Name: _____

CS 145 Images and Imagination
Exam 1

Score:

      1. (max 24) _____   5. (max 6) _____

      2. (max 6)   _____   6. (max 33) _____

      3. (max 18) _____   7. (max 5) _____

      4. (max 8)   _____

      Total Score: (max 100) _____

1. (3 pts each, 24 pts total) Assume you have the variable declarations below.

    ```
    int i = 100;
    int k = 20;
    float s = 0.5;
    float t = 1.0;
    ```

    What are the values of i and s below after each assignment, or state whether the assignment statement generates an error.

    ```
    i = 2*i + 4;
    ```
            ans: i = _____ (or error)

    ```
    i = k/15;
    ```
            ans: i = _____ (or error)

    ```
    i = k % 18;
    ```
            ans: i = _____ (or error)

    ```
    i = 2 * t;
    ```
            ans: i = _____ (or error)

    ```
    i = 18 % k;
    ```
            ans: i = _____ (or error)

    ```
    s = 2*k + 0.5;
    ```
            ans: s = _____ (or error)

    ```
    s = 4/5 + 10.8;
    ```
            ans: s = _____ (or error)

    ```
    s = 10*t/k;
    ```
            ans: s = _____ (or error)

2. (6 pts) What are the values of x, y and z after executing all of the following code?

```
int x = 2;
int y = 7;
int z = 5;
z = z + y;
y = z - x;
x = z + y;
```

x is _____, y is _____, z is _____

3. (18 pts total) For the program below, answer the following questions.

```
Line 1     int y = 10;
Line 2
Line 3     void setup() {
Line 4        int w = 200;
Line 5        int h = 300;
Line 6        size(w,h);
Line 7        drawRects();
Line 8     }
Line 9
Line 10    void drawRects() {
Line 11       int delta=20;
Line 12       for (int i=0; i < 50; i=i+10) {
Line 13          rect(i,y,delta,delta);
Line 14       }
Line 15    }
```

a. (5 pts) List all lines which contain _variable declarations_: Ans:_____

b. (3 pts) List all lines which contain function _calls_ (either programmer defined or

   Processing):   Ans: _____

c. (2 pts each, 10 pts total) What is the _scope_ of each of the following:.

   i.   y   Line numbers: _____to _____

   ii.   w   Line numbers: _____to_____

   iii.   h   Line numbers: _____to_____

   iv.   delta   Line numbers: _____to_____

   v.   i   Line numbers: _____to_____

4. (2 pts each, 8 pts total) Assuming you have set the colorModel using the command:

    `colorModel(RGB,100);`

    What color does each of the fill commands correspond to?:

    a. `fill(100,100,100);` Ans: _____

    b. `fill(50,50,50);` Ans: _____

    c. `fill(100, 0,0);` Ans: _____

    d. `fill(100,0,100);` Ans: _____

5. (6 pts) The program below begins executing at the command on line 2. What is the subsequent order of commands that follow? That is, list the entire sequence of line numbers *in the order in which they are executed*, starting at line 2 and ending when the program ends.

    The answer should have the _form_: 2, 8, 11-15, 26, 5-12, 16 (Note: the particular numbers in this example are just random and have nothing to do with the actual program below.)

    Ans: _____

    ```
    Line  1.          void setup() {
    Line  2.              size(100,100);
    Line  3.              tree();
    Line  4.              translate(20,0);
    Line  5.              tree();
    Line  6.              save("trees.png");
    Line  7.          }

    Line  8.          void tree() {
    Line  9.              fill(190, 130, 33);
    Line  10.             rect(6, 15, 6,15);
    Line  11.             fill(0,200,0);
    Line  12.             ellipse(9, 8, 15,15);
    Line  13.         }
    ```
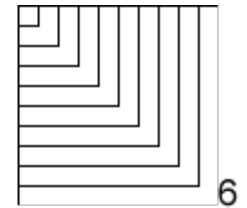
6. (3 pts each, 33 pts total) For each loop shown on the next page, give the *index* (1 to 11) of the picture that is generated by the loop. Each loop corresponds to one of the given choices, and each choice corresponds to one of the given loops. Note, index 11 corresponds to an infinite loop so no image is generated.

    For all, assume the size and color of the window is set using *only* the following commands:
    ```
    size(100,100);
    background(175);
    ```
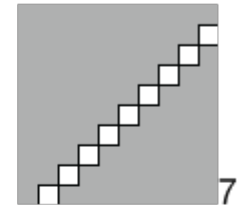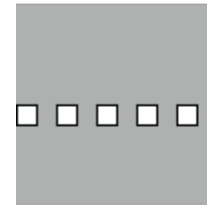
```
_____ a) for (int i = 0; i < width; i=i+10) {
          rect(width-i, i, 10, 10);
      }


_____ b) for (int i = 0; i < width; i=i+20) {
          rect(i, height/2, 10, 10);
      }


_____ c) for (int i = 0; i < 5; i=i+1) {
          rect(20*i, 20*i, 10, 10);
      }


_____ d) for (int i = 0; i < width; i=i+20) {
          rect(i, 0, 10, i);
      }


_____ e) for (int i = 0; i < width; i=i+20) {
          for (int j=height/2; j<height; j=j+20){
              rect(i,j, 10,10);
          }
      }

_____ f) for (int i = 0; i < width; i=i+20) {
          for (int j=0; j < height; j=j+20) {
              rect(i, j, 10, 10);
          }
      }

_____ g) for (int i = height; i > 0 ; i=i+10){
          rect(0, 0, i, i);
      }


_____ h) for (int i = 0; i < width; i=i+10) {
          rect(i, i, 10, 10);
      }


_____ i) for (int i = 0; i < width; i=i+20) {
          for (int j=0; j < i; j=j+20) {
              rect(i, j, 10, 10);
          }
      }

_____ j) for (int i = 0; i > width; i=i-20) {
          rect(0, 0, i, i);
      }

_____ k) for (int i = height; i > 0 ; i=i-10) {
          rect(0, 0, i, i);
      }
```
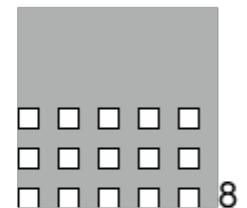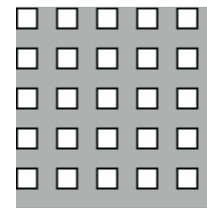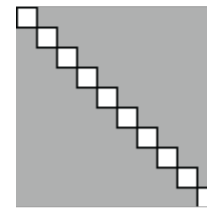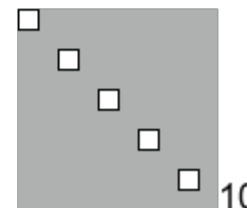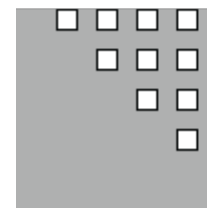
1

6

2

7

3

8

4

9

5

10

11 infinite loop

7. (6 pts) In the space provided below, write a conditional statement (i.e. a type of "if-else statement") so that the **stroke** color of the rectangle will be red if x is smaller than or equal to 150, blue if x is *between* 150 and 200, and black otherwise (200 or greater).

```
size(400,400);                  // set window size
colorMode(RGB, 255);            // set color mode
int x = (int) random(width);   // select x coord
int y = (int) random(height); // select y coord

// your conditional statement goes below:
```

```
rect(x,y,20,20);     // draw a rectangle
```