Looking Inside the Computer

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The Computer Defined

- Electronic device
- Converts data into information
- Modern computers are digital
  - Two digits combine to make data
- Older computers were analog
  - A range of values made data

Computers For Individual Use

- Desktop computers
  - The most common type of computer
  - Sits on the desk or floor
  - Performs a variety of tasks
- Workstations
  - Specialized computers
  - Optimized for science or graphics
  - More powerful than a desktop

Computers For Individual Use

- Notebook computers
  - Small portable computers
  - Weighs between 3 and 8 pounds
  - About 8 ½ by 11 inches
  - Typically as powerful as a desktop
  - Can include a docking station

Computers For Individual Use

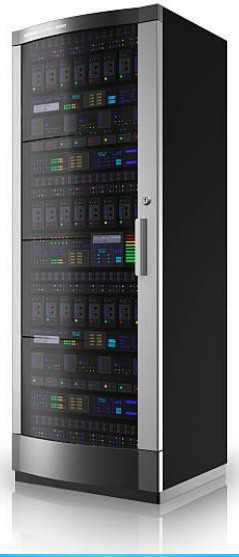
- Tablet computers
  - Newest development in portable computers
  - Input is through a pen
  - Run specialized versions of office products

Computers For Individual Use

- Smart phones
  - Hybrid of cell phone and Personal Digital Assistants
  - Very small computers
  - Can do anything same as tablet computer
  - Can use GPS, GSM Sim and other mobile phone services
  - Web surfing, e-mail access

Computers For Organizations

- Network servers
  - Centralized computer
  - All other computers connect
  - Provides access to network resources
  - Multiple servers are called server farms
  - Often simply a powerful desktop



Computers For Organizations

- Mainframes
  - Used in large organizations
  - Handle thousands of users
  - Users access through a terminal
  - Extremely high throughput and reliability

Computers For Organizations

- Minicomputers
  - Called midrange computers
  - Power between mainframe and desktop
  - Handle hundreds of users
  - Used in smaller organizations
  - Users access through a terminal

Computers For Organizations

- Supercomputers
  - The most powerful computers made
  - Handle large and complex calculations
  - Process trillions of operations per second
  - Found in research organizations

Computers In Society

- More impact than any other invention
  - Changed work and leisure activities
  - Used by all demographic groups
- Computers are important because:
  - Provide information to users
  - Information is critical to our society
  - Managing information is difficult

Computers In Society

- Computers at home
  - Many homes have multiple computers
  - Most American homes have Internet
  - Computers are used for
    - Business
    - Entertainment
    - Communication
    - Education

Computers In Society

- Computers in education
  - Computer literacy required at all levels
- Computers in small business
  - Makes businesses more profitable
  - Allows owners to manage
- Computers in industry
  - Computers are used to design products
  - Assembly lines are automated

Computers In Society

- Computers in government
  - Necessary to track data for population
    - Police officers
    - Tax calculation and collection
  - Governments were the first computer users

Computers In Society

- Computers in health care
  - Revolutionized health care
  - New treatments possible
  - Scheduling of patients has improved
  - Delivery of medicine is safer

How two digits combination make data

- Computer store data as binary number (0,1)
- Everything we pressed in Keyboard convert to binary
- Use ASCII code to convert data to binary

Common Number Systems

System	Base	Symbols	Used by humans?	Used in computers?
Decimal	10	0, 1, … 9	Yes	No
Binary	2	0, 1	No	Yes
Octal	8	0, 1, … 7	No	No
Hexa-decimal	16	0, 1, … 9, A, B, … F	No	No
Penta	5	0,1,2,3,4	No	No

Quantities/Counting

Decimal	Binary	Octal	Hexa-decimal
0	0	0	0
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7

Quick Example

$$25_{10} = 11001_{2} = 31_{8} = 19_{16}$$

Base

How computer store data

- The data below has been written in an 8-bit computer.
- Retrieve what is written there.

01010000 01011001 01010100 01001000 0100111101001110

How computer store data?

01010000 01011001 01010100 01001000 0100111101001110

A	65	G	71	M	77	S	83	Y	89
B	66	H	72	N	78	T	84	Z	90
C	67	I	73	O	79	U	85		
D	68	J	74	P	80	V	86		
E	69	K	75	Q	81	W	87		
F	70	L	76	R	82	X	88		

End of Lecture 3