What are your preferred pronouns? ________________________________

Intro/Algorithms Homework (12 points)
Due at the beginning of class on Wednesday, Sept 12th

1. Section 1.2 in zyBook discusses several historical figures in computer science. Here are four other important people in computer science. Read about them online, and then write a short paragraph on each (3-5 sentences) that describes what they have done for the computing revolution. The paragraph should be in your OWN words.
   a. Edsger Dijkstra
   b. Lucy Sanders
   c. Linus Torvalds
   d. Jean Sammet

2. Figure 1.4.4 in zyBook provides pictures of several places where embedded devices reside. Provide three other examples where embedded devices exist.

3. Write an algorithm (in pseudocode) to get four numbers corresponding to scores received on three semester tests and a final examination. Your algorithm should compute and display the average of all four tests, weighting the final exam twice as heavily as a regular test.

4. A student was asked to develop an algorithm to find and output the largest of three numerical values x, y, and z that are provided as input. Here is what was produced:

```
Input: x, y, z
Algorithm:
    Check if (x > y) and (x > z). If it is, then output the value of x and stop. Otherwise, continue to the next line.
    Check if (y > x) and (y > z). If it is, then output the value of y and stop. Otherwise, continue to the next line.
    Check if (z > x) and (z > y). If it is, then output the value of z and stop.
```

Is this a correct solution to the problem? Explain why or why not. If it is incorrect, fix the algorithm so that it is a correct solution.

5. Consider the following algorithm to determine whether summing a list of numbers exceeds 100,000. Is the algorithm efficient? If not, how might you improve?
   Step 1: Initialize sum = 0.
   Step 2: Start with the first number.
   Step 3: Add the current number to sum.
   Step 4: Repeat step 3 until all numbers have been added.
   Step 5: Compare sum with 100,000.
Name: _________________________________________________

Circle Section: A (10am), B (11am), C (noon), D (1pm), E (2pm), F(3pm), G(4pm)

What are your preferred pronouns? ________________________________

6. The following is Euclid’s 2,300-year-old algorithm for finding the greatest common divisor (gcd) of two positive integers I and J.

<table>
<thead>
<tr>
<th>Step</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get two positive integers as input; call the larger value I and the smaller value J</td>
</tr>
<tr>
<td>2</td>
<td>Divide I by J, and call the remainder R</td>
</tr>
<tr>
<td>3</td>
<td>If R is not 0, then reset I to the value of J, reset J to the value of R, and go back to Step 2</td>
</tr>
<tr>
<td>4</td>
<td>Print out the answer, which is the value of J</td>
</tr>
<tr>
<td>5</td>
<td>Stop</td>
</tr>
</tbody>
</table>

a. Go through this algorithm using the input values 20 and 32. After each step of the algorithm is completed, give the values of I, J, and R. Determine the final output of the algorithm.

b. Does the algorithm work correctly when the two inputs are 0 and 32? Describe exactly what happens, and modify the algorithm so that it gives an appropriate error message.

7. Consider the linear search and binary search algorithms, on a list with 300 ascending values: 2, 15, 27, ..., 821, 975. Suppose each comparison required in the algorithm costs 3 μs. What is the run time for each of the following?

a. Use linear search to determine if 7 exists?

b. Use binary search to determine if 7 exists?

c. Use linear search to determine if 950 exists?

d. Use binary search to determine if 950 exists?

8. Determine the simplified Big O notation for each of the following:

a. O(75 * N^2)

b. 50 + O(N)

c. 50 * O(N^3)

d. O(50 * N^4) + O(N^5)

9. On a separate sheet of paper, write pseudocode for folding an 8-1/2x11 sheet of paper into a paper airplane. Include your name AND section on this separate sheet of paper.