

CSE/INFO 100 Fluency with Information Technology
Winter 2006
Midterm 2 Review Questions ANSWER SHEET

Answers are given in *italics*.

1. What does it mean to “declare a variable” in JavaScript? Write code to declare a variable with a name of your own choosing, in Javascript.

Answer: `var total;`

2. Give a World Famous Iteration statement that loops a dozen times. (Assume the iteration variable has been declared, and ignore the statements in the body.)

Answer:
`for (i=0; i<12; i++) {`
`}`

3. An algorithm is a precise and systematic method to achieve a specified result. Algorithms have five properties. Give one of them and explain what it means.

Answer: The five are, input specified, output specified, definite, effective, and finite. (Explanations are in the book.)

4. Give the five steps of the fetch execute cycle.

Answer:
Instruction fetch
Instruction decode
Data fetch
Execute
Result Return

5. The key fact about “integration” as used in integrated circuits is (choose one):
 - a. The circuits are made out of a common family of materials
 - b. The circuits are extremely small, and so use little power

Answer: (a)

6. Opt-in/Opt-out refers to a person making a choice about how their private information will be used relative to some new purpose; explain each term.

Answer:

- a. Opt-in: Information cannot be used unless the person approves the new use
- b. Opt-out: Information can be used unless the person objects to the new use

7. Describe how to add comments in HTML, and describe the two ways of making comments in JavaScript.

Answer:

```
<!-- HTML comment -->
```

```
// Javascript comment
```

```
/* multiline  
Javascript comment */
```

8. Create a for loop to generate an empty table with 4 rows and 3 columns.

Answer:

```
<table>  
  <script language="JavaScript">  
    var i, j;  
    for (i=0; i<4; i++) {  
      document.write("<tr>")  
      for (j=0; j<3; j++) {  
        document.write("<td></td>");  
      }  
      document.write("</tr>")  
    }  
  </script>  
</table>
```

9. Write a JavaScript function that takes in a number and returns the square of that number.

How would we use this function to find the square of 145?

Answer:

```
function square(num) {  
  return 5*5;  
}
```

(using alert() would be OK too)

To call:

```
square(145);
```

10. What's the difference between a typical cookie and a 3rd party cookie? Why is a 3rd party cookie worrisome?

Answer: A 3rd party cookie is a cookie that doesn't come from a site you visited, but from another party, such as an ad agency. The danger is that they may be read from multiple sites, and may be used to track your visit across multiple sites.

11. What's a fetch/execute cycle? How is it related to clock rate?

Answer: The fetch/execute cycle is an operation performed by the CPU. In the fetch/execute cycle, the CPU fetches an instruction from memory, decodes it, fetches any data needed, executes the instruction, and returns the result.

The clock rate is the number of fetch/execute cycles performed in a set time (usually measured in cycles per second).

12. Write the HTML code for a form which includes (in the order mentioned):

- One textbox named "type"
- A blank line break
- Three radio buttons grouped together under the common name "numDonuts" labeled 1, 2, and 3.
- A blank line break
- Another textbox named "result"

Answer:

```
<form>
<input type=text name=type>
<br>
<input type=radio name=numDonuts>1
<input type=radio name=numDonuts>2
<input type=radio name=numDonuts>3
<br>
<input type=text name=result>
</form>
```

13. Now, take the form from the previous question and add the following functionality:

When a user clicks on any of the radio buttons, it will take the number that the radio button corresponds to, concatenate the value of the textbox "type" onto the back, and then store the result as the value in the "result" textbox. For example, if the "type" textbox contains "Sesame", and the user clicks "2", the result textbox should say "2 Sesame".

Answer:

```
<form>
<input type=text name=type>
<br>
<input type=radio name=numDonuts
onClick="result.value=1+type.value">1
<input type=radio name=numDonuts
onClick="result.value=2+type.value">2
<input type=radio name=numDonuts
onClick="result.value=3+type.value">3
<br>
<input type=text name=result>
</form>
```

14. Consider the following javascript code:

```
<script language="javascript">
function foo(foo1, foo2) {
    return foo1+foo2;
}
document.write(foo(1,2));
document.write(foo('foo', 'bar'));
</script>
```

- Describe what would be the output of the two document.write() calls.
- What is the name of the function defined in the Javascript code? What are the arguments that the function takes? What does the function return (there are two possibilities)?
- Our two document.write() calls have a problem. They print their output right next to each other and that makes it hard to see where one document.write() call ends and the other one begins. Modify the document.write() calls so that they print on separate lines.

Answers:

- The first document.write() call would print out 3. The second document.write() call would print out the word foobar.*
- Name of the function is foo. Arguments are foo1 and foo2. The function returns the sum of the two arguments if both the arguments are numbers, and concatenates the two arguments otherwise.*

c) *Two possible answers:*

```
document.write(foo(1,2) + "<br>");  
document.write(foo('foo', 'bar'));
```

OR

```
document.write(foo(1,2));  
document.write("<br>");  
document.write(foo('foo', 'bar'));
```

15. What kind of things can you do with algorithms? What are some algorithms that we have seen so far? Are algorithms strictly confined to computing?

Answer: No, algorithms can apply to all aspects of life. For example, we could apply an algorithm to sort CDs or books in a catalog. We have seen algorithms like the placeholder technique and the search with the alpha/beta sweeps.

16. Why would we want to prefetch images? Prefetch an image located at the relative URL "penguins.gif" and store it into a variable (name of the variable is your choice, however it should be a name that makes sense to what we're storing!).

Answer: We want to prefetch images because by prefetching images we store a temporary local copy of the image on our computer by means of a variable in javascript. Thus, when we want to use that picture we can just call on the variable, instead of asking the browser to go get it online (which usually takes a delay as the browser needs to contact the server and grab the image, which could potentially be very big).

```
var penguinImg = new Image;  
penguinImg.src = "penguins.gif";
```

17. Conditional Statements: What does the following Javascript code do? Describe the exact output you would see if you were to run this on a web browser in an HTML page.

```
<script language="Javascript">  
var myAge, yourAge;  
var older;  
myAge = 20;  
yourAge = myAge++;  
if(myAge < yourAge) {  
    older="You are older";  
} else {  
    if(yourAge < myAge) {  
        older="I am older";  
    } else {  
        older = "We're the same age.";  
    }  
}
```

```
}
alert("Who's older? " + older);
</script>
```

Answer: Will pop up an alert box that says "Who's older? I am older"

18. Array images question. Describe what will display on this HTML page. Assume all the image files are in the correct place, that is, in the same folder as the HTML page.

```
<html><head><title>Animals</title></head>
<body>
<br>
<br>
<br>

<script language="Javascript">
var i;
for(i = 0; i < 3; i++) {
    document.images[i].src = "butterfly.gif";
}
</script>
</body>
</html>
```

Three butterfly.gif images will appear, one right under the other.

19. Assume $a = 5$, $b = 4$, $c = 4$. Are the following Boolean expressions true or false?
- $b == c$
 - $(a < b \ || \ b < a)$
 - $!((a > c) \ \&\& \ (b == c))$
 - $((a > c) \ \&\& \ !(b > c))$

Answer: true, true, false, true

20. What is the difference between a function call and a function definition? Is `document.write("hello world")` a function call, a function definition, or something else?

Answer: Function definitions are the algorithms we want a function to perform when we make a function call. `document.write("hello world")` is a function call, we are telling the write function to write "hello world" onto the document. The write function is predefined for us in Javascript.

21. What is the purpose of having functions?

Answer: (p 598, reuse & complexity management)

22. What is an array? Declare an array with length n. Set the last element of the array to 5.

Answer: Arrays are variables that can be indexed and can contain multiple values.

```
var A = new Array(n);
```

```
A[n-1] = 5;
```

23. Define, then call, a function which takes 1 argument called n and returns the value 2 to the power n. The symbol ^ would not give you power, you need to find a way to compute this. For your call, use any argument you choose, but you must also give the result in a comment. Hint: use iteration.

// Two possible function definitions:

// Because variable answer is already 2, you only

// need to do one less iteration, so we're

// going to start off at i = 1 in the for loop

```
function power_of_two (n) {
```

```
    var i;
```

```
    var answer = 2;
```

```
    for (i=1; i<n; i++) {
```

```
        answer = answer * 2;
```

```
    }
```

```
    return answer;
```

```
}
```

// OR, you can start answer off at 1,

// and then start the loop from 0 as usual

// so that the first time the loop runs,

// answer will become 2

```
function power_of_two (n) {
```

```
    var i;
```

```
    var answer = 1;
```

```
    for (i=0; i<n; i++) {
```

```
        answer = answer * 2;
```

```
    }
```

```
    return answer;
```

```
}
```

// Function call:

```
power_of_two(3) // this will return 8
```

24. What is an event? What is event based programming? Why do we study it, i.e. why is it important?

Answer: When a user does something and expects the program to respond then the program triggers its response with an event. Also when the program is supposed to be continuously doing something (say animation) then this is also often handled with events. Event based programming means that the program waits for the user and responds to the information/actions that the user performs. Programs have to interact with users, which why understanding event based programming is essential.