COMP 1010
Final Exam Practice

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Sample Short Answer Questions

Solutions for each are on the posters in Gather.Town

Advice: don’t waste time typing things in to Processing.

Short Answer Q1

Write a loop that will print every Nth number from 0 to 20, inclusive. For example, if N=5, it should print 0, 5, 10, 15, and 20, and if N=6 it should print 0,6,12,18.

Short Answer Q2

Assume the following three functions already exist: `generatePoint()` assigns values to x and y, `offCanvas()` returns true if (x,y) is off the canvas, and `drawCreature()` draws a creature at (x,y). Fill in the blanks below with an appropriate loop that draws creatures until the creature would be off the canvas:

```
int x, y; //state variables
boolean isOnCanvas;

_______                          __________ {
    generatePoint(); //puts values in x and y
    isOnCanvas = !offCanvas();
    if ( isOnCanvas )
        drawCreature(); //draws creature at x,y

} _____                          _________
```

Short Answer Q3

Complete the function below, so that it is named **maxMagnitude**, accepts two **float** parameters, and returns the one with the larger magnitude (i.e. absolute value).

```
_____
                if(abs(x) > abs(y))
_____________________                    _____________
                else
_____________________                    _____________
_____________                              _____________
```

Short Answer Q4

What are the two main reasons for defining functions in your program?

_____ _____

_____ _____

Short Answer Q5

- Write ***one*** line of code that creates an array named **`favourites`** that contains three **`String`** values giving the names of your three favourite foods.

Short Answer Q6

) Given the declaration `int[] arrA = {8, 3, 0, 2, 7, 9, 6};` and the declaration `int[] arrB = new int[10];`, what is the result of each of the following expressions? If an expression will give an error, state the error.

`arrB[2]` _____ _

`arrA[arrA.length/3]` _____ _

`arrB[arrB.length]` _____ _

`arrA[arrA[3]]` _____ __

Short Answer Q7

- Given the following code:

```
int[] a;
int[] b = new int[30];
for(int i=1; i<=5; i++){
   b = new int[i];
}
```

How many array variables are created?

How many array objects are created?

Short Answer Q8

You need to be able to store up to 10 names, using a partially-full array. Give the ***declaration statements*** that would define and initialize all of the variables and constants that you would need to do this. ***Do not write any other code.***

Short Answer Q9

) Suppose we declared a partially-filled array (PFA) of `int`s:

```
final int MAX_PFA_SIZE = 100;
int[] myPFA = new int[ MAX_PFA_SIZE ];
int currentSize = 0; //current number of ints stored in myPFA
```

Fill in the blanks so that the following code prints on the console all numbers currently stored in myPFA that are bigger than 15:

```
for ( int i = 0; ____          _____; _____          _) {

    if (_______                ____________________)

        println(____                    ___________);
} // end for
```

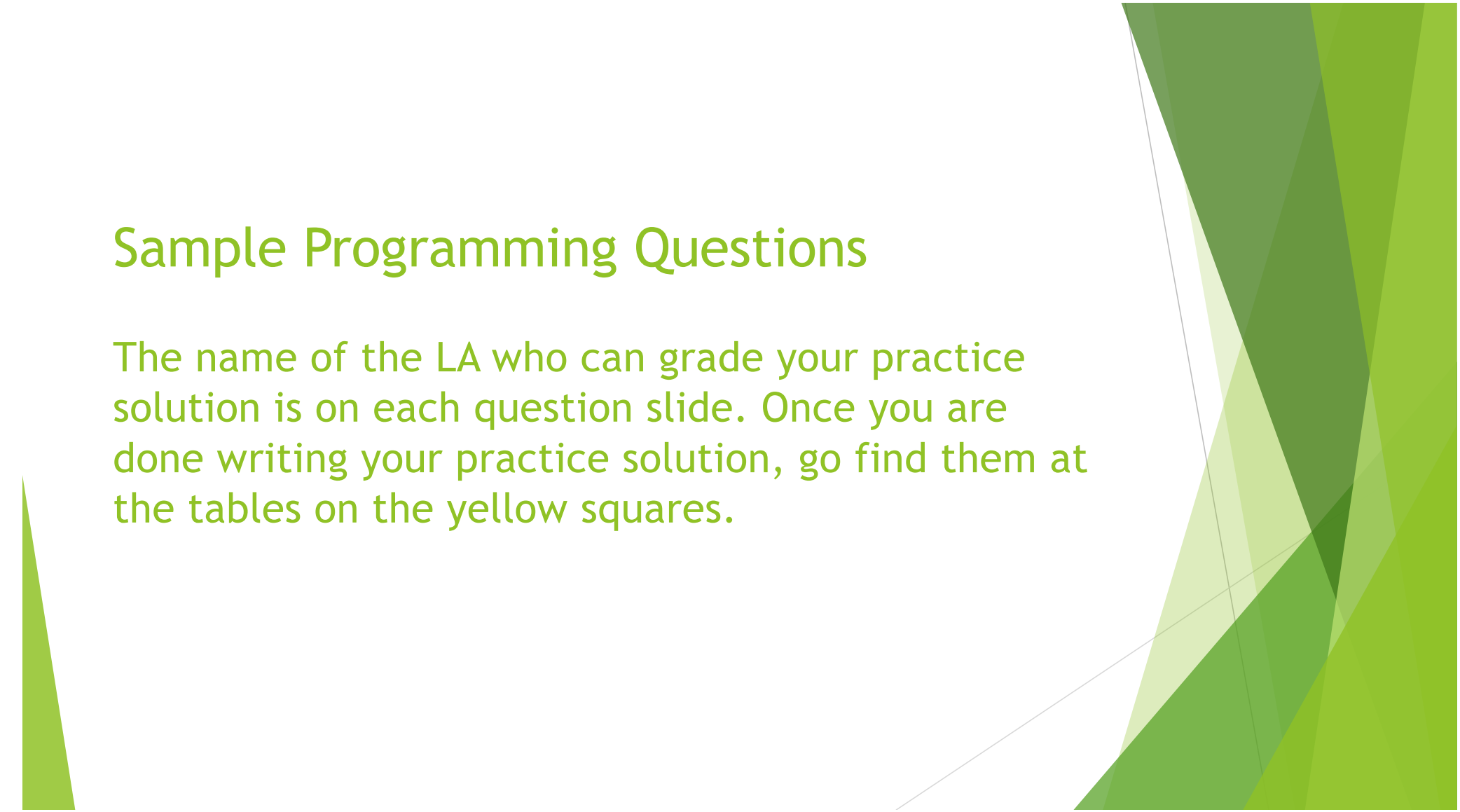
Short Answer Q10

) Complete the following function to delete an element at a given position from a partially-filled array.

```
int delete( int[] data, int size, int position){
   //delete the item in the given position, if the position is OK
   if(________                                    _______________){
      for(int i=___          _____;_              _______; i++){
         data[i] = data[i+1];
      }
      size--;
   }
   return size;
}
```

Sample Programming Questions

The name of the LA who can grade your practice solution is on each question slide. Once you are done writing your practice solution, go find them at the tables on the yellow squares.



Active Processing Programming Question

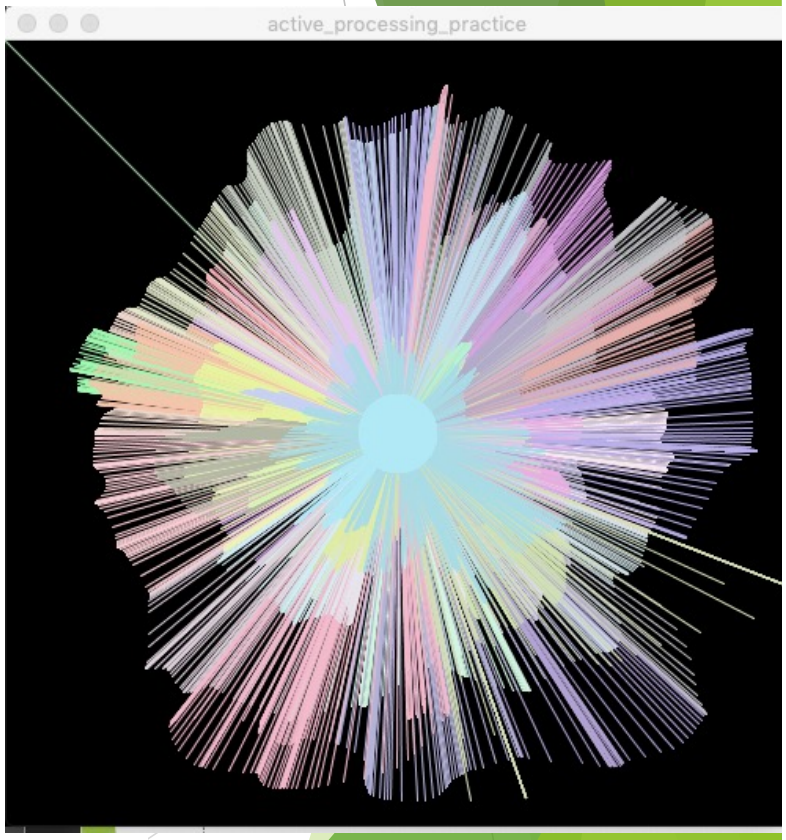
Without using any loops or if statements, complete the following program, which continuously draws lines from the center of the canvas to the current mouse cursor position. A random colour should be chosen when the program starts. When the user clicks the mouse, a new random colour is chosen for subsequent line drawing. There is also always a circle in the center of the canvas, showing the current line colour. If the user hits any key on the keyboard, the canvas is cleared back to black.

Pick random colours that are only light, for best contrast against the black background.

Use the provided global variable/constants.

See Matthew for grading

```
final int DIAM = 50;
final int CENTER_X = 250;
final int CENTER_Y = 250;
color currentCol;

void setup() {
  size(500, 500);


}

void draw() {









}

void mousePressed() {

}

void keyPressed() {

}
```



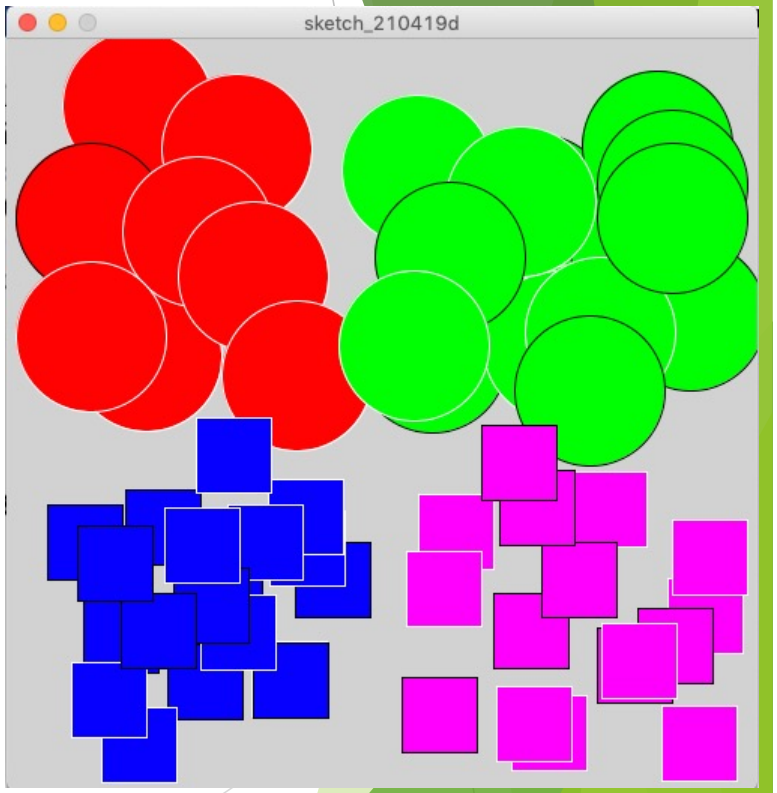
Boolean & IF Programming Question

Write a function called drawShape that takes in two int coordinates (where the shape needs to be drawn), and a boolean. This function should draw a circle if the coordinates are in the top half of the canvas, and a square if the coordinates are in the bottom half of the canvas. The fill color should be set by quadrant:

- Top-left: red
- Top-right: green
- Bottom-left: blue
- Bottom-right: purple

Regardless of where the shape is drawn, the outline should be black if the passed in boolean is true, and should be white otherwise. Assume the following two global constants have already been declared:

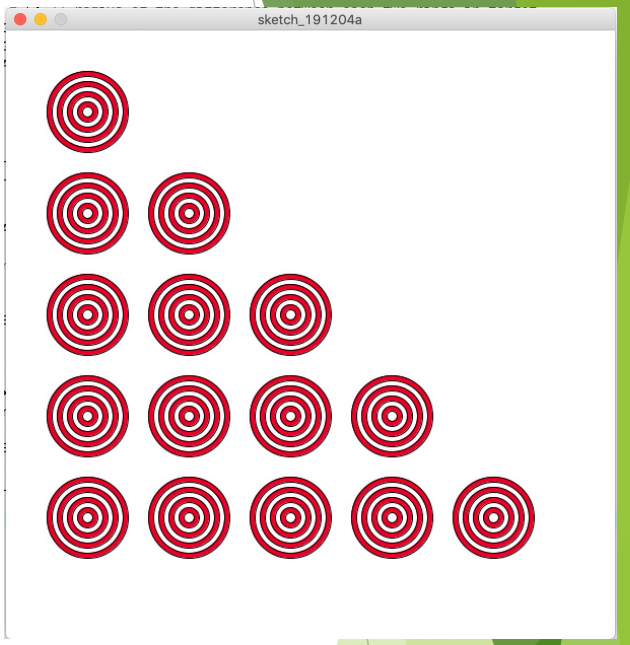
```
final int CIRCLE_DIAM = 100;
final int SQUARE_WIDTH = 50;
```



See Vicky for grading

Loops Programming Question

Write a static Processing script (no functions) that draws the image to the right. This consists of targets made by drawing circles on top of other circles, alternating the colours from red to white. Each target consists of 8 concentric circles. The diameter of each circle is 10 pixels smaller than the circle drawn before it. Use the provided constants and variables.




```
// Concentric Circles
final color DARK_RED = color(220, 20, 50);
final int NUM_ROWS = 5; // number of rows of targets
final int NUM_RINGS = 8; // number of circles to draw
final int MAX_DIAM = 80; // diameter of the outermost circle
final int RING_DIFF = 5; // radius of the difference between each two rings in target
final int FIRST_TARGET_X = 80; // horizontal location of the center of the top-left target
final int FIRST_TARGET_Y = 80; // vertical location of the center of the top-left target
final int TARGET_SPACING = 100; // horizontal and vertical spacing between target centers

size(600, 600);
background(255);

int centerX = FIRST_TARGET_X;
int centerY = FIRST_TARGET_Y;
```

See Britt for grading

Strings and Chars Programming Question

) Complete the following non-active program so that the output is a modified version of the `String s`, where all spaces have been replaced with the last vowel before the space. If a space is encountered before any vowels, replace the space with `'a'`. For example, if `s = "Computer science is fun"`, the output should be `"Computerescienceeisifun"`. If `s = "h ve go dsummer"`, the output should be `"haveegoodsummer"`.

```
String s = "There are many vowels in most sentences."
String output = "";

//  FILL IN HERE




println(output);

//  END OF PROGRAM
```

See Matthew for grading

Basic arrays and functions programming question

) Write a function named `filter`, which will accept an array of `int` values, and an `int` named `min`. It should create and return another array of `int` values, where the new array contains all values from the original array that are greater than or equal to `min`. For example, for the array

```
int[] test = {3,9,-2,6,1,8};
```

the function call

```
int[] result = filter(test,4);
```

should return the array

```
{9,6,8}.
```

The array returned should be exactly the correct size to hold the required number of values. The original array may be any size, 0 or greater.

See John for grading

Basic arrays Programming Question

[5] 23) Complete the function **validatedData(float[] data)** which will accept a full array of **float** values. It should create and return another array of **float** values containing only the "valid" data values from the array. The **validate** function (shown below) must be used to determine if a value is valid or not. The array returned should be exactly the correct size to hold the required number of values.

```
boolean validate(float x){ return 0 <= x && x <= 100; }

float[] validatedData(float[] data){

                                   ;
```

See John for grading

Partial Arrays Practice Question

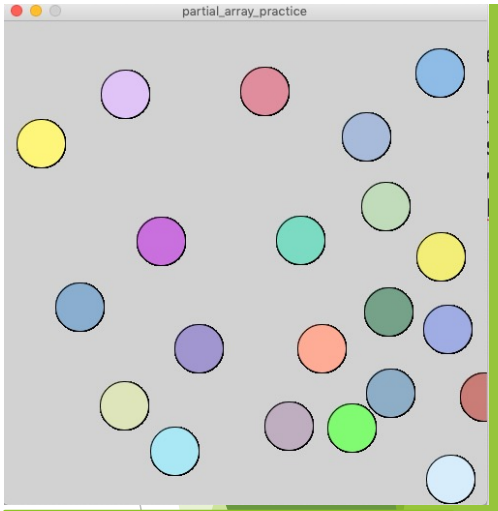
Complete the following program so that clicking on the canvas adds another dot where the user clicked (if there is room in the arrays to add another dot). Choose a random color for the dot.

When the user presses R or r on the keyboard, the colors array should get reset with all new colors for the dots. Complete setup, mouseReleased and keyPressed.

Use provided arrays, constants & variables

```
final int DIAM = 50;
final int MAX_CIRCLES = 200;
int[] circX;
int[] circY;
color[] colors;
int numCircles;

void setup() {
  size(500, 500);
  // initialize variables




}

void draw() {
  for (int i = 0; i < numCircles; i++) {
    fill(colors[i]);
    circle(circX[i], circY[i], DIAM);
  }
}

void mouseReleased() {




}

void keyPressed() {
  if (key == 'r' || key == 'R') {
    // TODO - get a whole new set of random colours for dots


  }
}
```

See Britt for grading



After pressing ‘r’ and clicking a few more times to add more dots: