1. (12pts)
   a) Give 3 legal/valid variable names in Java, two of which are NOT solely alphabetic.

   b) Give 3 Java keywords which could NOT be used as variable names:

   c) Give 3 illegal/invalid variable names that are NOT Java keywords:

   d) Give 3 variable names which are syntactically valid, but do not follow established Java naming conventions. Each variable name should violate a different convention.

2. (20pts) ASCII Encoding
   Characters (symbols) in the English alphabet are stored inside the computer as numbers. That is, each letter/symbol is encoded as a number. The encoding method used to represent the alphabet is known as the ASCII code (American Standard Code for Information Interchange). The website [http://www.ascii-code.com](http://www.ascii-code.com) contains ASCII code tables which shows the encoding from a decimal number to an English language character. The following questions concern Strings (a series or sequence of characters).

   a) Give the series of ASCII characters encoded by the following decimal values:
      34  72  105  32  83  112  114  49  54  33

   b) Give the series of decimal values to encode the following ASCII characters:
      Y^6+1  !tbB
3. (20pts) For the following statements, state whether the statement is correct or has an error. If there is an error, describe it. If there is no error, give the value stored by the assignment statement. Evaluate each statement with the original values of the variables given below. (Note: You will be asked to do similar problems on the midterm and you will not have access to a Java compiler. I recommend you write these statements inside a Java program after you have done the homework. You can check your answers --- if you have errors, understand why.)

Original values of the variables:

```java
int i1 = 0, i2 = 3, i3 = 7;
double d1 = 2.0, d2 = 3.5, d3 = 6.8;
String s1 = "5.0", s2 = "!", s3 = "123";
```

a) \( i2 = i3 \);
b) \( i1 = i2 + i3 \);
c) \( i1 = i3 + d1 \);
d) \( i3 = i3 \% i2 + i1 \);
e) \( i3 = (\text{int}) d3 \);
f) \( d3 = (\text{int}) d3 + (\text{int}) d2 \);
g) \( d3 = (\text{int}) d3 + d2 \);
h) \( d1 = i1 + i3 \);
i) \( d1 = i2 + d2 \);
j) \( d1 = s1 \);
k) \( i3 = i3 * i3 / i2 \);
l) \( i3 = i3 / i2 * i3 \);
m) \( s1 = i1 + i3 \);
n) \( s1 = s2 + s3 \);
o) \( s1 = i1 + s1 \);
p) \( s1 = i2 - i3 + s3 \);
q) \( s1 = s3 + i2 - i1 \);
r) \( s1 = s3 + i1 + d2 \);
s) \( s1 = i1 + d2 + s1 \);
t) \( s1 = s3 + i2 * i1 \);
4. The following program contains 10 syntax errors or errors which will cause a runtime error when the program is executed. (There are no logical errors.)

```java
public class 1stHW {
    public static void Main(String[] args)
    {
        int y = 20;
        System.out.print("The value of y is");
        System.out.println(y);
        int y = y + 16
        18 = y;
        int x = 19;
        y = x-;
        string s = "Hello";
        String S = ' World';
        System.out.println(s + S);
    }
}
```

a) (10pts) Identify the errors by circling them in the code above.

b) (10pts) Rewrite the code so that all the errors are removed or corrected. For statements that are ambiguous, any reasonable correction is acceptable.
5. Algorithm tracing – Consider the following algorithm, written in pseudocode:

\[
\begin{align*}
R & = 47; \\
Q & = 0; \\
D & = 9; \\
\text{as long as } R & \geq D \text{ do} \\
\{ & \\
& R = R - D; \\
& Q = Q + 1; \\
\} \\
//\text{complete table entry for the values of } R, Q \text{ and } D \text{ when you reach this point}
\end{align*}
\]

a) (15pts) Fill out the table below and trace each step (or loop) of the algorithm above (see comment). The initial state of the variables has been completed for you. Use only as many rows as you need.

<table>
<thead>
<tr>
<th>Step</th>
<th>R</th>
<th>Q</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>47</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) (5pts) In your own words, explain what the algorithm does. DO NOT simply restate the algorithm. Think about how the values of R, Q, and D are related. \textit{Hint: Look for a relationship between the original values of } R \text{ and } D \text{ and the values of } R \text{ and } Q \text{ when the algorithm finishes.}

6. (8 points) Please fill out our survey. It helps us get to know you better and understand why you're taking the course and what you want to learn. (And, it's free points on this homework!)

https://docs.google.com/forms/d/1fCw2jpL9w_z0WAgtNS3SS5oDvIted7miFzMYzps_1vc/viewform