

Year 10

Computer Science Test

29 October 2019

1) Perform the following conversions:

a) 110110_2 to decimal (1)

Number 1 1 0 1 1 0

Weights 32 16 8 4 2 1

$$110110_2 = 32 + 16 + 4 + 2 = 54_{10}$$

b) 47_{10} to binary (1)

2		47	
2		23	remainder 1
2		11	remainder 1
2		5	remainder 1
2		2	remainder 1
2		1	remainder 0
0			remainder 1

$$47_{10} = 101111_2$$

c) $3AB_H$ to binary (1)

$$3AB_H = 11\ 1010\ 1011_2$$

d) 1011011100_2 to hex. (1)

$$1011011100_2 = 10\ 1101\ 1100 = 2DC_H$$

2) Evaluate the expression $81-23$ by using two's complement arithmetic. Numbers are to be expressed in one byte. (3)

weights	-128	64	32	16	8	4	2	1	
81	0	1	0	1	0	0	0	1	
23	0	0	0	1	0	1	1	1	
Ones compl. of 23	1	1	1	0	1	0	0	0	
2's compl (add 1)	1	1	1	0	1	0	0	1	
81	0	1	0	1	0	0	0	1	+

$$\begin{array}{rcccccccc}
 -23 & & & & 1 & 1 & 1 & 0 & 1 & 0 & 0 & 1 \\
 81 + (-23) & & \times & & 0 & 0 & 1 & 1 & 1 & 0 & 1 & 0
 \end{array}$$

3) The following question is taken from Matsec 2019 May exam, paper 1, 5 a, b, c, d

a) A student table in a school database contains the following fields: idnumber, dateOfBirth, name, surname, age, classID. Give the data type for each field mentioned above.

idnumber: both 'number' and 'text' may be correct

dateOfBirth: date

name: text

surname: text

age: number (or integer)

classID: text

b) State which of these would you choose as the primary key.

idnumber, because it is the only unique field.

c) Which of these fields is unnecessary? Explain.

'age' is unnecessary because it can be deduced from the field 'dateOfBirth'.

d) Which of these fields is likely to be a foreign key?

'classID'. It would link the table on students with the table on classes.