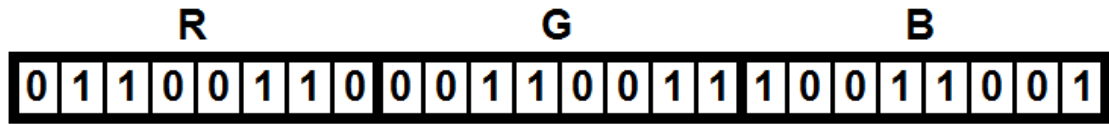


**CMPSCI 105 Midterm Exam
Solution Key
Fall 2019
November 19, 2019
Professor William T. Verts**

<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. **Correct answers will score as +1 point, blank answers as 0 points, but incorrect answers will be scored as -½ point (it is better to leave an answer blank than it is to guess incorrectly).**

FALSE	1. True or False: A 3½-inch diskette is a “hard disk”.
FALSE	2. True or False: A USB flash drive is a “hard disk”.
$2^4 = 16$	3. How many distinct binary patterns are possible with 4 bits?
$2^4 - 1 = 15$	4. What is the maximum unsigned number that will fit into 4 bits?
$2^{4-1} - 1 = 7$	5. What is the maximum signed number that will fit into 4 bits?
Tuesday	6. What day of the week is December 31, 2019?
2458849	7. What is the Julian Day number for December 31, 2019?
512	8. How many bytes are in 4 kilobits? $4 \times 1024 \div 8$
NO	9. Can the number π be stored in a float in a fixed number of bits?
$7+1i$	10. What is the sum of the complex numbers $4-2i$ and $3+3i$? or $7+i$
$18+6i$	11. What is the product of complex numbers $4-2i$ and $3+3i$? $4 \times 3 + 4 \times 3i + -2i \times 3 + -2i \times 3i = 12 + 12i - 6i - 6i^2 = (12+6) + (12-6)i$
1120	12. Convert the decimal number 42 into base 3. $42 \div 3 = 14R0$, $14 \div 3 = 4R2$, $4 \div 3 = 1R1$, $1 \div 3 = 0R1$
256	13. What is the decimal value of 2^8 ?
166	14. What is the decimal value of the hexadecimal number A6 ?
5.32E17	15. What is the computer way of writing the number 5.32×10^{17} ? or $+5.32E+17$
&pi; &ne; 3&frac14;	16. How would I typeset the expression $\pi \neq 3\frac{1}{4}$ in HTML?
&euro;	17. What is the <u>named</u> entity code for &#8364; ?
FTP	18. Would I use a telnet (PuTTY, ssh) program or an ftp (WinSCP, Fugu) program to move files between two computers?
True	19. True or False: I can make both a telnet <u>and</u> an FTP connection to the same account on the same server at the same time.
Tomato	20. What is the closest named color to #FE6446 ? #FF6347

<2> 7 Points – Here is a 24-bit color, in binary:



A. (4 points) What is the resulting hexadecimal HTML color code?

#663399 (1 point for #, 1 point for each color primary)

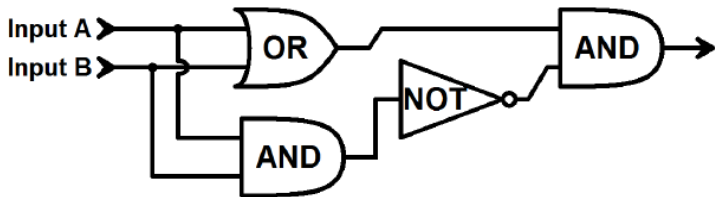
B. (1 point) Is that resulting color browser safe?

YES

C. (2 points) Does the resulting color have a name, and if so what is it?

RebeccaPurple

<3> 8 Points – Trace the following gate circuit and show its output for all combinations of input values. **2 points each answer.**



A	B	OUT
0	0	0
0	1	1
1	0	1
1	1	0

<4> 10 Points – In the current folder on my UNIX account on the `el srv3` server, I have three files: `index.html`, `Frog.jpg`, and `MyStyles.css`.

A: (5 points) Using the *symbolic* form of `chmod`, add read permission but also take away write permission (to user, group, and others) on all three of those files (all in one command). (3 points for permissions, 2 points for files, allow partial credit)

Symbolic: `chmod` `ugo+r, ugo-w` `*.*` may also be `a+r, a-w`

B: (5 points) Using the *absolute* form of `chmod`, set the permissions on only the `MyStyles.css` file to `r--r--r--`, regardless of what they were before. (3 points for permissions, 2 points for file, allow partial credit)

Absolute: `chmod` `444` `MyStyles.css`

<5> 20 Points – Write a complete, properly constructed HTML Web page using the framework below that contains the following things in the appropriate places:

1. (2 points) A title that says **My Page**.
2. (2 points) A style section with two entries:
 - A. (2 points) One that defines the background color of the page body to **green**.
 - B. (2 points) A second that defines all **H1** headings to be centered.
3. (2 points) An **H1** heading that says **Welcome!**
4. (3 points) A link to **www.frog.com** when you (2 points) click on an image called **frog.jpg**.
5. (2 points) A second **H1** heading that says **Goodbye!** with a (3 points) local style attribute setting its color to **red**.

In each section remove 1 point per error (forgetting quotes, not closing the tag correctly, etc.), but do not go below zero.

```
<!DOCTYPE html>
<HTML>
  <HEAD>

    <TITLE>My Page</TITLE>

    <STYLE TYPE="text/css">

      BODY {background-color:green}

      H1 {text-align:center}

    </STYLE>

  </HEAD>

  <BODY>

    <H1>Welcome</H1>

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

      <IMG SRC="frog.jpg">

    </A>

    <H1 STYLE="color:red">Goodbye!</H1>

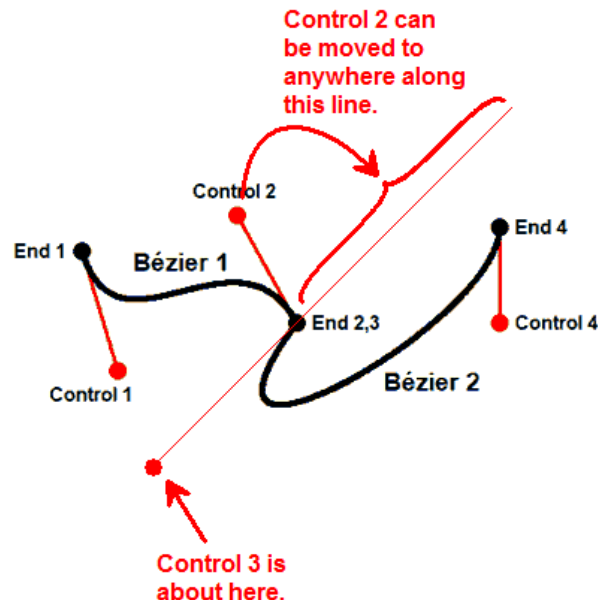
  </BODY>
</HTML>
```

- <6> 5 Points – Short Answer – I want to include an image on my Web page that contains a couple of triangles, a few circles, and a rectangle or two. Why would I choose to create and save the image as an **.SVG** file rather than as a **.GIF** or **.PNG** file?

Because **the image can be scaled to any size**, up or down, and the browser will render a perfect view of the image with no aliasing. If the image was saved as a pixel-based graphic, scaling it up in size would change diagonal lines into a “staircase” (an alias for the smooth line).

Score as: 5 points = they get it, 3 points = some ideas OK but not complete, 1 point = something meaningful but not much, 0 = completely off.

- <7> 4 Points – In the diagram below, there are two Bézier curves joined end-to-end, but there is a discontinuity (sharp turn) where they join at endpoints 2 and 3. (2 points) Control 3 is not shown; indicate its approximate position right now. (2 points) Where should Control 2 be moved to make the first curve blend seamlessly into the second?



<8> 6 Points – Examine the following text (no commercial endorsement implied!):

ALWAYS·FLY·DELTA

- A. (3 points) In the text, circle all places where ***kerning can be strongly applied***.
There are 6 kernable regions. Assign ½ point each.
- B. (1 point) The letters are in 48 point type. Exactly how many ***inches*** is that?
 $48 \div 72 = \frac{2}{3}$ of an inch
- C. (1 point) Does the typeface have ***serifs***, or is it ***sans-serif***?
sans-serif
- D. (1 point) Is the typeface ***proportionally spaced*** or ***monospaced***?
proportionally spaced

<9> 10 Points – Cell **x15** contains the following formula, which is then copied to cell **z20**:

=SUM (T40 , 25 , \$M\$10 , P5 : R9 , Z19)

(8 points) What is the resulting formula in cell **z20** after the copy has been completed?

4 points for getting the framework correct (allow partial credit):

=SUM (_____ , 25 , \$M\$10 , _____ : _____ , _____)

The formula is being copied right 2, down 5, so every relative cell gets modified by the same amount (1 point each):

T40 → V45

P5 → R10

R9 → T14

Z19 → AB24

=SUM (V45 , 25 , \$M\$10 , R10 : T14 , AB24)

(2 points) How many different values are being added up by this formula?

19

Explanation:

T40 is 1,

25 is 1,

\$M\$10 is 1,

P5 : R9 is 3 columns × 5 rows = 15,

Z19 is 1.

<10> 15 Points – Use the following spreadsheet model (all cells not shown are empty):

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		76	92	18	91	27		NO!		34	65	44	
3		32	87	254	45	34				65	76	31	
4		65	47	78	72	81			NO!				
5		76	4	85	3	83	NO!			NO!			
6		87	72	83	89	23		NO!				NO!	
7													
8													

- A. 5 Points – Write a formula using ranges to *average* all the cells in columns **B** through **F** that contain numbers, but not any other cells.

=AVERAGE (B2 : F6)

The range can be B2 : F6, F6 : B2, B6 : F2, or F2 : B6. Score as follows:

- 1 point: Starting with =
- 1 point: **AVERAGE (_____)** (-½ for AVG)
- 1 point: one corner of the range (probably **B2**)
- 1 point: The **:** to indicate the range
- 1 point: the other corner of the range (probably **F6**)

- B. 5 Points – Write a formula that returns the string "**LORGE**" if the biggest number in the table of numbers in columns **J** through **L** is larger than 50, and returns the string "**SMOL**" otherwise.

=IF (MAX (J2 : L3) >50 , "LORGE" , "SMOL")

Score as follows:

- A. 1 point: Basic framework: **=IF (_____ , _____ , _____)**
- B. 1 point: Conditional Expression: ***something*>50**
- C. 1 point: Function and Range: **MAX (J2 : L3)**
- D. 1 point: True Return: **"LORGE"**
- E. 1 point: False Return: **"SMOL"**

It is likely that a number of students answered as follows, with an anonymous range. If so, remove ½ point in part C.

=IF (J2 : L3>50 , "LORGE" , "SMOL")

- C. 3 Points – What is the result of the formula you wrote in part B? **"LORGE"**
- D. 2 Points – What is the result of the formula **=SUM (C5 : D5)** ? **89**