Data Communications

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◆ Course Books:

- DATA AND COMPUTER COMMUNICATIONS,
  - William Stallings, Prentice Hall International Edition
- DATA COMMUNICATIONS AND NETWORKING,
  - Behrouz A. Forouzan, McGraw Hill International
- COMPUTER NETWORKS,
  - Andrew Tanenbaum, Pearson Education Internaitional

Introduction

◆ This course is concerned with the **Communications Problem**:

"How can two remote entities communicate with each other <u>effectively</u> and <u>efficiently</u>"
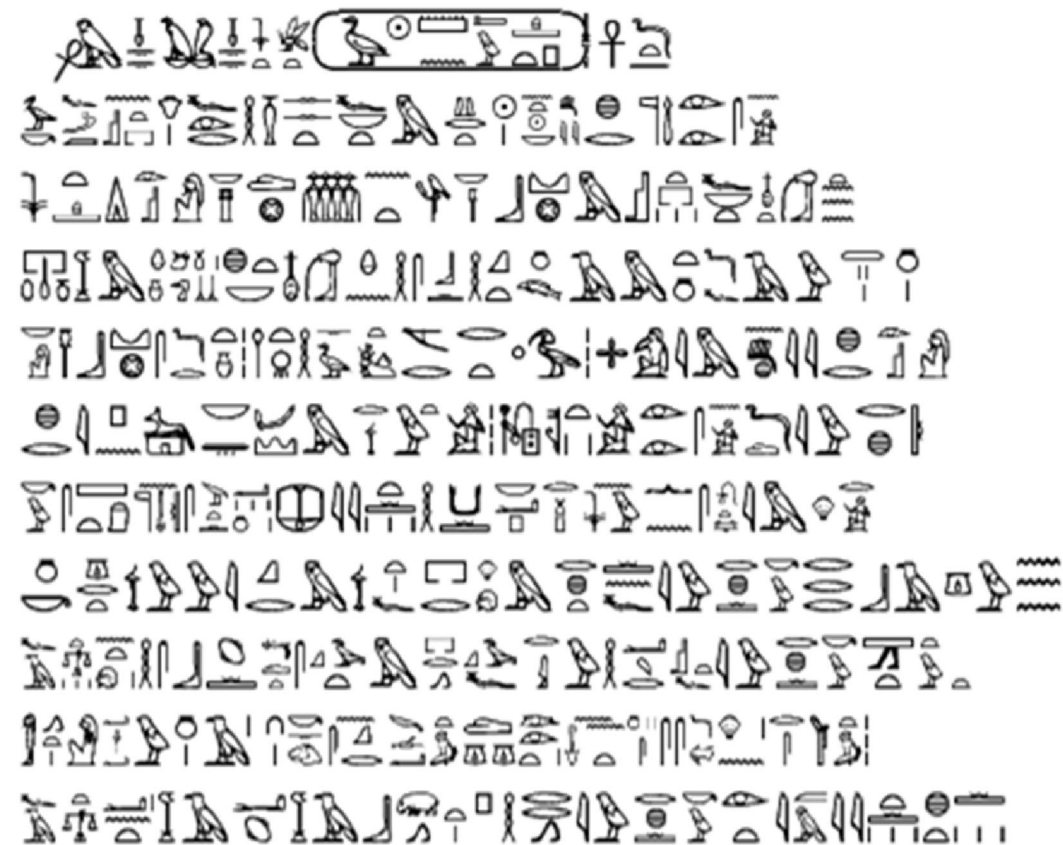
Cave Painting - 40,000 to 10,000 BC

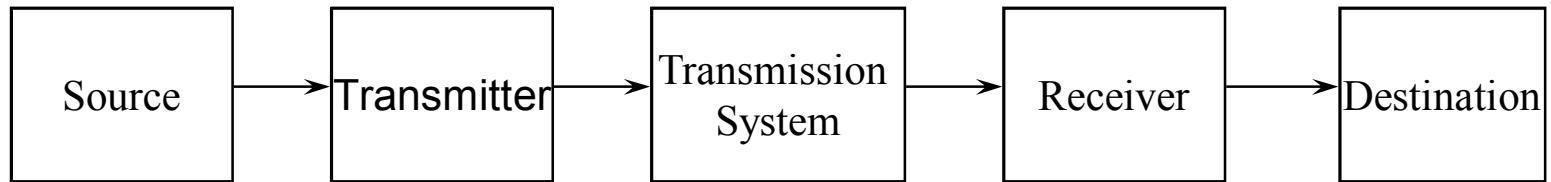**Lascaux, France**

Sumerian Cuneiform - 3000 BC

Inscriptions from the Behistun Rock (Western Iran)

Hieroglyphic Text

Model of Communications System

Source → Transmitter → Transmission System → Receiver → Destination

Communications Model Components

◆ Source: Device that generates data

◆ Transmitter: Transforms and encodes data

◆ Transmission System: The physical system connecting the source and destination devices

◆ Receiver: Performs reverse function of Transmitter

◆ Destination: Receives the incoming data

Course Topics

- ◆ **Introduction**
  - » Communications Model/Tasks
- ◆ **Signal Analysis**
  - » Signalling concepts
  - » Bandwidth concepts
  - » Relationship between Data Rate and Bandwidth
- ◆ **Data Transmission concepts**
  - » Digital versus analogue data/signals/systems

- ◆ **Transmission Impairments**
  - » Attenuation/Distortion/Noise
- ◆ **Channel capacity**
- ◆ **Transmission Media**
  - » Wired/Wireless
- ◆ **Data Encoding**
  - » Digital/Analogue Data onto Digital/Analogue signals etc.
- ◆ **Synchronous /Asynchronous**

Course Topics

- Flow Control techniques

- Error detection techniques

- Error Control techniques

- Sample Link Protocol

- Multiplexing

- Switching Networks

- Local Area Networks
  - Topologies and operation
  - Protocols
  - Access Control techniques

- Internetworks
  - PDU structure
  - Addressing Schema

……..and much more