

# **EE102: Software Engineering I**

## **Section 1 - World of Computers**

### **Motivation:**

- The economies of all developed nations are dependent on computers
- There is no area of in which computers do not play a significant role
- Computers control more and more systems encountered in our everyday life
- Computers enable information exchange (e-mail), count money (bank), control transport (planes), store data (databases), etc.
- Computers are useful in many applications, mostly for:
  - Storing of information
  - Retrieving information
  - Sending or communicating information
  - Modifying or transforming information.

## What is a computer?

- An electronic system that is capable of performing series of arithmetic and/or logical operations according to a program
- The computer allows for data to be inputted, stored and processed and results to be outputted, stored and further processed

## Computer Functions:

- It has four main functions:
  - Input (accepts data)
  - Processing (processes data)
  - Output (produces output)
  - Storage (save results)

## What are computer advantages?

- Processing speed
- Storage capacity
- Reliability

## Types of computers:

- Different types of computers exist from small PDAs (personal digital assistant), tablet PCs and laptops to personal computers (PCs) and large servers.
- There are also many specialised computers from language translators, trip planners and account pads to large computers that control industrial processes
- There are also very small computer-like devices such as micro-controllers that control many electronic devices such as hair dryers, vacuum cleaners, etc.



## Brief history of computers: Individuals:

- **Blaise Pascal (1623 - 1662)**
  - Pascaline
  - first mechanical adding machine
  - <http://lecture.eingang.org/pascaline.html>
  
- **Charles Babbage (1791 - 1871)**
  - The Difference Engine
  - Fully automatic, steam-powered computing machine controlled by a fixed instruction program to do repetitive commands
  - The Analytical Engine
  - Computing machine that incorporates conditional control and uses punched cards
  - <http://vmoc.museophile.org/babbage/>
  - <http://lecture.eingang.org/conditional.html>
  
- **Herman Hollerith (1860 - 1929)**
  - The Tabulating Machine
  - Read census results punched onto cards
  - <http://lecture.eingang.org/hollerith.html>

- **Konrad Zuse (1910 - 1995)**

- Binary representation
- First calculating machine to use binary representation
- <http://lecture.eingang.org/binrep.html>

- **Alan Turing (1912 - 1954)**

- The Turing Machine (Finite State machine)
- Machine that could perform logic and arithmetic operations on data inputted on a tape
- <http://lecture.eingang.org/turing.html>
- <http://www.turing.org.uk/turing>

- **John Louis von Neumann (1903-1957)**

- Von Neumann Architecture
- Foundation for existing computers architecture
- <http://ei.cs.vt.edu/~history/VonNeumann.html>

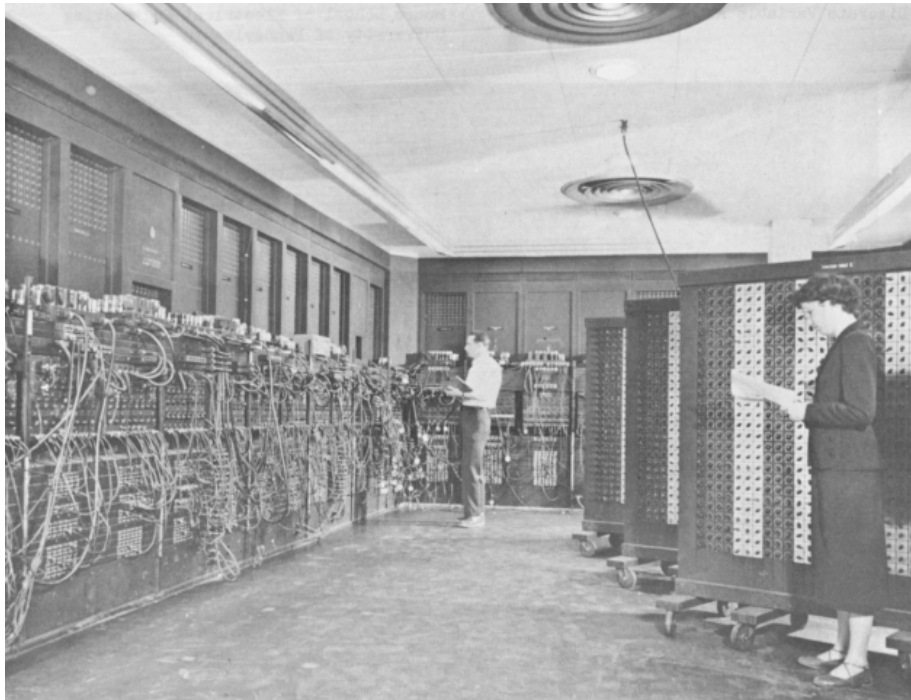
### Technology:

- Vacuum tubes
- Transistor (1947)
- Integrated circuit (1958)
- Microprocessor (1971)

## **Computers:**

- **The Harvard Mark I (1939 - 1944)**
  - First automatic digital computer
  
- **ENIAC (1946-1955)**
  - First successful high-speed electronic digital computer
  - Constructed with vacuum tubes
  
- **EDVAC and UNIVAC (1944 - 1952)**
  - First commercially available computers
  - Constructed with transistors and integrated circuits
  
- **IBM PC (1981)**
  - Launched computer revolution

- Images taken: <http://ftp.arl.mil/ftp/historic-computers>



**ENIAC**



**BRLESC-I**



**VAX**



**PCs**