

Name: _____

CS 145 Images and Imagination*Exam 1 Solutions***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.

<code>i = 2*i + 4;</code>	ans: <code>i =</code> <u> 204 </u> (or error)
<code>i = k/15;</code>	ans: <code>i =</code> <u> 1 </u> (or error)
<code>i = k % 18;</code>	ans: <code>i =</code> <u> 2 </u> (or error)
<code>i = 2 * t;</code>	ans: <code>i =</code> <u> error </u> (or error)
<code>i = 18 % k;</code>	ans: <code>i =</code> <u> 18 </u> (or error)
<code>s = 2*k + 0.5;</code>	ans: <code>s =</code> <u> 40.5 </u> (or error)
<code>s = 4/5 + 10.8;</code>	ans: <code>s =</code> <u> 10.8 </u> (or error)
<code>s = 10*t/k;</code>	ans: <code>s =</code> <u> 0.5 </u> (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 22, y is 10, z is 12

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: 1,4,5,11,12
- b. (3 pts) List all lines which contain function calls: Ans: 6,7,13
- c. (2 pts each, 10 pts total) What is the scope of each of the following:.

i.	y	Line numbers: <u>1</u> to <u>15</u>
ii.	w	Line numbers: <u>4</u> to <u>8</u>
iii.	h	Line numbers: <u>5</u> to <u>8</u>
iv.	delta	Line numbers: <u>11</u> to <u>15</u>
v.	i	Line numbers: <u>12</u> to <u>14</u>

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: white
- b. `fill(50, 50, 50);` Ans: gray
- c. `fill(100, 0, 0);` Ans: red
- d. `fill(100, 0, 100);` Ans: red+blue=magenta

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: 2, 3, 9-12, 4, 5, 9-12, 6

```

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.     }

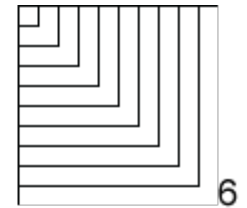
```

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.

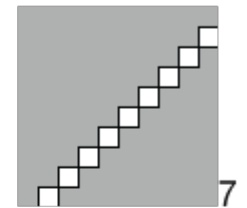
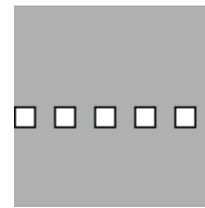
For all, assume the size and color of the window is set using *only* the following commands:

```
size(100,100);
background(175);
```

```
_7_ a) for (int i = 0; i < width; i=i+10) {
    rect(width-i, i, 10, 10);
}
```

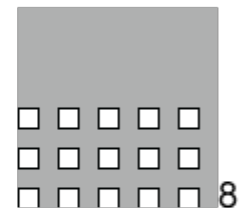
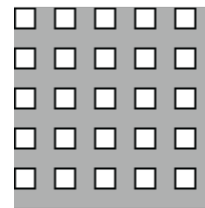


```
_2_ b) for (int i = 0; i < width; i=i+20) {
    rect(i, height/2, 10, 10);
}
```



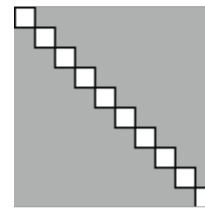
```
_10_ c) for (int i = 0; i < 5; i=i+1) {
    rect(20*i, 20*i, 10, 10);
}
```

```
_1_ d) for (int i = 0; i < width; i=i+20) {
    rect(i, 0, 10, i);
}
```



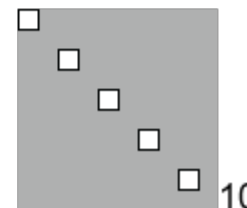
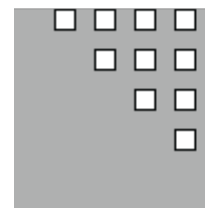
```
_8_ e) for (int i = 0; i < width; i=i+20) {
    for (int j=height/2; j<height; j=j+20){
        rect(i,j, 10,10);
    }
}
```

```
_3_ f) for (int i = 0; i < width; i=i+20) {
    for (int j=0; j < height; j=j+20) {
        rect(i, j, 10, 10);
    }
}
```



```
_11_ g) for (int i = height; i > 0 ; i=i+10){
    rect(0, 0, i, i);
}
```

```
_4_ h) for (int i = 0; i < width; i=i+10) {
    rect(i, i, 10, 10);
}
```



```
_5_ i) for (int i = 0; i < width; i=i+20) {
    for (int j=0; j < i; j=j+20) {
        rect(i, j, 10, 10);
    }
}
```

11 infinite loop

```
_9_ j) for (int i = 0; i > width; i=i-20) {
    rect(0, 0, i, i);
}
```

```
_6_ k) for (int i = height; i > 0 ; i=i-10) {
    rect(0, 0, i, i);
}
```

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:
```

```
if (x <= 150) {
  stroke(255,0,0);
} else if (x < 200) {
  stroke(0,0,255) ;
} else {
  stroke(0);
}
```

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