

CMPSCI 105 Midterm Exam Solution

Fall 2003

October 24, 2003

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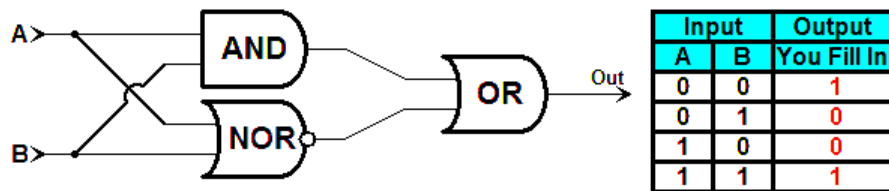
GENERAL KNOWLEDGE

<1> 12 Points – 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.

False	True or False: A 3½-inch diskette is a “hard disk”. The platter inside the hard shell is flexible.
$2^5 = 32$	I have a gate circuit with 5 inputs. How many rows in a truth table will I need to completely describe the behavior of the circuit?
55_{10}	Convert 106_7 to decimal (base 10). $1 \times 7^2 + 0 \times 7^1 + 6 \times 7^0 = 1 \times 49 + 0 \times 7 + 6 \times 1 = 49 + 0 + 6 = 55_{10}.$
$20F_{16}$	Convert 527_{10} to hexadecimal (base 16). $527_{10} = 2 \times 16^2 + 0 \times 16^1 + 15 \times 16^0 = 20F_{16}.$
3256_8	Convert 11010101110_2 to octal (base 8) using the bit partitioning method. Since $8=2^3$, chop the number into packets of three bits (add a leading zero to the leftmost packet to make it three bits wide), then convert each one as a separate problem: $011-010-101-110 = 3256$
110011_2	Add the binary numbers 11110_2 and 10101_2 and show the result in binary. <div style="text-align: center;"> \dots (carries) $\begin{array}{r} 11110 \\ +10101 \\ \hline 110011 \end{array}$ </div>
Cyan	Approximately what color is represented by the HTML color code "#1CFACE" Red = 1C = $1 \times 16^1 + 12 \times 16^0 = 16 + 12 = 28$ (low) Green = FA = $15 \times 16^1 + 10 \times 16^0 = 240 + 10 = 250$ (very high) Blue = CE = $12 \times 16^1 + 14 \times 16^0 = 192 + 14 = 206$ (high) Accept: Blue-Green, Cyan, Teal, Aqua, Turquoise, etc. <div style="text-align: center; border: 1px solid black; width: 100px; height: 50px; margin: 0 auto; background-color: cyan;"> "#1CFACE" </div>

754 ₈	<p>What is the octal (base 8) number code that corresponds to the UNIX permissions <code>rwxr-xr--</code> ?</p> <p>$rw\text{x} = 111 = 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 1 \times 4 + 1 \times 2 + 1 \times 1 = 4 + 2 + 1 = 7$</p> <p>$r\text{-x} = 101 = 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 1 \times 4 + 0 \times 2 + 1 \times 1 = 4 + 0 + 1 = 5$</p> <p>$r\text{--} = 100 = 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 = 1 \times 4 + 0 \times 2 + 0 \times 1 = 4 + 0 + 0 = 4$</p>
No	<p>Is the number 1A7E23 a valid number under the rules of base 12? (Yes or No)</p> <p>The “E” represents decimal value 14, which is too large for base 12.</p>
250,000	<p>How many bytes in size are the image data for a .BMP file which is 500 by 500 pixels, and stored as an 8-bit per pixel image?</p> <p>At 8 bits per pixel, each pixel takes up exactly one byte, so an image 500×500 takes 250,000 bytes. A .BMP file takes a little bit more space due to the storage of header and palette information.</p>
.GIF	<p>I have a 256-color .BMP containing text, drawings, and other “hard edges”. Should I convert the image into .GIF or .JPG format?</p> <p>Hard edges are retained when the file is converted to the lossless .GIF format, but exhibit “ringing” or high-frequency color noise when converted to the lossy .JPG format.</p>
5 ⁴ = 625	<p>A holiday display has 4 individual lights, each of which may be off, red, yellow, blue, or green. How many color combinations are there?</p> <p>The number of independent digits is 4 (the lights), and each digit is in base 5 (the number of color combinations, including “off”). The number of combinations is the base raised to the number of digits.</p>

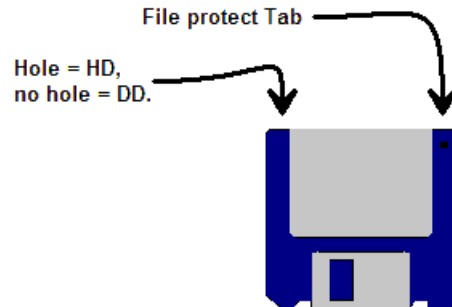
<2> 4 Points – Trace the following gate circuit and show its output for all combinations of input values.



- <3> 3 Points – On a floppy disk I wish to prevent accidental deletion of my files. What do I do to make it impossible for the hardware to modify the contents of the disk?

Set the file protect tab on the diskette so you can see light through the hole.

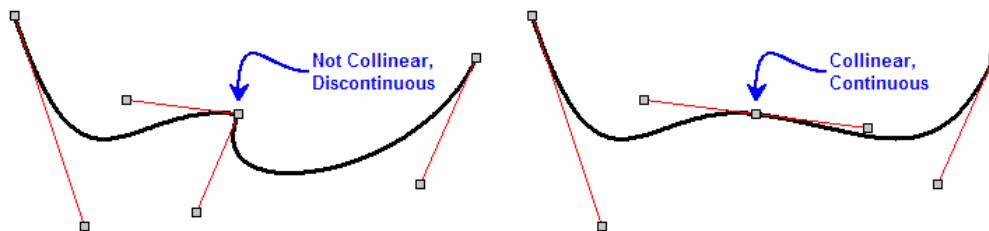
On 1.44 megabyte high density disks there will be a second hole in the opposite corner; this hole is missing in 720K double density disks. Both types have the sliding file protect tab.



- <4> 2 Points – Short answer. I connect two Bézier curves together end-to-end, but I do NOT make the corresponding control points collinear with the common endpoints. Do the two curves blend smoothly into each other, or is there a discontinuity?

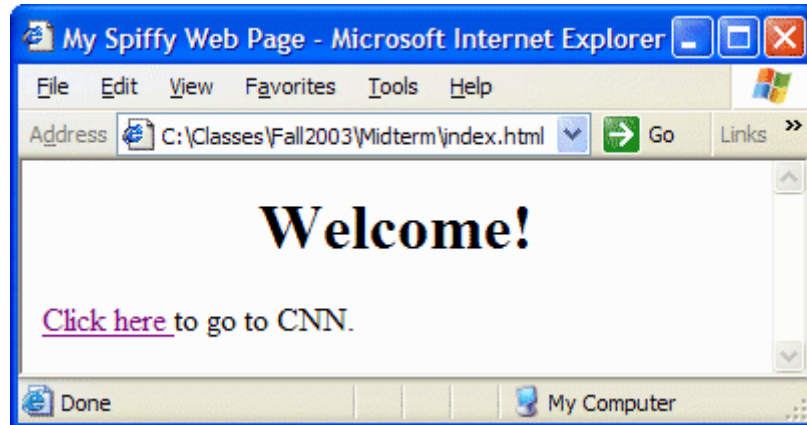
There will be a discontinuity.

In the left image below the two Bézier curves are joined at their endpoints, but the corresponding control points are not collinear with those endpoints. The composite curve takes a sharp turn (is discontinuous) at the common endpoints. In the right image the first control point of the second curve has been brought up to be collinear with the second control point of the first curve and the common endpoints. As a result the first Bézier curve blends smoothly into the second.



UNIX & THE INTERNET

- <5> 8 Points – Examine the following web page. In the framework below, write the complete, correct HTML code that will generate this page. Use `www.cnn.com` for the link address.



```
<HTML>
  <HEAD>
    <TITLE>My Spiffy Web Page</TITLE>
  </HEAD>
  <BODY>
    <CENTER>
      <H1>Welcome</H1>
    </CENTER>
    <A HREF="http://www.cnn.com/">Click here</A>
    to go to CNN.
  </BODY>
</HTML>
```

- <6> 4 Points – Correct all the errors in the following HTML fragment.

```
<IMG SRC="Froggy.jpg" ALT="A very nice frog">
```

<7> 4 Points – I want to change the permissions on the subdirectory `public_html` from `rwX-----` to `rwXr-xr-x` by using both the symbolic form and the absolute form of the `chmod` command. Fill in the blanks below with the appropriate coding for each form.

(Symbolic) `chmod go+rx public_html` (also a+rx)

(Absolute) `chmod 755 public_html`

<8> 4 Points – Short answer. What are the differences between telnet (including encrypted versions such as PuTTY and SecureCRT) and ftp? What can each do that the other cannot?

Telnet programs (including PuTTY and SecureCRT) all allow a user to issue commands to a remote computer over the Internet. FTP allows users to transfer files between computers over the Internet.

<9> 4 Points – Short answer. I log onto my UNIX account and type the `ls -al` command. I see files `index.html`, `public-html`, and `froggy.gif` listed, but nothing else of importance. Is my web page visible to the outside world? Why or why not?

The web page is not visible. First, there is no directory named `public_html` (the existing name contains a hyphen, not an underscore). Even if the directory *was* named correctly, the `index.html` and `froggy.gif` files are not inside, and are therefore not visible on the web.

<10> 4 Points – Short answer. It is 6:00pm here on the East Coast, and there is a multi-megabyte file that I want to download to my computer. Should I download that file from Colorado, or from Italy? Why would you choose one over the other?

It is 4:00pm in Colorado, but nearly midnight in Italy. Network traffic is likely to be heavy in Colorado since they are still in the middle of their business day, but many fewer Italians will be on line. I would download the file from the Italian mirror site.

MICROSOFT WINDOWS & ACCESSORIES

<11> 2 Points – A folder window is open on screen, containing a subfolder and a .TXT file. What happens when I *left*-click-drag the .TXT file to the subfolder?

The file is *moved* into the subfolder.

If the folder was on a different disk drive the file would be copied instead of moved, and if I right-click-drag the file anywhere I will get a pop-up asking what action should be taken (move, copy, or create shortcut).

<12> 5 Points – In Notepad, I select a region of text with the mouse, then click on Edit in the menu. Which items in the Edit menu will be black (active), gray (inactive), or you cannot tell from the information given?

- A. Undo Cannot tell (you don't know what happened before now)
- B. Cut Black (since text has been selected)
- C. Copy Black (since text has been selected)
- D. Paste Cannot tell (you don't know what is in the clipboard)
- E. Select All Black (always available)

<13> 4 Points – I have two folder windows open on screen side-by-side (not overlapping). Describe two different ways of knowing which one of the two is the active window.

1. The active window will have a darker title bar than the inactive window.
2. The active window will have a pushed-in button on the task bar.

WORD PROCESSING

- <14> 4 Points – Short answer. In making documents available to my students, I have often saved them in Adobe Acrobat format (with a .PDF extension). What are the advantages and disadvantages of distributing documents in .PDF format, as opposed to Word's .DOC format?

Advantages:

Don't need Word to view document. Can download free Acrobat Reader from the Web (<http://www.adobe.com>). Document appears on the printer identically to the way it appears on screen. Document appears the same way in Acrobat Reader for the PC and for the Mac.

Disadvantages:

Must download and install the Acrobat Reader manually since it isn't part of Microsoft Windows. Need Acrobat Writer (not free) to create .PDF files.

- <15> 4 Points – Short answer. In Word, what are the differences between saving a document to a file and printing a document to a file? What are the benefits of each?

Saving to a file saves the original text plus formatting commands that describe how that text should be marked up (which sections are bold, italic, how paragraphs are to be formatted, etc.) Printing to a file converts the document into a language specific to a printer for how to make marks on paper.

A saved file can be opened on any computer with Word installed, while a printer file cannot. A printer file can be created on a computer without a printer (just the printer driver installed) and taken to a computer with the proper printer (but not necessarily with Word installed) for printing.

- <16> 4 Points – You need two “documents” to complete a mail-merge (such as lab #4). What information is in each document, and how does each contribute to the process?

The first is the “boilerplate” master document that contains all the generic text that goes to everybody, plus tags that indicate where specific information should be filled in from the second document, which is a database of unique customizing information.

- <17> 2 Points – I took the following picture in western Nebraska this summer. Show or describe the points where *kerning* needs to occur.

Between the A and T in “RATTLESNAKES” and in “NATIVE”. Also acceptable answers are between the T and O in “TO” and between the A and U in “CAUTION”, but these are less obvious candidates for kerning than the A-T combinations.



- <18> 2 Points – Does the typeface used in the sign have serifs, or is it sans-serif?

It is sans-serif. There are no spiky decorative points on any characters.

SPREADSHEETS

- <19> 4 Points – Parenthesize the following expression to show how it will be evaluated by a spreadsheet. Use as many parentheses as necessary to show the complete order of evaluation.

$$(((9 * 5) * (3 ^ 6)) + (4 / 2)) + 8)$$

Most people get the parentheses in red for the power and the multiplications and divisions, but forget the outer ones in blue for the additions (and any subtractions). Don't forget that equal precedence operators get evaluated from left to right.

- <20> 4 Points – Write a complete, valid Excel formula to compute the following expression:

$$\frac{\sqrt{5}+1}{2}$$

$$=(SQRT(5)+1)/2$$

Note that the expression =SQRT(5)+1/2 is not correct as it only divides the 1 by 2, and does nothing to the square root before the addition.

<21> 4 Points – Cell **T3** contains the formula:

$$=(R2+\$A\$1*5-MAX(M5:P7)/Z\$4)$$

which is then copied to cell **W2**. What is the resulting formula in cell **W2** after the copy has been completed?

The formula is being copied to the right three columns and up one row. Every relative reference in the original formula is modified by the same offset.

Partial credit for: $=(___+\$A\$1*5-MAX(___: ___)/___\$4)$

R2	+ (right 3, up 1)	= U1
M5	+ (right 3, up 1)	= P4
P7	+ (right 3, up 1)	= S6
Z	+ (right 3)	= AC

Full credit for: $=(U1+\$A\$1*5-MAX(P4:S6)/AC\$4)$

<22> 2 Points – In Excel, at exactly 3:00am on October 24, 2003 the formula =NOW() returns date number 37918.125 (formatted as a date and time). What date number will be returned by =NOW() at 6:00am on October 31, 2003?

37925.25

The difference between October 31 and October 24 is 7 days, so $37918+7=37925$. At 6:00am we are $\frac{1}{4}$ of the way through the day, or 0.25 of a day. Therefore, $37925 + 0.25 = 37925.25$.

<23> 4 Points – Write a correct Excel formula to compute the number of days remaining between October 31, 2003 and January 1, 2004.

$$=DATE(2004,1,1) - DATE(2003,10,31)$$

No need to count out the days from the previous problem; let the spreadsheet do the work for you!

<24> 6 Points – The cursor is on notebook page **Calculations**. Write a formula in the current cell using an Excel function to add up cells B3, B4, B5, B6, C3, C4, C5, and C6 from the **Input Output** page of the notebook.

=SUM('Input Output'!B3:C6)

The important skill here is to recognize that the eight cells being summed are all part of the same single range **B3:C6**. Next is to apply the cross-page reference correctly to that range, and finally use the result as the argument to the SUM function.