Name (print): __________________________________________________

- INSTRUCTIONS:
  - Keep your eyes on your own paper and do your best to prevent anyone else from seeing your work.
  - Do NOT communicate with anyone other than the professor/proctor for ANY reason in ANY language in ANY manner.
  - This exam is closed notes, closed books, and no calculator, no electronics.
  - Turn all mobile devices OFF and put them away now. You cannot have them on your desk.
  - Write neatly and clearly indicate your answers. If I cannot read your answer, I will assume to be incorrect.
  - Stop writing when told to do so at the end of the exam. I will take 10 points OFF if you keep writing after I told you to stop.
  - Academic misconduct will not be tolerated. Suspected academic misconduct will be immediately referred to the Emory Honor Council. Penalties for misconduct will be a zero on this exam, an F grade in the course, and/or other disciplinary action that may be applied by the Emory Honor Council.

- TIME: This exam has 5 questions on 6 pages including the title page. Please check to make sure all pages are included. You will have a total of 60 minutes to complete the exam. Good luck!

I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Emory community. I have also read and understand the requirements and policies outlined above.

Signature: ____________________________________________________________

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1. (16 points) Draw the array that would result after the following code is executed.

   (a) (4 points)

   ```java
   int[] data = new int[8];
   data[0] = 3;
   data[7] = -18;
   data[4] = 5;
   data[1] = data[0];

   int x = data[4];
   data[4] = 6;
   data[x] = data[0] * data[1];
   ```

   **Solution:** [3,3,0,0,6,9,0,-18] Some students left out 0s (initial values when array is created). -1 for leaving out all 0s.

   (b) (6 points)

   ```java
   int[] list = {2,18,6,-4,5,1};
   for (int i = 0; i < list.length; i++) {
       list[i] = list[i] + (list[i] / list[0]);
   }
   ```

   **Solution:** [3,24,8,-5,6,1]

   (c) (6 points) Consider the function below:

   ```java
   public static void mystery(int[] a) {
       for(int i = 0; i < a.length - 1; i++) {
           if(a[i] < a[i+1]) {
               a[i] = a[i+1];
           }
       }
   }
   ```

   Draw the array a2 after the code below executes.

   ```java
   int[] a2 = {2, 4, 6, 3, 7, 9};
   mystery(a2);
   ```

   **Solution:** [4,6,6,7,9,9]
2. (11 points) Write a function no29 which takes an array of single digit integers as a parameter. The function should return a boolean value. The function returns true if the array contains no 2s or it contains no 9s. Examples of function calls and return values:

no29({1,2,3}) returns true
no29({1,2,8,9}) returns false
no29({7,8,9}) returns true

Solution:

```java
public static boolean no29(int[] a) {
    boolean no2 = true;
    boolean no9 = true;

    for (int i = 0; i < a.length; i++) {
        if(a[i] == 2) {
            no2 = false;
        }
        if(a[i] == 9) {
            no9 = false;
        }
    }
    return no2 || no9;
}
```

+3: function header (return value, name, parameters)
+2: uses loops correctly to examine all elements
+2: detects no 2s
+2: detects no 9s
+1: returns boolean
+1: returns correct value

Another way of solving the problem: count all the twos and count all the 9s in the array. Return false if the 2's count is g.t. 0 AND the 9's count is g.t. 0. For example: if (two_count > 0 && nine_count > 0) return false; Otherwise, return true.

3. (5 points) What modifier should you use on the members of a class so that they are not accessible to another class in a different package, but are accessible to any classes in this class’s package?

A) public
B) private
C) Use the default modifier.

Solution: default
4. (26 points) Write code that creates and uses a class named Student to update data information for a student in cs170 class. Each student has private information such as id (integer) and date of birth (string), and non-private information such as name (string). Use the Student class to perform the following operations:

- Create a Student object that has the following info:
  id = 12345, name = John Smith, dob = 12/12/2001
- Print the Student info to the screen (use toString method) in the following format
  id = 12345 name = John Smith dob = 12/12/2001
- Fix the dob mistake to dob = 12/12/1990
- Print the Student info to the screen (use toString method)
  id = 12345 name = John Smith dob = 12/12/2001

Note: For full points your main method should have only the lines that include the object creation and method invocations. The test class should include only the main method.

```java
public class Student{
    private int id;
    public String name;
    private String dob;

    Student(int ssn, String newName, String dob){
        id = ssn;
        name = newName;
        dob = dob;
    }

    public int getID(){
        return id;
    }

    public String getName(){
        return name;
    }

    public String getDob(){
        return dob;
    }

    public void setDOB(String newBOD){
        dob = newBOD;
    }

    public static String toString(){
        return "id = " + id + " name = " + "dob = " + dob;
    }
}
```
public class Test{
    public static main(String[] args){
        Student stud = new Student(12345,"John Smith", "12/12/2001");
        System.out.println(stud.toString());
        stud.setDob("12/12/1990");
        System.out.println(stud.toString());
    }
}

5. (12 points) Declare two strings named s1 and s2 which include the following texts "ArithmeticException" and “RuntimeException”, respectively. Write code to perform the following tasks:

2 pts each

A) Concatenation of these strings into a string named s3.

String s3 = s1 + s2; or String s3 = s1.concat(s2);

B) Compare s1 and s2 strings, ignore case.

s1.compareTo(s2) or s1.equals(s2)

C) Create a new string that starts from index 7 to index 9 of s2.

String s4 = s2.substr(7,9);

D) Assign the index of the first occurrence of character ‘e’ in s3 to an int variable x.

```java
int x  = s3.indexOf('e') //or
int x;
for(int i=0; i< s3.length(); i++)
    if(s3.charAt(i) == 'e'){  x = i; break;} //only 1st occurrence required
```

E) Split s3 by character ‘e’ into an array named tok.

String[] tok = s3.split('e');

F) Indicate the output of the print statements below. If the statement would generate an error, simply write “error”.

System.out.println(s1.charAt(s1.length())); error, index out of range
System.out.println(s2.charAt(s2.length()-1)); n