

**CMPSCI 105 Midterm Exam
Solution Key**

**Fall 2013
October 17, 2013**

Professor William T. Verts

<1> 15 Points – (1 point each) – Fill in your answer into the box at the left side of each question. Show your work on the back of a page if you want us to consider partial credit. **Pick any 15 problems.** For extra credit, you may do more than 15.

F	1. True or False: A 3½-inch diskette is a “hard disk”.
F	2. True or False: A USB flash drive is a “hard disk”.
F	3. True or False: The decimal fraction $\frac{1}{3}$ can be converted to binary with a <u>fixed</u> number of bits.
$2^6 = 64$	4. How many different binary patterns can be expressed with 6 bits?
$2^6 - 1 = 63$	5. What is the largest unsigned number that will fit into 6 bits? One of the 64 patterns is zero, so the largest remaining is 63.
$2^{6-1} - 1 = +31$	6. What is the largest signed number that will fit into 6 bits? 32 are negative, 32 are zero and above, biggest of those = 31
$-2^{6-1} = -32$	7. What is the <u>smallest</u> signed number that will fit into 6 bits? All 32 are negative, smallest is -32.
313_4	8. Convert the decimal (base 10) number 55 into base 4. $55 \div 4 = 13R3$ (rightmost), $13 \div 4 = 3R1$, $3 \div 4 = 0R3$ (leftmost).
E5	9. Convert the binary (base 2) number 11100101_2 into hexadecimal (base 16) using the bit-partitioning method. $1110=14$, $0101=5$
345	10. Convert the binary (base 2) number 11100101_2 into octal (base 8) using the bit-partitioning method. $011=3$, $100=4$, $101=5$
100001011	11. What is the sum in binary (base 2) of the two binary numbers 11100101_2 and 00100110_2 ?
$3+9i$	12. What is the sum of complex numbers $5+3i$ and $-2+6i$? Add up reals, add up imaginaries.
$-28+24i$	13. What is the product of complex numbers $5+3i$ and $-2+6i$? FOIL: $5 \times -2 = -10$, $5 \times 6i = 30i$, $3i \times -2 = -6i$, $3i \times 6i = 18i^2 = -18$
integer	14. Is the sum of $(5+3i)$ and $(5-3i)$ an integer , rational , irrational , or complex ? (Complex parts cancel, leaving integer 10)
0.53502648	15. What is the logarithm, base 3, of the number 1.8? (See table in book, page 1164 in 2013 edition)
462	16. In the UNIX command <code>chmod _____ filename</code> what must be in the blank to set permissions to <code>r--rw--w-</code> ?
g-w	17. In the UNIX command <code>chmod _____ filename</code> what must be in the blank to deny write permission to group ?
.CA	18. Two servers hold identical files, one in .CA and one in .CZ . Based on distance alone, from which should I download a file?
new	19. Fred changes his elsrv3 password through PuTTY. When he connects with WinSCP, should he use the <u>old</u> or <u>new</u> password?
yes	20. Yes or No: Can I have a telnet (PuTTY, ssh) connection and an FTP (WinSCP, Fugu) connection open to the same account on the same server at the same time?

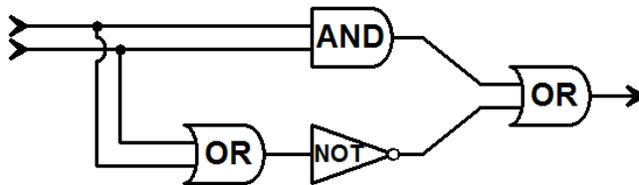
<2> 4 Points – Short Answer. Several people have told me that they would “log in to PuTTY” or “log in to Fugu”. What is wrong with these statements?

They are confusing PuTTY/Fugu/etc. with the server.

They should say “log in to the server using PuTTY/Fugu/etc.”

Answers that distinguish the server from the programs that access it are accepted.

<3> 8 Points – Trace the following gate circuit and show its output for all combinations of input values.



In		Output
A	B	
0	0	1
0	1	0
1	0	0
1	1	1

<4> 8 Points – I want to create a Web color where the red component is at full power, the green component is 102, and the blue component is turned off.

A. (4 points) What is the proper 6-digit hexadecimal code for this color?

Full Power = $255_{10} = FF$, $102_{10} = 66$, off = $0_{10} = 00$. Code is **#FF6600**

B. (1 point) Is this color compatible with the “short hex” format?

Yes (short hex would be #F60)

C. (1 point) Is this color browser safe?

Yes (all three primary values are from the set: 00, 33, 66, 99, CC, FF)

D. (1 point) Does this color have a name?

No (see page 1179 in the 2013 edition).

<5> 3 Points – Short Answer. In what cases would I use an .SVG file instead of any bitmap graphic file type (.BMP, .GIF, .JPG, etc.)?

When I want an image to look the same way at any scale.

Bitmap graphics are pixel-based and suffer from “jaggies” when scaled up - .SVG files do not because they are coordinate-based descriptions of objects.

- <6> 5 Points – I want to use the image **Frog.png** to link to **www.amphibian.com**. Write an HTML *fragment* (not a complete Web page) to do this.

```
<A HREF="http://www.amphibian.com/">
  <IMG SRC="Frog.png">
</A>
```

- <7> 5 Points – Short Answer – All of the following Web addresses fetch, by default, a file called **index.html**. Is it the same **index.html** file in each case? Why or why not?

```
http://www.umass.edu/
http://www.cs.umass.edu/
http://www.cs.umass.edu/~verts/
http://www.cs.umass.edu/~verts/stuff/
```

No. Each URL describes a different folder on the server – the **index.html** file fetched is unique to that folder.

- <8> 10 Points – Answer with **telnet**, **ftp**, **browser**, **editor**, or **none** to describe the best program to use in each case. (Expectation was that “editor” meant “text editor”)

Connect to a remote UNIX server to give it commands.	telnet
Change the HTML contents of index.html .	editor
Move index.html between a laptop and the server.	ftp
Draw Bézier curves.	none
View a Web page stored on a server.	browser / telnet / ftp
Grab an image file from nic.funet.fi .	ftp
Set the permissions on a file located on a UNIX server.	telnet / ftp
Log in to the UMass network through a wireless access point.	browser
Change your elsrv3 password.	telnet
Add geometric objects to a .SVG file.	editor

- <9> 2 Points – Yes or No – Two Bézier curves join at a common end point, and the end points with their corresponding control points all form a straight line. Can you tell visually where the two curves join?

No.

(This is the point of Bézier Curves: when the “straight line” condition is met, one curve blends smoothly into the next, and you cannot determine the point of intersection.)

- <10> 15 Points – Fill in the **STYLE** section so that the body of the Web page has a background color where red=255, green=228, and blue=225, and where all **H3** headings are by default in the **Arial** typeface and have the color **DarkOrchid**.

Fill in the blanks as follows: The second **H3** heading must be **DarkGray** instead of the default color. The hypertext link must contain a complete URL to **CNN** and the image is the file **The_News.gif** (with the height set to 50 pixels and the alternate text set to **Talking Heads**). The copyright © symbol must appear in the correct blank, but use the numeric form of the copyright entity. The last blank must contain the fraction $\frac{1}{3}$, properly typeset in HTML.

```
<HTML>
  <HEAD>
    <TITLE>My Spiffy Web Page</TITLE>

    <STYLE TYPE="text/css">

      BODY {background-color:#FFE4E1}      (or MistyRose)

      H3 {font-family:'Arial' ;
        color:DarkOrchid }                (or #9932CC)

    </STYLE>
  </HEAD>

  <BODY>
    <H3>Welcome!</H3>

    <A HREF="http://www.cnn.com/">

      <IMG SRC="The_News.gif"

        ALT="Talking Heads"

        HEIGHT="50">

    </A>

    <H3 STYLE="color:DarkGray">Legal</H3>      (or #A9A9A9)

    Copyright &#169; 2013 All Rights Reserved

    <SUP>1</SUP>&frac1<SUB>3</SUB>-Baked
      Productions, Inc.

  </BODY>
</HTML>
```

- <11> 10 Points – Find and correct all of the errors in the following **.SVG** file that cause it to fail to be displayed. There are at least ten mistakes. There will be a penalty of -1 point for each correct item misidentified as an error, but +½ point extra credit for each correctly found error more than ten. Remember that presentation attributes like **fill**, **stroke**, **stroke-width**, and **stroke-linejoin** are all optional, and the absence of one or more of these is not an error.

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>

<!-- Copyright 2013 William T. Verts -->

<svg
  xmlns:svg="http://www.w3.org/2000/svg"
  xmlns="http://www.w3.org/22000/svg"
  version="1.1"
  x="0px"
  y="0px"
  width="320px"
  height="240px">

  <rect
    x="0" y="0" width="320" height="140"
    fill="#00FFFF"/>

  <line x1="0" y1="140" x2="320" y2="140"
    stroke="black" stroke-width="3"/>

  <polyline or gon
    points="250,100 190,160 310,160 250,100"
    fill="#00F080" stroke-line-join:miter
    stroke="#000000" stroke-width="3"/>

  <circle
    cx="50" cy="40" r="20"
    fill="#FFFF00"
    stroke="#000000"/>
</svg>
```

Cases where a character needs to be deleted, that character is shown with strike-through.

Cases where the wrong character is used or is missing, the correct character is highlighted in red.

<12> 5 Points – Examine the picture to the right for the following questions.



WASHINGTON
ADVANTAGE

1. The letters are each around $\frac{3}{4}$ inches high. How many points is that?

$\frac{3}{4}$ inches \times 72 $\frac{\text{points}}{\text{inch}}$ = **54 points.**

2. On the picture, indicate by circling all places where *Kerning can be strongly applied* (there are a couple of places where it may be questionable whether or not kerning could be applied; ignore those).

The WA in WASHINGTON, the VA and TA in ADVANTAGE.

<13> 5 Points – For each typeface indicate whether it is *monospaced* or *proportionally spaced*. Also, for each one indicate if it has *serifs* or if it is *sans-serif*.

1. **COPPERPLATE GOTHIC (A LITTLE TEXT.)**

serif, proportional

2. Arial Narrow (Here is a little text.)

sans-serif, proportional

3. **Bodoni MT Black (Here is a little text.)**

serif, proportional

4. Courier New (Here is a little text.)

serif, monospace

5. Lucida Fax (Here is a little text.)

serif, proportional

<14> 5 Points – Short Answer – Answer only one of the following questions on the back of this page. (No extra credit for answering more than one.) Please, no more than 5 sentences.

1. How is the **Normal.dotm** file in Word similar to a **.css** file as used in HTML Web pages?

Both are external files that contain style information.

2. Describe the *cascade* of styles in HTML.

External **.css** file → **<STYLE>** block → **STYLE** attribute → default values.

3. The **.gif** file format for graphics is very old and very limited. In what circumstances might it be preferable over a newer standard such as **.png**?

Animation is the one thing **.gif** can do that **.png** cannot.

4. What are the advantages and disadvantages of using Word to create Web pages?

Simple, but creates huge HTML files and makes a bunch of auxiliary files that also must be put onto the server.

5. Why is it useful to save a word processing file in **.RTF** format?

Move documents between different word processors.