Homework 3: Programming
INFO/CSE 100 Autumn 2004

Print out this page and write your answers to the following questions. Use a separate sheet of paper if you need more space. The last problem requires an additional sheet of paper. Be sure to put your name, student ID, and section at the top of this page, on any attached pages, and securely fasten all sheets together with a staple. *You may lose points if you do not do so!* Have fun.

Concepts

1. Algorithms
    a. In *your own words*, clearly explain what an algorithm is.

Precise recipe or series of steps for producing a specified result.

Should have specified inputs, outputs, be definite, doable (effective), and finite.

    b. Why is it important to have well-specified algorithms? What are algorithms useful for?

If not well-specified, will have difficulty communicating with other people/computers. Algorithms are useful for communication.

2. I have ten people standing in line, and I want to order them in alphabetical order by first name, from "A" at the beginning of the line to "Z" at the end. Give a well-specified algorithm to do so. These people are not too bright, so they will only respond to direct orders/questions given to each of them individually (i.e. you can't just yell at them "Everybody get in line by alphabetical order!"), but you can use things like "for" loops.

See lecture 10, slide 3, or page 274-276.

3. What is/are the benefit(s) of having functions? Why not just write all the code out in the place where it is needed, instead of calling a function somewhere else to do the job?

So that you don't have to rewrite-code, you can reuse it. It makes code clearer. Also, if you change your algorithm, you don't have to change it all over the place, just change the function.

4. Give a specific, *compelling* example of where using a variable (`var temp = 10; var result = 3 * temp;`) instead of a literal value is better (`var result = 3 * 10;`). Explain your example, and why it is better to use a variable in that specific case.

Say I have a program that calculates the price of purchases for many different people. So, I have

var tax = = 0.075

and I calculate the price + tax in a number of different places in my program (for each of the people, individually), like this.

person1price = p1price + (p1price*tax);
person2price = p2price + (p2price*tax)
etc…

If the sales tax changes for our state, I don't have to change the tax amount for each person, I just change it in the variable tax.

Javascript

For some of the following problems, it may behoove you to run it by creating an HTML page and placing the code in that page and loading it in Mozilla (and possibly using the Javascript Console), or by using W3School's TryIt Editor (http://www.w3schools.com/js/tryit.asp?filename=tryjs_text) to test what the code does.

5. Why will the Javascript code below not work? How should it be fixed?

```
<script type="text/javascript">
document.write(greeting);
var greeting = "Ni hao!";
</script>
```

greeting wasn't defined yet when it was used in document.write. Execution goes from top to bottom.

It can be fixed by exchanging the order of the lines document.write(greeting) and var greeting="Ni hao!" In other words, the fixed version should look like this:

```
<script type="text/javascript">
var greeting = "Ni hao!";
document.write(greeting);
</script>
```

6. I have the following code. What will be printed on my webpage once it initially finishes loading?

```
<head>
<script type="text/javascript">
function cod() {
    document.write(' cod');
}
function catfish() {
    document.write(' catfish');
}
function Cod() {
    document.write(' capitalCod');
}
function guppy() {
    document.write(' guppy');
}
</script>
</head>

<body>

<script type="text/javascript">
guppy();
catfish();
```

```
    Cod();
    </script>

    </body>
    </html>
```

Output should be:

guppy catfish capitalCod

Must be all on the same line, because they will all be written on the same line, since we are using the "write" function and not the "writeln"

7. I have a variable called `myGrade` that stores a number. Write an if-else statement that will give an alert box that says "Woohoo!" if myGrade is greater than 3.4 and less than or equal to 4.0. (Hint: you will need to review Boolean and relational operators.) Otherwise, it will give an alert box that says "Boooo!" Please be careful with your capitalization, spelling, punctuation, etc. If your code doesn't run, you lose points.

   if (myGrade > 3.4 && myGrade <= 4.0) {
   *   alert("Woohoo!");*
   } else {
   *   alert("Boooo!");*
   }

8. The following code is the source of the HTML document:
   http://www.cs.washington.edu/education/courses/cse100/CurrentQtr/hw03/hw3problem8.html.
   This file is supposed to count the number of both upper and lowercase s's, and then print out the total number, but as you can see when you load the page, nothing shows up because it's got a lot of errors. Write down EACH STEP of your debugging process. You will probably need to do this on a separate page, or on the back of this page. What did you first do to figure out where the errors are? What are the errors? What steps did you do to figure out the error? Also, *print out* a copy of your corrected code.

```
<html>
<head><title>Hw 3 Problem 8</title></head>
<body>
<script type="text/javascript">
var myWord = 'Supercalifragilisticexpialidocious';
var count = 0;

for(var i = 1; i > myWord.length; i++) {
    if(myWord.charAt(i) == 's') {
        count++;
    }
}
document.write('You have ' count + " s's.");
```

```
</script>
</body>
</html>
```

Corrected version is (there were 4 errors, the changes are in a different color):

```
<html>
<head><title>Hw 3 Problem 8</title></head>
<body>
<script type="text/javascript">
var myWord = 'Supercalifragilisticexpialidocious';
var count = 0;

for(var i = 0; i < myWord.length; i++) {
    if(myWord.charAt(i) == 's'|| myWord.charAt(i) == 'S') {
        count++;
    }
}
document.write('You have ' + count + " s's.");

</script>
</body>
</html>
```

You should also have a description of your debugging process here.