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EECS 1520.03 COMPUTER USE: Fundamentals

Test 1 (Solutions)
October 23, 2014

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 **7** pages including this cover. Please count them.

Part	Value	Mark
A	**20**	_____
B	**30**	_____
Total:	**50**	

Part A [20 points]

[1] 1. A worksheet that contains a description of the purpose of the spreadsheet model would usually be called: a

a) Comments
b) Graph
c) Main Data
d) Parameters
e) Summary

[1] 2. Which Excel function can be used to calculate the lowest value in a list? d

a) AVERAGE
b) MAX
c) MEDIAN
d) MIN
e) SUM

[1] 3. What is the largest digit in the octal number system? c

a) 1
b) 2
c) 7
d) 8
e) 9

[1] 4. Directory tree is a structure showing the nested directory organization of the file system inside a computer. The directory at the highest level is called _____e_____

a) working directory
b) bottom directory
c) common directory
d) sub directory
e) root directory

[1] 5. In digitizing an audio signal, a sampling rate of approximately _____e_____ times per second is enough to create a reasonable sound?

a) 2,000
b) 4,000
c) 10,000
d) 20,000
e) 40,000

[1] 6) In general, the process of converting analog data to digital data is called _____b_____.

a) encoding
b) digitizing
c) decoding
d) sampling
e) none of the above

[1] 7) __Analog_____ data is a continuous representation of information.

[1] 8) Digitizing picture is the act of representing it as a collection of individual dots called b
- a) resolution
- b) pixels
- c) vector graphics
- d) JPEG
- e) photograph

[1] 9) In the 19th century, analytical engine is designed by c
- a) Joseph Jacquard
- b) Blaise Pascal
- c) Charles Babbage
- d) Thomas Edison
- e) Gottfried Wilhelm von Leibniz

[1] 10) The number of bit combinations of an 11-bit data is d
- a) 11
- b) 256
- c) 1024
- d) 2048
- e) none of the above

[2] 11) The decimal value of the unsigned binary number 0101100.101 is d
- a) 43.375
- b) 43.675
- c) 44.375
- d) 44.625
- e) 44.875

[2] 12) The unsigned 7 bit representation of the decimal number 37 is d
- a) 0001101
- b) 0010001
- c) 0101000
- d) 0100101
- e) 1100010

[2] 13) In Excel, the cell E8 contains the formula = A3. This formula is copied from cell E8 and pasted into cell H9. What will the formula look like in cell H9? b
- a) =C3
- b) =D4
- c) =E5
- d) =F6
- e) =G7

[1] 14) _____a_____ uses a variable length binary string to represent a character so that frequently used characters have short codes.

a) Huffman encoding
b) Unicode encoding
c) Keyword encoding
d) Vector graphics
e) Run length encoding

[1] 15) Temporal compression looks for differences between consecutive frames; whereas _____c_____ removes redundant information within a frame.

a) Huffman encoding
b) Keyword encoding
c) Spatial compression
d) Vector graphics
e) Raster graphics

[1] 16) What is the amount of memory required to store a character called? c

a) bit
b) file
c) byte
d) folder
e) register

[1] 17) At what point in the course can a student in CSE1520 annul a test grade? d

a) Before the test
b) Immediately after the test
c) Within 7 days of the grades being available
d) At the end of the term
e) Never

Part B [30 point]

[3] 1) Convert the decimal number 1151 to its hexadecimal representation. Show all your steps.

	Quotient	Remainder
1151/16	71	15
71/16	4	7
4/16	0	4

Hence, the decimal number 1151 in hexadecimal is **47F**

[4] 2) Convert the hexadecimal number in 1) into 12 bit data, and verify that the 12 bit data corresponds to the decimal number 1151 in 1). Show all your steps.

47F => 0100 0111 1111

Hence in 12-bit representation is **0100 0111 1111**

To convert the 14-bit data to its decimal value:
$= 2^{10}+2^{6}+2^{5}+2^{4}+2^{3}+2^{2}+2^{1}+2^{0} = 1024+64+32+16+8+4+2+1 = 1151$

[4] 3) Give the 2 bytes two's complement representation of the decimal number -132. Show all your steps.

	Quotient	Remainder
132/2	66	0
66/2	33	0
33/2	16	1
16/2	8	0
8/2	4	0
4/2	2	0
2/2	1	0
1/2	0	1

2 bytes of data is 16bits so 132 in 2 bytes representation is: 0000 0000 1000 0100
Hence, -132 is: **1111 1111 0111 1100**

[2] 4) If the "*" is the flag character in a run-length encoding scheme, how would the following string be compressed?

BBBBDDDYYYYZZZZ44442

*B4DDD*Y4*Z4*442

[1] 5) What compression ratio is achieved in 4)?

16/20 or .80 or 80%

[2] 6) Use the following Huffman alphabet to decode the string.

e = 00 v = 1111 r = 110 o = 1110 w = 010 p= 10

10111001000110

power

[1] 7) What compression ratio is achieved in 6)?

original size: 5 characters @ 8 bits each = 40 bits
compressed size: 14
ratio: **14/40 or .35 or 35%**

[2] 8) Consider the following formula: $L/5^{M}(b/a^{3}-c^{2}/d)^{a/(M-d)}$. Assuming a, b, c, d, L, M are all named ranges, write an Excel expression for this mathematical formula.

L/5^M*(b/a^3-c^2/d)^(a/(M-d))

[4] 9) Show how a computer would use 8 bit binary notation to compute:

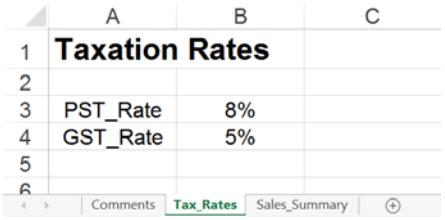
100 -15

Show all your steps (i.e. negative number is represented as 2's complement representation).

100 in binary is: 01100100
15 in binary is: 00001111
-15 in binary is: 11110001

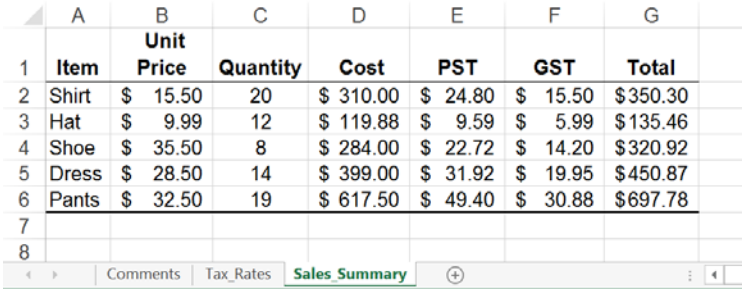
Hence,
```
  01100100
+ 11110001
 1 01010101  => 85
```

Given the following Excel worksheet, answer the following four questions.
(**Unit Price**, **Quantity** are given data; **Cost**, **PST, GST and Total** are calculated using named ranges. **PST_Rate** is defined as **Tax_Rates!$B$3**, **GST_Rate** is defined as **Tax_Rates!$B$4**)



	A	B	C
1	**Taxation Rates**		
2			
3	PST_Rate	8%	
4	GST_Rate	5%	
5			
6			

Comments | Tax_Rates | Sales_Summary



	A	B	C	D	E	F	G
1	**Item**	**Unit Price**	**Quantity**	**Cost**	**PST**	**GST**	**Total**
2	Shirt	$ 15.50	20	$ 310.00	$ 24.80	$ 15.50	$350.30
3	Hat	$ 9.99	12	$ 119.88	$ 9.59	$ 5.99	$135.46
4	Shoe	$ 35.50	8	$ 284.00	$ 22.72	$ 14.20	$320.92
5	Dress	$ 28.50	14	$ 399.00	$ 31.92	$ 19.95	$450.87
6	Pants	$ 32.50	19	$ 617.50	$ 49.40	$ 30.88	$697.78
7							
8							

Comments | Tax_Rates | Sales_Summary

[1] 10) Write down a formula in Excel that you would enter to calculate **Cost** in the **Sales_Summary** worksheet.

=Unit_Price*Quantity

[2] 11) Write down the formulas in Excel that you would enter to calculate the **PST** and **GST** in the **Sales_Summary** worksheet.

PST: =Cost*PST_Rate

GST: =Cost*GST_Rate

[1] 12) Write down a formula using functions and named ranges that you would enter in cell F8 to give the highest **GST** from all the items.

=MAX(GST)

[3] 13) Now, suppose the "**Quantity**" of "Shirt" is changed from 20 to 10. Which cells will be affected? Calculate the updated values in those cells.

Cells: D2, E2, F2, G2 will be affected.

The new values are:
D2 = $ 155, E2 = $ 12.40, F2 = $7.75, G2 = $ 175.15