

Midterm Exam 2-2 Solutions

```
1. public void paintComponent(Graphics g)
   {
       g2 = (Graphics2D) g;

       // Write one or more loops calling the drawRectangle method
       // to produce the desired pattern
       for (int row = 0; row < ROWS; row++)
           for (int col = 0; col < COLUMNS; col ++)
               {
                   if (row < 2 || row > ROWS - 1 - 2 || col < 2 || col > COLUMNS - 1 - 2)
                       drawRectangle(row, col, Color.RED);
                   else
                       drawRectangle(row, col, Color.BLUE);
               }
           }
   }
```

Rubric:

Loop over rows and columns: Attempt - 1. Correct - 3

Determine center area: Attempt - 2. Correct - 4

Draw rectangles: Attempt: 1. Correct - 3

2. (a) digit should be initialized to an empty String instead of null
The conditional asks about what the entire string contains, rather than one character.
The conditional is only true if ALL of the digits are contained (instead of if ANY).
The ';' following the if statement immediately ends it (given the above, maybe that is good)
The last concatenation adds a big substring, from the *i*th index of *s* to the end of *s*.
- (b) A version that is probably closest in text to the given code is:

```
public static String getDigits(String str)
{
    String digit = "";
    for (int i = 0; i < str.length(); i++)
    {
        String s = str.substring(i, i+1);
        if(s.contains("0") || s.contains("1") || s.contains("2") ||
           s.contains("3")
           || s.contains("4") || s.contains("5") || s.contains("6") ||
           s.contains("7")
           || s.contains("8") || s.contains("9"))
            digit = digit + s;
    }
    return digit;
}
```

While a more elegant version, using only the trick from lab, is:

```
public static String getDigits(String str)
{
    String digit = "";
    for (int i = 0; i < str.length(); i++)
    {
        String s = str.substring(i, i+1);
        if("0123456789".contains(s))
            digit = digit + s;
    }
    return digit;
}
```

Rubric:

- a) Grade the first three answers, no matter how many are given
2 points for each that correctly identifies an error
- b) Correct solution: 2 points for credible attempt, 4 if correct.

3. I have put the following into a static method, but that was not required.

```
public static ArrayList<Integer> merge(ArrayList<Integer> a, ArrayList<Integer> b)
{
    if (a == null || b == null || a.size() != b.size())
        return null;
    ArrayList<Integer> mergedList = new ArrayList<Integer>();
    for(int i = 0; i < a.size(); i++)
    {
        mergedList.add(a.get(i));
        mergedList.add(b.get(i));
    }
    //Your code goes here.
    return mergedList;
}
```

Rubric:

Copy/paste unrelated problem: 0

Loop through the indices. Attempted: 1, Correct: 2

Declare and initialize mergedList: 1 point each

Use array list methods, not array brackets. 1

Add elements from each: 1

Alternating: 2

To the end of new list: 1 attempt, 2 correct

4. `public class Person`
{

```

public Person(String aName)
{
    name = aName;
    population++;
}

public String getName()
{
    return name;
}

public static int getPopulation()
{
    return population;
}

private String name;
private static int population;
}

```

Rubric:

Add a population field. 1

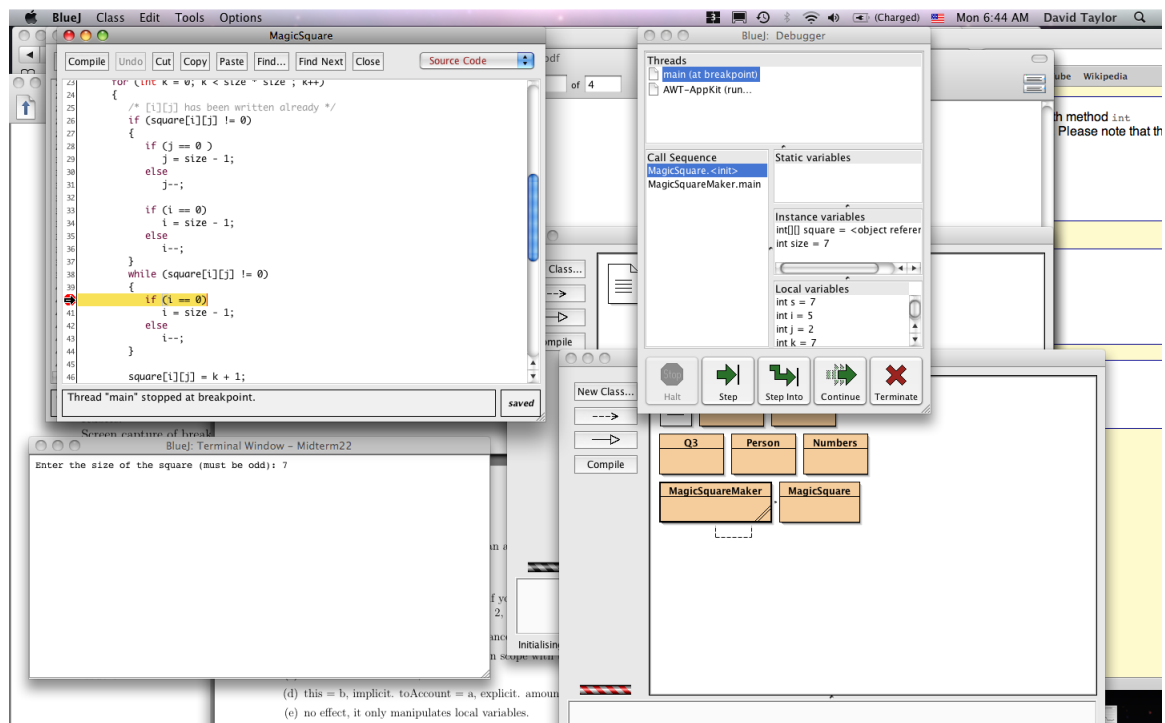
Make it static. 3

Increment it. Attempt: 1, Correct: 2

In the constructor: 2

return it in getPopulation method: 2

5. (a) Screenshot:



(b) $i = 4, j = 2, k = 7$

Rubric:

Screen capture of breakpoint hit: 5 (or 4 if you forgot it)

Values of variables: 2, 3, or 5 points for 1, 2, or 3 correct. (or 2 each if you forgot screenshot)

6. (a) length: lines 16-24. values: instance variable, valid throughout all methods of the class. (2 through 62)
- (b) Parameter variable `i` (line 44) and local variable `i` (line 48) are not allowed to have overlapping scope.
- (c) `this.values = values;`
- (d) Oops, I didn't really mean to give a call with no explicit parameters. Oh well, too late. Parameter variable "this" has value "numbers" (that is, the same Numbers object constructed in the main method). It is implicit. There are no explicit parameters.
- (e) no effect, it only manipulates parameter variables.

Rubric:

For each part, 1 point for partially correct answer, 3 points for correct answer, 2 if only one minor issue off.