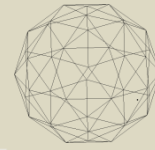


Basic 3D animation using Blender

SKANI101x



Timing and spacing

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Outline

- What is frame rate?
- Timing & Spacing
- Why, Where and How is this principle used

What is frame rate?

Human eye can register movement when we run a video with 24 frames per second (fps). This is called **persistence of vision**.

- If we increase frame rate up to 30 fps we will be able to see smooth movement
- When we reduce the frame rate up to 10 fps we will see the video/animation with a flicker

Animation principles (Disney)

Disney's twelve animation principles are introduced by Disney animators in the book Illusion of Life*

1. Squash & stretch
2. Anticipation
3. Staging
4. Straight ahead action & Pose to Pose
5. Follow through & overlapping action
6. Slow in & slow out
7. Arc
8. Secondary action
9. Timing
10. Exaggeration
11. Solid drawing
12. Appeal

* Ollie Johnston and Frank Thomas

Timing & Spacing

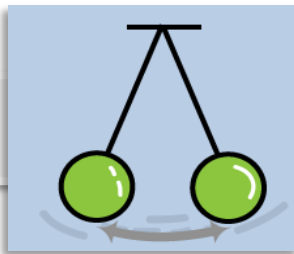
What is Timing?

Time required to complete a certain movement is the **timing** of that particular shot.

What is Timing?

Examples:

- An oscillation of a pendulum



- Lifting a bottle

- Pressing a switch



Why to find perfect Timing?

- It gives a perfect message/information to the audience.
- Incorrect timing leads to a wrong message/information.

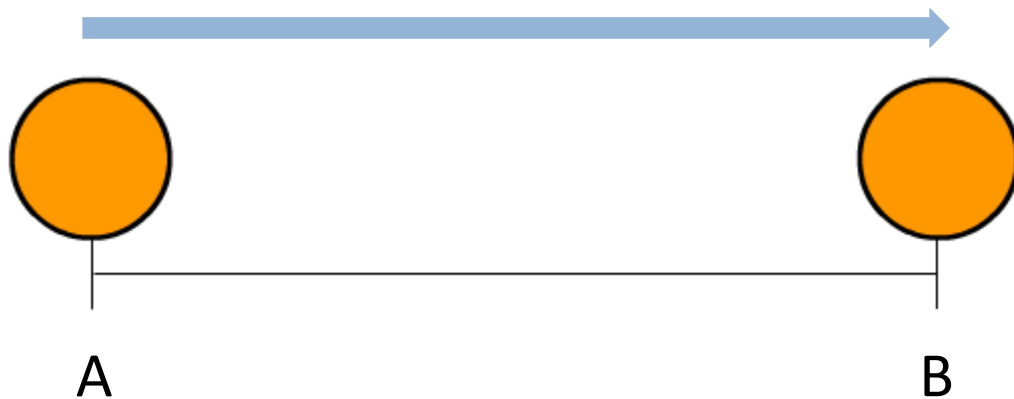
How to find out timing?

- Use a watch to estimate the timing
- Record using a camera, and find out the timing. You can see the difference in the timing if you shoot variations in the actions.
- A stop watch is used for getting the perfect timing.

Timing: Example

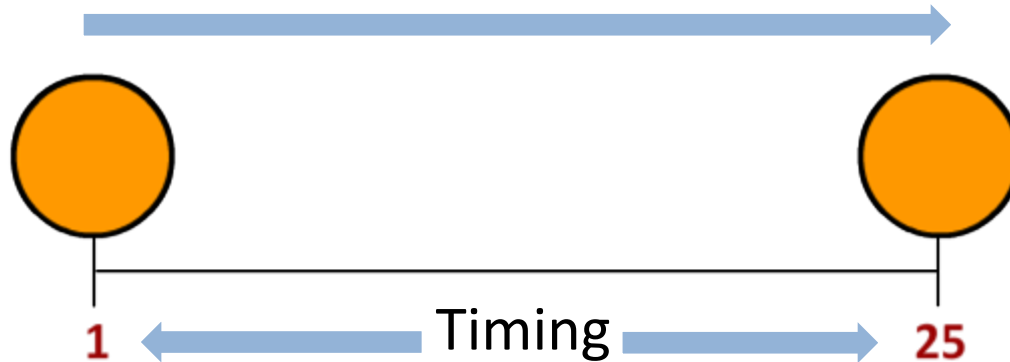
In a shot, a circle takes 1 second to move from position A to position B.

Therefore, **Timing** of this shot is 1 second.



Timing: Example

Position A is frame no 1 and position B is frame no 25.



Change of speed within the given time is **Spacing**.

There are many types of Spacing (Speed):

1. Constant: Equal speed
2. Slow in: Starts slowly and ends with more speed
3. Slow out: Starts speedily and ends slowly
4. Slow in & Slow out: Starts slowly, gathers more speed and ends with less speed
5. Random: No set pattern

Same timing different meanings

25 frames

Car moving at constant speed

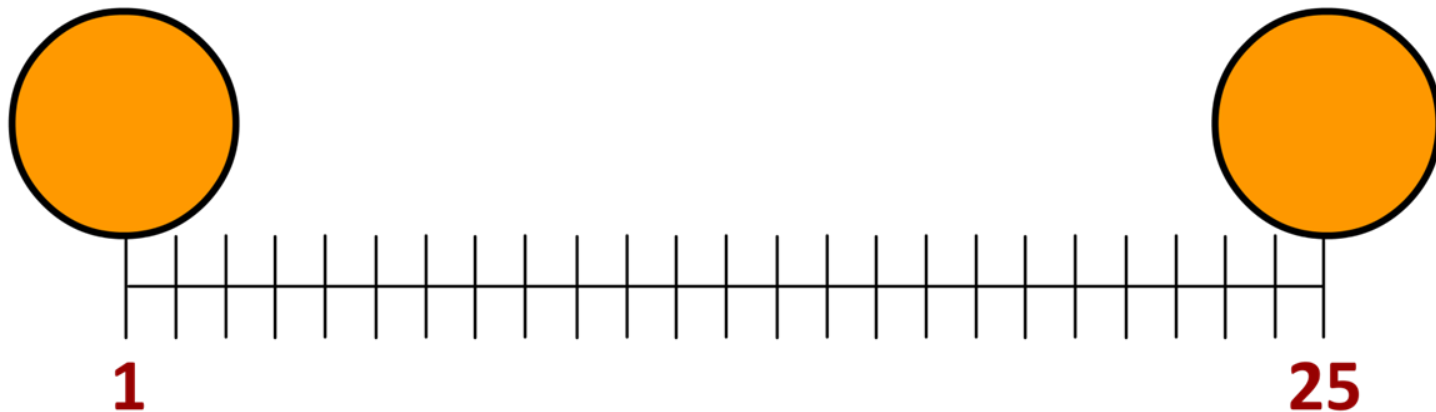
Car starting from rest

Car coming to rest

Faulty car

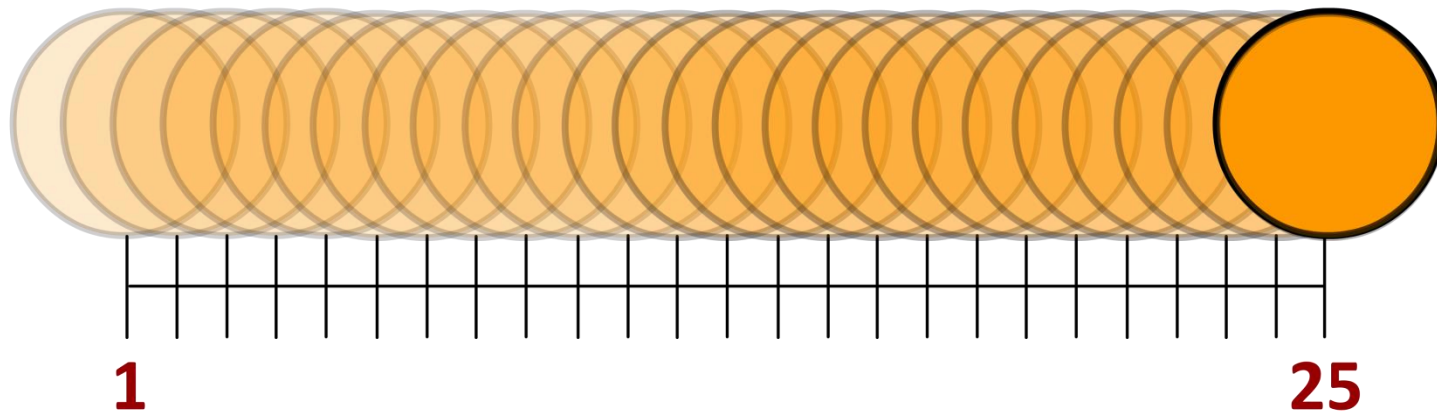
Adding constant speed

For constant speed: Keep the distance (spacing) same between each frame



Adding constant speed

For constant speed: Keep the distance (spacing) same between each frame



Constant

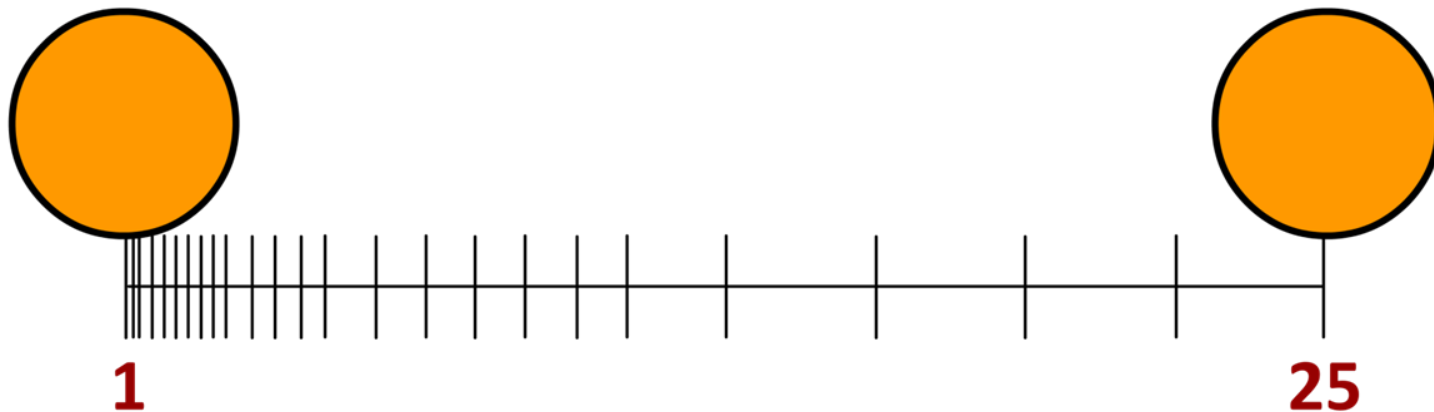
When the speed is constant

Example:

1. Car moving with constant speed (50 km/hour)
2. Robotic movement/ machine

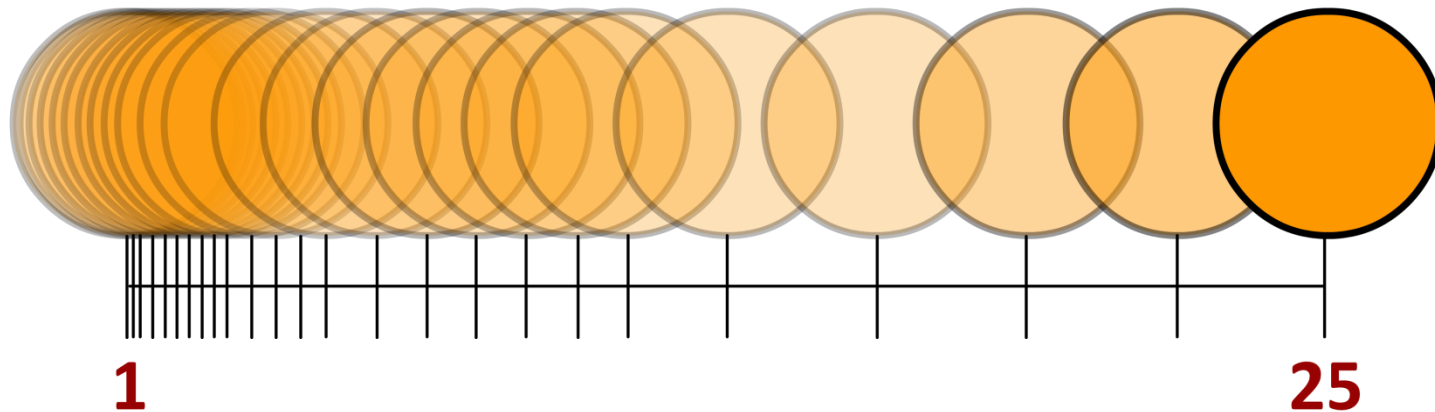
Adding slow in

To slow in : Starts with more number of frames and ends with less number of frames



Adding slow in

To slow in : Starts with more number of frames and ends with less number of frames



Slow in

When a movement starts from slow to fast

Example:

1. When a car starts moving from static position

Slow out

When a movement is from fast to slow

Example:

When a car stops

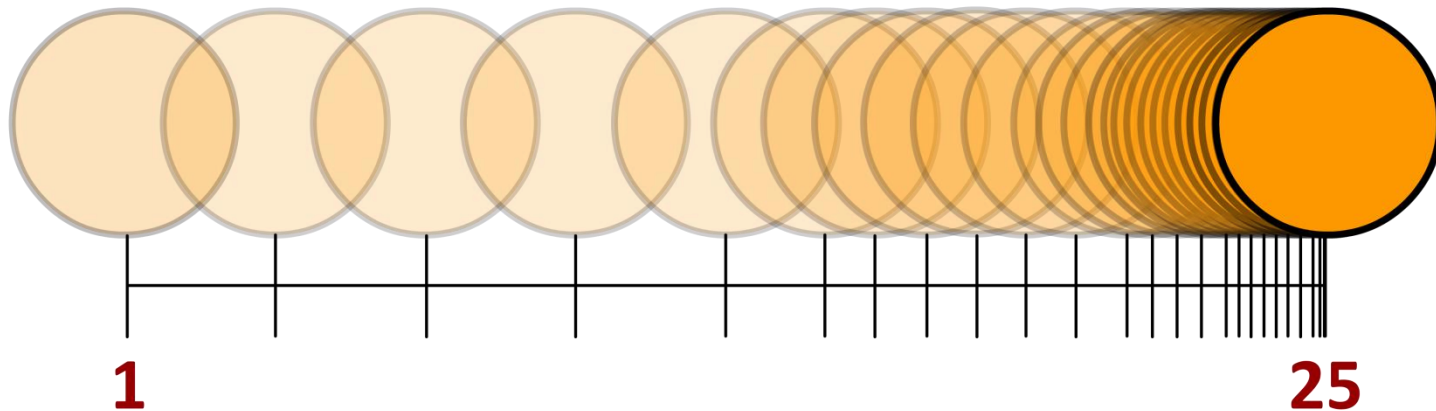
Adding slow out

To slow out : Starts with less number of frames and end with more number of frames



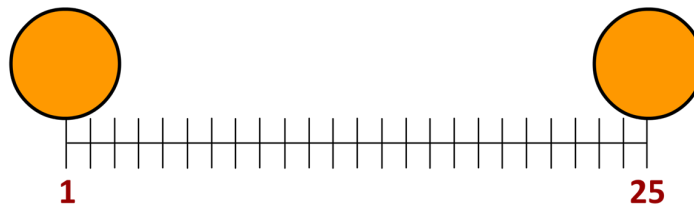
Adding slow out

To slow out : Starts with less number of frames and end with more number of frames



See the difference

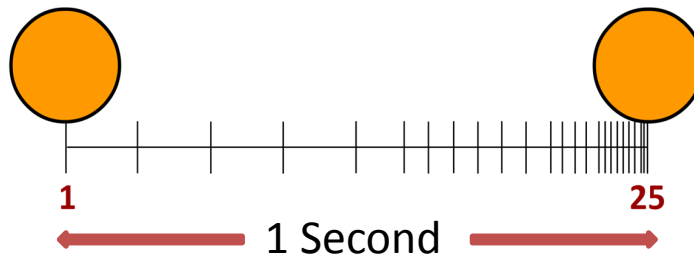
1. Constant



2. Slow in



3. Slow out



Conclusion

Applying the Timing and Spacing helps to create:

- Realistic & believable motion
- Emotion in your character and gives them thought behind their actions



Before using this principle always find out

- Reason/intention behind particular action
- Volume, weight and properties of the object

Based on this information:

- Decide the timing of the action
- Plan the spacing
- Use various options to get the appropriate results

Next session

Assignment