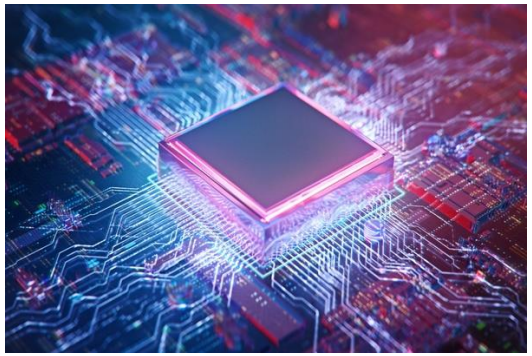

EL2003
Computer Organization and Assembly Language

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Learning objective of the course

- Explain all the basic operations of the computer.
- Understand the psychology of the computer.

- Above-mentioned objectives can only be met using machine language or Assembly language.

Preface

- Assembly Language (AL) programming develops a very basic and low-level understanding of the computer.
- AL programming gives freehand exposure to the computer and lets the programmer talk with it in its language.
- IBM PC based on Intel architecture will be used.
- Basic digital logic operations of AND, OR, NOT etc.

Big question?

- Why should we learn assembly language when there are higher level languages one better than the other; C, C++, Java, Python etc.?

- Example 1:
  - Japanese to English translator

- Example 2:
  - Four color picture scanned at 300 dots per inch
  - 90000 pixels per square inch
  - Processing on this picture requires 360000 operations per square inch (one operation for each color of each pixel)
  - A few extra instructions placed by the translator can cost hours of extra time.

Another big use of Assembly Language

- Used in a class of time-critical systems (real-time systems).
  - Airline traffic control systems
  - Command Control Systems
  - Airlines reservation system
  - Heart Pacemaker
  - Network Multimedia Systems
  - Robot etc.

Another big use of Assembly Language (contd.)

- Real-time systems have time-bound responses (an upper limit of time on certain operations).
- For such precise timing requirements, we must keep the instructions in total control.
- In higher-level languages we cannot even tell how many computer instructions were actually used

Another major use of Assembly Language

- Learn AL to produce fine-grained logic in programmers
  - Each and every grain of assembly language has a meaning
  - Nothing is presumed (e.g. div and mul for input and output of decimal number).