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# EECS 1520.03 COMPUTER USE: Fundamentals

Test 2 (Solutions)
April 1, 2015

Instructions:

- This is an in class examination, therefore examination rules are in effect.
- Fill in the box at the top of this page, and print your Student ID# at the top of each other page.
- Answer ALL questions:
- Time allowed is **60** minutes.
- Use of calculators is **NOT** permitted.
- There are **13** pages including this cover. Please count them.
- An **EXCEL FUNCTION LIST** is attached at the end.

Mark

_____

**Total: 35**

1) _____ is the time it takes for the read/write head of the hard-disk drive to get into position over the specified track of a disk.

a) rotational delay
b) seek time
c) latency
d) access time
e) transfer rate

2) Inside a CPU, _____ contains the address of the next instruction to be executed.

a) instruction register
b) control unit
c) program counter
d) memory data register
e) ALU

3) How many input lines are connected to a multiplexer with 4 control lines?

a) 2
b) 4
c) 8
d) 16
e) 32

4) Which gate(s) produce a 1 if all its inputs are 0?

I. AND II. OR III. NAND IV. NOR

a) II.
b) I. and II.
c) III. and IV.
d) II. and III. And IV.
e) All of the above

5) "A • B = B • A" is an example of which of the following properties?

a) Commutative
b) Associative
c) Distributive
d) Identity
e) Complement

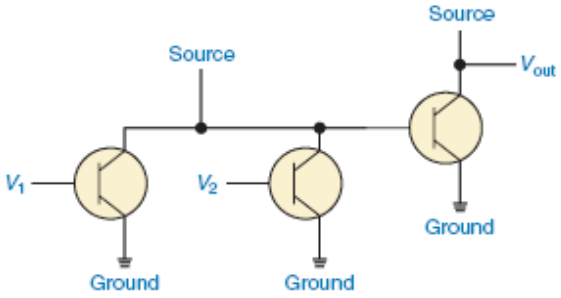
6) "(A + B) + C = A + (B + C)" is an example of which of the following properties?

a) Commutative
b) Associative
c) Distributive
d) Identity
e) DeMorgan's law

7) If A is a Boolean variable that takes on values 0 or 1, then A + A' =_____ and A • A' = _____.

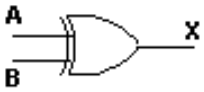
a) 0, 0
b) 0, 1
c) 1, 0
d) 1, 1
e) 1, A

8) The following transistor diagram implements which gate?




a) AND
b) OR
c) NOR
d) NAND
e) XOR

9) The following logic diagram represents which gate?




a) AND
b) OR
c) NOR
d) NAND
e) XOR

10) How many transistors are required to implement the following gate?


a) 2
b) 3
c) 4
d) 5
e) 6

11) The "sum bit" of a half-adder circuit is the output of which gate?

a) OR
b) AND
c) NOR
d) XOR
e) NOT

12) In an S-R latch logic circuit, the output state remains the same when S is _____ and R is _____.

a) 0, 0
b) 0, 1
c) 1, 0
d) 1, 1
e) none of the above

13) What is the Boolean expression for the following truth table?

| **A** | **B** | **X** |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

a) X = (A • B)'
b) X = (A + B)'
c) X = (A ⊕ B)'
d) X = A + B
e) X = A ⊕ B

14) _____ serves as both an input and output device.

a) monitor
b) printer
c) touchscreen
d) scanner
e) plotter

15) The memory consists of a small program as shown in **TABLE 2**, the list of the op-code is shown in **TABLE 1**. What is the action being taken place in memory location 000100?

**TABLE 1.**

| Op-code | Functions |
|---|---|
| 00 | HALT |
| 01 | LOAD |
| 10 | STORE |
| 11 | ADD |

**TABLE 2.**

| | Memory |
|---|---|
| 000000 | |
| 000001 | |
| 000010 | 10100000 |
| 000011 | 00000000 |
| 000100 | 01001000 |
| 000101 | 11001001 |
| 000110 | 10001010 |
| 000111 | 00000000 |
| 001000 | 00001001 |
| 001001 | 00000101 |
| 001010 | |

a) Add a number of decimal value 9
b) Add a number of decimal value 5
c) Load a number of decimal value 9
d) Store a data
e) Delete a data

16) Consider the following list of powers of 10: $10^{-12}$, $10^{9}$, $10^{-6}$. Which list of prefixes corresponds to this list?

a) pico, tera, micro
b) pico, nano, micro
c) tera, nano, micro
d) pico, giga, micro
e) tera, giga, mega

17) The CPU in a Von Neumann machine consist of _____.

a) Memory unit and Control unit
b) ALU and Memory Unit
c) Instruction register and Memory Unit
d) ALU and Control Unit
e) Program counter and Memory Unit

18) Inside the CPU, _____ contains the instruction currently being executed.

a) program counter
b) memory address register
c) instruction register
d) ALU
e) ROM

19) The processing cycle within the CPU in a Von Neumann machine is called:

a) Execute-Decode-Fetch cycle
b) Fetch-Decode-Execute cycle
c) Fetch-Decode-Fetch-Execute cycle
d) Decode-Fetch-Execute cycle
e) Decode-Fetch-Execute-Fetch

20) In _____, multiple processors apply the same program in lock-step to multiple data sets.

a) synchronous processing
b) bit-level parallelism
c) instruction-level parallelism
d) shared memory parallel processor
e) asymmetrical processing

21) What result is produced when the following Excel expression is evaluated?

=MID(RIGHT("eecs 1520",LEN("eecs 1520")-1),2,5)

a) 1520
b) cs 15
c) s 152
d) ecs 1
e) cs152

22) What result is produced when the following Excel expression is evaluated?

=IF(ISLOGICAL(NOT(1)),NOT(1)+2,NOT(1)-1)

a) -2
b) -1
c) 0
d) 1
e) 2

23) Two single bits are defined as A and B in Excel using named ranges. If A = 0, B = 1, then which of the following function(s) will return "**TRUE**" in Excel?

I. =OR(A<>B,NOT(B))
II. =AND(B,NOT(A))
III. =NOT(A<>B)

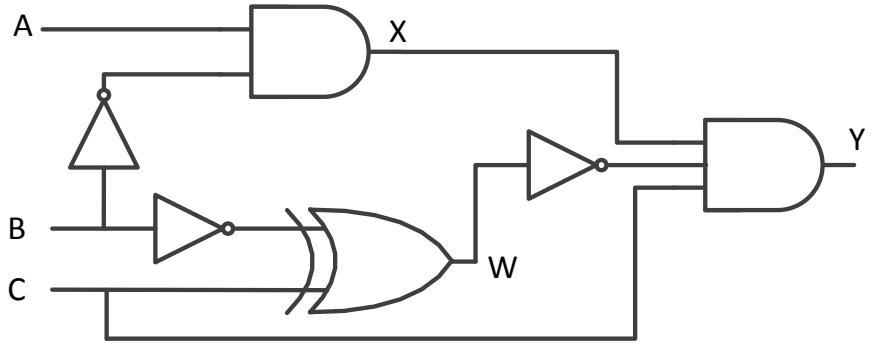
a) I.
b) I. and II.
c) II.
d) I. and III.
e) I. and II. and III.

24) How many transistors are required to implement the following Boolean expression?

$$Y = \left(A \bullet \overline{B}\right) \bullet \left(\overline{B + C}\right)$$

a) 8
b) 9
c) 10
d) 11
e) 12

25) Consider the following circuit:



What is the Boolean expression for Y?

a) $Y = \left(A \bullet \overline{B}\right) \bullet C \oplus \overline{B}$

b) $Y = C \bullet \left(A \bullet \overline{B}\right) \oplus \overline{B + C}$

c) $Y = \overline{\left(\overline{B} \oplus C\right)} \bullet \left(A + \overline{B}\right) \bullet \overline{B}$

d) $Y = \overline{\left(\overline{B} \oplus C\right)} \bullet \left(A \bullet \overline{B}\right) \bullet C$

e) $Y = \left(\overline{B} \oplus C\right) \bullet \left(A \bullet \overline{B}\right) \bullet C$

26) Back to the circuit in question 25), "W" is equal to 1 under which of the following condition(s)?

I. B = 0, C = 0
II. B = 1, C = 0
III. B = 1, C = 1

a) II.
b) I. and II.
c) I. and III.
d) II. and III.
e) I. and II. and III.

27) Back to the circuit in question 25), which truth table represents the correct relationship between inputs A, B and the state "X"?

A.

| **A** | **B** | **X** |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

B.

| **A** | **B** | **X** |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

C.

| **A** | **B** | **X** |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

D.

| A | B | X |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

E.

| A | B | X |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

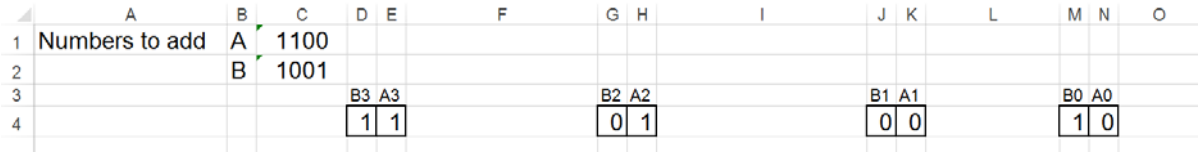
28) How many logic gates are required to implement a 4-bit adder?

a) 16
b) 17
c) 18
d) 19
e) 20

29) Which Excel function converts a string of digits to a number?

a) MID
b) VALUE
c) TEXT
d) LEN
e) FIND

30) Consider the top few rows from the 4-bit Adder exercise in Ch. 4 of the Glade Manual, the digits in cell C1 and C2 are stored in text format, which of the following formula correctly calculates the most significant bit in A (i.e. A3)?




a) =VALUE(MID(A,LEN(A)-3,1))
b) =VALUE(MID(A,LEN(A)-4,0))
c) =TEXT(MID(A,LEN(A)-1,1))
d) =VALUE(LEFT(A,2))
e) =TEXT(LEFT(A,1))

The next **5** questions are based on the following table and spreadsheet. They contain the information about a group of 14 sales people in Ontario. Listed in the table includes the person's name, ID, gender, area, and the sales. The "Rating" and "Bonus" are to be determined based on their performances.

The following table determine the rating. All ranges are named using the labels that appear in the column heading of the worksheet.

| | A | B |
|---|---|---|
| 1 | **Sales_range** | **Classification** |
| 2 | $500,000 | Averge |
| 3 | $1,000,000 | Good |
| 4 | $1,500,000 | Very Good |
| 5 | $2,000,000 | Excellent |
| 6 | $2,500,000 | Outstanding |
| 7 | | |

Here is the spreadsheet that contains the information about the sales people. The named ranges are: **Title**(A1:G1), **Sales_ID** (A2:A15), **Name** (B2:B15), **Area** (C2:C15), **Gender** (D2:D15), **Sales** (E2:E15), **Bonus** (F2:F15), **Rating** (G2:G15), and **Table** (A1:G15)

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Sales ID** | **Name** | **Area** | **Gender** | **Sales** | **Bonus** | **Rating** |
| 2 | 10001 | Park | Toronto | M | $1,900,252 | | |
| 3 | 10002 | Fraser | Kingston | F | $1,280,020 | | |
| 4 | 10003 | King | Ottawa | F | $1,134,002 | | |
| 5 | 10004 | Allen | Toronto | M | $1,637,702 | | |
| 6 | 10005 | Chen | Toronto | M | $1,237,992 | | |
| 7 | 10006 | Bushby | Hamilton | M | $2,245,892 | | |
| 8 | 10007 | Hall | Ottawa | M | $989,765 | | |
| 9 | 10008 | Jones | Ottawa | F | $1,557,970 | | |
| 10 | 10009 | Tam | Hamilton | F | $1,454,011 | | |
| 11 | 10010 | Gary | Kingston | M | $1,189,765 | | |
| 12 | 10011 | Dung | Toronto | F | $2,540,025 | | |
| 13 | 10012 | Smith | Toronto | F | $2,189,065 | | |
| 14 | 10013 | Erikson | Hamilton | M | $1,339,260 | | |
| 15 | 10014 | Davidson | Hamilton | M | $993,989 | | |

31) The "Rating" column is filled in using the formula:

=LOOKUP(Sales,Sales_range,Classification)

What are the "Rating" for the 2 sales people: Park from Toronto and King from Ottawa?

a) Very Good, Very Good
b) Excellent, Very Good
c) Excellent, Good
d) Very Good, Good
e) Outstanding, Very Good

32) The "Bonus" column lists whether the sales person will receive a year-end bonus based on certain criteria. To determine this, the average sales is first obtained and is named **Avg_Sales**, which has a value of $ $1,549,265. The "Bonus" column is then filled in using the following formula:

=IF(AND(OR(Area="Kingston",Area="Ottawa"),Sales>=Avg_Sales),"Year-end bonus","no")

Based on the above formula, how many sales people will receive a year-end bonus?

a) 1
b) 2
c) 3
d) 4
e) 5

33) A new spreadsheet called "**Area**" as shown in the following figure is created to summarize the sales total for each area. Which formula would return the total sales in Ottawa?

| | A | B |
|---|---|---|
| 1 | **Location** | **Total Sales** |
| 2 | Toronto | |
| 3 | Kingston | |
| 4 | Ottawa | |
| 5 | Hamilton | |
| 6 | | |

a) =SUMIF(A4,Area,Sales)
b) =SUMIF(Area,A4,Sales)
c) =SUMIF(Area,B4,Sales)
d) =COUNTIF(Area,A4)
e) =SUM(Sales)

34) Which formula would return the name of the sales person with the least sales?

a) =LOOKUP(Name,MIN(Sales),Sales)
b) =VLOOKUP(MATCH(MIN(Sales),Sales,0),Table,2)
c) =INDEX(Table,MATCH(MIN(Sales),Sales,0),MATCH("Name",Title,0))
d) =INDEX(Table,MATCH(MIN(Sales),Sales,0)+1,MATCH("Name",Title,0))
e) =INDEX(Table,MATCH(MIN(Sales),Sales,0),MATCH("Name",Title,0)+1)

35) A new worksheet called "Criterion" is now created as shown in the following figure, which shows that when a Sales ID is entered in cell B2, Excel will display the corresponding Name, Gender, Area and Sales. Which formula would return the corresponding gender in cell B4?

| | A | B |
|---|---|---|
| 1 | Criterion | |
| 2 | **Sales ID** | 10003 |
| 3 | **Name** | |
| 4 | **Gender** | |
| 5 | **Area** | |
| 6 | **Sales** | |

a) =INDEX(Table,MATCH(Criterion!$B$2,Sales,0)+1,4)
b) =INDEX(Table,MATCH(Criterion!$B$2,Sales_ID,0)+1,MATCH(A4,Title,0))
b) =INDEX(Table,MATCH(Criterion!$B$2,Sales_ID,0),4)
c) =VLOOKUP(Gender,Table,4)
d) =MATCH(Criterion!$B$2,Sales_ID,0)

## EXCEL FUNCTION LIST

SUM (range)
MIN (range)
MAX (range)
AVERAGE (range)
SIN (number)
RAND ()
ROUND (number, num_digits)
ROUNDUP (number, num_digits)
COUNTIF (range, criteria)
PRODUCT (number1, number2, …)
LOOKUP (lookup_value, lookup_vector, result_vector)
STDEV (number1, number2, …)
IF (logical_test, value_if_true, value_if_false)
AND (logical1, logical2, …)
OR (logical1, logical2, …)
NOT (logical)
TRUE ()
FALSE ()
ISBLANK (Value)
ISERR (Value)
ISERROR (Value)
ISLOGICAL (Value)
ISNA (Value)
ISNONTEXT (Value)
ISNUMBER (Value)
ISREF (Value)
ISTEXT (Value)
CONCATENATE (string1, string2)
EXACT (string1, string2)
LEFT (string, number_of_characters)
LEN (string)
LOWER (string)
MID (string, start_position, number_of_characters)
RIGHT (string, number_of_characters)
TEXT (value, format_text)
UPPER (string)
VALUE (string)
SUMIF (range, criteria, sum_range)
VLOOKUP (lookup_value, table_array, col_index_num)
MATCH (lookup_value, lookup_array, match_type)
INDEX (array, row_num, col_num)