

Basic Sprite Animations



Game Programming Foundations

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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



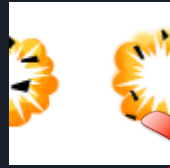
Sprite Sheets

- 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  
}
```

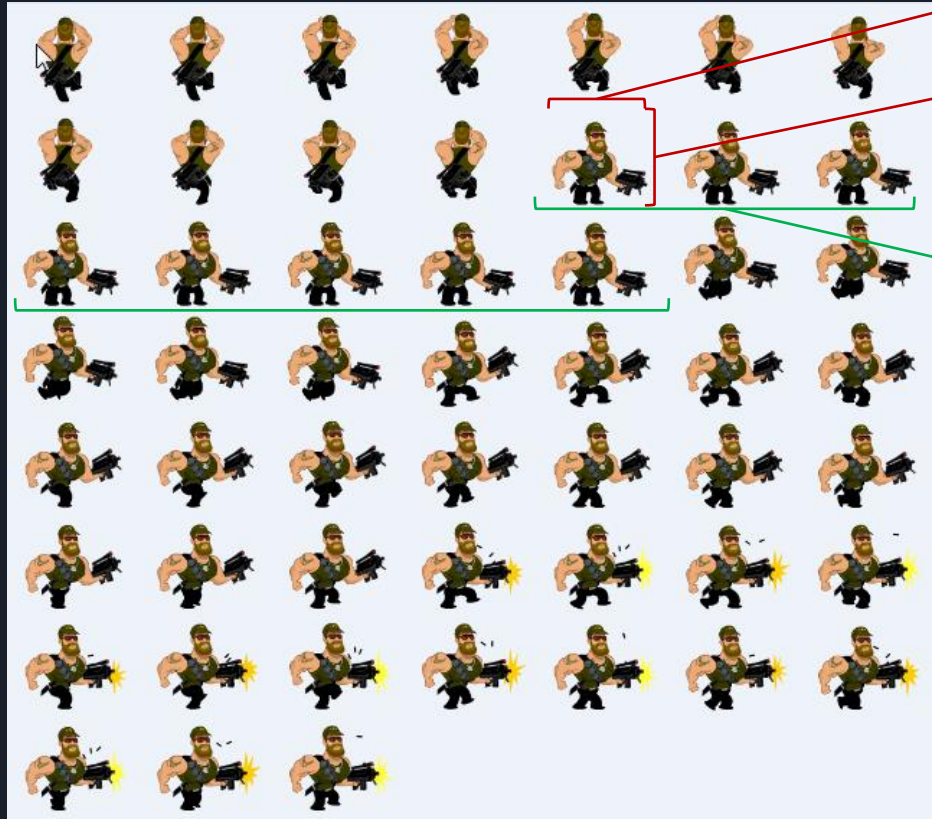
Frame Count X (7)

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

```
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);  
}
```

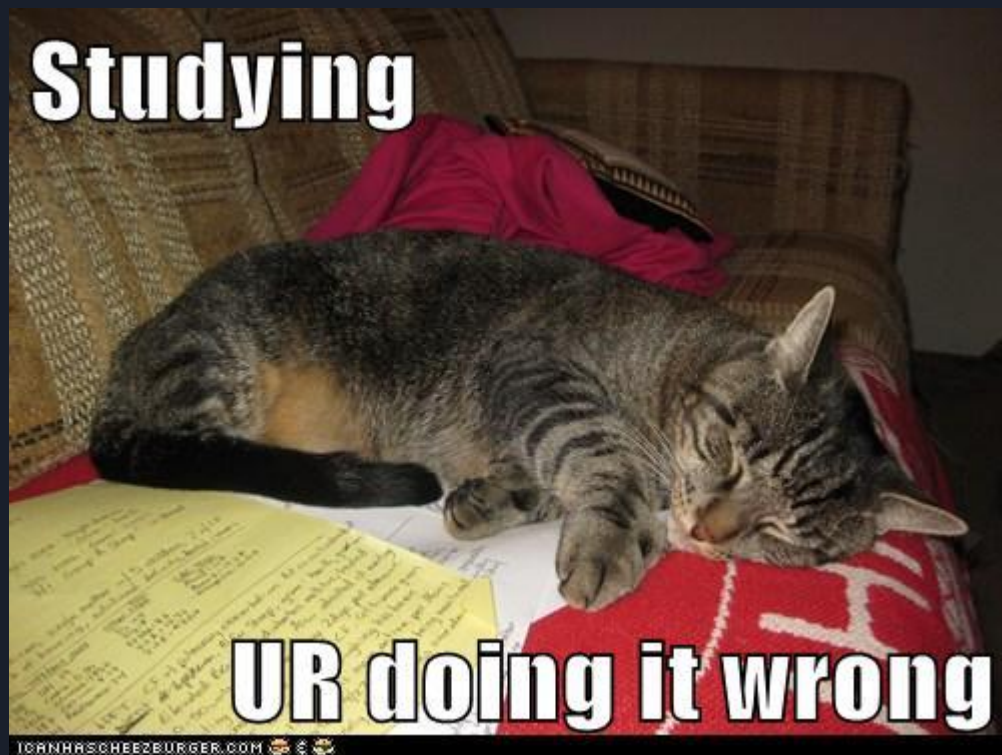
Helpful Properties/Methods

- `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 width/height, and must be aligned properly
- Use the sprite.js file provided to add animated sprites to your game

Questions?



References

- JavaScript Tutorial. 2016. JavaScript Tutorial. [ONLINE] Available at: <http://www.w3schools.com/js/default.asp>. [Accessed 01 March 2016].