



Lab Exercise 11: Steganography

Goal:

The goal is to understand how a photo can hide directly in “plain sight”.

Hide A Photo

Begin by finding a photo on the WWW. Think of a topic, do a search, check under Images, and select a photo that is (a) less than 700 x 474 in size, (b) is interesting, (c) *suitable for classroom display*. You should not spend more than 10 minutes on this. I will use the photo at right, which is 400x400.



Grab the “Hide” code that comes with this lab. Edit it to (a) change the integer `wid` to be the width of your photo (400), integer `hi` to be the height of your photo (400), and `loadImage()` command to reference your `.jpg` file, `loadImage(“mine.jpg”)`.

Run the program, being sure your picture and the fog picture (also given with the lab) are in the `data` folder, click the mouse, and notice that you now have a `labFog.png` file. This is the fog picture with your photo hidden inside of it.

Reveal A Photo

The following Processing code extracts a photo hidden in the last two bits of the pixels of a `.png` photo. Type this code as a new Processing program. As you enter it, adjust the `wid` and `hi` parameters to match your photo.

```
PImage fog;
int srcw=700;
int srch=474;
int wid=400;
int hi=400;
color c, cprime;
int step = 0;

void setup( ) {
  size(srcw, srch);
  fog = loadImage("labFog.png");
  image(fog,0,0);
}
```

```

void draw( ) {
  if (step == 1) {
    for (int i=0; i<srcw; i++){
      for(int j=0; j<srch; j++) {
        c = get(i,j);
        if (i<wid && j<hi) {
          cprime=color(((int(red(c))*2)%256),
                      ((int(green(c))*2)%256),
                      ((int(blue(c))*2)%256));
          set(i,j, cprime);
        } else {
          set(i,j,c);
        }
      }
    }
    step = 0;
  }
}

```

```

void keyPressed( ) {
  step = 1;
}

```

When the program is complete, move the labFog.png image encoded above to the folder of this program, and run it. When a key is pressed, the color bits are shifted to the left one position. The hidden photo will be revealed.

Explain

Add a (multiline) comment to your program explaining how the line `cprime = ...` reveals the photo. What is happening in this line? (Check the lecture notes if you do not understand it.)

Check Them Out!

Show off your hidden picture to someone in the room.

Turn-In: Submit your code with its explanation and the labFog.png picture to the class dropbox.

