

CS106A Summer 2022 Practice Quiz Answer Key

Problem 1: Place Flag

```
def climb_mountain(bit):
    while bit.front_clear():
        bit.move()
    bit.left()
    while not bit.right_clear():
        bit.move()
    bit.right()
    while bit.front_clear():
        bit.move()
    bit.paint('red')

def climb_back_down(bit):
    bit.right()
    bit.right()
    while not bit.left_clear():
        bit.move()
    bit.left()
    while bit.front_clear():
        bit.move()
    bit.right()
    while bit.front_clear():
        bit.move()

def place_flag(filename):
    bit = Bit(filename)
    climb_mountain(bit)
    climb_back_down(bit)
    return bit
```

Problem 2: Rotate and Convert to Grayscale

```
def rotatel80_and_bw(filename):
    image = SimpleImage(filename)
    out = SimpleImage.blank(image.width, image.height)
    for y in range(image.height):
        for x in range(image.width):
            pixel = image.get_pixel(x, y)
            out_pixel = out.get_pixel(image.width - 1 - x,
                                      image.height - 1 - y)
            average = (pixel.red + pixel.green + pixel.blue) // 3
            out_pixel.red = average
            out_pixel.green = average
            out_pixel.blue = average
    return out
```

Problem 3: Blur

```
def blur(filename):
    image = SimpleImage(filename)
    out = SimpleImage.blank(image.width, image.height)
    for y in range(image.height):
        for x in range(image.width):
            pixel = image.get_pixel(x, y)
            out_pixel = out.get_pixel(x, y)
            if x == 0 or x == image.width - 1:
                # just put the pixel
                out_pixel.red = pixel.red
                out_pixel.green = pixel.green
                out_pixel.blue = pixel.blue
            else:
                left_px = image.get_pixel(x - 1, y)
                right_px = image.get_pixel(x + 1, y)
                avg_red = (left_px.red + pixel.red + right_px.red) // 3
                avg_green = (left_px.green +
                            pixel.green +
                            right_px.green) // 3
                avg_blue = (left_px.blue + pixel.blue + right_px.blue) // 3
                out_pixel.red = avg_red
                out_pixel.green = avg_green
                out_pixel.blue = avg_blue

    return out
```