Jump Breakdown and Polish Notes

Terms

* Anticipation
  + the action before the main action that allows the audience to anticipate the main action
* Overlapping Action
  + When parts of an object or character drag behind the main action. Their movements *overlap* the main action and occurs while the main action is happening
* Follow-Through
  + When parts of an object or character continue to move after the main action stops. This allows the motion to settle
* Arcs
  + The way all living things move
* Breakdowns
  + Inbetween poses that help define the motion. It clarifies sub-poses and sub-actions
* Polish
  + The final tweaks of an animation to remove any unwanted artifacts when converting the animation into splined mode
* Gimbal Lock
  + The problem that occurs when the gimbal axis overlap each other, thus losing an axis of rotation
* Euler Filter
  + A way to smooth out rotations to the minimal rotation between poses
* Overshooting
  + Maya’s attempt at splining motion may cause parts of the body to move past your desired pose.

FIRST: Add a ground plane. Read the Required Reading

Timing

* Before you start adding breakdowns, make sure your timing is **close** to being right
* Sometimes it’s hard to tell whether or not the timing is right in **stepped mode**
  + You can **spline** your animation to get an idea about the timing and spacing
  + **Note:** you will have to switch back to **stepped mode** after you adjust your timing
* **Review:** Highlight and select keys + middle click on timeline to move them down

New Animation Principles

1. Anticipation
   1. the action that follows into the main action
   2. in many cases it can be thought of as a “windup” or “preparation”
   3. it allows the audience to **anticipate** the character’s next movement
      1. therefore the audience will not be surprised by any sudden movements
   4. Examples:
      1. windup before a punch (<https://www.youtube.com/watch?v=coCsLWqT3v0&feature=youtu.be&t=531> )
      2. road runner (<https://www.youtube.com/watch?v=KJJW7EF5aVk&feature=youtu.be&t=31> )
2. Overlapping Action and Follow-Through
   1. Overlapping action
      1. Most things don’t move at the same time; actions follow from one to the next
      2. somethings may drag behind while the main action is happening
      3. Overlapping action occurs during the main action
      4. examples
         1. Antenna on a car
         2. clothes
         3. hair
   2. Follow-Through
      1. when things are overlapping, they tend to continue moving after the main action has stopped
      2. It’s an extension of the main action and helps settle movement
      3. example
         1. have someone with long hair turn around really fast
3. Arcs
   1. **Review:** motion arcs & line of action
      1. they make poses easier to read
   2. they make motion smooth and pleasant to watch
   3. they are more natural (pay attention to arms and legs in this demo)
   4. they can help emphasize force
   5. **Anything that’s alive moves in arcs**

Breakdowns

What are they and what do they do?

* Also referred as “inbetweens” because they are the poses between the key/extreme poses.
* **~99%** of your animation should be done in breakdowns. The last bit is finished in polish
* Help define movement with each breakdown pose
  + They do so by breaking down the poses into sub poses.
  + They break down an action into sub actions
* With enough poses, your animation should read better (keep the animation principles in mind when adding poses)
  + More defined motion arcs
  + More defined overlapping action
* DO NOT simply find what the pose would look like half way between the two extremes (maya can do this easily for you)
  + you will need to think about arcs, overlapping action, and follow through
  + what should be overlapping? what should follow through? when should these happen?
* When posing breakdowns, pose with **INTENT**. If the pose isn’t adding anything to your motion, don’t waste your time on it.
* Think about the actions between the extreme poses. Is there a weight shift? Is there a subaction? These require further breakdown poses.
* You may switch between spline and stepped mode to see your progress (be sure to revert back to stepped)
  + constantly review your timing and spacing

What can go wrong?

* Gimbal lock
  + gimbal axis are kinda like this space training thing <http://westsidetoday.com/wp-content/uploads/2014/03/201-Cyrus-Daster-CA.jpg>
  + one rotation can have many rotation orders
  + this is a problem when your gimbal axis are overlapping each other
  + this can be avoided by
    - setting your **rotate order** in the **attribute editor** before you start animating (if you’ve already animated, then your rotated object will have different rotations)
    - avoid rotating your anim in a way that will cause gimbal lock
      * turn on **gimbal rotate axis** in maya
    - frame by frame animating (not recommended, but sometimes is the only solution)
* Over rotating or rotating in the wrong direction
  + sometimes you might rotate your anims in such a way that makes the character swing more than you want.
  + this can be fixed by
    - going into the graph editor and using **euler filter**
      * **euler filter** will try to *normalize* your rotation
      * It finds the shortest amount to rotate from one position to the next
      * **euler filter** may also help when trying to solve gimbal lock, but chances are it won’t completely fix it.
    - manually moving the values in the graph editor

Polish

* similar to breakdowns, you will need to add even more definition to your animation
* How do you know when to polish???
  + your motion should look finished with just breakdowns (in stepped mode)
  + if you think maya won’t mess up your motion when you let it fill in the inbetweens
  + when all of your subactions are posed and fleshed out
  + there are no weird poses (if you have bad poses, it will only get worse in polish)
  + if you think you’re ready for polish, you probably aren’t ready.
    - ask the TAs to make sure you’re ready
* you may go into **spline mode** and edit your animation
  + you should also change your Animation preference to:
    - default in tangent: spline
    - default out tangent: spline
* Find areas in your animation that needs more definition
  + definition as in:
    - follow through
    - smoother arcs
    - better easing/spacing
* Find areas in your animation that needs fixing
  + gimbal lock
  + overshooting
  + popping
* Example:
  + the feet
    - sometimes it will go through the ground when splined (also known as “**overshooting**”
    - can be easily fixed with the graph editor
      * **Review: tangents**
  + the arms
    - if there is gimbal lock or over rotation
  + the legs
    - popping of the knee when jumping or landing
    - play around with the cog and try to ease the bend
* Feel free to use **editable motion trails** again
  + try attaching it to the **COG anim** to view the overall motion arc
  + be sure to delete it after you are done
  + **Review**: **editable motion trail** parameters (time range)
* Playblast often to view the animation
  + maya’s playback preview will not show 24fps

Tricks and Tips

* Let maya do some of the work for you
  + spline your animation, go somewhere in between two poses and key it.
    - always adjust your character afterwards
* Copy over positions from previous or next frames
  + go to a previous frame, middle click and drag it over in the timeline
    - this will freeze everything in the scene to the first frame
    - you can then select individual anims and even individual channels to key
    - keying them will copy its value from the previous frame to the current frame
    - use case: useful when trying to keep the feet planted on the ground

Conventions

* Arms in FK
* Do **NOT** key the topcon
* Key **ALL** anims on each pose
* Pose the **WHOLE** body (no piece-meal motion)
* 24fps
* Pose to the camera
* Side view