*Name:*_____

*ID:*_____

ECS 15: Introduction to Computers
Midterm
November 6, 2013

Notes:
1) The midterm is open book, open notes.
2) You have 50 minutes, no more: I will strictly enforce this.
3) The midterm is divided into 2 parts, and graded over 100 points
4) You can answer directly on these sheets (preferred), or on loose paper.
5) Please write your name at the top right of each page you turn in!
6) Please, check your work! If possible, show your work when multiple steps are involved.

Part I (15 questions, each 4 points; total 60 points)
(These questions are multiple choices; in each case, find the most **plausible** answer)

1) *What is RAM?*
   a. An animal with horns,
   b. Temporary memory space,
   c. A video game,
   d. A device that stores energy for a computer.

2) *How is it possible that both programs and data can be stored on a single disk?*
   a. Many disks have two sides, one for programs and one for data,
   b. It is not possible, as disks can only store data,
   c. Programs and data are both software, and both can be stored on any memory device,
   d. It is not possible, as a disk has to be formatted for one or for the other

3) *Which of these is NOT software:*
   a. Microsoft Word
   b. Microsoft Powerpoint
   c. Grand Theft Auto V
   d. DVD

4) *How much memory is one gigabyte?*
   a. About 1000 bytes
   b. About one billion bytes
   c. About one million bytes
   d. About 100,000 bytes

5) **How much space would you need to store a 5 min song that has been sampled at 44.1 KHz, with each data point stored on 24 bits, in mono (i.e. with a single microphone)? Assume no compression.**
   a. About 40 GBytes
   b. About 40 MBytes
   c. About 4 Mbytes
   d. About 400 KBytes

6) **Let X be the number with the hexadecimal representation AA and Y the number whose hexadecimal representation is 9D; which of these numbers T (in hexadecimal form) satisfies X-T=Y?**
   a. A
   b. B
   c. C
   d. D

7) **Which of these bytes represents the letter P (uppercase) based on the ASCII code?**
   a. 01010000
   b. 10100000
   c. 01010010
   d. 10100010

8) **A new type of binary-encoded clock is introduced and work as described below:**

Add the values of each column to get six decimal digits. There are two columns each for hours, minutes and seconds.
In the example shown:
Hours: 1 in the left column
  0 in the right column
  Therefore: 10 hours
Minutes: 3 (1+2) in the left column
  7 (1+2+4) in the right column
  Therefore: 37 minutes
Seconds: 4 in the left column
  9 (8+1) in the right column
  Therefore: 49 seconds.

HH : MM : SS

8
4
2
1

1 0 3 7 4 9

10 : 37 : 49

9)

What time is it on this clock?

   a. 17:59:31
   b. 15:59:31
   c. 17:59:21
   d. 17:49:21

9) **Which of these 4 numbers, given in hexadecimal format, correspond to blue in the RGB system?**
   a. #FF0000
   b. #00FF00
   c. #0000FF
   d. #FFFFFF

10) **Which of the following expression is NOT a valid html tag:**
   a. <body>
   b. </html>
   c. <body />
   d.

11) **The heart rate of a young athlete can go as high as 180 beats per minute. What is the most appropriate sampling rate to use if you want to monitor heart rate during exercise?**
   a. 1 Hz,
   b. 8 Hz,
   c. 5 Hz,
   d. 3 Hz.

12) **Which of these devices is NOT an input device for a computer?**
   a. Keyboard
   b. Touchscreen
   c. Microphone
   d. Printer

13) **Which of these devices cannot be assimilated to, or does not contain a computer?**
   a. Smartphone
   b. Electronic book reader
   c. Slide ruler
   d. Notebook

14) **You take a picture with a digital camera and you know that this picture requires 64 Mbytes of storage (without compression). Assuming that each pixel is stored on 32 bits, what is the resolution of your camera, in megapixels:**
   a. 16
   b. 12
   c. 4
   d. 32

15) **The hexadecimal equivalent of 1110010 is**
   e. 82
   f. 71
   g. 72
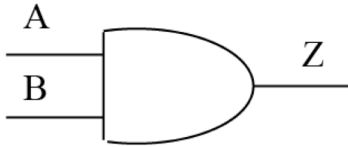   h. F2

Part II (four problems; total 40 points)

1) Based on the logic tables for the three basic gates AND, OR, and NOT given below, find the logic table associated with the "new" gate X: *(10 points)*
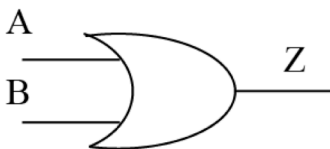
The AND gate

Logic table:

A	B	Z
0	0	0
0	1	0
1	0	0
1	1	1

The OR gate

Logic table:

A	B	Z
0	0	0
0	1	1
1	0	1
1	1	1

The NOT gate
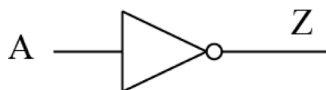
A	Z
0	1
1	0

The X gate
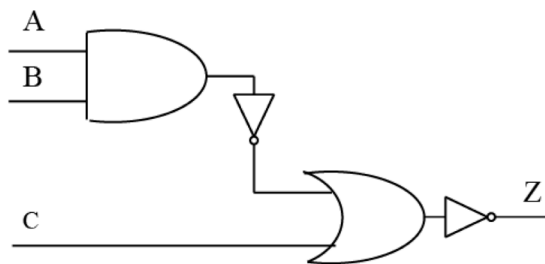
Logic table:

A	B	C	Z
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

2) The five bytes written below represent an acronym based on the ASCII code. Decode these bytes and find the corresponding acronym. Show your work *(10 points)*

01000101 01000011 01010011 00110001 00110101

3) The table below shows three problems that can occur on a computer. For each of these problems, identify at least one possible cause *(10 points)*

Problem	Possible cause ()
The computer fails the POST	
The computer passes the POST, but it does not boot	
The computer starts thrashing	

4) List at least 5 types of buses found on the motherboard of a computer *(10 points).*

Appendix: ASCII table

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	Null	32	20	Space	64	40	@	96	60	`
1	01	Start of heading	33	21	!	65	41	A	97	61	a
2	02	Start of text	34	22	"	66	42	B	98	62	b
3	03	End of text	35	23	#	67	43	C	99	63	c
4	04	End of transmit	36	24	$	68	44	D	100	64	d
5	05	Enquiry	37	25	%	69	45	E	101	65	e
6	06	Acknowledge	38	26	&	70	46	F	102	66	f
7	07	Audible bell	39	27	'	71	47	G	103	67	g
8	08	Backspace	40	28	(	72	48	H	104	68	h
9	09	Horizontal tab	41	29	)	73	49	I	105	69	i
10	0A	Line feed	42	2A	*	74	4A	J	106	6A	j
11	0B	Vertical tab	43	2B	+	75	4B	K	107	6B	k
12	0C	Form feed	44	2C	,	76	4C	L	108	6C	l
13	0D	Carriage return	45	2D	-	77	4D	M	109	6D	m
14	0E	Shift out	46	2E	.	78	4E	N	110	6E	n
15	0F	Shift in	47	2F	/	79	4F	O	111	6F	o
16	10	Data link escape	48	30	0	80	50	P	112	70	p
17	11	Device control 1	49	31	1	81	51	Q	113	71	q
18	12	Device control 2	50	32	2	82	52	R	114	72	r
19	13	Device control 3	51	33	3	83	53	S	115	73	s
20	14	Device control 4	52	34	4	84	54	T	116	74	t
21	15	Neg. acknowledge	53	35	5	85	55	U	117	75	u
22	16	Synchronous idle	54	36	6	86	56	V	118	76	v
23	17	End trans. block	55	37	7	87	57	W	119	77	w
24	18	Cancel	56	38	8	88	58	X	120	78	x
25	19	End of medium	57	39	9	89	59	Y	121	79	y
26	1A	Substitution	58	3A	:	90	5A	Z	122	7A	z
27	1B	Escape	59	3B	;	91	5B	[	123	7B	{
28	1C	File separator	60	3C	<	92	5C	\	124	7C		
29	1D	Group separator	61	3D	=	93	5D	]	125	7D	}
30	1E	Record separator	62	3E	>	94	5E	^	126	7E	~
31	1F	Unit separator	63	3F	?	95	5F	_	127	7F	□