



PROGRAMMING

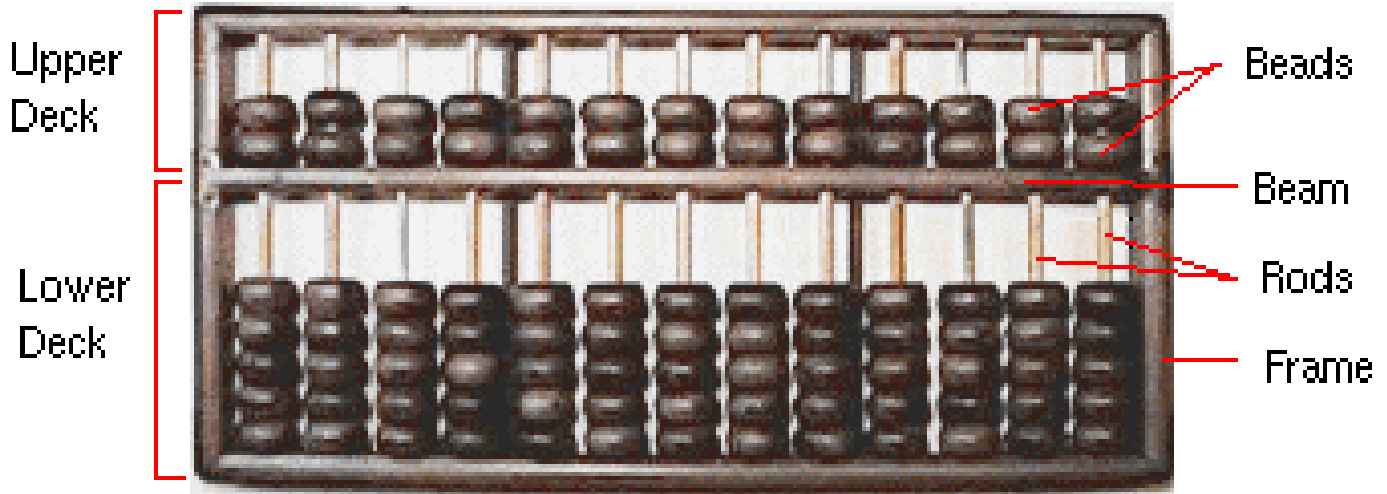


INTRODUCTION

Chapter 1

THE ABACUS

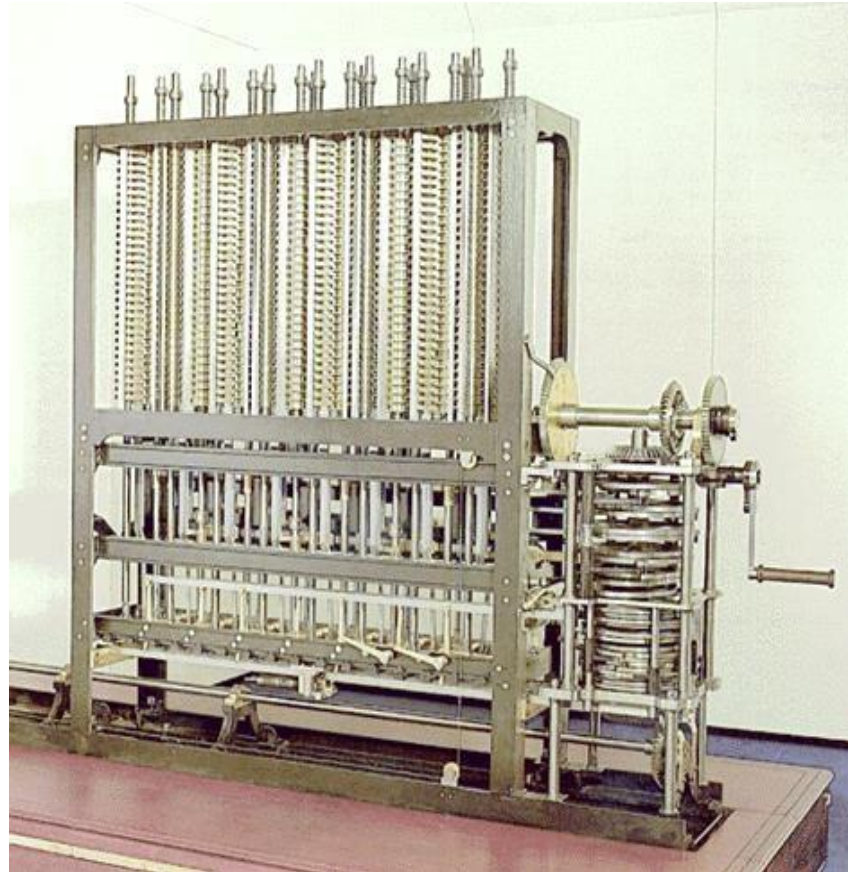
- The abacus, a simple counting aid, may have been invented in Babylonia (now Iraq) in the fourth century B.C.



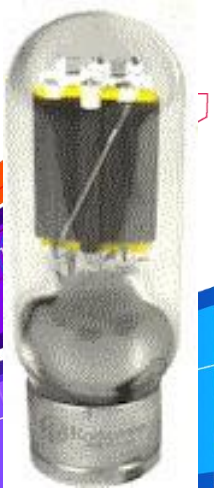
JACQUARD LOOM



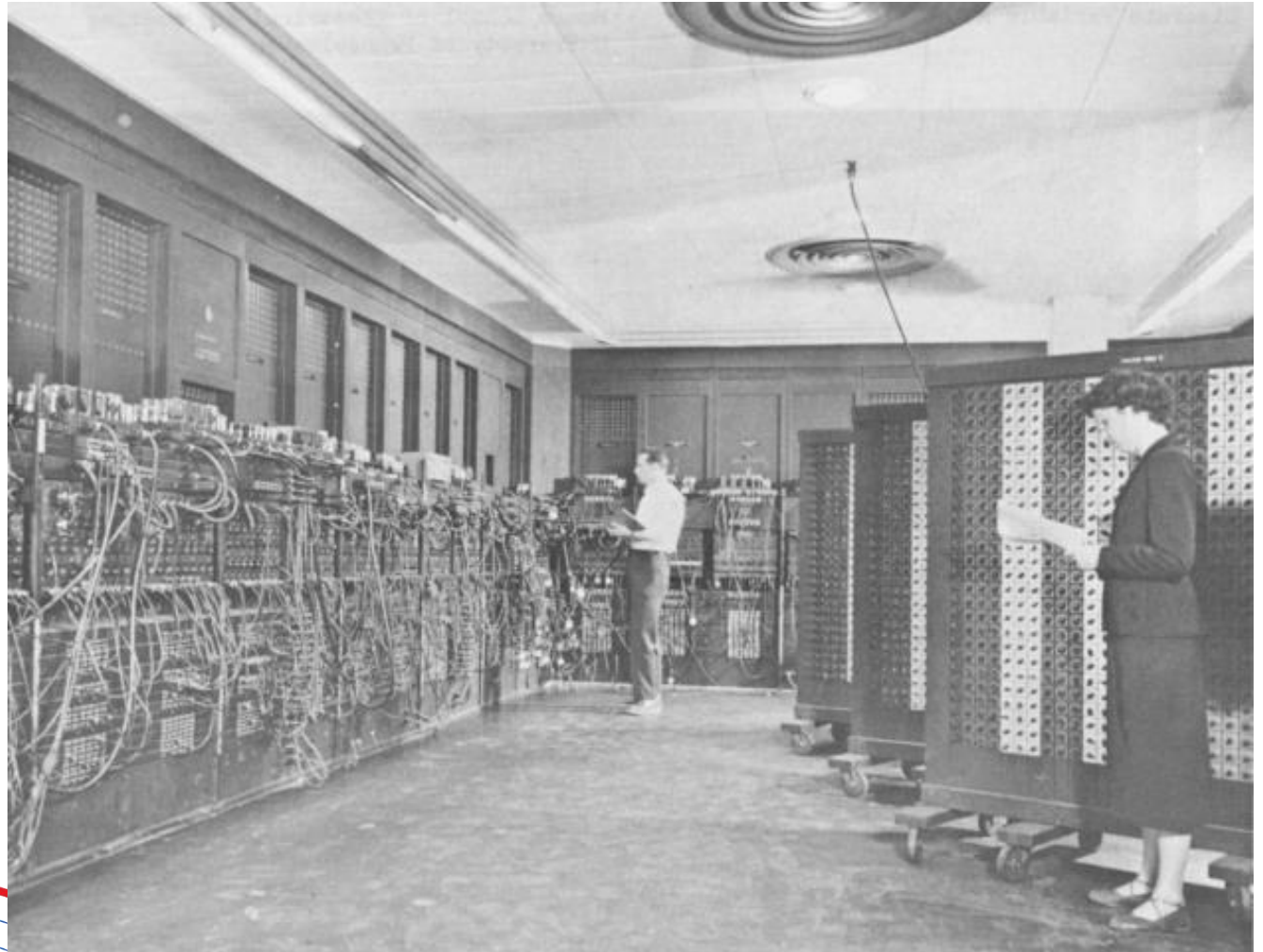
BABBAGE DIFFERENCE ENGINE,
RECONSTRUCTED BY THE BRITISH
GOVERNMENT IN 1991.



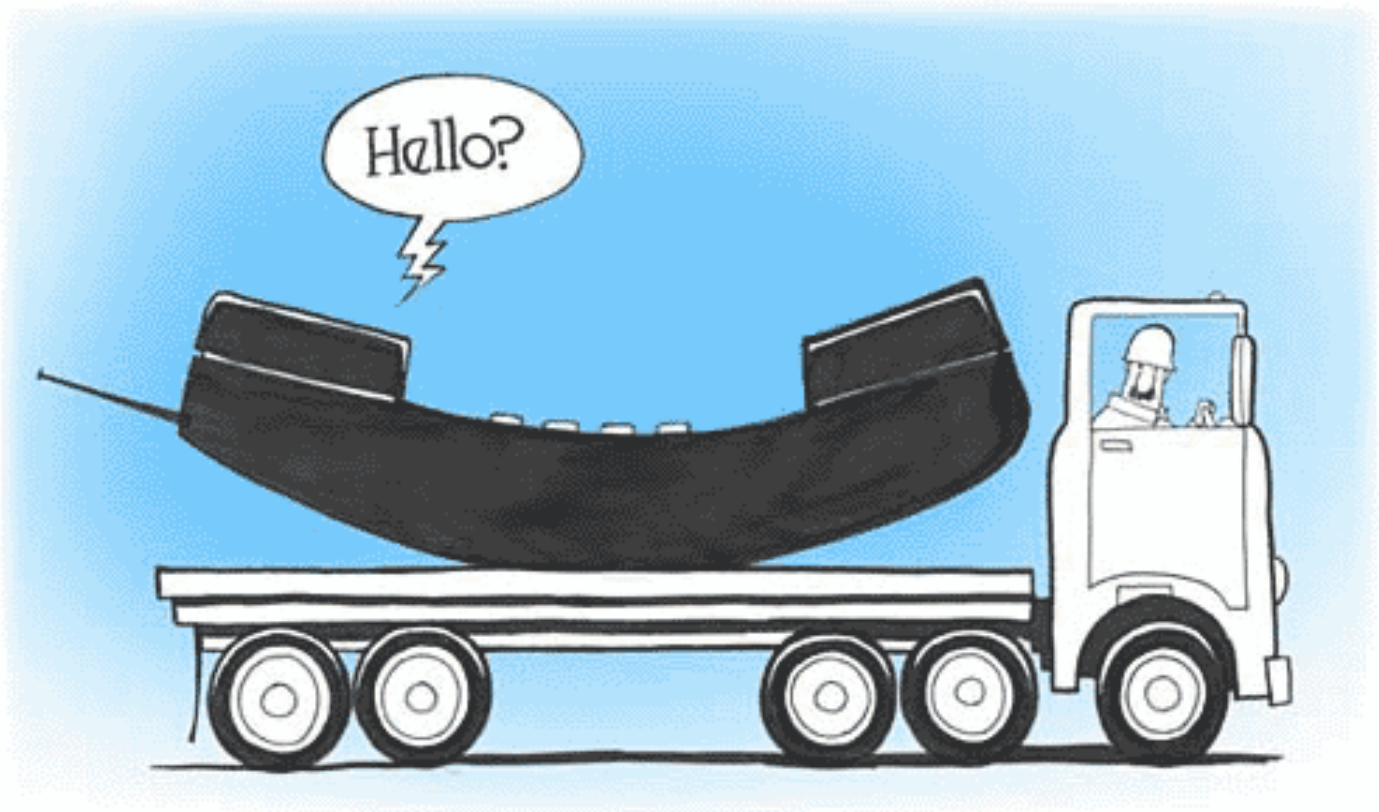
THE ENIAC



Vacuum
Tube



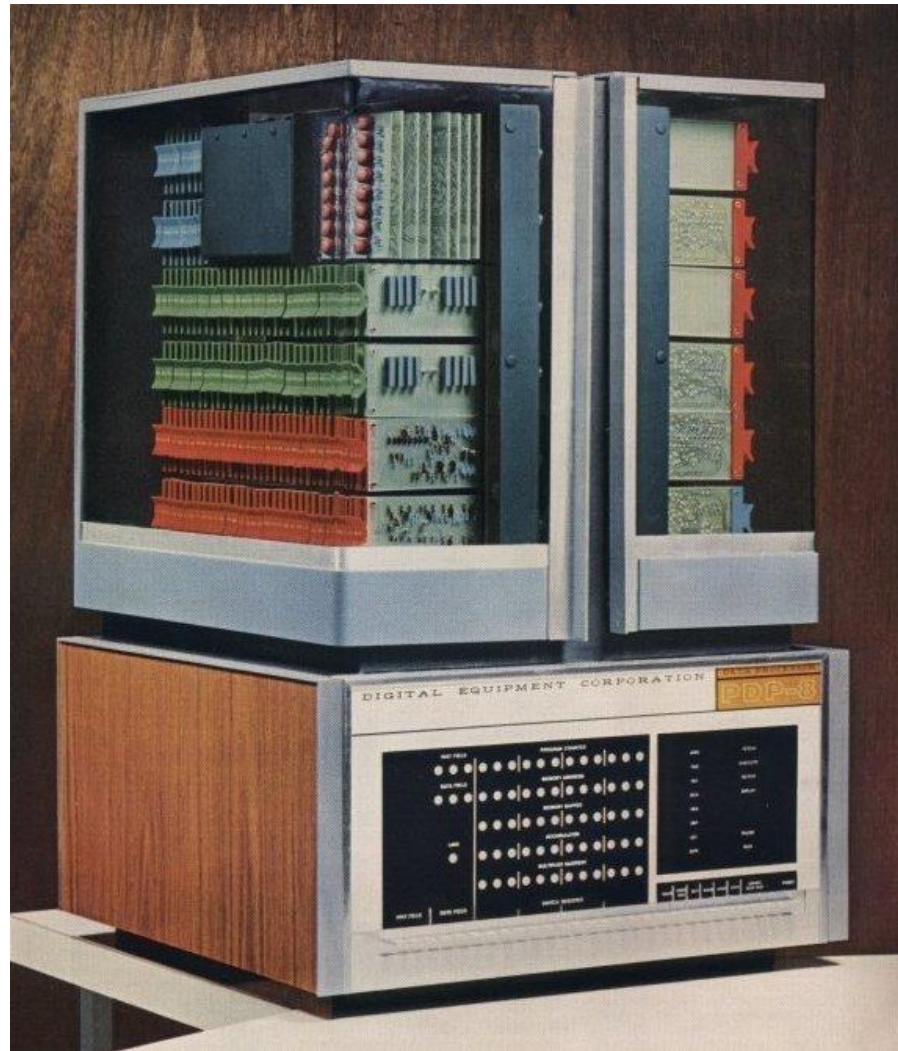
THE SIZE OF A CELL PHONE BUILT WITH VACUUM TUBES



THE IBM 360

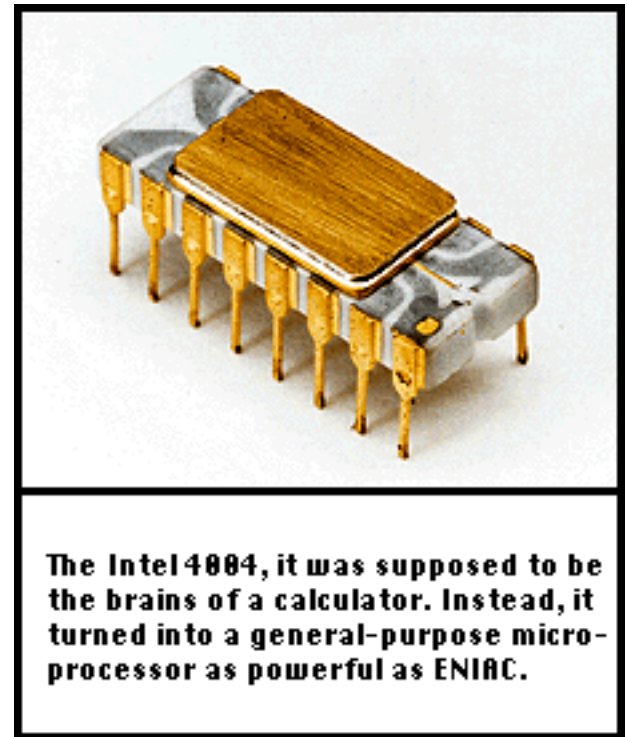


THE PDP-8



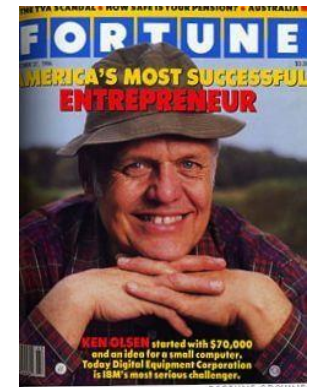
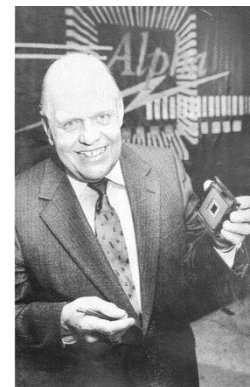
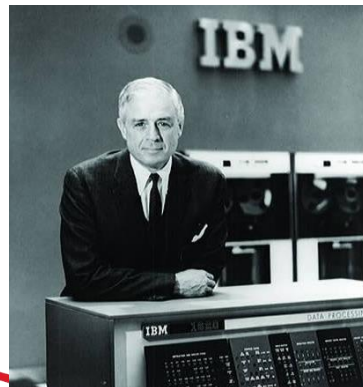
THE MICROPROCESSOR

- A computer chip that contains on it the entire CPU
 - Mass produced at a very low price
 - Computers become smaller and cheaper
- Intel 4004 – the first computer on a chip, more powerful than the original ENIAC.
- Intel 8088 – used in IBM PC



FAMOUS QUOTES ABOUT COMPUTERS

- “I think there is a world market for maybe five computers.” – Thomas Watson, chairman of IBM, 1943
- “There is no reason anyone in the right state of mind will want a computer in their home.” – Ken Olson, President of Digital Equipment Corp, 1977.



HARDWARE

- **Hardware** – the physical devices that make up a computer (often referred to as the computer system)



HARDWARE CORE



- CPU (Central Processing Unit)
 - **CPU (machine) cycle** – retrieve, decode, and execute instruction, then return result to RAM if necessary
 - CPU speed measured in gigahertz (GHz)
 - **GHz** – number of billions of CPU cycles per second
- RAM (Random Access Memory)
 - Also called Memory, Main Memory, or Primary Storage
 - Measured in gigabytes (GB, billions of bytes) today
 - Byte → Character
 - RAM is volatile
 - Temporary storage for instructions and data

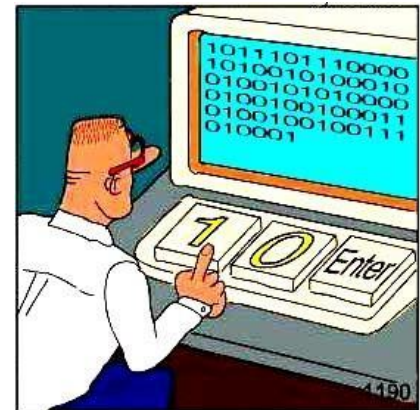
CAPACITY OF SECONDARY STORAGE DEVICES

- **Kilobyte (KB or K)** – about 1 thousand bytes
- **Megabyte (MB or M or Meg)** – about 1 million bytes
- **Gigabyte (GB or Gig)** – about 1 billion bytes
- **Terabyte (TB)** – about 1 trillion bytes



SOFTWARE

- Programs — instructions that tell the computer what to do
- Categories
 - **Application software** - enables you to solve specific problems or perform specific tasks.
 - **System software** - handles tasks specific to technology management and coordinates the interaction of all technology devices
 - **Utility software** - provides additional functionality to your operating system software



REAL Programmers code in BINARY.

SYSTEM SOFTWARE

- Operating System
 - UNIX / Linux
 - Windows
 - MAC OS
 - Palm OS
 - Android
- Language Translators
 - C, C++, Basic, Java, ...
- Device Drivers





C PROGRAMMING LANGUAGE



Bell Laboratories

- Developed at AT&T Bell Labs in early 1970s
- Unix also developed at Bell Labs
 - All but core of Unix is in C
- Standardized by American National Standards Institute (ANSI)

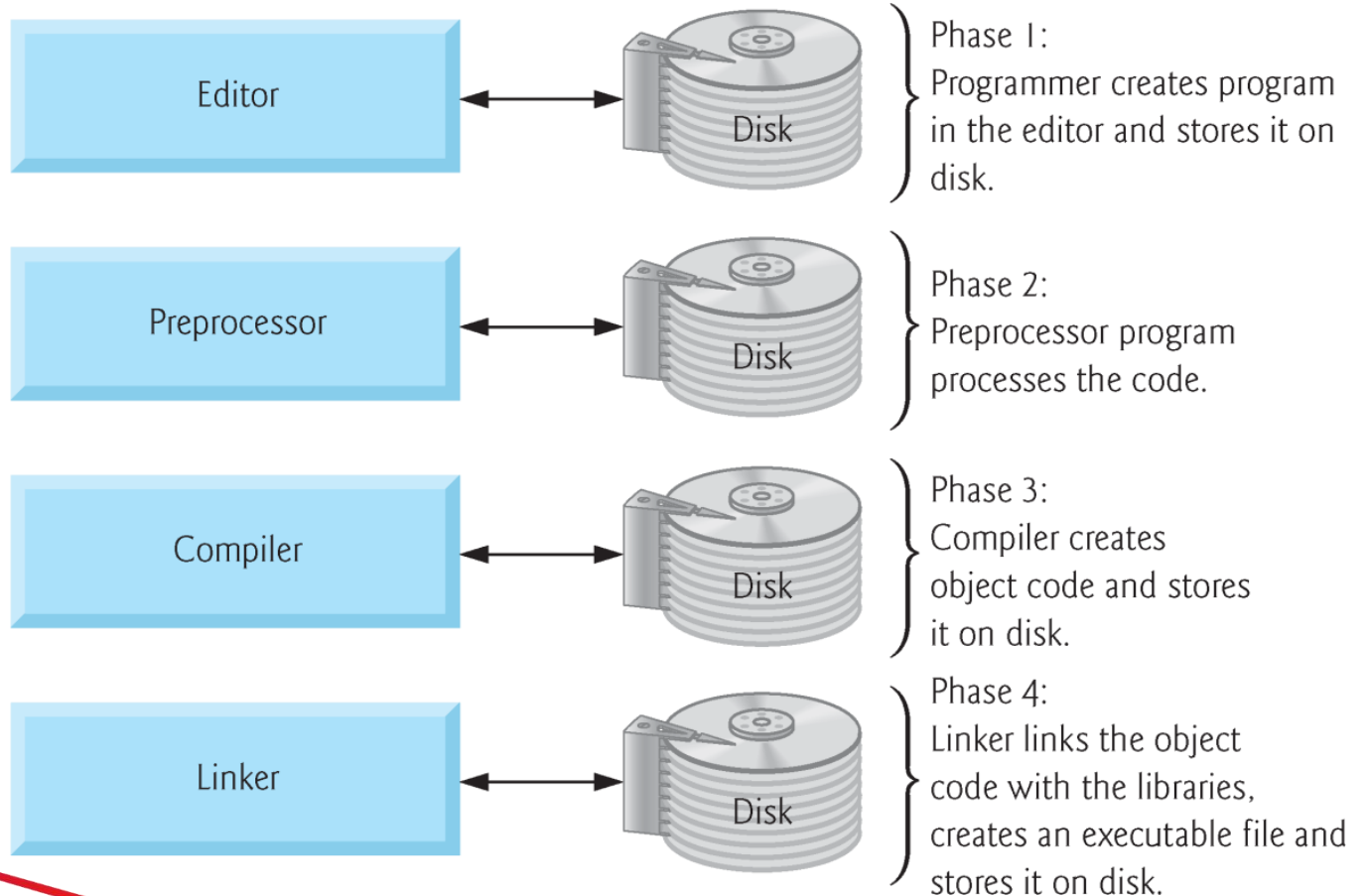


American National Standards Institute

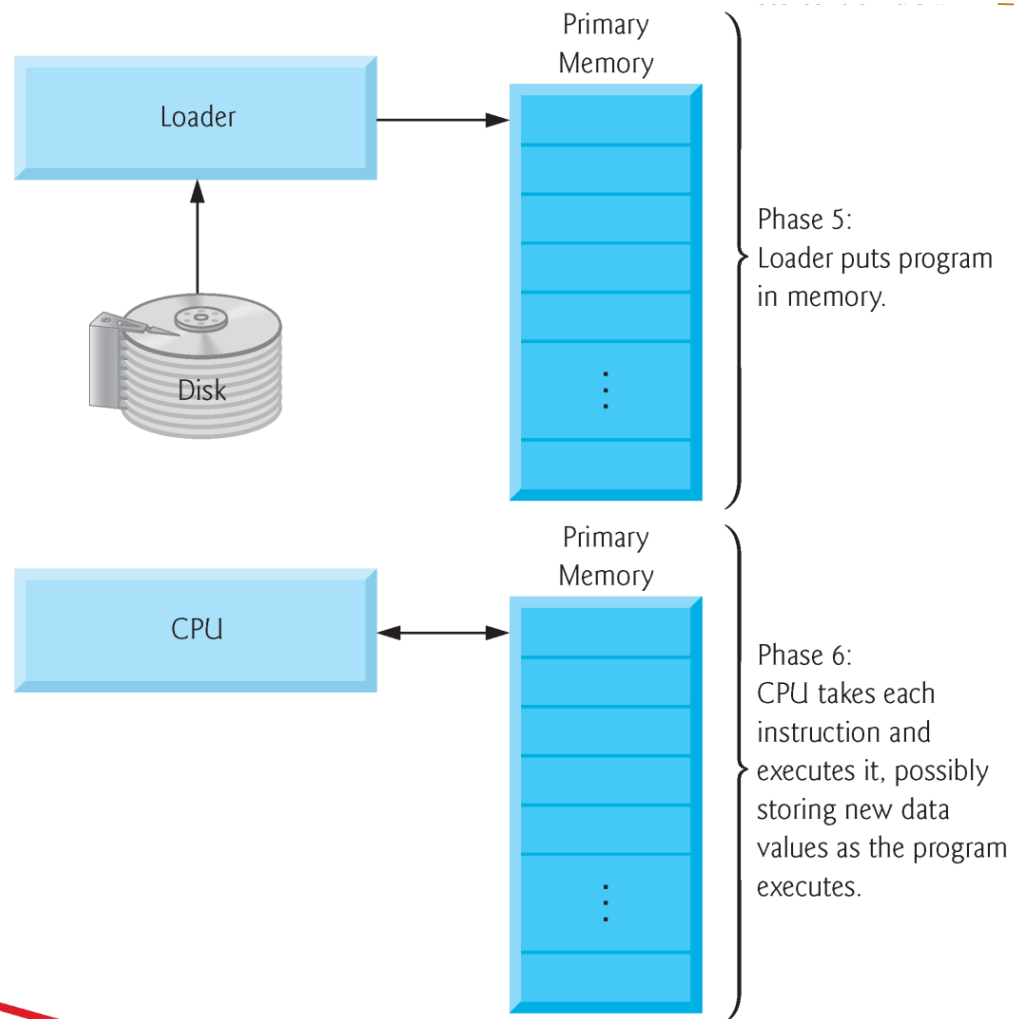


Because C is a hardware-independent, widely available language, applications written in C can run with little or no modifications on a wide range of different computer systems.

C DEVELOPMENT ENVIRONMENT



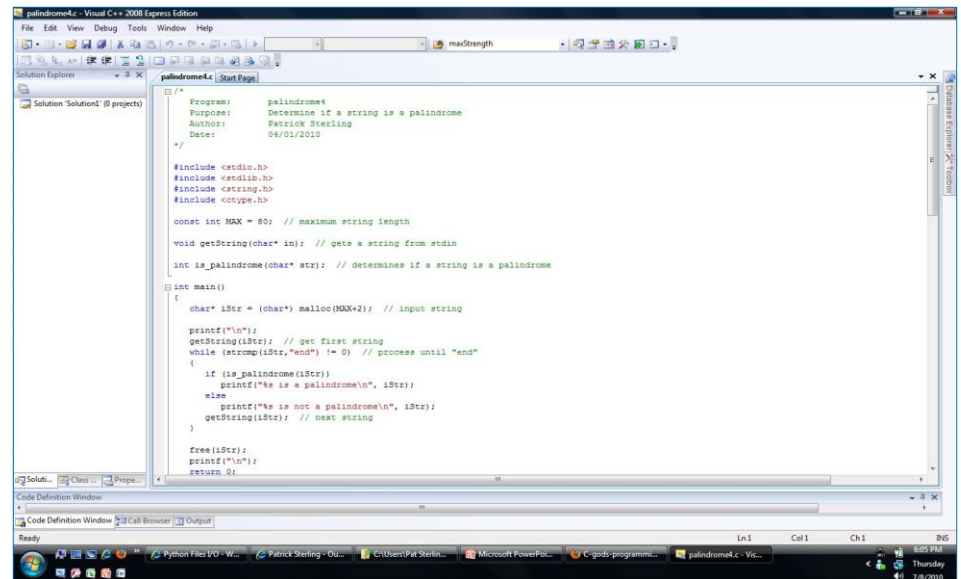
EXECUTION ENVIRONMENT



Optionally
under control
of a Debugger

IDE

- Integrated Development Environment
 - Editor
 - Compiler
 - Debugger
- Ex:
MS Visual C++
Xcode



```
palindrome4.c - Visual C++ 2008 Express Edition
File Edit View Debug Tools Window Help
Solution Explorer
Solution 'Solution1' @ projects
palindrome4.c [Start Page]
Program: palindrome4
Purpose: Determine if a string is a palindrome
Author: Patrick Sterling
Date: 04/01/2010
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
const int MAX = 80; // maximum string length
void getString(char* in); // gets a string from stdin
int is_palindrome(char* str); // determines if a string is a palindrome
int main()
{
    char* iStr = (char*) malloc(MAX*2); // input string
    printf("\n");
    getString(iStr); // get first string
    while (strcmp(iStr, "end") != 0) // process until "end"
    {
        if (is_palindrome(iStr))
            printf("%s is a palindrome\n", iStr);
        else
            printf("%s is not a palindrome\n", iStr);
        getString(iStr); // next string
    }
    free(iStr);
    printf("\n");
    return 0;
}
```

BEST PROGRAMMING LANGUAGE?



PROGRAMMING