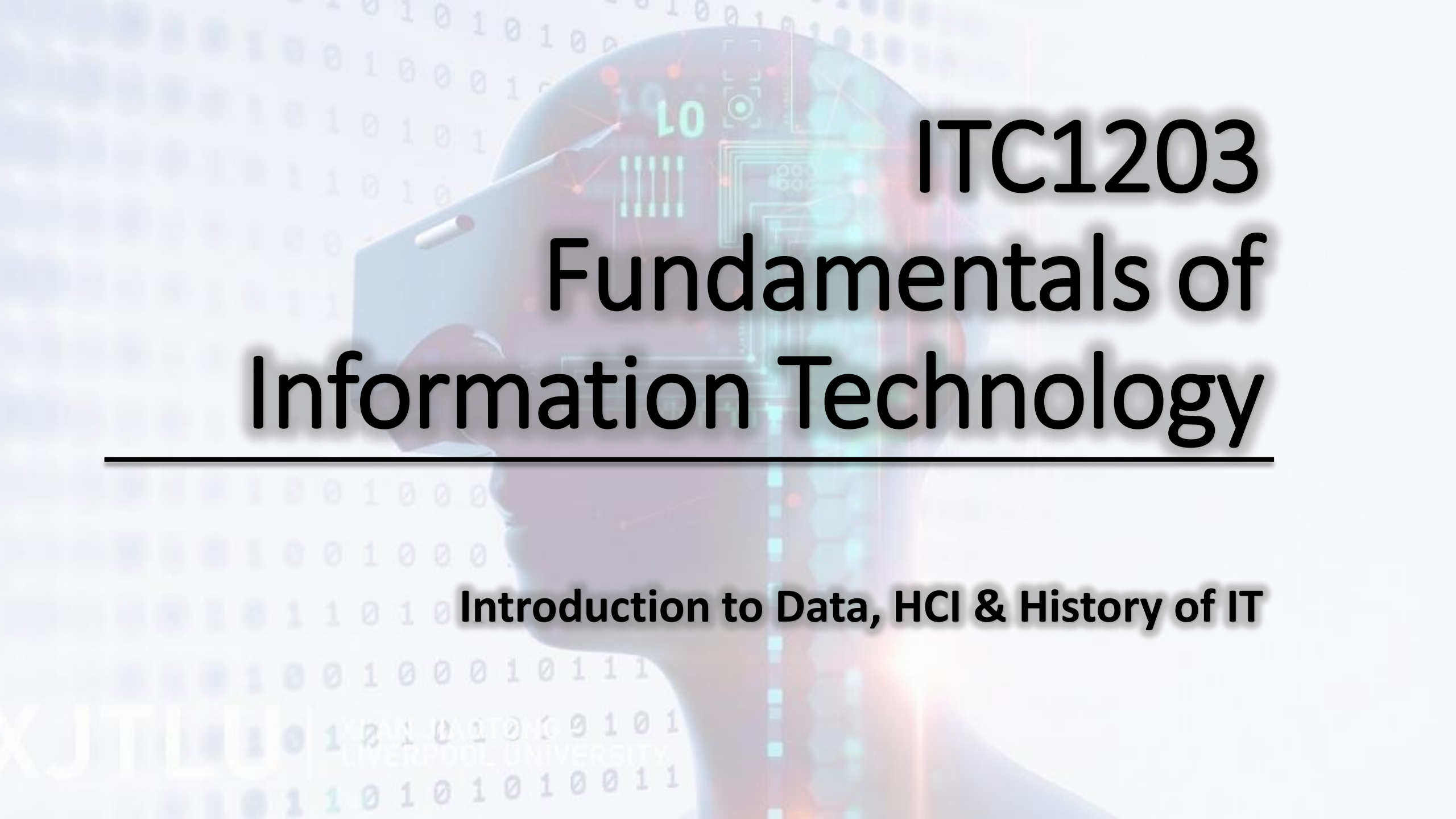

ITC1203 Fundamentals of Information Technology

Introduction to Data, HCI & History of IT

Data Representation

- Information today comes in different forms such as:
    1. Text
    2. Numbers
    3. Images
    4. Audio
    5. Video

Text

- In data communications, text is represented as a bit pattern, a sequence of bits (0s or 1s).
- Different sets of bit patterns have been designed to represent text symbols.
- Each set is called a code, and the process of representing symbols is called coding.

Numbers

- Numbers are also represented by bit patterns.
- However, a code such as ASCII is not used to represent numbers.
- The number is directly converted to a binary number to simplify mathematical operations.

Images

- Images are also represented by bit patterns.
- In its simplest form, an image is composed of a matrix of pixels *(picture elements),* where each pixel is a small dot.
- The size of the pixel depends on the resolution.

Audio

- Audio refers to the recording or broadcasting of sound or music, it is by nature different from text, numbers, or images.
- It is continuous, not discrete.
- Even when we use a microphone to change voice or music to an electric signal, we create a continuous signal.

Video

- Video refers to the recording or broadcasting of a picture or movie.
- Video can either be produced as a continuous entity (e.g., by a TV camera), or it can be a combination of images, each a discrete entity, arranged to convey the idea of motion.

HCI (human-computer interaction)

HCI

- HCI *(human-computer interaction)* is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings.
- As its name implies, HCI consists of three parts:
    1. User
    2. Computer itself
    3. The ways they work together.

User

- "user", we may mean an individual user or a group of users working together.
- An appreciation of the way people's sensory systems *(sight, hearing, touch)* relay information is vital.
- Also, different users form different conceptions or mental models about their interactions and have different ways of learning and keeping knowledge.

A Brief History of Information Technology

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Introduction

- Information technology has been around for a long, long time.
- Basically as long as people have been around! Humans have always been quick to adapt technologies for better and faster communication.

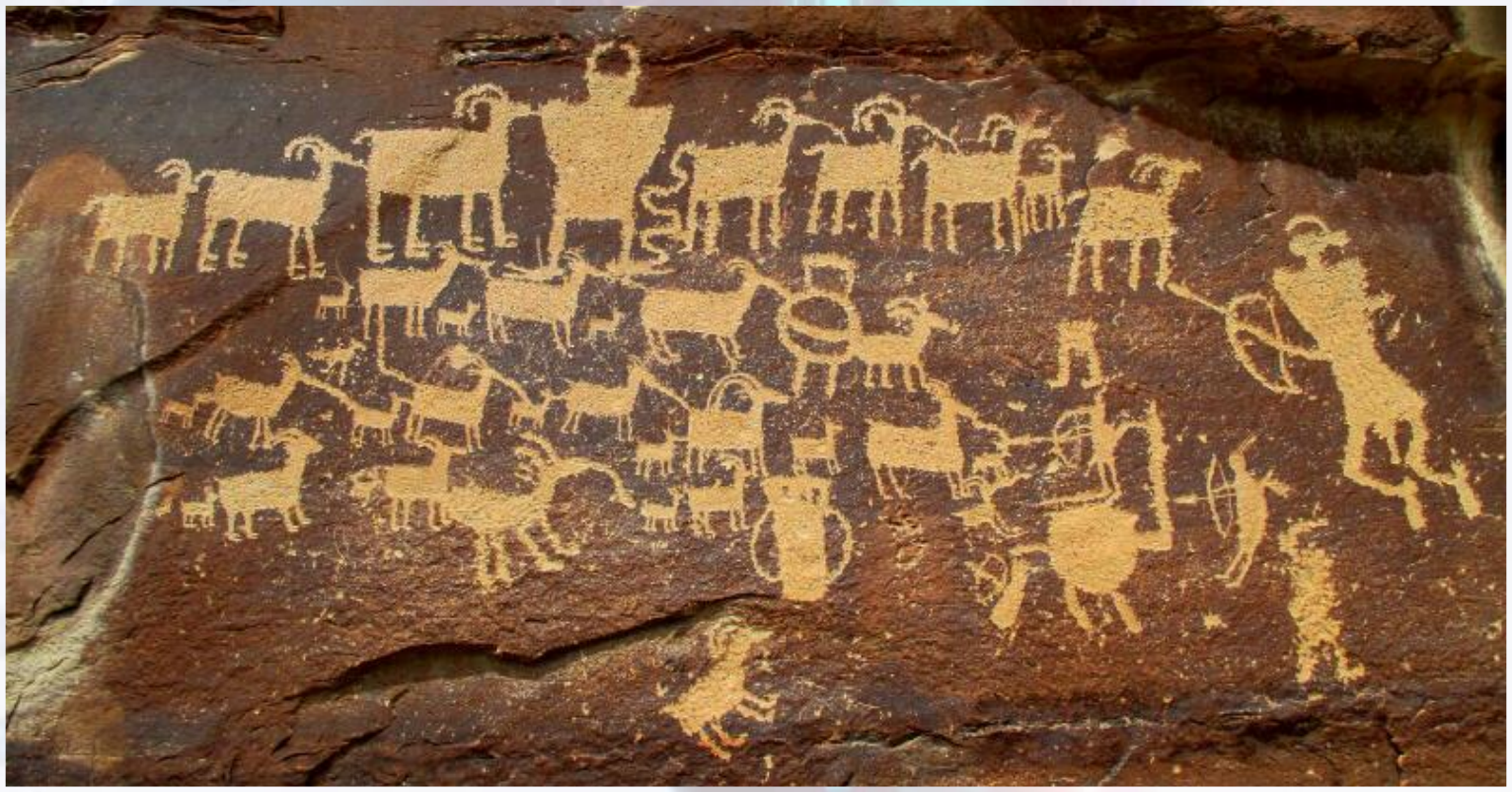
Introduction

- There are 4 main ages that divide up the history of information technology but only the latest age *(electronic)* and some of the *electromechanical* age really affects us today.
    1. Pre-Mechanical
    2. Mechanical
    3. Electro-Mechanical
    4. Electronic

Pre-Mechanical

- This is the earliest age of technology.
- It can be defined as the time between 3000 B.C. and 1450 A.D.
- When humans first started communicating, they would try to use language to make simple pictures *(petroglyphs)* to tell a story, map their terrain, or keep accounts such as how many animals one owned.

Pre-Mechanical



Pre-Mechanical

- This trend continued with the advent of formal language and better media such as rags, papyrus, and eventually paper.
- The first ever calculator – *(the abacus)* was invented in this period after the development of numbering systems.

Mechanical

- The mechanical age is when we first start to see connections between our current technology and its ancestors.
- The mechanical age can be defined as the time between 1450 and 1840.
- A lot of new technologies were developed in this era due to an explosion of interest in computation and information.

Mechanical

- Technologies like the slide ruler *(an analog computer used for multiplying and dividing)* were invented in this period.

Mechanical

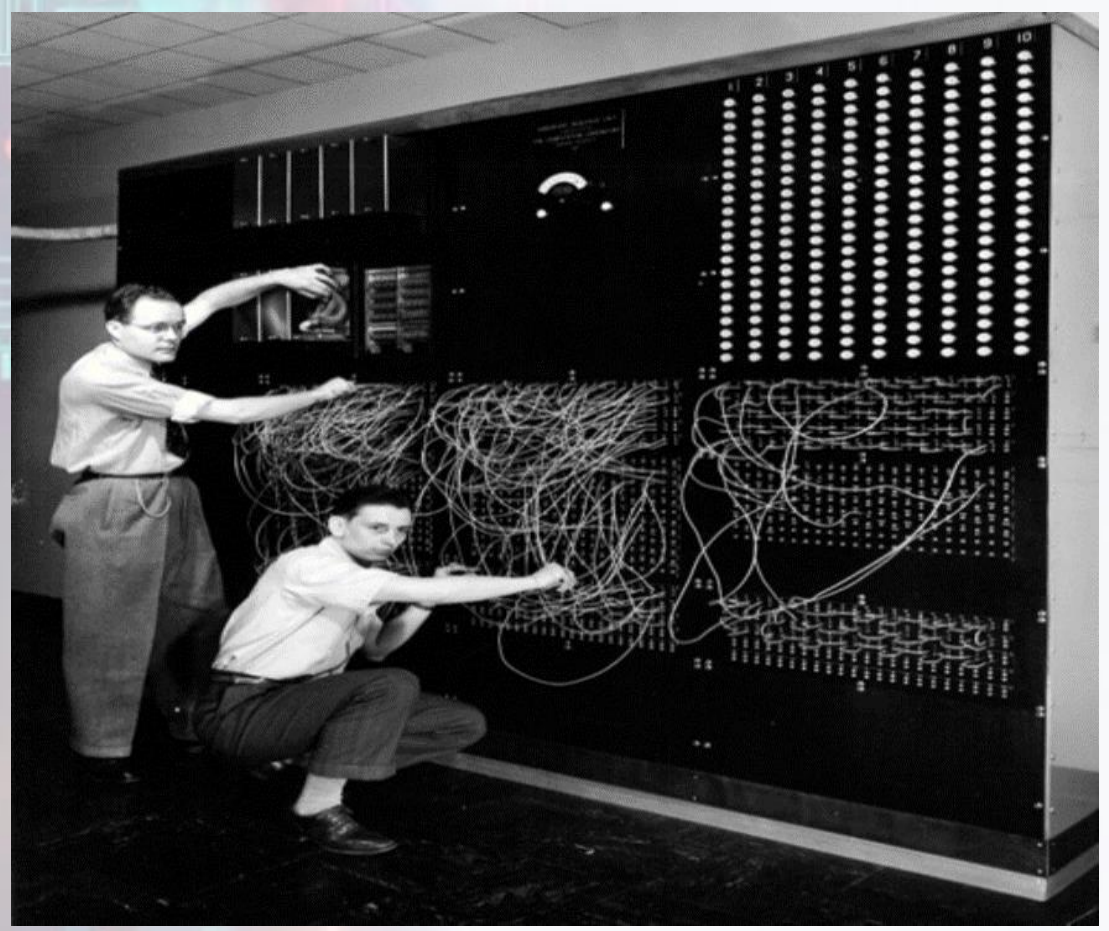
- Blaise Pascal invented the Pascaline, a very popular mechanical computer capable of adding, subtracting, multiplying, and dividing two numbers.
- Initially called the arithmetic machine, it was granted a royal privilege by King Louis XIV of France in 1649.

Electro-Mechanical

- The electromechanical age heralded the beginnings of telecommunications as we know it today.
- This age can be defined roughly as the time between 1840 and 1940.
- Several revolutionary technologies were invented in this period such as the Morse code, telephone, radio, etc.
- All of these technologies were crucial stepping stones towards modern information technology systems.

Electro-Mechanical

- The first large-scale automatic digital computer in the United States was the Harvard Mark 1 created by IBM in 1944.
- This 8ft x 50ft x 2ft big computer weighed a whopping five tons and had to be programmed using punch cards.



Electro-Mechanical

- Its first use was by the Manhattan Project to simulate the feasibility of an implosion to detonate an atomic bomb.

Electronic

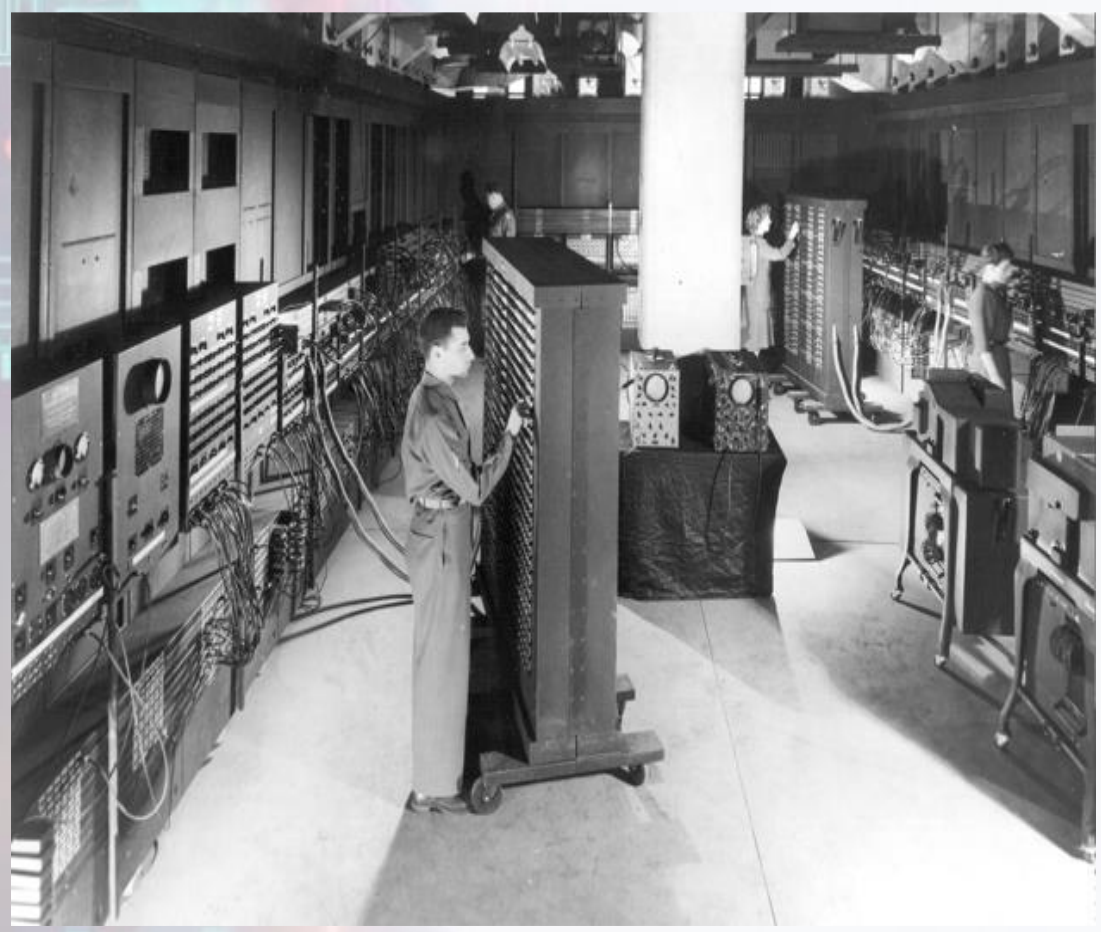
- These machines used electronic switches, in the form of vacuum tubes, instead of the electromechanical relays seen in the previous era.
- In principle the electronic switches would be more reliable, since they would have no moving parts that would wear out, but the technology was still new at that time and the tubes were comparable to relays in reliability.

Electronic

- The major benefit of electronic switches was that they could ‘open’ and ‘close’ thousands of times faster than relays.

Electronic

- ENIAC (Electronic Numerical Integrator and Computer) was the first electronic general-purpose computer.
- It could solve a large class of numerical problems through reprogramming.



Electronic

- ENIAC was designed and primarily used to calculate artillery firing tables for the United States Army's Ballistic Research Laboratory.
- Its first program included a study of the feasibility of the thermonuclear weapon.

Information Age and the Internet

- The information age, made possible by the advent of electronic computers, is characterized by the shift from traditional industry to an economy based on information digitization.
- The onset of the Information Age is associated with the Digital Revolution.

Information Age and the Internet

- The Internet, synonymous with modern IT, was conceived of as a fail-proof network that could connect computers together and be resistant to any single point of failure.
- Because of decentralization, the Internet cannot be totally destroyed in one event.
- If large areas are disabled, the information can be easily rerouted.
- Its initial software applications were e-mail and computer file transfer.

Questions!

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