

THE UNIVERSITY OF BRITISH COLUMBIA  
CPSC 101: MIDTERM – NOVEMBER 5, 2014

Full Name: ANSWER KEY

Lab Section: A (F12-15) B (Tu18-21) C (W11-14)  
D (Th9-12) E (F15-18)

Signature: \_\_\_\_\_

UBC Student #: \_\_\_\_\_

**Important notes about this examination**

1. **This examination has 3 double-sided pages. Check that you have a complete paper.**
2. This is a closed book, closed notes exam. No books or other material may be used. Answer all the questions on this paper.
3. Give very **short but precise** answers. State any assumptions you make
4. Work fast and do the easy questions first. Leave some time to review your exam at the end.
5. You have 50 minutes to complete this exam. Good luck!

**Student Conduct during Examinations**

1. Each examination candidate must be prepared to produce, upon the request of the invigilator or examiner, his or her UBCcard for identification.
2. Examination candidates are not permitted to ask questions of the examiners or invigilators, except in cases of supposed errors or ambiguities in examination questions, illegible or missing material, or the like.
3. No examination candidate shall be permitted to enter the examination room after the expiration of one-half hour from the scheduled starting time, or to leave during the first half hour of the examination. Should the examination run forty-five (45) minutes or less, no examination candidate shall be permitted to enter the examination room once the examination has begun.
4. Examination candidates must conduct themselves honestly and in accordance with established rules for a given examination, which will be articulated by the examiner or invigilator prior to the examination commencing. Should dishonest behaviour be observed by the examiner(s) or invigilator(s), pleas of accident or forgetfulness shall not be received.
5. Examination candidates suspected of any of the following, or any other similar practices, may be immediately dismissed from the examination by the examiner/invigilator, and may be subject to disciplinary action:
  - i. speaking or communicating with other examination candidates, unless otherwise authorized;
  - ii. purposely exposing written papers to the view of other examination candidates or imaging devices;
  - iii. purposely viewing the written papers of other examination candidates;
  - iv. using or having visible at the place of writing any books, papers or other memory aid devices other than those authorized by the examiner(s); and,
  - v. using or operating electronic devices including but not limited to telephones, calculators, computers, or similar devices other than those authorized by the examiner(s)—(electronic devices other than those authorized by the examiner(s) must be completely powered down if present at the place of writing).
6. Examination candidates must not destroy or damage any examination material, must hand in all examination papers, and must not take any examination material from the examination room without permission of the examiner or invigilator.
7. Notwithstanding the above, for any mode of examination that does not fall into the traditional, paper-based method, examination candidates shall adhere to any special rules for conduct as established and articulated by the examiner.
8. Examination candidates must follow any additional examination rules or directions communicated by the examiner(s) or invigilator(s).

**Please do not write in this space:**

Problem 0: \_\_\_\_\_

Problem 1: \_\_\_\_\_

Problem 2: \_\_\_\_\_

Problem 3: \_\_\_\_\_

Problem 4: \_\_\_\_\_



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**Problem 1: Multiple Choice – circle the correct answer [4 marks]**

- i. How many symbols can be represented by four bits?
  - a. 12
  - b. 16
  - c. 36
  - d. 256
  
- ii. On the computer, variables are
  - a. memory locations
  - b. programs
  - c. files
  - d. all of the above
  
- iii. In JavaScript, **onclick** is a(n)
  - a. variable
  - b. event
  - c. event handler
  - d. button
  
- iv. Suppose you have an image saved in a vector representation. The size of the vector graphics file depends on the size of the image.
  - a. true
  - b. false

**Note: all are practice exercises recommended exercises from the book or the exercises page**

## Problem 2: Understand JavaScript Function [9 marks]

Find values of a, b, c, d, e, f, g, h, i. List them in the table to the right.

```
a = 1 + 1;  
b = 2 * (a - 1);  
c = a + b;  
d = c;  
e = foo(d,b)  
f = 10;  
g = bar(f,d);  
h = baz(f,d);  
i = foo(baz(1,1),bar(a,b));
```

```
function foo(x,y) {  
    return x + y;  
}
```

```
function bar(w,z) {  
    return 2 * foo(w,z);  
}
```

```
function baz(q,r) {  
    return bar(q,r) + foo(q,r);  
}
```

<b>a</b>	
<b>b</b>	
<b>c</b>	
<b>d</b>	
<b>e</b>	
<b>f</b>	
<b>g</b>	
<b>h</b>	
<b>i</b>	

### Answer:

```
a = 2;  
b = 2;  
c = 4;  
d = 4;  
e = 4 + 2 = 6;  
f = 10;  
g = 2 * foo(10,4) = 2 * 14 = 28;  
h = 2 * foo(10,4) + foo(10,4) = 3 * 14 = 42;  
i = foo(bar(1,1) + foo(1,1),4) = foo((4+2),8) = 14;
```

**note: this is a practice question for module 3**

### Problem 3: Write JavaScript Function [7 marks]

Complete the following function that takes a number “n”, and returns the average of the numbers from 1 to n.  
Example: averageN(5) returns  $(1+2+3+4+5)/5 = 3$

```
function averageN(n) {  
    var sum = 0;  
    var i;  
  
    for(i=1;i <= n;i++) {  
        sum += i;  
    }  
    return sum/n;  
}
```

**Problem 4: Translation between binary, hexadecimal, and decimal [10 marks]**

- (a) Translate the following decimal number to its binary equivalent. SHOW YOUR WORK.

**42**

**101010**

- (b) Translate the following hexadecimal number to its binary equivalent. SHOW YOUR WORK.

**FACE1**

**11111010110011100001**

## Appendix: HTML, JavaScript, Binary and Hexadecimal digits

### Summary of some common HTML tags:

Start Tag	End Tag	Meaning
<html>	</html>	HTML document; first and last tags in an HTML file
<title>	</title>	title bar text; describes page
<head>	</head>	preliminary material at start of the page
<body>	</body>	the main part of the page
<p>	</p>	paragraph, can use align attribute
<script>	</script>	Start a script. By default this is JavaScript
<!--	-->	HTML comment (not really a tag); ignored by the browser

### Summary of some common JavaScript syntax

<pre>var foo = 42; //create a variable named foo</pre>
<pre>if (&lt;Boolean expression&gt;     &lt;then-statement&gt; else     &lt;else-statement&gt;</pre>
<pre>function &lt;function name&gt;(&lt;parameters&gt;) {     &lt;function body&gt; }</pre>
<pre>for (&lt;initialization&gt;; &lt;continuation&gt;; &lt;next iteration&gt;){     &lt;statement list&gt; }</pre>

### Powers of two

$2^9$	$2^8$	$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
512	256	128	64	32	16	8	4	2	1

### Hexadecimal digits

Binary representation	Decimal representation	Hexadecimal representation
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F