1. **Loops**: example: Print the order (begin from 0) and letters in the word “Illinois”.

```javascript
var s = "Illinois";
for (var i = 0; i < s.length; i++) {
  console.log(s.charAt(i));
}
```

2. **SimpleImage**: A new data type created for CS105, helping us to get or set pixel data about the image.

**Pixel**: A single dot on computer screen with a single color and location. Its color is represented by primary colors of light (R, G, B).

**Image**: A rectangle grid of pixels. Example:

In this image we have 7*11 pixels.

`image.width=11`

`image.height=7`

`var pixel=img.getRGB(x,y), returns an RGB pixel from location (x,y). And it has 3 properties (pixel.r, pixel.g and pixel.b) with a value between 0-255:`

You can find RGB and HSL with the following color picker: [http://colorizer.org/](http://colorizer.org/)
Lecture example 1:

Make Red filter: Set \( \text{pixel.r} \) to 255, which is pure red, for every pixel in the image. Similarly, by setting \( \text{pixel.g} \) and \( \text{pixel.b} \) to 255 we can get Make Green and Make Blue filter.

```javascript
var filter_red = function(origImg, newImg) {
  for (var x = 0; x < origImg.width; x++) {
    for (var y = 0; y < origImg.height; y++) {
      var pixel = origImg.getRGB(x, y);
      pixel.r = 255;
      newImg.setRGB(x, y, pixel);
    }
  }
};
```

Set the RGB color given a RGB pixel.

Lecture example 2:

Make Lecture filter: Analogically, we have `img.getHSL(x,y)`, `img.setHSL(x,y,pixel)`, `pixel.s`, `pixel.h`, `pixel.l`.

```javascript
var filter_lecture = function(origImg, newImg) {
  for (var x = 0; x < origImg.width; x++) {
    for (var y = 0; y < origImg.height; y++) {
      var pixel = origImg.getHSL(x, y);
      pixel.h = 27;
      newImg.setHSL(x, y, pixel);
    }
  }
};
```

Don’t forget to add a new filter.
Select your image:

Choose File: nature.png

Original Image

Filter
- No Filter
- Make Red
- Make Green
- Make Blue
- Make Lecture

New Image