Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CS112**

**Final Exam**

**1) [21 points]** Match the definitions to the functions and variables listed below. More than one function may match a definition, be sure to include all matching functions. Some functions will not be used.

\_d,h\_ Function(s) a programmer would use to draw a shape.

\_J\_\_\_ Function(s) a programmer would use to define the window a Processing program runs in.

\_e,k\_ Function(s) a programmer would use to define the color of a shape.

\_a\_\_\_ Function(s) a programmer would use to erase the screen.

\_c\_\_\_ Function(s) that creates an endless loop in Processing

\_f,l\_\_ Function(s) that can be used to display words or numbers.

\_\_g\_\_ Function(s) a programmer would use to generate a random number.

1. background()
2. color()
3. draw()
4. ellipse()
5. fill()
6. println()
7. random()
8. rect()
9. setup()
10. size()
11. stroke()
12. text()

**2) [15 points]** Consider the following block of code, and mark all of the following statements as true or false with regards to the code.

if(x < 0 || x > width){

 crash();

}

\_\_?\_\_ The code within the curly braces would have to be executed if x is equal to width - 50. [Depends on whether width < 50]

\_\_T\_\_ crash() is a function.

\_\_\_T\_\_ The programmer has to define x.

\_\_F\_\_\_ The programmer has to define width.

\_\_F\_\_\_ The programmer has to define if.

**3) [15 points]** Consider the following block of code, and mark all of the following statements as true or false with regards to the code.

horse[] herd;

herd = new horse(10);

herd[5].display();

herd[15].display();

\_\_T\_\_\_ horse is a class.

\_\_\_T\_\_ herd is an array.

\_\_\_F\_\_ herd defines 10 things numbered 1 to 10. [numbered 0 to 9]

\_\_F\_\_\_ This code asks the 5th horse in the herd to “display itself”. [6th horse, they start at 0]

\_\_T\_\_\_ This code will result in an error. [ needs []’s around 10 on the second line]

**4) [18 points]** Consider the following block of code (which is not complete – there may be more code in the program), and mark all of the following statements as true or false with regards to the code.

class thing{

 float x,y;

float r;

 thing(float sr){

 x = width\*0.5;

 y = height\*0.5;

 r = sr;

}

void draw(){

 fill(0,255,0);

 ellipse(x,y,r);

}

};

\_\_F\_\_\_ thing is an object. [thing is a class]

\_\_T\_\_\_ An object of type thing includes three variables of type float.

\_\_T\_\_\_ When an object of type thing is created it is always created in the middle of the window.

\_\_F\_\_\_ When an object of type thing is drawn it is always drawn in the middle of the window. [It could move]

\_\_F\_\_\_ When drawn these things are blue. [they are green]

\_\_\_T\_\_ The size of an object of type thing is determined by the programmer when the object is created.

**5) [12 points]** Consider the following block of code (which is not complete – there may be more code in the program).

for(int j = 10; j < 100; j = j + 10;){

 println(j);

}

What is the first number printed by this code? 10

What is the second number printed by this code? 20

What is the last number printed by this code? 90

**6) [9 points]** Define the following types of variables:

int – a number (positive or negative) without a decimal

float – a number (positive or negative) with a decimal

Boolean – true or false

**6) [9 points]** Sketch what the following function would draw:

void display(float x, float y, float r){

 stroke(0);

 fill(255);

 rect(x,y,r\*2,r);

 fill(0);

 ellipse(x+r, y+(r\*0.5), r\*0.5, r\*2);

}

Sketch:

Depending on the ellipse mode being used you could get either figure.

Either one is correct.

**7) [15 points]** Write a function that takes two floats and one int as arguments/inputs. The function should draw two squares as shown below (it should only draw the boxes, not the text).

Red

(x,y)

Green

w

w

The upper left hand corner of the boxes (x,y) should be defined by the first two arguments to the function. The height and width of the larger box should be defined by the third argument to the function. The smaller box should be half the size of the larger box. The larger box should be red and the smaller box should be green (colors aren’t shown because the copier doesn’t do colors).

void squares(float x, float y, int s){

 fill(255,0,0);

 rect(x,y,s,s);

 fill(0,255,0);

 rect(x,y,s\*0.5,s\*0.5);

}

**8) [16 points]** Below are a list of Processing concepts and a second list of NetLogo and Scratch concepts. Match the Processing concepts to the similar NetLogo or Scratch concept.

\_\_b\_\_\_ In Processing once you have created a class you can create multiple objects that are all the same.

\_\_c\_\_\_ In Processing {}’s are used to define blocks of code.

\_\_d\_\_\_ In Processing the draw() function loops indefinitely.

\_\_a\_\_\_ In Processing the setup() function is run as soon as the program starts.

1. In Scratch it’s a good idea to begin a program by resetting the location, rotation, and visibility of all of the sprites.
2. In NetLogo you can easily create lots of turtles that behave the same way.
3. In NetLogo functions begin with to and end with end.
4. In NetLogo you can create a button (like GO) that runs forever.