

Introduction to Computing

When do you use a computer?

- Word Processing
 - Web Surfing
 - Instant Messaging/Email
 - Music downloads/Games
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- Air traffic control
 - Car diagnostics
 - Climate control

Why do you use a computer?

- Word Processing
 - Improved communication
- Web Surfing
 - Knowledge acquisition
- Instant Messaging/Email
 - Community
- Music downloads/Games
 - Entertainment

What do you need in a computer?

- Word Processing
 - WYSIWYG
 - Attached to printer/Email
- Web Surfing
 - Network connection
- Instant Messaging/Email
 - Network connection
- Music downloads/Games
 - Network connection
 - Disk space
 - CD-ROM or Pen Drive

When do you use a computer?

- Air traffic control
- Car diagnostics
- Climate control

What is a computer?

- Processor *brains*
- Memory *scratch paper*
- Disk *long term memory*
- I/O *communication (senses)*

- Software *reconfigurability*

What makes a computer special?

- Most complex object made by humans
- Communication mechanism
- Reconfigurability
- Moore's Law

The pieces

- How are computers built?
- How are computers programmed?
- How are computers networked?

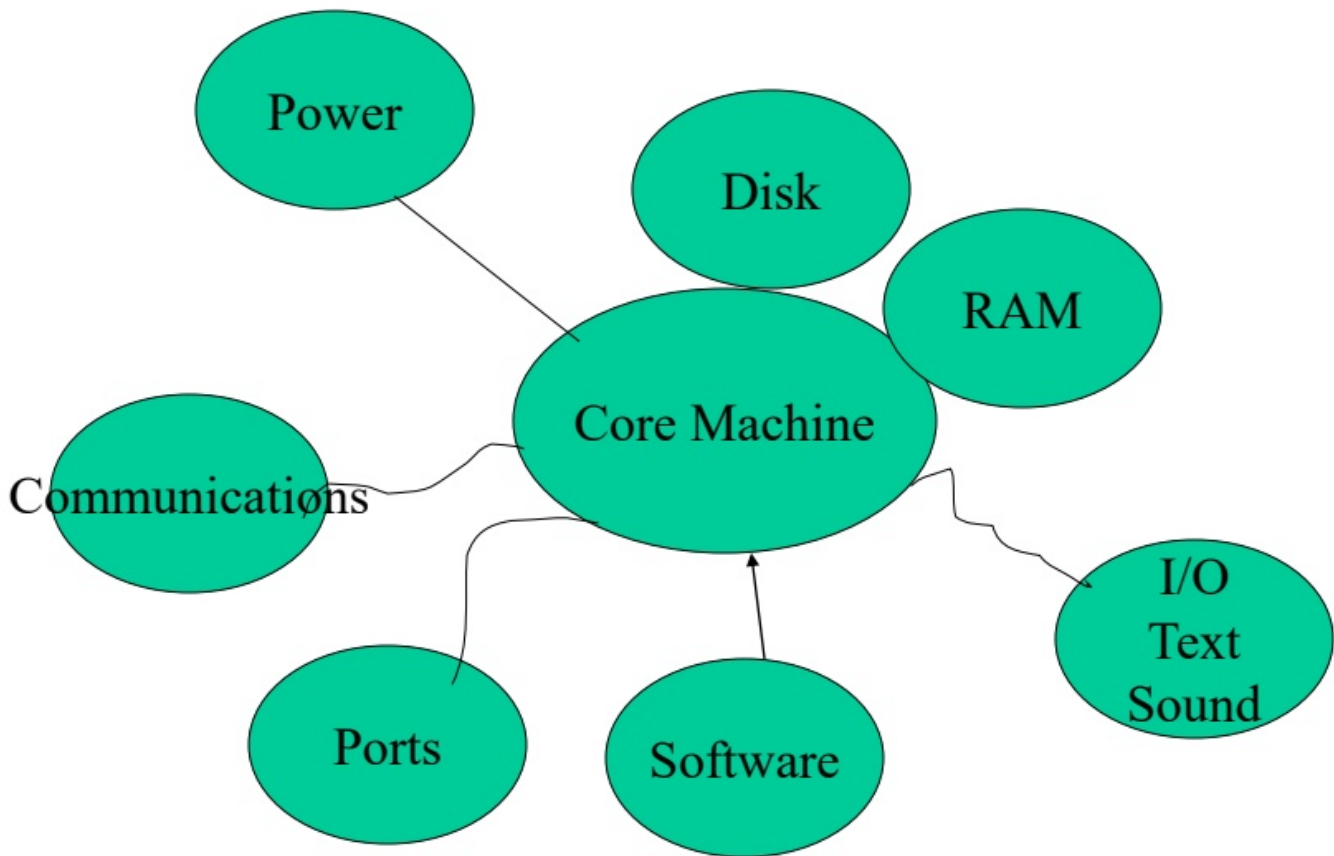
What was in my 1st Machine

- Processor (Pentium III 850 MHz)
- RAM (64 MB of SDRAM expand to 128 MB)
- Disk (128 GB)
- CD ROM/ **CD RW/DVD/...**
- 15" XGA Display (1024x768 res.)
- 3.5" 1.44MB Floppy Disk Drive
- S3 Savage IX 128-bit AGP 2x graphics
 - 8MB memory, 3D Hardware acceleration, composite TV-Out support, ...
- 16-bit Soundblaster Compatible Sound

What was in my 1st Machine

- 2 Type-I or Type-II slots or 1 Type-III slot
- 2 USB Ports
- Built-in 56Kbps V.90 Data/fax modem
- Built-in 10/100 Ethernet Adapter
 - Microsoft Windows Millennium Edition,
 - Encarta World Encyclopedia online version...

The machine



Building an application

- Word (is a part of the Office application)
- Runs on Windows (an operating system)
- Runs on Pentium (a computer)
- Enhanced by connections to monitor, printer, network
- Uses random access memory (RAM) to work on document, disk (non-volatile) memory to store in
- Need a CD-ROM to install application

What does this mean?

- Building a computer
- Using a computer
- Networking the computer
- Understanding the limitations of the computer
- Social Issues
- Applications

What does this mean?

- **Building a computer**
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Building a computer

- Start with simplest part – switch
- Build logic gates – AND/OR
 - Use to solve logic problems
- Build memory
- Build processing power
 - Arithmetic Unit
- Build simple programming language

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Using a computer

- How to represent data
- How to manipulate data
- How to manage information

- Start with 2 applications
 - Picture processing on the computer
 - Sound processing on the computer

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- **Networking the computer**
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Networking the computer

- How do computers communicate
 - Protocols TCP/IP, HTTP, FTP, ...
- The InterNet
 - What it is and where it came from
 - How it transports email and displays web pages
- Differing network connections
 - Client/server vs. peer-to-peer
 - How networks facilitate music sharing

What does this mean?

- Building a computer
- Using a computer
- Networking the computer
- **Understanding the limitations of the computer**
- Societal Issues
- Applications

Understanding the limitations of the computer

- Algorithms for solving simple problems
- Harder problem
 - Problems unlikely to be solved in our lifetime
 - Problems unlikely to be solved in millennia
- Undecidable problems
 - Problems that provably can never be solved

What does this mean?

- Building a computer
- Using a computer
- Networking the computer
- Understanding the limitations of the computer
- **Societal Issues**
- Applications

Societal Issues

- Digital rights management
 - Old ideas of copyright law do not work
 - When is sharing legal?
- Privacy
 - Systems are not secure
 - How much information should be public
- Safe communication
 - Should you send your credit card over the internet?

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- Using a computer
- Networking the computer
- Understanding the limitations of the computer
- Societal Issues
- **Applications**

Applications

- How well can computers
 - Understand written text
 - Understand spoken text
 - Understand hand drawn pictures
 - Play chess ...
- Possibly a look inside a big program