This is a 60 minute, CLOSED notes, books, etc. exam.
ASK if anything is not clear.
WORK INDIVIDUALLY. CHEATERS WILL BE DROPPED/FAILED. PROTECT YOUR WORK FROM BEING COPIED.
Strategy: Scan the entire exam first. Work on the easier ones before the harder ones. Don’t waste too much time on any one problem. Provide enough information to show how you got your answers. Show all work on the space provided. Write your name on each page. Check to make sure you have 5 pages.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nested Ifs</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>2D Arrays</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>What’s wrong?</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>Write the code</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Parameter passing</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>Methods</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100</td>
</tr>
</tbody>
</table>
1. **Nested Ifs (15 points)**
   What’s the output of the following program segment? Hint: reformatting the code will help you understand the nesting levels.

```java
boolean warm, windy;
String month;

warm = false;
windy = true;
month = "November";

if (warm)
   if (windy)
      if (month == "April")
         System.out.println( "Maui" );
      else System.out.println( "Perth" );
   else System.out.println( "San Diego" );
else if (windy)
   if (month == "April")
      System.out.println( "Santa Cruz" );
   else System.out.println( "Peng Hu" );
System.out.println( "I need a break" );
```

2. **2D Arrays (15 points)**
   In class, we transposed a 2D `image` array by going through each element of the upper triangle as follows:

   ```java
   for( i=0; i<image.length; i++ )
      for( j=i; j<image[i].length; j++ )
      {
         tmp = image[i][j];
         image[i][j] = image[j][i];
         image[j][i] = tmp;
      }
   ```

   Modify the code so that the `image` array is transposed by going through each element of the lower triangle instead.
3. **What's wrong? (15 points)**

Identify what's wrong with the following code and fix it!

```java
static void reverseNums( int[] nums )
{
    int[] hold;
    int i, tmp, len;

    len = nums.length;
    for( i=0; i<len; i++ )
        hold[i] = nums[len-i-1];
    for( i=0; i<len; i++ )
        nums[i] = hold[i];
}
```

4. **Write the Code (20 points)**

Write a method that takes an array of String as a parameter and returns the number of characters in the entire array of String. For example, a poem is stored in an array of String, this method should return a count on the number of characters in the poem.
5. **Parameter Passing (20 points)**

What’s the output of the following program?

```java
class PP{
    public static void main( String[] args) {
        int x = 5;
        int y = 10;
        int z = 15;

        z = hula( x );
        System.out.println( "Main: " + x + " " + y + " " + " " + z );

        z = mula( y );
        System.out.println( "Main: " + x + " " + y + " " + " " + z );
    }
}

static int hula( int a )
{
    a = 2*a;
    System.out.println( "Hula: " + a );
    return( a );
}

static int mula( int a )
{
    a = hula( a );
    System.out.println( "Mula: " + a );
    return( a );
}
```
6. **Methods (15 points)**

You are given the following class definition:

```java
class Card{
    private int value;
    private static String[] suitarray = {
        "club", "heart", "diamond", "spade"};
    private static String[] facearray = {

    public String suit()
    {
        return suitarray[value/13];
    }

    public String face()
    {
        return facearray[value%13];
    }

    public Card()
    {
        value = (int) (Math.random() * 52);
    }
}
```

Complete the following method for another class that decides if a card is red or black. Note that spade and club are black, while diamond and heart are red. You can use the String method `equals` to compare if two strings are equal or not. `equals` takes a String object as argument and returns a boolean. The result is true if and only if the argument is not null and is a String object that represents the same sequence of characters as this object.

```java
static String blackOrRed( Card c )
{
}
```