# 1 Information Representation 信息的表示

## 1.1 Data Representation 数据的表示

### denary numbers 十进制数

also known as decimal numbers, are written using one of the symbols 0~9 for each denary digit.

### bit 位

a digit in the binary number system written using either of the symbols 0 and 1.

### byte 字节

a group of eight bits treated as a single unit.

### nibble 半字节

a group of four bits.

### decimal prefix 十进制前缀

a prefix to define the magnitude of a value. Examples are *kilo-*, *mega-*, *giga-* and *tera-* representing factors of $10^3$, $10^6$, $10^9$ and $10^{12}$ respectively.

### binary prefix 二进制前缀

a prefix to define the magnitude of a value. Examples are *kibi*, *mebi*, *gibi* and *tebi* representing factors of $2^{10}$, $2^{20}$, $2^{30}$ and $2^{40}$ respectively.

**one's complement 反码表示法**

a form of signed integer, in which the binary representation of $-n$ is the bitwise `NOT` of that of $n$.

**two's complement 补码表示法**

a form of signed integer, in which the binary representation of $-n$ is the bitwise `NOT` of that of $n$ **plus 1**.

**overflow 溢出**

a condition when the result of a calculation is too large to fit into the number of bits defined for storage.

**binary coded decimal (BCD)**

the storage of a binary value representing one denary digit in a nibble.

**packed BCD**

store two BCD nibbles in one byte.

**character set 字符集**

all of the characters/symbols that the computer can use, in which each character has a unique numerical code.

**ASCII code ASCII 码**

coding system in which **7 bits** are used to encode all the characters on a keyboard and control codes. Extended ASCII use **8 bits** to represent more

characters.

**Unicode**

coding system which represents characters in all the languages of the world, using up to 4 bytes. The first 128 characters are the same as ASCII code.

## 1.2 Multimedia 多媒体

**vector graphic 矢量图**

a graphic consisting of drawing objects defined in a drawing list.

**drawing object**

a component defined by geometric formulae and associated properties (fill colour, line width, etc.).

**drawing list**

a list contains one set of values for each drawing object.

**property 性质**

defines one aspect of the appearance of the drawing object.

**bitmap image 位图**

an image made up of pixels stored in sequence.

**picture element (pixel) 像素**

the smallest identifiable component of a bitmap image, defined by just two properties: its position in the bitmap matrix and its colour.

**colour depth 色深**

the number of bits used to represent one pixel.

**bit depth 位深**

the number of bits used to represent each of the red, green and blue colours.

**image resolution 图像分辨率**

the number of pixels in the bitmap file defined as the product of the width and the height values.

**screen resolution 屏幕分辨率**

the product of width and height values for the number of pixels that the screen can display.

**file header 文件的标头**

a set of bytes at the beginning of a bitmap file which identifies the file and contains data about the image file e.g. file format, bit depty, file size, etc.

**analogue data 模拟信号数据**

data obtained by measurement of a physical property which can have any value from a continuous range of values.

**digital data 数字信号数据**

data that has been stored as a binary value which can have one of a discrete range of values.

**sampling 采样**

taking measurements at regular intervals and storing the value.

**sampling resolution 采样分辨率**

the number of bits used to store each sample.

**sampling rate 采样频率**

the number of samples taken per second.

## 1.3 Compression 压缩

**compression 压缩**

represent the original content of a file with another file of smaller size. Compressed file takes less storage space and can be transmitted in less time using less bandwidth.

**lossless compression 无损压缩**

compression methods that allow subsequent decoding to recreate exactly the original file.

**lossy compression 有损压缩**

compression methods that cause some information to be lost so that the exact original file cannot be recovered in subsequent decoding.

**Running-Length Encoding (RLE) 游程编码**

a lossless compression algorithm that identifies consecutive repeating data and stores the data and the number of times it repeats.