

15-104 Introduction to Computing for Creative Practice

Fall 2020

18 Images

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Images

- We have seen how we can draw shapes on the canvas (e.g. ellipses, rectangles, triangles, arbitrary shapes using the vertex function, etc.).
- We can also draw images on a canvas using similar principles.

`loadImage(path)`

- Loads an image from a **path** and creates and returns a `p5.Image` object from it.
- The path can be a location on your own computer, or it can be a URL to an image stored somewhere on the internet. (cautions coming)
- Unlike other functions we've seen, your program will continue running while `loadImage` is working.

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preload function

- We probably do not want the program to run until the image is available.
- The `preload` function is called before `setup`, and P5 waits for all images to load before calling `setup`.
- Using this technique, the `width` and `height` properties of an image will be known once `setup` and `draw` start running.
- What do you think might happen if we tried to access the `width` or `height` of an image before it was completely loaded?

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Example

```
var img;
function preload() {
  img =
    loadImage("https://i.imgur.com/BBgivpu.jpg");
}
function setup() {
  createCanvas(400, 400);
  frameRate(10);
}
```



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image function

- We can draw an image object using the `image` function.

```
image(img, x, y, [width], [height])
```

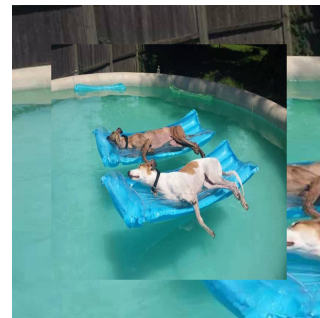
Parameters:

<code>img</code>	<code>p5.Image</code> : the image to display
<code>x</code>	Number: the x-coordinate of the top-left corner of the image
<code>y</code>	Number: the y-coordinate of the top-left corner of the image
<code>width</code>	Number: the width to draw the image (Optional)
<code>height</code>	Number: the height to draw the image (Optional)

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Example

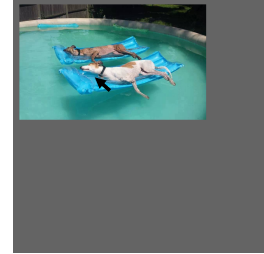
```
var img;
function preload() {
  img = loadImage("https://i.imgur.com/BBgivpu.jpg");
}
function setup() {
  createCanvas(400, 400);
}
function draw() {
  background(100);
  image(img, 0, 0);
  image(img, 50, 50, 300, 300);
}
```



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Images controlled by the mouse

```
var img;
function preload() {
  img = loadImage("https://i.imgur.com/BBgivpu.jpg");
}
function setup() {
  createCanvas(400, 400);
  frameRate(10);
}
function draw() {
  background(100);
  var scaleX = max(1, mouseX) / width;
  var scaleY = max(1, mouseY) / height;
  image(img, 10, 10, img.width * scaleX, img.height * scaleY);
}
```



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Loading...

- If you see “Loading...” on the webpage for more than a very short time, then your image probably didn’t load due to security issues.
- Check the Javascript Console to confirm:

```
Access to image at 'file:///Users/Tom/Desktop/15-104%20Fall%202020/Examples/18-Images/1-BasicImageDisplay/TomAtThePacific.jpg' from origin 'null' has been blocked by CORS policy: Cross origin requests are only supported for protocol schemes: http, data, chrome, chrome-extension, chrome-untrusted, https.
```

```
TomAtThePacific.jpg:1 Failed to load resource: net::ERR_FAILED
p5.js:54066
```

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Browser Security

- The restrictions on composing a web page with sources from multiple sites is related to security.
 - There are sneaky ways for websites to inject code into your webpage and use the code to extract secrets from another website you might be logged into, but only if your Browser allows mixing of websites.
- `imgur.com` adds some extra information to images telling your browser “it’s really ok for anyone to access this image” so the browser allows Javascript to access the image.
- One advantage of `imgur.com` is that the URL will be the same when you move your project to WordPress.

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Posting on WordPress

- Alternate method if you don’t use `imgur.com`:
 - Add your image to our Media Library but use a name that starts with your Andrew ID. (e.g. `acarnegie-dogs.jpg`)
 - If you click on your image in the Media Library, you should see a URL for your image from our site.
e.g.
`"https://courses.ideate.cmu.edu/15-104/f2020/wp-content/uploads/2020/10/acarnegie-dogs.jpg"`
 - Copy this URL into your code (keep the quotes) as the argument to `loadImage`.
 - Post your code as usual. Note that your code will no longer run locally.

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Rotating Image

```
var img;
var angle_dx = 0;
function preload() { // same as before
}
function setup() { // same as before
}
function draw() {
  background(100);
  push();
  translate(200, 200);
  rotate(radians(angle_dx));
  image(img, 0, 0, img.width*0.2, img.height*0.2); // cont'd
  // draw cont'd
  pop();
  angle_dx += 5;
}
```



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get method

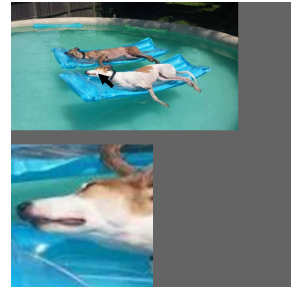
- The `get` method can extract a pixel or a subimage from an image.
- Note that `get` is a method of images. How would you call `get`?
`get(img)` or `img.get()` ?
- Options on usage:

<code>get()</code>	returns the entire <code>p5.Image</code>
<code>get(x,y,w,h)</code>	returns the section of the image with top left at (x,y) and width w and height h (the returned object is also of type <code>p5.Image</code>)
<code>get(x,y)</code>	returns the pixel at index (x,y) in the image (the returned object is of type <code>p5.Color</code>)

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Subimage (zoom)

```
var img;
function preload() { // same as before }
function setup() {   // same as before }
function draw() {
  background(100);
  image(img, 0, 0, img.width / 3, img.height / 3);
  var x = constrain(mouseX, 0, img.width / 3 - 1);
  var y = constrain(mouseY, 0, img.height / 3 - 1);
  var smaller = img.get(3*x-50, 3*y-50, 100, 100);
  image(smaller, 0, 200, 200, 200);
}
```

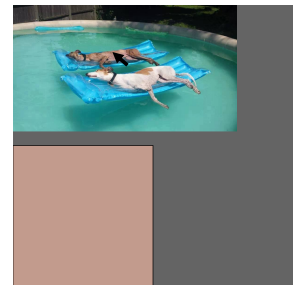


Why?

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Color viewer

```
var img;
function preload() { // same as before }
function setup() {   // same as before }
function draw() {
  background(100);
  image(img, 0, 0, img.width / 3, img.height / 3);
  var x = constrain(mouseX, 0, img.width/3 - 1);
  var y = constrain(mouseY, 0, img.height/3 - 1);
  var c = img.get(3*x, 3*y); // returns a color
  fill(c);
  rect(0, 200, 200, 200);
}
```



Why?

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Cautions: Content and Citation

- Please consider the content of any images you upload so that they are suitable for all audiences. Your work is public.
- If you use an image from someone else, you should cite the source so that it is not assumed to be your own.
 - If you point to an image in imgur, the URL in your code acts as a citation. But you should still write a comment to indicate what is in the image and that you didn't not create the image (unless it is, indeed, your own).
 - For other images, be sure to include comments in your program to cite the author of the image or at least the location you found it.

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Try This

- Implement the same programs for zoom and color viewer, but with the image in the center of the canvas and with the zoom or color showing up overlaid in the middle of the canvas (like a magnifying glass).

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