse on location property in transform panel
- Enable pop-up (right click)
  - Pop-up will appear
- Select 'Delete Keyframes' option to delete key frame for object's location

Similarly delete key frames for rotation and scaling properties





# Next session

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## Key frame animation – Part II