

CSE/INFO 100 Fluency with Information Technology
Winter 2007
Midterm 2 Review Questions ANSWER SHEET

Answers are given in *italics*.

1. What is a variable, and what are the three main data types a variable can contain? 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: A variable is a named memory location that can hold a value. In JavaScript the three main data types are numbers, strings, and Booleans (true/false). When we declare variables, we state the names of the variables used in the program. A sample variable declaration:

```
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. What’s the 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 or Hertz per second).

5. Give the five steps of the fetch/execute cycle.

Answer:

*Instruction fetch
Instruction decode
Data fetch
Execute
Result return*

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

Answer: (a)

7. 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:

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

8. Describe how to add comments in HTML and explain the two ways of making comments in JavaScript.

Answer:

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

// JavaScript comment

/* Multi-line
   JavaScript comment */
```

9. Using a for loop, generate an empty HTML table with 4 rows and 3 columns in JavaScript.

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>
```

10. 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 num*num;
}
```

```
}  
to call:  
square(145);
```

11. 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 it may be read from multiple sites, and may be used to track your visit across multiple sites.

12. Write the HTML code for a form that 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 results 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)?
- The 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 a 3. The second `document.write()` call would print the word foobar.*
- The name of the function is `foo`. Arguments are `foo1` and `foo2`. The function returns the sum of its two arguments if both 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 are not specific to computing. For example, we could apply an algorithm to sort CDs or books on a shelf. 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. (The name of the variable is your choice, however it should be a name that makes sense based on what we are storing.)

Answer: We want to prefetch images and store a local copy of the image in our computer in a JavaScript variable. Then when we want to display that picture, we can just use the contents (copy of the picture) in the variable, instead of having to ask the browser to get the picture online, which usually causes a delay as the browser contacts the server and gets the image over the network.

```
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-1;
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 this 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>

```

Answer: Three butterfly.gif images, one right under the other.

19. Assume $a = 5, b = 4, c = 4$. Are the following Boolean expressions true or false?

- a. $b == c$
- b. $(a < b \ || \ b < a)$
- c. $!(a > c) \ \&\& \ (b == c)$
- d. $((a > c) \ \&\& \ !(b > c))$

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 give 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" on the document. The write function is predefined for us in JavaScript.

21. What is the purpose of having functions?

Answer: Reuse and complexity management. See p. 598 in the book.

22. What is an array? Declare an array with length n . Set the last element in 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 that takes 1 argument called n and returns the value 2 to the power n . (The symbol $^$ would not compute the 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.

Answer: Here are two possibilities

```

// Compute 2 to the power n by starting with 2 and
// multiplying the result by 2 a total of n-1 times
function power_of_two(n) {

```

```

var i;
var answer = 2;
for (i = 1; i < n; i++) {
    answer = answer * 2;
}
return answer;
}

// second version

// Compute 2 to the power n by starting with 1 and
// multiplying by 2 a total of n times
function power_of_two(n) {
    var i;
    var answer = 1;
    for (i = 0; i < n; i++) {
        answer = answer * 2;
    }
}

// example 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 or other events to occur and responds to the information/actions the user performs. Programs need to interact with users, which is why understanding event based programming is important.