CS170 (005): Introduction to Computer Science Exam 1

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 close notes, close books, and no calculator
- Turn off all mobile devices 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
- Remain in your seat until you are done. If you have a question raise your hand and wait until the instructor comes to you.

Time: This exam has 6 questions on 11 pages, including this title page and an ASCII table at the end. Please make sure all pages are included. You will have 50 minutes to complete this exam; budget your time accordingly. Partial credit will be given, so if you are unable to complete a question at least give an attempt.

Honor Code: 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>Q1 (10)</th>
<th>Q2 (23)</th>
<th>Q3 (25)</th>
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Question 1: (10 pts) For each of the following terms give the definition of the term. You just need to give a good description of the term, a formal definition is not needed. You can use an example if it will help your explanation. Please keep your answers short.

**DEFINE 5 of the 6 terms below.** Clearly mark the term you do not want me to grade. If it is not marked, I will assume that the last term is the one you do not want to grade.

a) Data type

b) Keyword

c) final

d) Casting

e) Variable

f) Compiler
Question 2: (23 pts) Evaluate each of the following expressions. Give the result and the data type of the result in the space provided. If the expression cannot be evaluated or is not proper Java syntax, write “error” as the result. The values and data types of all variables used in the expressions are given.

```java
int i1 = 3, i2 = 4, i3 = -1;
double d1 = 2.0, d2 = 4.0;
String s1 = "Holy", s2="grail", s3 = "4";
char c1 = 'p';
```

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>i1 + i3</code></td>
<td></td>
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</tr>
<tr>
<td><code>i2 / i1 * 3</code></td>
<td></td>
<td></td>
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<tr>
<td><code>i2 % i1 + 1</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td>`i3 &lt;= -1 &amp;&amp; i2 &gt; 4</td>
<td></td>
<td>i1 == 3`</td>
</tr>
<tr>
<td><code>s3 * i1</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>s1 + ' ' + s2</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>s3 + i2</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>(int)(d2 / d1)</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>(int)d2 / d1</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>i3 &lt; i2</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>3 &lt;= i2 &lt;= 5</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>d2 / (i1 / i2)</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>2.0 * (i3 - i2)</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>c1 + i1</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>Integer.parseInt(s3)</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Question 3: (25 pts)** We are writing a program for a user named John who wants to know if he is burning more calories than he is eating. If John sits still all day he will burn 1800 calories. John can increase the number of calories he burned by working out. Every 30 minutes he works out he burns an additional 400 calories.

Our program will ask John how many calories he ate, and then ask how many 30 minute workout segments he did (He only works out in 30 minute segments). You need to fill in the program below to do the following:

1) If John burned more calories than he ate, then print out “Under max calories by X calories” (You should replace X with the number of calories he is under)
2) If John ate more calories than he burned, then print out “Over max calories by X calories” (You should replace X with the number of calories he is over)
3) If John eats and burns the same number of calories you should print “Perfect!”
4) **Also:** If John burns 3000 or more calories in a day you should also print “Get some rest!”
5) **Also:** If John eats 3000 or more calories in a day you should also print “Are you full?”
6) **Also:** If John eats and burns 3000 or more calories in a day you should also print “Michael Phelps?”

CODE BEGINS ON NEXT PAGE
import java.util.Scanner;

public class JohnCalories {
    public static void main(String [] args) {
        int restingCalories = 1800;
        int workoutSegments;
        int eatingCalories;

        Scanner in = new Scanner(System.in);

        System.out.println("How many 30 min. workouts? ");
        workoutSegments = in.nextInt();
        System.out.println("How many calories did you eat? ");
        eatingCalories = in.nextInt();

        // FILL IN CODE HERE

        // Continue on next page if needed
Question 4: (15 pts) Assume the statements below are part of a Java program which compiles and runs. What is the output if the user types 15?

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

System.out.println("Summer:");
if (num % 10 == 0) {
    System.out.println("baseball");
} else {
    System.out.println("sailing");
} if (num % 2 == 5) {
    System.out.println("golf");
} if (num % 5 == 0) {
    System.out.println("track and field");
} else {
    System.out.println("swimming");
}

System.out.println("Fall:");
if (num <= 10) {
    System.out.println("soccer");
} if (num == 10) {
    System.out.println("basketball");
} else if (num > 15) {
    System.out.println("football");
} else {
    System.out.println("volleyball");
}

num *= 2;

System.out.println("Winter:");
if (num > 20) {
    switch (num) {
        case 20:
            System.out.println("curling");
            break;
        case 30:
            System.out.println("hockey");
            break;
        default:
            System.out.println("luge");
    }
} else {
    System.out.println("skiing");
}
```
**Question 5: (18 pts)** The following Java program reads in three numbers from the user and computes an output value based on the user's input. There are six errors in the program that will prevent this code from compiling. You need to identify each of these errors and describe the reason for the error.

**Question5.java**

```java
public class Question5 {
    public static void main(String [] args) {
        Scanner in = new Scanner(System.in);

        int a, b, c;

        System.out.println("a: ");
        a = in.nextInt();
        System.out.println("b: ");
        b = in.nextInt();
        System.out.println("c: ");
        c = in.nextInt();

        int d;

        String message = "The value is: ";

        if (!a % b == 0) {
            d = 1.5 * a;
        } else if (a + b + c < 5) {
            d = 5 - (a + b + c);
        } else if (a == b) {
            d = a++ - b++;
        } else {
            System.out.println("All Conditions are false!");
        }

        System.out.println(message + d);
    }
}
```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
Question 6: (9 pts) Answer the following questions below.

a) Give 3 valid identifiers in Java, two of which are NOT solely alphabetic

b) Give 3 illegal identifiers that are NOT Java keywords:

c) Give 3 Java keywords that could NOT be used as variable names: