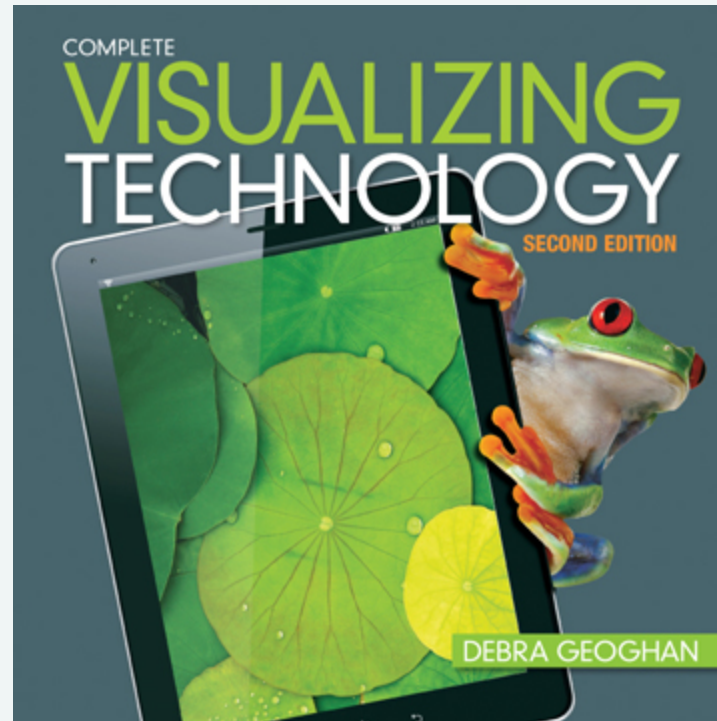


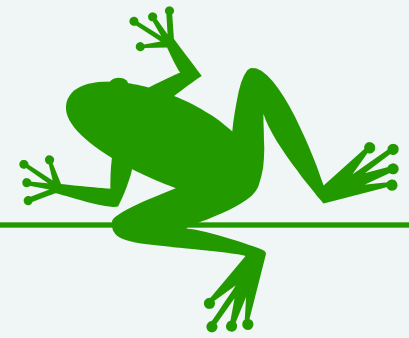
PowerPoint Presentation to Accompany



Chapter 1

What Is a Computer?

Objectives



1. Explain the functions of a computer.
2. Describe the evolution of computer hardware, and explain the importance of Moore's Law.
3. Describe how computers represent data using binary codes.
4. List the various types and characteristics of personal computers.
5. Give examples of other computing devices.
6. List the various types and characteristics of multiuser computers.
7. Explain the terms "ubiquitous computing" and "convergence."

Objective 1: Overview

What Does a Computer Do?

1. Explain the information processing cycle
2. Briefly review the Industrial Revolution and its contribution to computers

Key Terms

- Computer
- Data
- Information
- Information processing cycle (IPC)



What is a Computer?

A programmable machine that converts **raw data** into **useful information**

- Data:
 - Text
 - Numbers
 - Images
- Information:
 - Documents
 - Charts
 - Spreadsheets
 - Photo galleries

Information Processing Cycle

Input

- Data collected from customers who submit a form on a website

Process

- The data is manipulated, or processed, so it can be used to evaluate the customer's needs

Storage

- The raw data is stored temporarily until it can be processed
- The processed information is stored for later retrieval

Output

- The processed raw data – now information – is output as reports and charts that managers can use to help make decisions

Industrial Revolution

Early Contributions to Computers



Augusta Ada King,
Countess of Lovelace

- Original computers were people
- Jacquard Loom:
 - First machine to use punched cards
 - Ability to follow an algorithm
- Analytical Engine:
 - Designed by Charles Babbage
 - Ada Lovelace – programmer
 - Never actually built

Alan Turing

- 1936, introduced the concept of machines that could perform mathematical computations
- 1950, developed the Turing test, which tests a machine's ability to display intelligent behavior
- Father of computer science and artificial intelligence



How did Boole, Bush, Tesla, and Leibniz contribute to the Industrial Revolution?

Objective 2: Overview

A Brief History of Computers

1. Discuss the four generations of computers and the technology that defined them
2. Discuss Moore's Law and its prediction

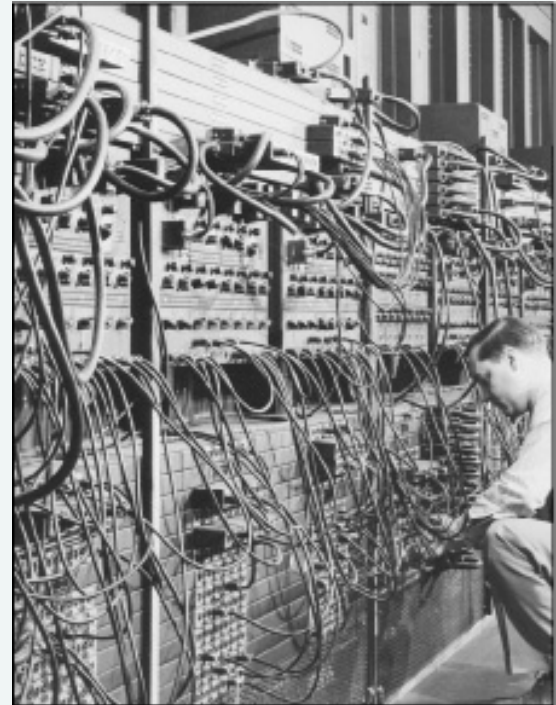
Key Terms

- ENIAC
- Integrated circuit (IC)
- Microprocessor
- Moore's Law
- Transistor
- Vacuum tubes



First Generation Vacuum Tubes

- 1941: Z1– Conrad Zuse
- 1942: Atanasoff-Berry Computer
- 1944: Colossus
- 1944: Harvard Mark 1
- 1946: ENIAC
- 1951: UNIVAC



ENIAC

First Generation Vacuum Tubes

Date	Computer	Origin	Creator
1936-41	Z1-Z3	Germany	Konrad Zuse
1942	ABC (Atanasoff-Berry Computer)	USA	Iowa State Professor John Atanasoff and graduate student Clifford Berry
1944	Colossus	UK	Tommy Flowers
1944	Harvard Mark 1	USA	Designed by Howard Aiken, programmed by Grace Hopper
1946	ENIAC	USA	Presper Eckert and John Mauchly at University of Pennsylvania
1951	UNIVAC	USA	Eckert and Mauchly

First Generation Vacuum Tubes



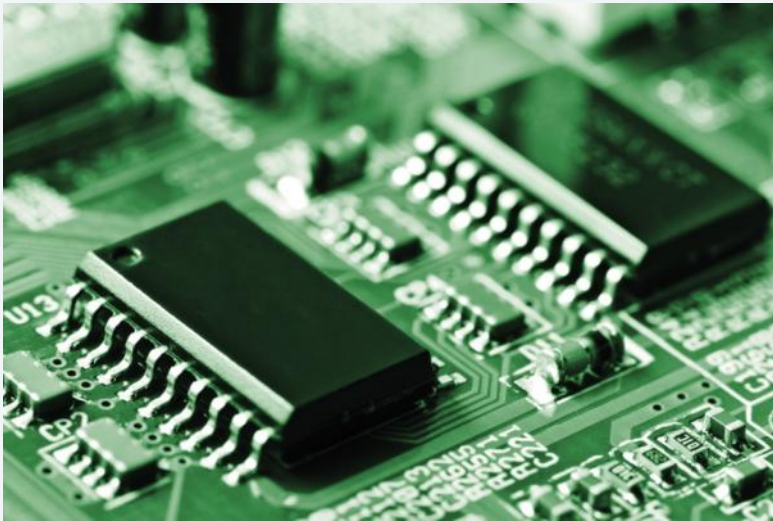
- Resembled incandescent light bulbs
- Gave off a lot of heat and were unreliable
- Major characteristic of first-generation computers is the vacuum tube

Second Generation Transistors

- Replaced vacuum tubes in 1947
- Made computers more powerful, smaller, reliable
- Revolutionized the electronics industry



Third Generation Integrated Circuit



- Faster, smaller, and more reliable than transistors
- Popularized in 1960
- Invented by Jack Kilby and Robert Noyce

Fourth Generation **Microprocessor**

- Integrated circuit (IC) contains Central Processing Unit (CPU)
- Emerged in 1970s
- As powerful as ENIAC



Where are some places transistors are used today?

Objective 3: Overview

Bits and Bytes

1. Describe and understand binary code
2. Understand how data is measured
3. Understand the ASCII and Unicode character sets

Key Terms

- ASCII (American Standard Code for Information Interchange)
- Binary code
- Binary number system (base 2)
- Bit
- Byte
- Unicode



Binary Code

Binary Number System: 1s & 0s

NUMBER OF BITS (SWITCHES)	POSSIBILITIES	POWER OF TWO
1	2	2^1
2	4	2^2
3	8	2^3
4	16	2^4
5	32	2^5
6	64	2^6
7	128	2^7
8	256	2^8

- Bit –smallest unit of digital information
- 8 bits = 1 byte
- Binary code has two possible states: on/off, 1/0, yes/no
- With 8 bits there are 256 different possible combinations

Measuring Data

Bits measure data transfer rates

Bytes measure file size and storage capacity

Decimal Prefix	Symbol	Decimal Value
kilo	K or k	1,000
mega	M	1,000,000
giga	G	1,000,000,000
tera	T	1,000,000,000,000
peta	P	1,000,000,000,000,000
exa	E	1,000,000,000,000,000,000
zetta	A	1,000,000,000,000,000,000,000
yotta	Y	1,000,000,000,000,000,000,000,000

ASCII & UNICODE

Represent Characters, Numbers, Symbols

CHARACTER	ASCII	UNICODE
"	34	34
#	35	35
\$	36	36
0	48	48
1	49	49
2	50	50
A	65	65
B	66	66
C	67	67
a	97	97
b	98	98
c	99	99
ó		337
œ		339
í		341
ë		399
λ		411
α		945

- First 256 characters are the same in ASCII and Unicode



What is the smallest unit of digital information?

Objective 4: Overview

Let's Get Personal

1. Discuss the different types of personal computers
2. Discuss the advantages and disadvantages of each type of computer
3. Discuss the platform options

Key Terms

- All-in-one computers
- Desktop computers
- Mac vs. PC
- Notebook vs. workstation
- Netbook & tablet PC



Types of Computers

- Desktop
- All-in-one
- Notebook
- Tablet
- Netbook



Desktop Computers

- Desktop computers are designed to sit on a user's desk
 - Workstation
 - All-in-one computer



Portable Computers

- Portable personal mobile computers
- Notebook
- Laptop
- Tablet
- Netbook



Which Platform Are You?

Platform	Pros	Cons
PC	<ul style="list-style-type: none">• Cost-effective• Preferred platform in business sector	<ul style="list-style-type: none">• Security and virus issues• Operating system stability
Mac	<ul style="list-style-type: none">• User-friendly• Great multimedia• More secure environment	<ul style="list-style-type: none">• More expensive than PC• More limited software options

Ergonomics

Relationship Between Users and Their Workspace

- Sit up straight
- Hips at 90°
- Knees bent at least 90°
- Use a footrest
- Elbows on armrest bent at 90°





What are the common features of ergonomically designed furniture? What is the cost vs. benefit?

Objective 5: Overview

Give examples of other personal computing devices

1. Discuss the different types of mobile devices

Key Terms

- GPS
- Handheld
- Mobile device
- Video game system
- Wearable



Mobile Devices

- 60% of worldwide PC sales
- Fastest-growing segment of personal computers
- Feature:
 - Internet access
 - Email access
 - Digital cameras
 - GPS
 - Mapping tools
 - Document editing
 - Mobile apps

Global Positioning System (GPS)

- Satellite-based navigation system
- Network of 24 satellites



Wearable and Hands-free Computers

- Wearable:
 - Worn on the body
- Hands-free:
 - Health monitoring
 - Communications
 - Military operations
 - Entertainment



Video Game Systems

Computers designed primarily to play games



- Microsoft Xbox
- Sony PlayStation
- Nintendo Wii

Other Computing Devices

Match the Terms:

PDA/smartphones

GPS

Wearables

Video game systems

- A computer that is designed primarily to play games
- Xbox, Wii, PS3
- Used in cars, boats, and cell phones
- Acronym for Global Positioning System
- Computers designed to be worn on the body
- Pocket-sized computers with many built-in features including email, cameras, and Internet



***How are medical students using video games?
Which schools are using such systems? Are these
acceptable to teachers and students?***

Objective 6: Overview

Multuser Computers: More Power to You

1. Discuss the different types of multuser computers (servers, minicomputer, mainframe, supercomputers)
2. Define the characteristics of each type of multuser computer
3. Differentiate among distributed, grid, and volunteer computing

Key Terms

- Client and server
- Distributed computing
- Grid computing
- Mainframe and supercomputer
- Minicomputer
- Multuser computer
- Volunteer computing



Types of Computers

What type of computer provides services, such as printing?

SERVER

What previous type of computer has been replaced by midrange servers?

MINICOMPUTER

What type of computer can perform millions of transactions in a day?

MAINFRAME

What type of computer is used to perform complex mathematical calculations?

SUPERCOMPUTER

Types of Computing

What type of computing distributes the processing of a task across a group of computers?

DISTRIBUTED COMPUTING

What type of computing is done on a small scale, using a few computers in one location?

GRID COMPUTING

What type of computing uses the processing power of many personal computers?

VOLUNTEER COMPUTING



*How are supercomputers used today?
For what types of work are they used?*

Objective 7: Overview

Computers Are Everywhere: Ubiquitous Computing

1. Define “ubiquitous computing”
2. Define and discuss embedded computers
3. Discuss the convergence of technology and how it has impacted our lives

Key Terms

- Convergence
- Embedded computer
- Green computing
- ubicomp



Ubiquitous Computing Technology Fades into the Background

UBICOMP

- Billboards vs. digital signage
- Credit card sales vs. cash
- Upload vs. print photos
- Online banking vs. drive-thru

CONVERGENCE

- Smartphones
- Televisions

EMBEDDED COMPUTERS

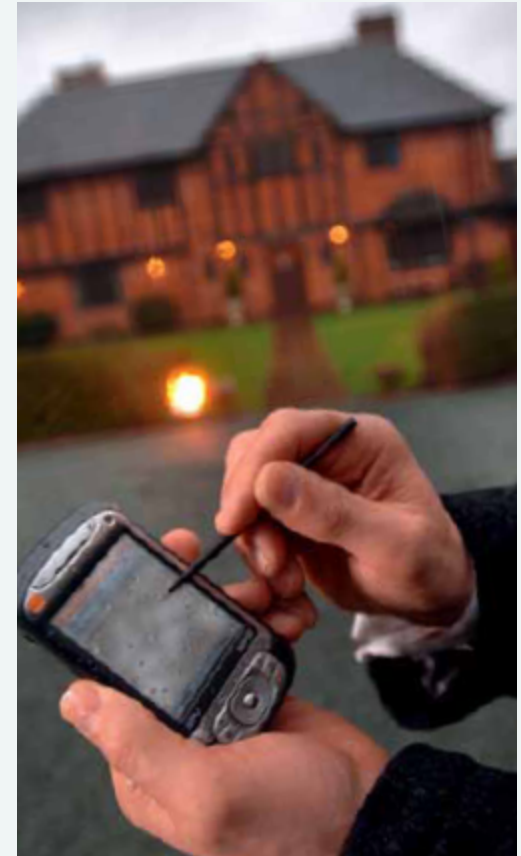
- Wireless devices
- Washing machines
- Climate-control systems
- Traffic signals

GREEN COMPUTING

- Smart homes
- Smart appliances


Green Computing

- Smart homes and smart appliances
 - Save energy
- Home automation controls
 - Lighting
 - Heating and cooling
 - Security
 - Entertainment
 - Smart appliances in a home





Science fiction or fact? Which Star Trek technologies exist today?



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2014 Pearson Education, Inc.
Publishing as Prentice Hall