



# **“Digital Logic Design”**

## **Lecture # 3**

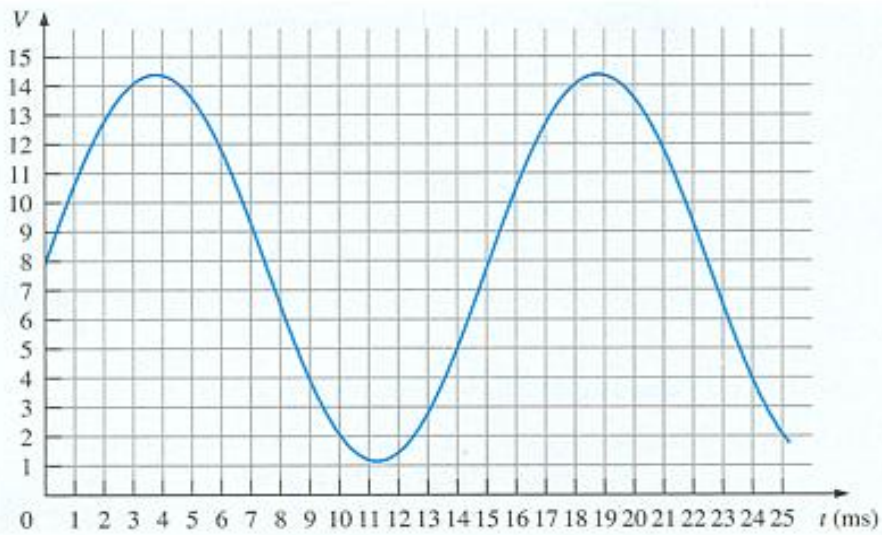


# Digital and Analog Quantities

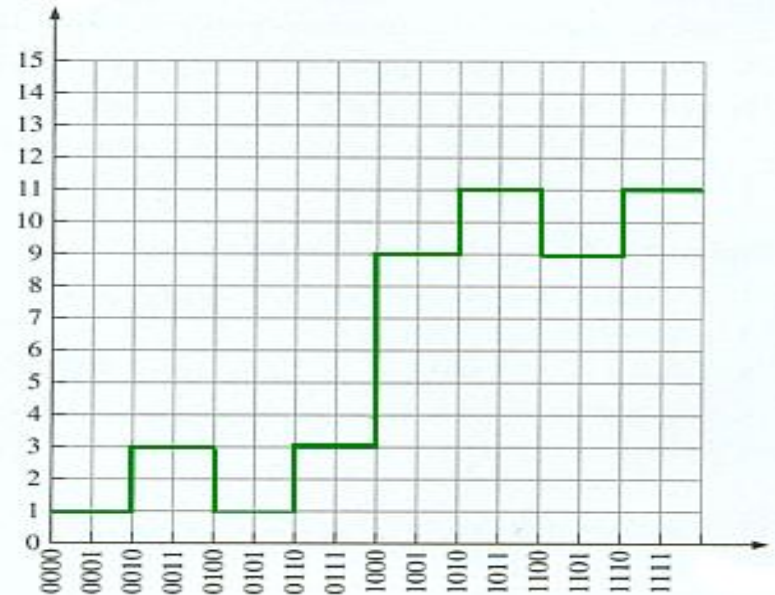


# Digital and Analog Quantities

- Analog quantities have continuous values
- Digital quantities have discrete sets of values



**Analog quantities** have continuous values

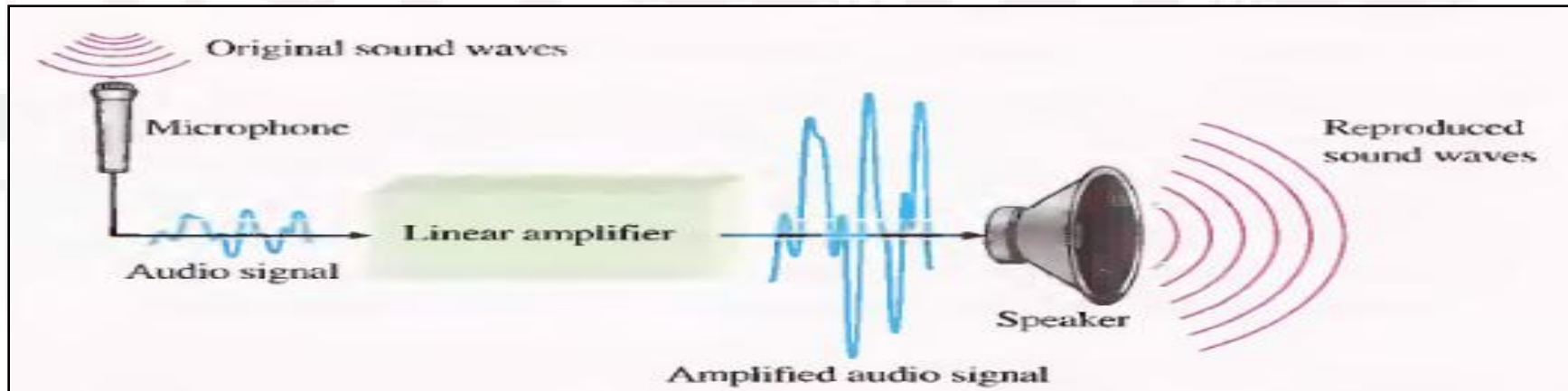


**Digital quantities** have discrete sets of values

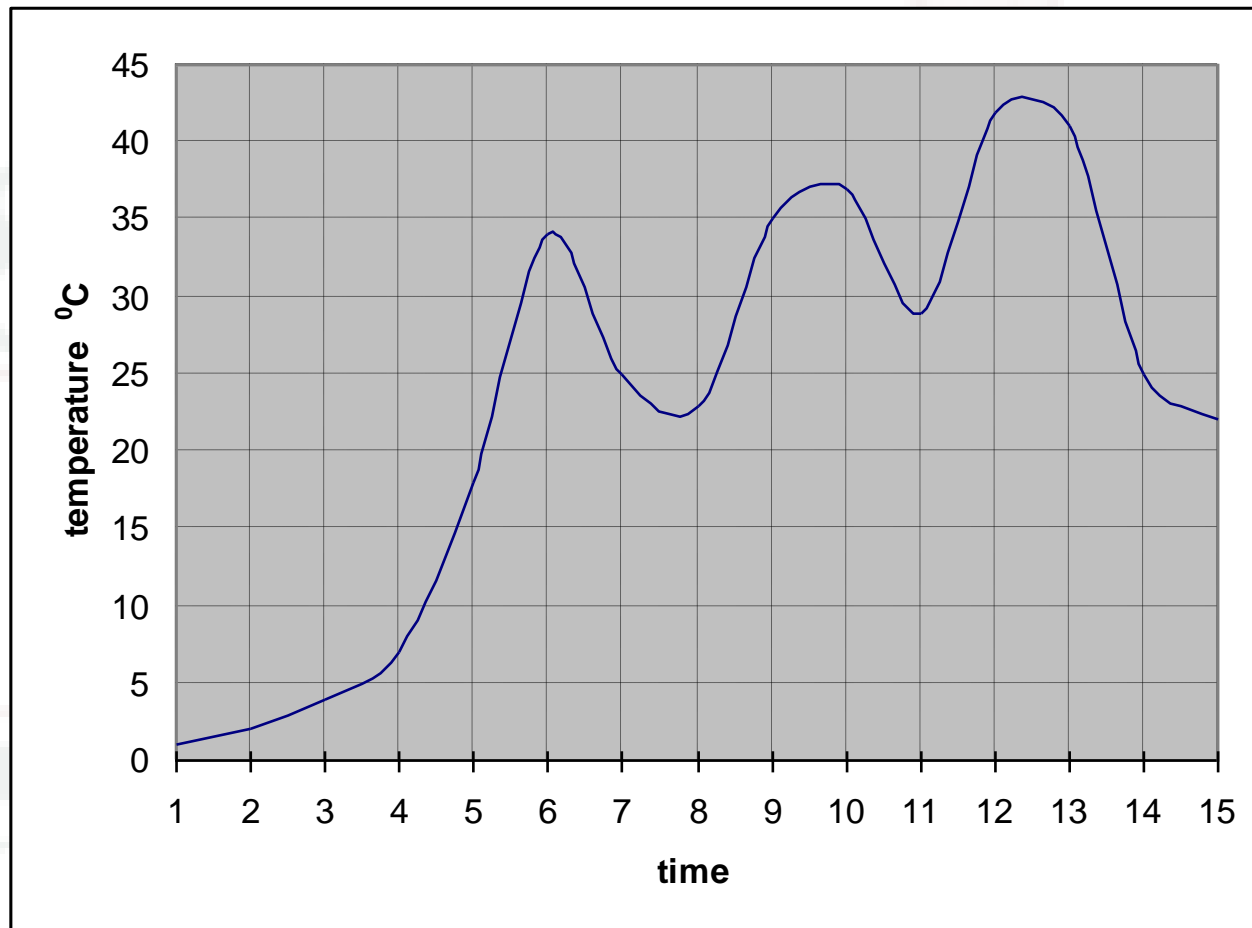
# Analogue Quantities

Most of the quantities in nature that we can measure are Continuous, for example

- Intensity of Light
- Temperature
- Velocity
- Basic audio public address system



# Continuous Signal

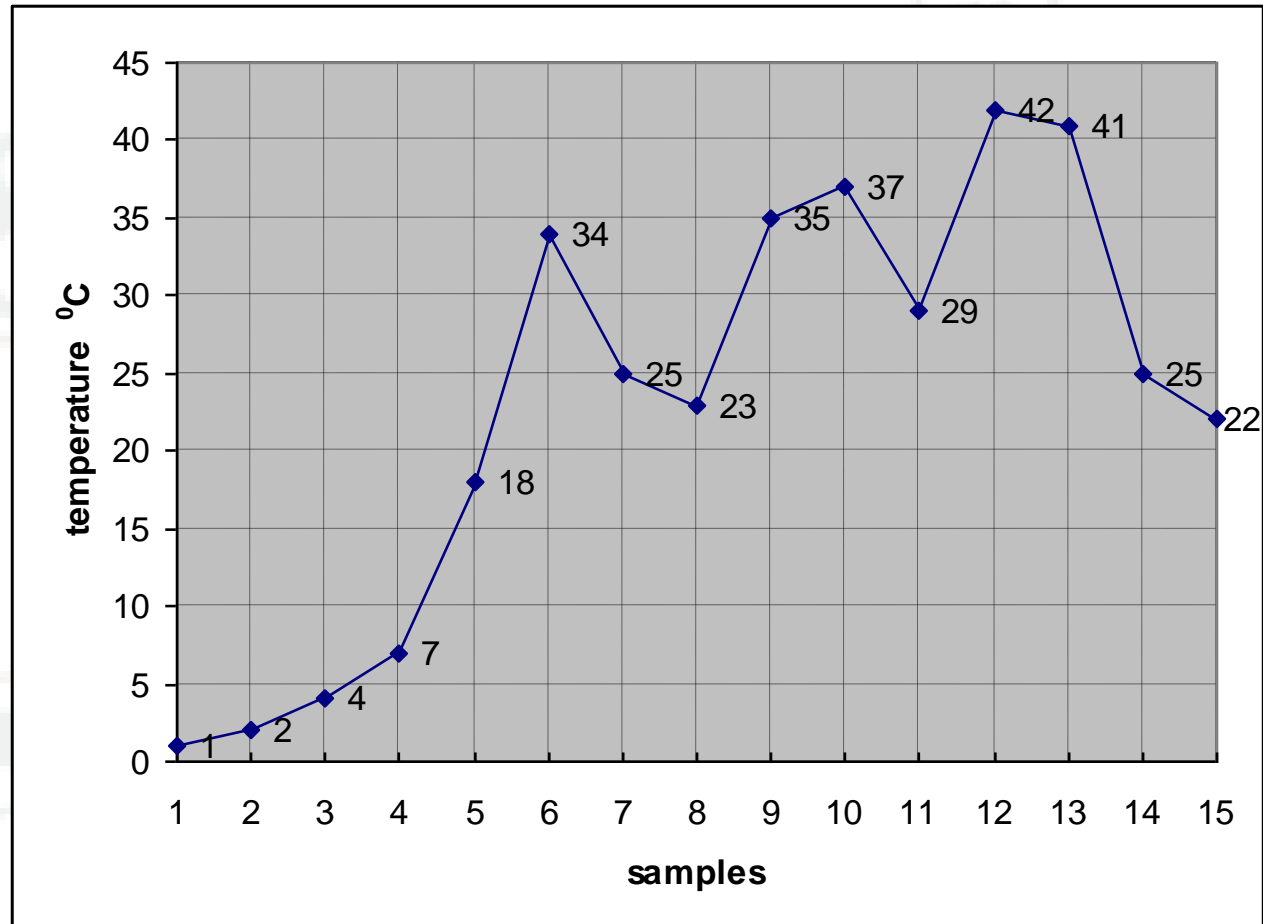


Consider the continuous signal shown in the diagram.

# Digital Quantities

- ❑ Digital values on the other hand are a discrete set of values which represent the actual Continuous Signal
- ❑ Personal computers
- ❑ Laptops
- ❑ Mobiles phones
- ❑ And many so on .....

# Digital Representation



The reconstructed continuous signal does not give an exact replica of the original, it has sharp edges and corners in contrast to the original signal which has smooth curves

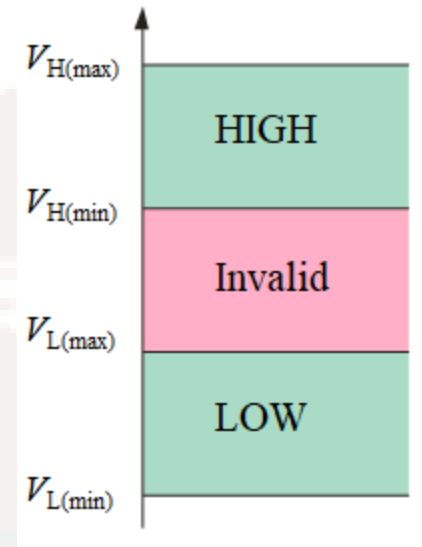
# Digital Systems

- Digital systems use electronic circuitry that only works with two levels. The two voltage levels represent two states. A value near the supply voltage represents logic high or logic 1 state and a reference value at 0 voltage level or ground which represents logic low or logic 0 state. The Two Levels can be represented as:
  - Two States
    - ▣ Number 0/1
    - ▣ On/Off
    - ▣ Black/White
    - ▣ Hot/Cold
    - ▣ Stationary/Moving



# Binary Digits and Logic Levels

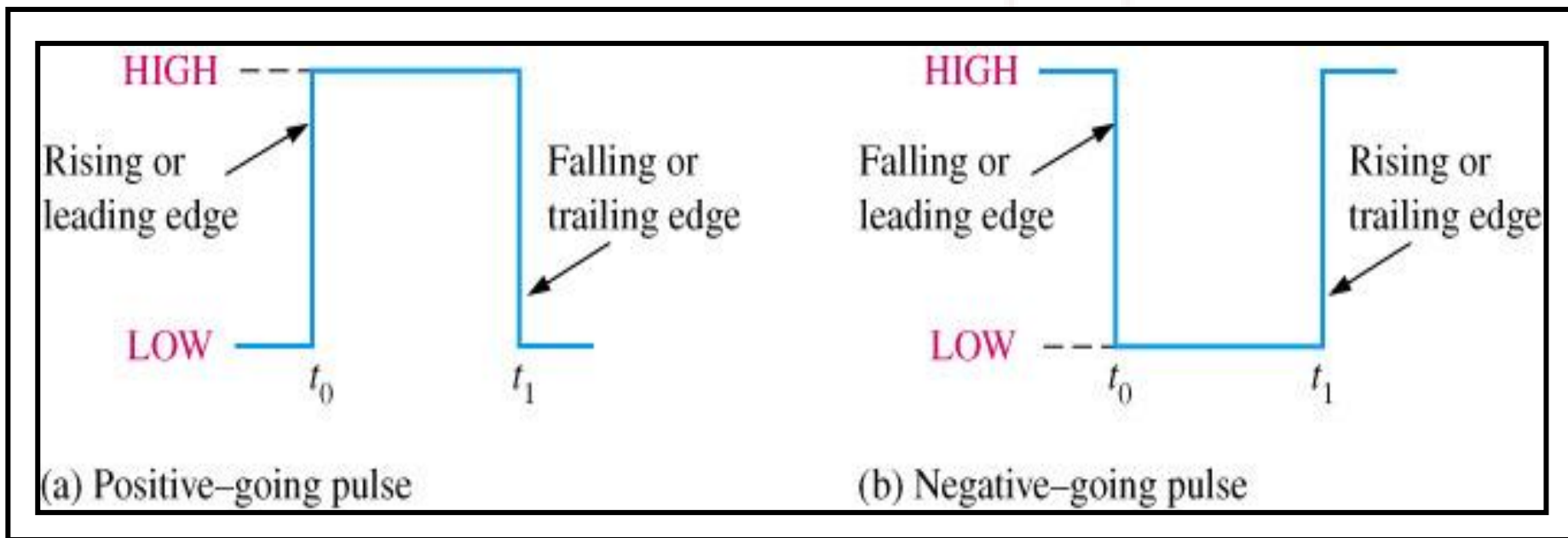
- In binary, a single number is called a *bit* (for *binary digit*). A bit can have the value of either a 0 or a 1, depending on if the voltage is HIGH or LOW.
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What is group of bits called ?

# Digital Waveforms

- Binary values are also represented by voltage levels



- What is positive logic ?
- What is negative logic ?

The background features a large, faint watermark of the SMM University logo. It includes a central tower with a clock face, flanked by two wings, and the text '1885' at the top, 'SMM' in the middle, and 'UNIVERSITY' at the bottom.

**Thanks**