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.
  - Turn all mobile devices off and put them away now. You cannot have them on your desk.
  - Write neatly and clearly indicate your answers. What I cannot read, I will assume to be incorrect.
  - Stop writing when told to do so at the end of the exam. I will take 5 points off your exam if I have to tell you multiple times.
  - 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 7 questions on 7 pages including the title page. Please check to make sure all pages are included. You will have 50 minutes to complete this exam.

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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: ________________________________

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>10</td>
<td>6</td>
<td>30</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Score:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. (10 points) Errors:
In the following pieces of code, write if it has a syntax error or if it is correct. If it is correct, write the output. If it has an error, explain the error. Assume that the pieces of code are run independently and are not in sequence. The first one is set as an example:

<table>
<thead>
<tr>
<th>Code</th>
<th>Error or Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{system.out.println(&quot;Exam1&quot;);}</td>
<td>Error: it should be uppercase s</td>
</tr>
<tr>
<td>\texttt{int j = 0; while(j=0){ System.out.println(j); j++; }}</td>
<td>Error: (j==0) j=0 is not a boolean</td>
</tr>
<tr>
<td>\texttt{int i=4.0; System.out.println(i);}</td>
<td>Error: 4.0 is not an int Java cannot convert automatically</td>
</tr>
<tr>
<td>\texttt{String s1 = &quot;Luke&quot;; System.out.println(s1.charAt(4));}</td>
<td>Error: no character at position 4</td>
</tr>
<tr>
<td>\texttt{char ch=&quot;c&quot;;} System.out.println(ch);</td>
<td>Error: &quot;c&quot; is not a char</td>
</tr>
<tr>
<td>\texttt{System.out.println(&quot;0&quot;+1+2);}</td>
<td>Correct. Output: 012</td>
</tr>
</tbody>
</table>

2. (6 points) Convert 10010 from binary to decimal

18

Convert 110010 from binary to decimal

50

Convert 15 from decimal to binary

1111
3. (30 points) Evaluate each expression. Then give the result of the evaluation and the data type of the result. The first row has been done for you.

```java
String s1 = "4", s2 = "Jabba (the Hutt)";
char c1 = 'c';
int num1 = 2, num2 = 3;
double d1 = 2.5, d2 = 8.0;
```

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+1</td>
<td>2</td>
<td>int</td>
</tr>
<tr>
<td>d2+num2</td>
<td>11.0</td>
<td>int</td>
</tr>
<tr>
<td>num2/2</td>
<td>1</td>
<td>int</td>
</tr>
<tr>
<td>d1*2+num2/3</td>
<td>6.0</td>
<td>double</td>
</tr>
<tr>
<td>num1+s1+(num1+num2)</td>
<td>&quot;245&quot;</td>
<td>String</td>
</tr>
<tr>
<td>(int)d1+num2</td>
<td>5</td>
<td>int</td>
</tr>
<tr>
<td>s1+(Integer.parseInt(s1)+4)</td>
<td>&quot;48&quot;</td>
<td>String</td>
</tr>
<tr>
<td>s1.length()+1==2</td>
<td>true</td>
<td>boolean</td>
</tr>
<tr>
<td>num1%2!=0</td>
<td>false</td>
<td>boolean</td>
</tr>
<tr>
<td>s1+c1+num1</td>
<td>&quot;4c2&quot;</td>
<td>String</td>
</tr>
<tr>
<td>(num2==3)&amp;&amp;(num1&lt;3)</td>
<td>true</td>
<td>boolean</td>
</tr>
<tr>
<td>('d'&gt;c1)</td>
<td></td>
<td>(d2&lt;10.0)</td>
</tr>
<tr>
<td>s2.charAt(4)</td>
<td>'a'</td>
<td>char</td>
</tr>
<tr>
<td>s2.substring(1,4)</td>
<td>&quot;abb&quot;</td>
<td>String</td>
</tr>
<tr>
<td>(num1++)+(--num2)</td>
<td>4</td>
<td>int</td>
</tr>
<tr>
<td>(double)((int)d1+d2)</td>
<td>10.0</td>
<td>double</td>
</tr>
</tbody>
</table>
4. (10 points) Assume the statements below are part of a Java program which compiles
and runs. What is the output if the user types 40?

```java
Scanner in = new Scanner(System.in);
int n = in.nextInt();

if (n >= 0 && n<50){
    System.out.println("Duck");
    if(n<30){
        System.out.println("Canary");
    } else{
        if(n<=40){
            System.out.println("Emu");
        }
        System.out.println("Albatross");
    }
    System.out.println("Toucan");
} System.out.println("Hawk");
n+=3;
switch(n){
    case 40:
        System.out.println("Goose");
        break;
    case 41:
        System.out.println("Pigeon");
        break;
    case 42:
        System.out.println("Penguin");
        break;
    case 43:
        System.out.println("Skylark");
        break;
    case 44:
        System.out.println("Quail");
        break;
    default:
        System.out.println("Ostrich");
        break;
}

if(n>=43){
    System.out.println("Tui");
    if(n<100){
        System.out.println("Avocet");
    }
    System.out.println("Road Runner");
} else{ 
    System.out.println("Hummingbird");
}
```

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Output in exam A: Duck, Emu, Albatross, Toucan, Hawk, Tui, Avocet, Road Runner
Output in exam B: Duck, Albatross, Roadrunner, Kiwi, Finch, Ostrich, Robin, Crow, Eagle

5. (12 points) The program below accepts 3 integers from the user: a, b, and c. Add code that prints "Yoda" if the second number (b) is between the other two (a and c), OR if the third number (c) is even (regardless of the value of a and b). Make your program print "Obi Wan" if none of these conditions is fulfilled. For example:

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>Program Output</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>5</td>
<td>Yoda</td>
<td>(since 4 is between 2 and 5)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>6</td>
<td>Yoda</td>
<td>(since the third number is even)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5</td>
<td>Obi Wan</td>
<td>(since none of the conditions is fulfilled)</td>
</tr>
</tbody>
</table>

```java
import java.util.Scanner;

public class Jedi {
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);

        int a = in.nextInt();
        int b = in.nextInt();
        int c = in.nextInt();

        /*----------- Your code here -------------*/
        if( (a<b && b<c) || (c<b && b<a) || c%2==0)
            System.out.println("Yoda");
        else
            System.out.println("Obi Wan");
    }

    Answer for exam B:
    if( (i<j && j<k) || (k<j && j<i) || c%2==1)
        System.out.println("Obi Wan");
    else
        System.out.println("Qui-Gon");
```
6. (12 points) Complete the following program. The user enters a positive int number \( n \) and the program prints every other number between \( m \) and 1. So, if the user enters, for example, 7, the program should print 7 5 3 1. If the user enters 8, the program should print 8 6 4 2.

import java.util.Scanner;
public class OddNums {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        int n = in.nextInt();
        /*----------- Your code here -------------*/

        while(n>=1){
            System.out.print(n + " ");
            n-=2;
        }
    }
}
7. (20 points) Complete the program below. It accepts a string from the user and it counts the number of 'a's and 'h's in the string. For example, if the string is lightsaber, the output would be 2. You can assume that the given word is all in lower case.

```java
import java.util.Scanner;
public class CountAandH {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        String word = in.next();

        /*----------- Your code here -------------*/
        int counter=0;
        for(int i=0; i<word.length(); i++)
            if(word.charAt(i)=='a' || word.charAt(i)=='h')
                counter++;
        System.out.println(counter);
    }
}
```

Solution exam B:

```java
int counter=0;
int i =0;
while(i<str.length()){
    if(str.charAt(i)=='a' || str.charAt(i)=='y')
        counter++;
    i++;
}
System.out.println(counter);
```