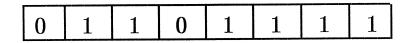
## 1.0. OVERVIEW OF MODULE

Why has digital signal processing become so important?

• All signal information is represented by finite length binary words:



⇒ require only bistable circuits and storage medium to process, store, and transmit signals.

- Benefits:
  - precision,
  - reproducibility (possibility of perfect signal regeneration),
  - all signal processing operations are implemented as either arithmetic or logical operations.
- The same digital computer technology that is used for general information processing can be used for DSP.

## MODULE 1 OBJECTIVES

- Develop fundamental tools for analysis of continuous-time and discrete-time signals and systems.
- Use these tools to gain an understanding of:
  - sampling and quantization,
  - digital filters,
  - discrete Fourier transform.

## OUTLINE

- 1. Signals
- 2. Systems
- 3. Fourier analysis
- 4. Sampling and quantization
- 5. Z transform
- 6. Digital filters
- 7. Discrete Fourier Transform (DFT)

## Why study continuous-time case?

- Signals usually originate in continuous-time (analog) form and will ultimately be converted back to analog form.
- It is often easier to conceptualize the effect of a signal processing operation in continuous-time than in discrete-time.
- For maximum efficiency, we will develop the two cases side-by-side.