Basic Sprite Animations

Topics

- What are sprite animations?
- Sprite sheets
- How to create animations
- Sample implementation
- Helpful properties

What are Sprite Animations

- Normal (static) sprites are so boring, right?

- Our Asteroids game seemed OK because the lack of animation didn't decrease realism (much)

- For our platformer, this is not acceptable

  – Characters should run, walk and jump!

  – Explosions should explode!

What are Sprite Animations

- Instead of only one (static) image, several images are used to show the change in movement from one frame to the next

- Examples include:
  - Explosions
  - Chuck Norris running
  - Chuck Norris jumping
 - Chuck Norris shooting

Sprite Sheets

- To create an animation, we need a sprite sheet

- Holds an image for each frame of an animation

- All images stored in a single image

- Can store more than one animation in the same sheet

Sprite Sheets

- For our purposes, the following rules apply
  - Each frame must be the same width and height
  - Frames must be side by side and/or top to bottom
- Failing to follow these rules could result in drawing half frames / drawing part of the next frame
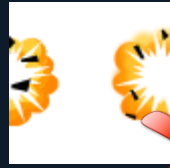
How to Create Animations

- Usage is simple

- Instead of drawing whole sprite (as with static sprites), draw a section of the sheet
  - drawImage can take extra arguments to do this

- At specific time intervals, change the area of the sheet we are currently drawing

- Do this fast enough to achieve animation

How to Create Animations

- drawImage lets you specify a region of an image to draw
- drawImage(image, srcX, srcY, srcW, srcH, destX, destY, destW, destH)
  - source refers to the image, destination to the screen
- While fairly easy, it requires a bit of setup

Source Rectangle

FPS: 41

Destination Rectangle

How to Create Animations

- We've provided an animated sprite implementation for you to use in your games

Sample Implementation

- Include a <script> tag for sprite.js in index.html
- Create a sprite variable, passing in a sprite sheet filename
- Call buildAnimation to create an animation for the sprite
  - buildAnimation(frameCountX, frameCountY, width, height, timestep, frameArray)
  - You can create more than one animation for each sprite
  - Each animation must use the same sprite sheet
  - All frames must be the same size

```
var sprite;
function initialize()
{
    sprite = new Sprite("ChuckNorris.png");
    sprite.buildAnimation(7, 8, 165, 126, 0.05, [12, 13, 14, 15, 16, 17, 18, 19]);  // builds the idle anim
}
```
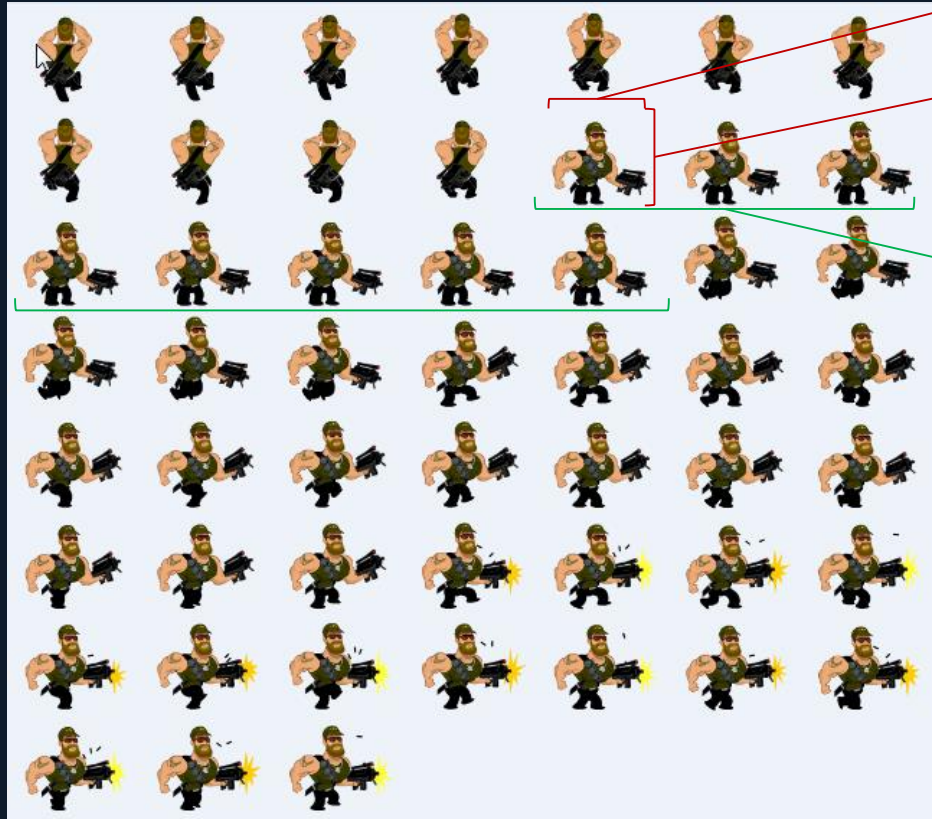
Frame Count X (7)

Width (165)

Height (126)

Frame Array
[11,12,13,14,15,16,17,18]

Frame Count Y
(8)

Sample Implementation

- Update and Draw the animation each frame

- Pass the context and X,Y position when drawing

```javascript
var sprite;
function initialize()
{
    sprite = new Sprite("ChuckNorris.png");
    sprite.buildAnimation(7, 8, 165, 126, 0.05,
            [11,12, 13, 14, 15, 16, 17, 18]);
}

function run()
{
    context.fillStyle = "#ccc";
    context.fillRect(0, 0, canvas.width, canvas.height);

    var deltaTime = getDeltaTime();

    sprite.update(deltaTime);
    sprite.draw(context, 10, 10);
}
```
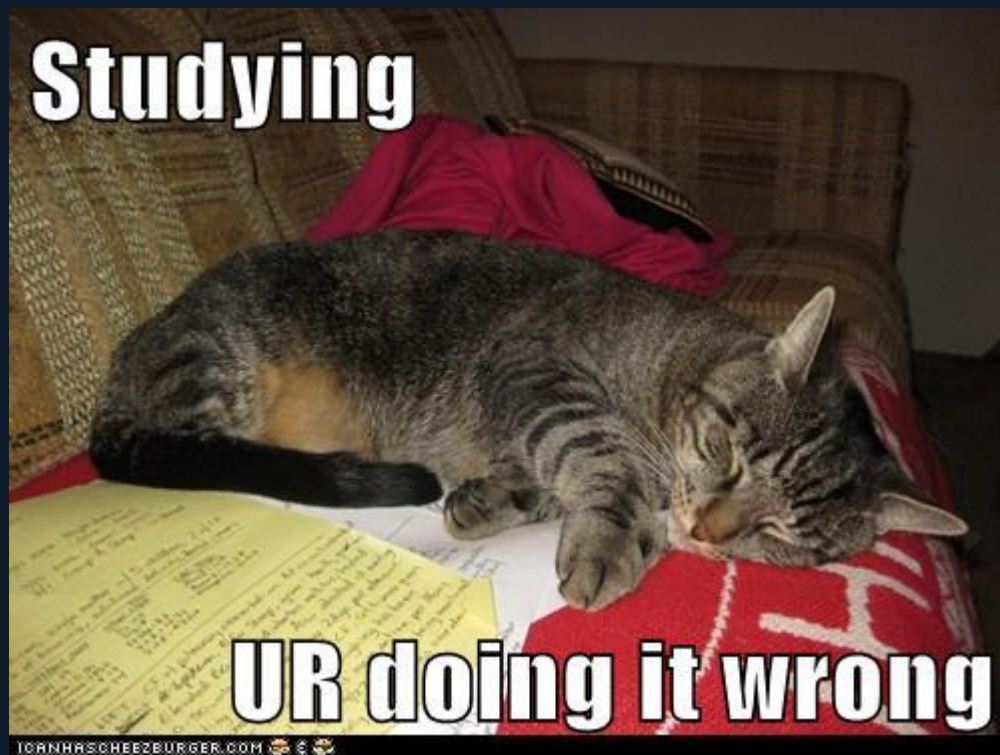
Helpful Properties/Methods

- setAnimation(index):
  start playing the specified animation
- setLoop(loop):
  keep repeating the animation (default is on)
- setAnimationOffset(anim, x, y):
  set an x,y offset for a specific animation
- isFinished():
  has an animation finished playing
- pingpong:
  reverse animation direction when end is reached

Summary

- Animations consist of several static images played in quick succession

- We need a sprite sheet to make animated sprites

- Each frame must be the same with/height, and must be aligned properly

- Use the sprite.js file provided to add animated sprites to your game

Questions?