3D ANIMATION IN COMPUTER GAMES

LECTURE 2 - BASICS OF ANIMATION

Asst. Prof. Dr. Hüseyin Akcan
huseyin.akcan@ieu.edu.tr
Drawing and animation

Slides are partly taken from “Animators Survival Kit” Richard Williams Book
Timing and spacing

- Animation is all about timing and spacing
- Check the jumping ball!
Timing

- Timing

Diagram showing a series of boinks spaced out over time.
Spacing

- Spacing
Timing and Spacing

\[ d = \frac{1}{2}gt^2 \]
Timing and Spacing

Say, 20 frames

10 frames

13 frames

10 frames
Timing and Spacing

Coin travels in 1 sec – this is timing!
Squash and stretch

Type of the ball changes the animation (e.g. Golf ball, soft balloon etc.)
Extremes and inbetweens

Chart showing the spacing
Extremes and inbetweens

Assume you want to animate a pendulum.
What will your extremes be?
Extremes and inbetweens

Assume you want to animate a pendulum.

How about breakdows?
Extremes and inbetweens

Assume you want to animate a pendulum.

Correct

Incorrect

[Diagrams showing the arc of action and a pendulum with labels 1, 3, 5]
Extremes and inbetweens
Extremes and inbetweens

To emphasise spacing add more inbetweens for ease out and ease in
Question: What is a key?

Answer: The storytelling drawing. The drawing or drawings that show what’s happening in the shot.
Keys

What is the story here?
Keys

Plus breakdowns and in-betweens
3 ways to animate – (1) Straight Ahead

**ADVANTAGES**

- We get a natural flow of fluid, spontaneous action.
- It has the vitality of improvisation.
- It's very 'creative' - we go with the flow - taking all of the action as it comes along.
- Often the unconscious mind starts to kick in: like authors saying their character tells them what's going to happen.
- It can produce surprises - 'magic'.
- It's fun.

**DISADVANTAGES**

- Things start to wander.
- Time stretches and the shot gets longer and longer.
- Characters grow and shrink.
- We can tend to miss the point of the shot and not arrive at the right place at the right time.
- The director hates us, because he/she can't see what's happening.
- It's lots of work to clean up the mess afterwards - and it's hard to assist.
- It's expensive - the producer hates us.
- It can be hard on the nerves - mad artist and nervous breakdown time as we creatively leap in and thrash around in the void - especially with looming deadlines.
3 ways to animate – (2) Pose to Pose

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE GET CLARITY,</td>
<td>BUT – AND IT'S A BIG BUT:</td>
</tr>
<tr>
<td>The Point of the Scene is nice and clear.</td>
<td>WE MISS THE FLOW.</td>
</tr>
<tr>
<td>It's structured, calculated, logical.</td>
<td>The action can be a bit choppy, a bit unnatural.</td>
</tr>
<tr>
<td>We can get nice drawings and clearly readable positions.</td>
<td>And if we correct that by adding a lot of overlapping action to it it can go</td>
</tr>
<tr>
<td>It's in order – the Right Things happen at the Right Time and in the Right Place in the Overall Time</td>
<td>easily the other way and be rubbery and squishy – equally unnatural.</td>
</tr>
<tr>
<td>allotted.</td>
<td>It can be too literal – a bit cold-blooded. No surprises</td>
</tr>
<tr>
<td>The Director loves us.</td>
<td>Where's the magic?</td>
</tr>
<tr>
<td>It's easy to assist.</td>
<td></td>
</tr>
<tr>
<td>It's a quick way to work and frees us up to do more scenes.</td>
<td></td>
</tr>
<tr>
<td>The producer loves us.</td>
<td></td>
</tr>
<tr>
<td>We keep sane, our hair isn't standing on end.</td>
<td></td>
</tr>
<tr>
<td>We earn more money as we are seen to be responsible people and clearly not mad artists.</td>
<td></td>
</tr>
</tbody>
</table>
3 ways to animate – (3) Combinaton of (1) and (2)

**ADVANTAGES**

- Working this way combines the structured planning of working from pose to pose with the natural free flow of the straight ahead approach.
- It's a balance between planning and spontaneity.
- It's a balance between cold-bloodedness and passion.

**DISADVANTAGES**

- None that I know of...
3 ways to animate

Question: What do I do first?
Answer: Keys!
3 ways to animate

Question: What do I do next?
Answer: Extremes!
3 ways to animate

Question: And next?
Answer: Breakdowns!
3 ways to animate

Question: And next?
Answer: Separate runs on different parts!