

Section 0.1 : NUMBERING AND CODING SYSTEMS

2. convert the following binary numbers to decimal

- a) 36,
- b) 65,
- c) 29,
- d) 10,
- e) 34

3. convert the values in problem 2 to hexadecimal

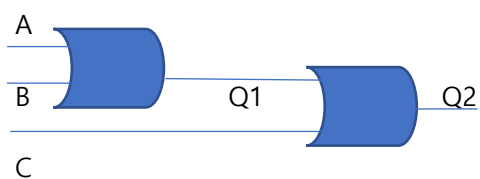
- a) 25H₁₆,
- b) 41H₁₆,
- c) 1DH₁₆,
- d) AH₁₆,
- e) 22H₁₆

6. find the 2's complement of the following binary numbers

- a) (0110110)₂,
- b) (000111)₂,
- c) (01111110)₂,
- d) (00000111)₂,

SECTION 0.2 : DIGITAL PRIMER

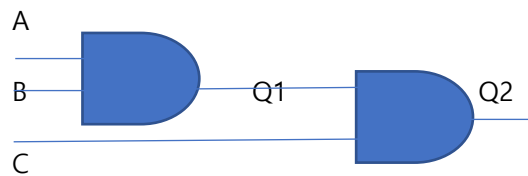
11. Draw a 3-input OR gate using a 2-input OR gate



12. show the truth table for a 3-input OR gate

| A | B | C | Q1 | Q2 |
|---|---|---|----|----|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 |

13. Draw a 3-input AND gate using a 2-input AND gate



14. Show the truth table for a 3-input AND gate

| A | B | C | Q1 | Q2 |
|---|---|---|----|----|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 |

SECTION 0.3 : INSIDE THE COMPUTER

21. answer the following :

a) $16/4 = 4$

b) $32/8 = 4$,

c) $64/16 = 4$,

d) $2^{20} \approx 10^6$,

e) $2^{10}K$,

f) $2^{30} \approx 10^9$,

g) $2^{20}K$,

h) $2^{10}M$,

i) $8 * 2^{20} \text{ bytes} = 8 * 2^{10}KB$

24. A given computer has a 32-bit data bus what is the largest number that can be carried into the CPU at a time?

$$2^{30}-1$$

27.Regarding the data bus and address bus, which is unidirectional and which is bidirectional?

address bus => unidirectional

data bus => bidirectional

28. which register of the CPU holds the address of the instruction to be fetched?

program counter

30. List the three bus types present in every CPU

control bus, address bus, data bus

SECTION 1.1 : MICROCONTROLLERS AND EMBEDDED PROCESSORS

1. A general-purpose microprocessor has on-chip ROM

False

2. A microcontroller has on-chip ROM

True

3. A microcontroller has on-chip I/O ports

True

4. A microcontroller has a fixed amount of RAM on the chip

True

5. what components are normally put together with the microcontroller into a single chip?

RAM, ROM, I/O ports, and timer

6. intel's pentium chips used in windows PCs need external and chips to store data and code.

RAM, ROM

11. in a battery-based embedded product, what is the most important factor in choosing a microcontroller?

low power consumption

15. if a microcontroller architecture has both 8bit and 16bit versions, which of the following statements is true?

a) the 8bit software will run on the 16-bit system

b) 불가능. 16bit 소프트웨어는 special instruction 과 register 때문에

8bit 소프트웨어에 작동할 수 없다.

SECTION 1.2: OVERVIEW OF THE 8051 FAMILY

21. the 8051 family has 32 pins for I/O.

29. what is the difference between the 8031 and 8051?

8051은 4K ROM을 갖고 있지만 8031은 ROM을 갖고 있지 않다.