
Exercise 1.

1. *Count from* 0 *to* 25 *in binary code.*
2. *Count from* 0 *to* 17 *in Gray code.*

Exercise 2.

1. *Convert to Straight Binary, the following numbers written in Gray code.*

$$110011_{Gray};\ 101111011_{Gray};\ ;\ 11111111_{Gray}.$$

2. *Convert to Gray code, the following numbers written in Straight Binary code.*

$$100011_2;\ 1111011_2;\ 11000111_2.$$

Exercise 3.

How many bits would be required to encode decimal numbers from 0 *to* 99999 *in straight binary and BCD codes ?*

Exercise 4.

1. *Write the BCD equivalent codes of.*

$$49;\ 678;\ 9822;\ 26.97;\ 125.36.$$

2. *Convert to decimal the following numbers written in BCD code.*

$$10010110;\ 100000100111;\ 110010.001;\ 1001.0110001.$$

Exercise 5.

1. *Write the Excess-3 equivalent codes of*

$$59;\ 764;\ 75.48;\ 645.275.$$

2. *Convert to decimal the following numbers written in Excess-3 code.*

$$1001_{XS-3};\ 1010100001100111_{XS-3};\ 1100.01;\ 1011.11001000.$$

Exercise 6.

1. *Using ASCII encoding table to encode your name in hexadecimal.*
2. *Using ASCII encoding table to decrypt the following ASCII data.*

57	68	61	74	20	69	73	20	$6D$	61	74	68	65	$6D$	61
74	69	63	73	$3F$	20	49	74	20	69	73	20	$6F$	$6E$	$6C$
79	20	61	20	73	79	73	74	65	$6D$	61	74	69	63	20
65	66	66	$6F$	72	74	20	$6F$	66	20	73	$6F$	$6C$	76	69
$6E$	67	20	70	75	$7A$	$7A$	$6C$	65	73	20	70	$6F$	73	65
64	20	62	79	20	$6E$	61	74	75	72	65	$2E$			

Exercise 7.
Encode the following quote in binary. "Mathematics is the music of reason."

Exercise 8.
Give the number of characters in the following UTF-8 code.

$$F5\ B2\ A3\ 91\ 2C\ C1\ 9D\ 30.$$

Exercise 9.

1. *Encode in UTF-8 the arabic character*

   م

   of Unicode code. $U + FEE9$, follow this instructions.
   — *Convert* 0645 *to binary.*
   — *Determine the number of significant bits.*
   — *Choose a design.*
   — *Give the binary code.*
   — *Covert this code to hexadecimal.*
2. *Determine the Unicode code of the UTF-8 encoded character in hexadecimal $D8AA$*

   ت

   .

Exercise 10.

1. *Determine the 8-bit or 16-bit ; SM, 1C and 2C of the following numbers.*

$$+42, -70, \ -56_8, -AF_{16}, \ -2C_{16} \ -128.$$

0

2. *Convert the following numbers to decimal representation.*

$$00011001_{SM}, 10000101_{SM}, 00101101_{1C}, 11001111_{1C}, 10000000_{2C}, \ 00101100_{2C}, 11111$$

Exercise 11.
Perform the following addition operations ; using 1's complement format, then 2's complement format in 8-bit representation. Indicate the reason for any errors.

$$+49 - 65, \ -127 - 1, \ -32 + 32, \ -127 - 5.$$

Exercise 12.
Let X be an integer defined by

$$X = (a_7a_6a_5a_4a_3a_2a_1a_0)_{2C},$$

we note by $|X|$ the absolute value of X. Define $|X|$ in $2C$.

Exercise 13.

1. *Represent -118.625 in the $IEEE$ 754 single-precision format,*
2. *Decode the number $F0CCAA_{16}$, written in the $IEEE$ 754 single-precision format*