Chương 1: Number systems and codes

Dạng 1: Dạng dữ liệu biểu diễn trên máy tính.

1.27 Assign a binary code in some orderly manner to the 52 playing cards. Use the minimum number of bits.

The answer:

25 =32 < 52, 26 = 64 >52 → 6 bits

The minimum number of bits for 52 cards is 6.

2bits first for: Heart(00), Tiles(01), Clovers(10), Pikes(11) 4 bits last for: 1-13 (Ace to K). example: Ace Pikes: 110001, K heart: 001101.

Dạng 2: Các Đơn vị đo dữ liệu (bits, byte, word,…)

1.2\* What is the exact number of bytes in a system that contains

a.32K bytes

b.64M bytes

c.6.4G bytes

The answer:

1. 32x210 bytes
2. 64x220 bytes
3. 6.4x230 bytes

1.32 What bit must be complemented to change an ASCII letter from capital to Lowercase and vice versa?

01000001 A 01100001 a

01000010 B 01100010 b

01000011 C 01100011 c

01000100 D 01100100 d

01000101 E 01100101 e

01000110 F 01100110 f

01000111 G 01100111 g

01001000 H 01101000 h

01001001 I 01101001 i

01001010 J 01101010 j

01001011 K 01101011 k

01001100 L 01101100 l

01001101 M 01101101 m

01001110 N 01101110 n

01001111 O 01101111 o

01010000 P 01110000 p

01010001 Q 01110001 q

01010010 R 01110010 r

01010011 S 01110011 s

01010100 T 01110100 t

01010101 U 01110101 u

01010110 V 01110110 v

01010111 W 01110111 w

01011000 X 01111000 x

01011001 Y 01111001 y

01011010 Z 01111010 z

0x61 is hexadecimal for 97 = a

0x41 is hexadecimal for 65 = A

=> subtraction or addition 32 is uppercase or lowercase

Z is 90 = 0b1111010

z is 122 = 0b1011010  
=> convert the sixth of bit to lowercase or uppercase

Dạng 3: So sánh sự khác nhau giữa ngôn ngữ bậc cao và bậc thấp

Dạng 4: Các thành phần trong máy tính Computer (CPU, RAM, HĐ,BUS,…)

Dạng 5: Chuyển đổi qua lại giữa các hệ đếm

1.3 Convert the following numbers with the indicated bases to decimal:

a. (4310)5 = 4x53+3x52+1x51+0x50 = (580)10

b. (198)12 = 1x122+9x121+8x120=(260)10

c. (435)8 = 4x82+3x81+5x80=(285)10

d. (345)6 = 3x62+4x61+5x60=(137)10

What is the largest binary number that can be expressed with 16 bits?   
The answer: (1111111111111111)2

* 1. What are the equiv-alent decimal and hexadecimal numbers?  
     The answer: decimal: 65535; hexadecimal: (FFFF)16
  2. Determine the base of the numbers in each case for the following operations to be correct:

1. 14/2=5
2. 54/4=13
3. 24+17=40

The answer:

* 1. Let the base is “b”:

14/2=5   
⬄(1 xb1 +4 x b0)/(2xb0)=5xb0

⬄(b+4)/2=5

⬄b/2+4/2=5  
 ⬄b=6

* 1. Let the base is “b”:

54/4=13

⬄(5xb1+4xb0)/4xb0=1xb1+3xb0

⬄(5b+4)/4=b+3

⬄b=8

1. Let the base is “b”:

24+17=40

⬄(2xb1+4xb0)+(1xb1+7xb0)=4xb1+0xb0

⬄3b+11=4b

⬄b=11

Dạng 6: Bù 1, Bù 2.

1.14 Obtain the 1’s and 2’s complements of the following binary numbers:

(a) 00010000 = 000100001s = 000100002s

(b) 00000000 = 111111111s = 000000002s

(c) 11011010 = 001001011s = 001001102s

(d) 10101010 = 010101011s = 010111102s

(e) 10000101= 011110101s = 0111101102s

(f) 11111111=000000001s = 000000012s

1.15 Find the 9’s and the 10’s complement of the following decimal numbers:

(a) 25,478,036= 108-25,478,036= 74,521,96410s = 74,521,9639s

(b) 63,325,600 = 108-63,325,600= 36,674,40010s = 36,674,3999s

(c) 25,000,000 = 108-25,000,000=75,000,00010s=74,999,9999s

(d) 00,000,000 = 108-00,000,000=10,000,00010s=99999999s