Contents

1 Data Representation

1.1 Number Systems

The number system consisting of digits 0 through 9 is called the denary or decimal system (10 digits). Computers use another number system called binary, consisting of digits 0 through 1. This is done such that computers are able to pass the data through logic gates and can be stored in registers.

The number of digits in a number system is the base of that system; denary is base ten; binary is base two; hexadecimal is base 16.

Conversions

From positive denary to positive binary:

1. Perform short division on given denary number, taking note of the remainders.
2. Write the remainders from bottom to top, resulting in the binary number.

From positive binary to positive denary:

1. Write the binary number with their *place powers* .
2. Sum the products of each binary digit with the place power, resulting in the converted denary number.
3. Write the remainders from bottom to top, resulting in the binary number.

From positive denary to positive hexadecimal:

1. Convert given number to binary
2. Split resulting binary number to four-bit parts.
3. Convert the four-bit binaries to denary.
4. 1 = 1; 2 = 2; ... 10 = A; 11 = B; 12 = C; 13 = D; 14 = E; 15 = F.
5. Arrange resulting digits side-by-side.

From positive hexadecimal to positive denary:

1. Convert each given hex number to denary using the index in step 4 of denary-hex.
2. Convert each denary number to binary.
3. Arrange the resulting four-bit binary pieces, producing binary result.

From positive hexadecimal to positive binary:

1. Convert to denary.

2. Convert to binary.

From positive binary to positive hexadecimal:

1. Convert to binary.
2. Convert to denary.