Chapter 1. Historical Perspective

- History of Computers with CAD/CAM
- Computer Hardware: CPU, input/output devices, and memory
- Types of Computers: main, mini, workstations, and personal computers
- Computer Software: Programming Languages: machine, assembler, high-level languages (Fortran, Cobol, Pascal, Basic, C)
- Number Representation: binary, octal, decimal, and hexadecimal systems
Computer Hardware
CAD Systems
Classes

- Centrally Controlled Systems Based on a Powerful Minicomputer
- Workstation IRISC) Based Systems
- PC-Based Systems

- Sun Microsystems
- IBM
- Hewlett-Packard
- Techtronix
- Silicon Graphics
- Data General
- Apollo Computer
- Harris
- NEC Information System
- Apple Computer
- IBM PC
- IBM Clones (AutoCAD, CADKey, VesaCAD)
Networked Computers: Conventional and LAN
Computer Software: Programmable Languages (Assembly)

- **Assembly language: mnemonic instructions**
  - LXI H, BLK1; memory pointer 1 = start of block 1
  - LXI D, BLK2; start block 2
  - MVI B, COUNT; count = length of blocks
  - **TRANS:** MOV A, M; get element of block 1
  - STAX D; move element to block 2
  - ...
```c
#include <stdio.h>
#include <conio.h>

/* declare the prototype */
void addmul(double a, double b, double *c, double *d);

int main()
{
    /* declare variables */
    double a, b, c, d;
    FILE *ip, *op;

    /* open the files */
    ip = fopen("basic-3.inp"., "rt");
    op = fopen("basic-3.out", "wt");

    /* read from the file */
    fscanf(ip, "%lf %lf", &a, &b);

    /* call a function */
    addmul(a, b, &c, &d);

    /* write to screen */
    fprintf(op, "c = %f, d = %f", c, d);
    return 0;
}

void addmul(double a, double b, double *c, double *d)
{
    /* computes */
    *c = a + b;
    *d = a * b;
}
```

```c
declare automatically the variables to be double precision
with a through h and o through z
otherwise (i.e., variables starting with i, j, k, l, m, n) the
implicit real*8 (a-h, o-z)
to be able to read from or write to a file open them with
open(1, file='basic-3.inp')
open(7, file='basic-3.out')
read a and b now from the file
read(1, *) a, b
call a subroutine to compute addition and multiplication
call addmul(a, b, c, d)
write the output to the monitor
write(7, *) c, d
stop
end

subroutine addmul(a, b, c, d)
make sure to use same precision as main program
implicit real*8 (a-h, o-z)
computes the addition and multiplication
  c = a + b
d = a * b
return
end
```
Number Conversion

With advance of computer technology, more works are being done by computers. The communication is done through human instructions to computers. But problem in communication is the different languages human and computer use. Since the computer use machine language (binary number system) and human decimal system and alphabets, appropriate translation is required. The software that does this translation is called **compiler**. This translates the high-level languages like C, Fortran to low-level language (i.e., machine language).

In manufacturing area, NC codes uses the mid-level language (i.e., part programming language similar to assembly language) that are translated to machine language by controller or computer. Thus, it is essential to understand how the conversion takes place from one number system to another to be able to talk about programming.

Example:

(123)_8 = ( ? )_{10}
(759)_{10} = ( ? )_{16}
(10101101)_2 = ( ? )_{10}

(0.678)_{10} = ( ? )_{8}

Hint: for integer part, divide the number and separate remainder and for decimal places, multiply the base and then separate the integer values.
Training and Continuing Education

Training is an essential part of continuing education and a wise investment. Training enables you to:

- work faster, smarter and become more productive
- increase your engineering expertise and value to your company and customers
- make analysis and simulation an integral part of your design process
- take advantage of advanced software capabilities and
- meet with other users to exchange ideas and techniques.

Knowledgeable users can then help companies speed up time to market and make better, safer products at a lower cost.