Name: _____ Class: _____ ( )

Binary Number and Data Representation worksheet 1

Part A: Binary number

1. (a) List the symbols used in decimal system. _____

   (b) List the symbols used in binary system. _____

(2 marks)

2. Convert the following binary numbers to decimal numbers. Show your steps clearly. (Hint: $2^0 = 1$.) (6 marks)

   (a) $101_{(2)}$ = ____ × 2^2 + ____ × 2^1 + ____ × 2^0

   = _____ + _____ + _____

   = _____$_{(10)}$

   (b) $10100_{(2)}$ = ____ × 16 + ____ × 8 + ____ × 4 + _____ × 2 + _____ × 1

   = _____

   (c) $101101_{(2)}$

   _____

   _____

   _____

   (d) $110010_{(2)}$

   _____

   _____

   _____

   (e) $101001_{(2)}$

   _____

   _____

   _____

   (f) $110111_{(2)}$

   _____

   _____

   _____

3. Convert the following decimal numbers to binary numbers. (4 marks)

   (a) $19_{(10)}$ (b) $28_{(10)}$ (c) $43_{(10)}$ (d) $57_{(10)}$

```
2 | 19
2 |____...
2 |____...
2 |____...
    ...
```

```
2 | 28
```

$\therefore 19_{(10)}$ = _____

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Part 2: Hexadecimal number

4. Convert the following hexadecimal numbers to binary numbers. (4 marks)

(a) $5F_{(16)}$ (b) $4D3_{(16)}$

_____ _____

(c) $390_{(16)}$ (d) $ABC_{(16)}$

_____ _____

5. Complete the following table. (5 marks)

Binary	Hexadecimal
101000110010	A32
111001011101	
1010011001	

Binary	Hexadecimal
1011010	
111010010	
11011100001	

6. Convert $2E_{(16)}$ to binary number and then decimal number. (3 marks)

_____

_____

Part 3: Counting

7. Write the next and last 6 consecutive numbers of the binary number 11011 in the following series:

_____ , _____ , _____ , _____ , _____ , _____ , 11011 , _____ ,

_____ , _____ , _____ , _____ , _____

8. Complete the following series with suitable hexadecimal numbers:

_____ , _____ , _____ , _____ , _____ , _____ , _____ ,

_____ , _____ , _____ , _____ , B3 , B4 , B5 , B6 ,

B7 , _____ , _____ , _____ , _____ , _____ , _____ , _____

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Binary Number and Data Representation Worksheet 2

1. Convert the following binary numbers to decimal numbers.

   (a) $1100_{(2)}$ (b) $10\ 0100_{(2)}$ (c) $100\ 1001_{(2)}$

   (d) $1000\ 1100_{(2)}$ (e) $1001\ 0011_{(2)}$ (f) $1\ 0000\ 0010_{(2)}$

2. Convert the following decimal numbers to binary numbers.

   (a) $33_{(10)}$ (b) $52_{(10)}$ (c) $64_{(10)}$

   (d) $78_{(10)}$ (e) $83_{(10)}$ (f) $102_{(10)}$

3. Convert the following hexadecimal numbers to binary numbers.

   (a) $\mathrm{AF}_{(16)}$ (b) $\mathrm{3F1}_{(16)}$ (c) $44_{(16)}$

   (d) $\mathrm{B20}_{(16)}$ (e) $\mathrm{C9A0}_{(16)}$ (f) $\mathrm{20D5}_{(16)}$

4. Convert the following binary numbers to hexadecimal numbers.

   (a) $100\ 1100_{(2)}$ (b) $1010\ 0000_{(2)}$ (c) $1\ 0100\ 0001_{(2)}$

   (d) $11\ 0100\ 0100_{(2)}$ (e) $111\ 1001\ 1100_{(2)}$ (f) $11\ 1000\ 0100\ 0100_{(2)}$

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5. Write down the next 4 consecutive numbers of the following binary numbers.
   (a) $1000_{(2)}$ (b) $10\ 1110_{(2)}$ (c) $101\ 1111_{(2)}$

6. Write down the last 4 consecutive numbers of the following binary numbers.
   (a) $1111_{(2)}$ (b) $1000_{(2)}$ (c) $11\ 1000_{(2)}$

7. Write down the next 4 consecutive numbers of the following hexadecimal numbers.
   (a) $37_{(16)}$ (b) $2A8_{(16)}$ (c) $C8E_{(16)}$

   (d) $78F_{(16)}$ (e) $269E_{(16)}$ (f) $ACCD_{(16)}$

8. Write down the last 4 consecutive numbers of the following hexadecimal numbers.
   (a) $59_{(16)}$ (b) $8AE_{(16)}$ (c) $D8B_{(16)}$

   (d) $A62_{(16)}$ (e) $2AB1_{(16)}$ (f) $FA8B_{(16)}$

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Binary Number and Data Representation Worksheet 3

1. Fill in the blanks.

   (a) 1 byte = _____ bit

   (b) 2 MB = _____ KB

   (c) 2048 MB = _____ GB

   (d) 4096 byte = _____KB

2. Amy types some words in a simple text file and its size is 2 kB. If 1 byte is used to store one character, find the number of characters in the document.

3. Betty recently bought a 4-GB hard disk drive for her digital photos. If the size of each photo is 2 MB, at most how many photos can be stored in the hard disk drive?

4. In a company, Dolly keeps some reports in Word document format of 80 KB each. If there are 256 reports in the company, what is the total size (in MB) of these reports?

5. At most how many characters can be represented in 2-bit data? _____

   List all possible binary codes in 2-bit data.

   _____

6. What is the minimum number of bits required to encode 256 symbols? _____

7. ASCII code and big-5 code are two common encoding methods in Asian regions.

   (a) How many bits are used in ASCII code? _____

   (b) How many bits are used in big-5 code? _____

   (c) Which character set, ASCII code or big-5 code, can represent more characters?

   _____