IMGD 1001:
2D Art

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Outline

- The Pipeline
- Concept Art
- 2D Art (next)
  - Animation, Tiles
- 3D Art
  - Modeling, Texturing, Lighting

Animation

- Animation → produces the illusion of movement
- Display a series of frames with small differences between them
- Done in rapid succession, eye blends to get motion
- Unit is Frames Per Second (fps). For video:
  - 24-30 fps: full-motion (Game Maker does 30)
  - 15 fps: full-motion approximation
  - 7 fps: choppy
  - 3 fps: very choppy
  - Less than 3 fps: slide show

  →(2D Sprites can get away with about ½ the above)
- To do successfully, need to keenly observe, focus on differences in movement
  - Apply basic principles (next)

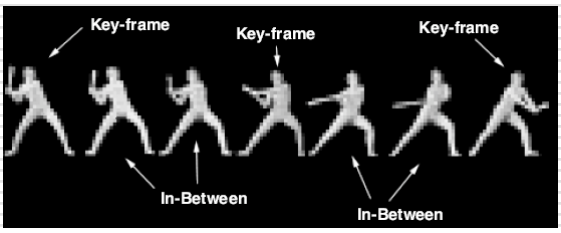
Key Frames

- Images at extremes in movement
  - Most noticeable to observer
  - Ex: for flight wings up and wings down
  - Ex: for walking, right leg forward, leg together
- The more the better?
  - Smoother, yes
  - But more time to develop (tradeoffs)
  - And more prone to errors, "bugs" that interfere with the animation

FIGURE 9-3: Key-frame Example

In-Between Frames

- Generated to get smooth motion between key-frames
  - Can be tedious and time consuming to make
  - Most software allows duplication



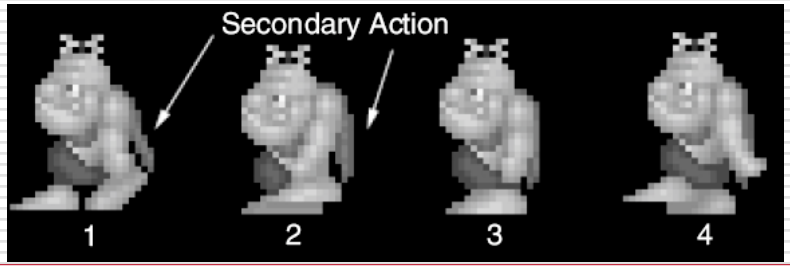
Frame Animation Guidelines

Object	*Minimum # of Frames*	*Maximum #*
4-legged animal running	4	16
Animal biting	2	5
Crawling	2	12
Explosions	5	16
Falling	3	5
Flying	2	12
Jumping	2	10
Kicking	2	6
Punching	2	6
Rotating/spinning	4	16
Running	2	12
Swinging (an object)	2	8
Throwing (an object)	2	6
Vehicle flying	2	4
Vehicle moving	2	8
Walking	2	12

Faster motion needs fewer drawings. Slower motion needs more drawings.
(See GameMaker tutorial shooter for examples of Enemy Planes, Explosions)

Secondary Actions

- Animation part that does not lead movement, but follows it
  - Add extra dimension of reality
  - Ex: Hair moving in wind
  - Ex: Cape billowing backward



Steps in Creating Animation Sequences (1 of 3)

- Conceptualize – have vision (in mind or on paper) of what animation will look like
- Decide on object behavior
  1. Animated once (no looping)
  2. Animated continuously (using cycles)
     - 2nd choice means must make last key frame blend with first
- Choose an image size – will contain and constrain object
  - Test and experiment briefly to have plenty of room
- Design key-frames - drawing the motion extremes
  - Use simple shapes to represent main actions
    - Ex: stick figures or basic shapes (circles, squares)

Steps in Creating Animation Sequences (2 of 3)

- Estimate the in-betweens
  - Think of how many you will need to complete the sequence smoothly
  - Be conservative. Easier to add additional transition frames than to remove them
- Apply secondary enhancements
  - Embellish to look convincing and enticing
  - Exaggeration

Steps in Creating Animation Sequences (3 of 3)

- Test each movement
  - Can be done with 'copy' and 'undo' in tool
  - Others have animation rendering (ex- Game Maker)
  - Look for flaws (movement, discolored pixels …)
- Repeat
  - Repeat for all animations

Primitives

- Used in many games
- If you know these, you can apply primitive rules out of the box:
  - Cylindrical primitive
  - Rotational primitive
  - Disintegration primitive
  - Color flash primitive
  - Scissors primitive
  - Growing primitive
  - Shrinking primitive
  - Minor primitives (used less often)
  - (See Chapter 9 of Feldman)

Tiles

- Needed for common backgrounds
  - Too hard to make every pixel different!
- Exploration games (especially outdoors) make heavy use of these
  - Grass, trees, water, sand
- Start with a grass tile to warm up

Grass is Green

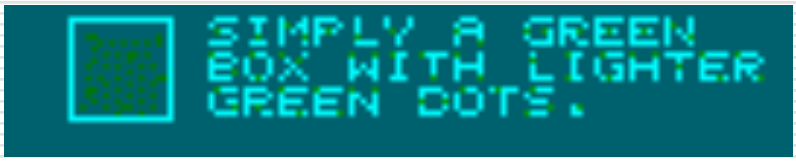
- Use a basic green square
- But this looks unnatural
  - Like flat, shiny metal
- No illusion of movement

← Simply a Green Box

(Ex: `bkg_grass0`)

Grass has Variation

- Can do a lot with simple enhancement of color shades



(Ex: `bkg_grass1`)

Make Variation More Random

- Can use the "spray" tool

(Ex: `bkg_grass2`)

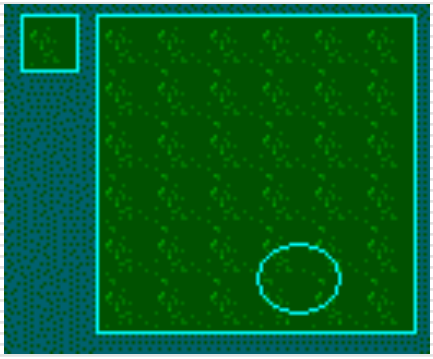
Make Look Random but with Control

- Draw by hand for more control
  - 4 pixel line strokes

(Ex: `bkg_grass3`)

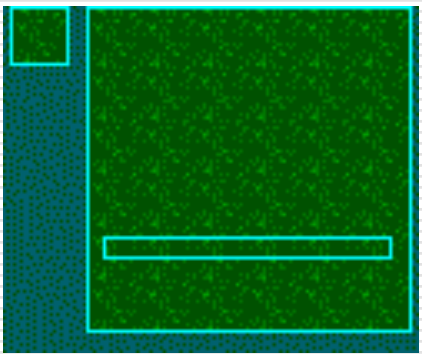
The "Grid" (1 of 3)

- Looks too much like tiles
- "Large" blank is problem, so remove



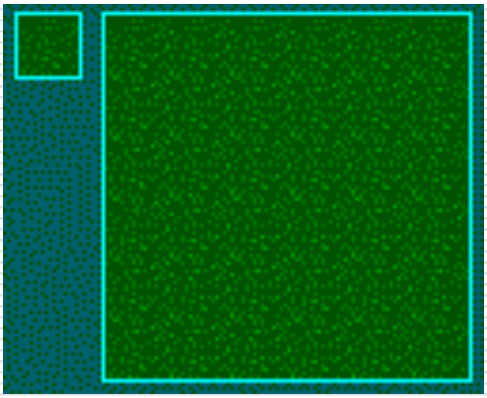
The "Grid" (2 of 3)

- Still, some "lines" are visible when repeated
- Break up with more color



The "Grid" (3 of 3)

- Much better!



(Ex: `bkg_grass4`)

Don't Try This at Home

- Don't use same texture for all, else not much better than just colors

When the Rubber hits the Road?

- Beware of the seams where different types of tiles meet!