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Faculty of Pure and Applied Science
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CSE 1520.03 COMPUTER USE: Fundamentals
Test 1 – Version D

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 ID# at the top of each odd numbered page.
- Answer ALL questions.
- Time allowed is **50** minutes.
- Use of calculators is **NOT** permitted.
- There are **5** pages of questions in addition to the cover.
  Please count them.

Part	Value	Mark
A	5	_____
B	7	_____
C	2	_____
D	6	_____
E	9	_____
F	11	_____
G	10	_____
Total:	***50***	**_____**

Part A [5 points] – Enter a number in each space.

For each of these concepts, indicate the generation in which it was first used and to which history (**hardware** or **software**) it belongs.

high-level languages	_____2	hardware / software
parallel computing	_____4	hardware / software
structured programming	_____4	hardware / software
transistors	_____2	hardware / software
translators	_____1	hardware / software

Part B [7 points] – Complete the table.

A pattern of binary digits can be interpreted in several different ways.
Show how the pattern **01001010** translates using each of the following interpretations.

unsigned integer	74
integer in 2's complement notation	+74
integer in excess notation	-54
Hexadecimal short form	4A
Octal short form	112
floating point notation	+⅝
ASCII	J

Part C [2 points] – Circle the LETTER of the best answer

1. In CSE1520, how many of a student's test grades can be annulled?
   a) None
   b) Only Test 2
   c) Only Test 1
   d) 0, 1, or 2

2. At what point in the course can a student in CSE1520 annul a test grade?
   a) Before the test
   b) Immediately after the test
   c) At the end of the term
   d) Never

Part D [6 points] – Put the proper LETTER in each blank.

1) In general, the process of converting analog data to digital data is called _____.
   a) digitizing
   b) reset
   c) encoding
   d) sampling
   e) reclocking

2) The process of correcting degradation to digital data is called _____.
   a) digitizing
   b) reset
   c) encoding
   d) sampling
   e) reclocking

3) The process of converting sound to digital data is called _____.
   a) digitizing
   b) reset
   c) encoding
   d) sampling
   e) reclocking

4) _____ removes redundant information from within a frame.
   a) Huffman encoding
   b) keyword encoding
   c) run length encoding
   d) spatial compression
   e) temporal compression

5) A discrete representation, breaking the information up into separate elements.
   a) analog data
   b) digital data

6) Data can be retrieved without any loss of the original information.
   a) lossless
   b) lossy

Part E [9 points]

1. An Excel worksheet that contains data values that remain constant throughout the spreadsheet model would usually be called:
   a) Comments
   b) Parameters
   c) Graph
   d) Summary
   e) Main Data

2. A cell in a spreadsheet can contain:
   a) a formula
   b) a, c, & e
   c) a literal string
   d) none of these
   e) a literal value

3. In Excel, the best style for formulas is to
   a) use relative cell addresses
   b) use absolute cell addresses
   c) use a mixture of types of cell addresses
   d) use named ranges
   e) avoid formulas

4. In Excel, a formula on one worksheet that reads data from another worksheet
   a) can only use relative addressing
   b) cannot use LOOKUP
   c) is called a "between the sheets formula"
   d) is called an "intersheet formula"
   e) is illegal

5. Create an Excel formula that will randomly generate either "Heads" or "Tails".[5]

=IF(RAND() <0.5, "Heads", "Tails")

N.B. >=0.5 will also work
BUT, >0.5 should lose ½ point

N.B.#2 "Heads" and "Tails" can be interchanged

Part F [11 points]

1) In 6-bit, 2's complement notation, how many of the bit patterns represent negative numbers?[1]

32

2) Perform the following calculation in Binary: [1]

```
  0001.1001
+ 0101.0011
  0110.1100
```

3) Express the answer above as a proper fraction in decimal. [1]

6¾

4) Show an **optimised** calculation for the following binary multiplication. Show all your steps. [5]

57 * 66

57 * 66 can be expressed as	57 * (64 + 2)	1
57 converts to	111001	1
57 * 64 =	111001000000	1
57 * 2 =	1110010	1
57 * 64 + 57 * 2 =	111010110010	1

5) Show how a computer would use 8 bit binary notation to compute the following. [3]

29 – 9

29 converts to	00011101	1
9 converts to	00001001	
so negative 9 is	11110111	1
To 29	00011101	
add negative 9	+11110111	
	1 00010100	1

Part G [10 points] – Short!! Answer

1. If the "*" is the flag character in run-length encoding, how would the following string be compressed?

   AAAAAABBBBBCCDDDDDDEEEEEE

   *A6*B5CC*D6*E6

2. What is the compression ratio achieved by this process?

   14/25 or .56 or 56%

3. Using the same style for run-length encoding, unpack the following :

   *N4X*M5*34SSS

   NNNNXMMMMM3333SSS

4. Use the following Huffman alphabet to encode the string.
   s = 00 p = 1111 d = 110 g = 1110 o = 01 t= 10

   "topdog"

   10011111110011110

5. Using the same Huffman alphabet, decode the following:

   "001001011111"

   stoop

6. What is the compression ratio achieved by this process?

   Original size: 5 characters @ 8 bits each = 40 bits
   12/40 = .30 or 30%

7. What is the term that refers to the amount of data that is used to represent a colour?

   colour depth

8. What basic colours are used by computer monitors to produce coloured images?

   red, green, blue

9. _____ describes an image in terms of lines and geometric shapes

   vector graphics

10. If an image's size is 150 X 200 pixels, and is stored in Hi-Color format, how many bytes of memory are needed to store the image without compression?

    150 * 200 = 30,000 pixels * 2 bytes/pixel = 60,000 bytes