

Esame di Lingua Inglese (1.5 ore)

Number bases

We are accustomed to writing numbers in base 10, for example, 75 means 7 tens and five units. However numbers can be written in any number base.

If we use base 8 instead of base 10, then 75 is written as 113 which denotes 1 sixty four (8^2), 1 eight (8^1) and 3 units.

Base 2 is particularly useful as it only requires two symbols, namely zero and one, and it is the way numbers are represented in computers. Base 16 is also used in computers and the symbols we use are 0, 1, ..., 9, a, b, c, d, e, and f.

Just as in base 10 the positions represent powers of 10 and have value 1, 10, 10^2 , 10^3 etc. (reading from right to left), so in base 2, the positions represent powers of 2.

As another example, we use the symbols 0, 1, 2, 3 and 4 to represent numbers in base 5. The positions in base 5 have value 1, 5, 25, 125, 625 etc reading from right to left. The number 75 in base 10 is the same as the number 300 in base 5, that is 3 twenty fives, no fives and no units.

To write numbers between 0 and 1, we use negative powers of the base. For example, in base 2 we use halves, quarters, eighths, sixteenths etc instead of the tenths, hundredths, thousandths etc. which we use in base 10.

So if we write 11.11 in base 2 this denotes $2^1 + 2^0 + 2^{-1} + 2^{-2}$. The equivalent in base 10 is $2 + 1 + \frac{1}{2} + \frac{1}{4}$, that is 3.75 in base 10.

ESERCIZI

1. SELEZIONARE IL CORRETTO COMPLETAMENTO

1. In base 5 we (do not use) (can use) (need) the symbol “8”.
2. In base 16 we need (less) (fewer) (more) (many) than 10 symbols.
3. Using 5 fingers and base 2 we (cannot) (can) represent every number (between) (among) 0 and 40.
4. When we use base n a number is divisible by n if and only if the (leftmost) (rightmost) digit of (this) (his) (its) representation is 0.

2. TRADURRE IN INGLESE LE FRASI SEGUENTI

1. Quanti simboli sono necessari per scrivere i numeri in base 16?
2. Solitamente i computer usano 32 o 64 bit.
3. Qual è il numero intero più grande che si può rappresentare in un computer a 32 bit?
4. “a0” in base 16 è lo stesso di “160” in base 10.

3. TRADURRE IN ITALIANO IL TESTO