



# Computer Fundamentals

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Lecture 1



# Course Outline

- Computer Systems
- Input and Output Devices
- Information Processing
- Number Conversions
- Logical Operations
- Processors
- Storage Devices
- Operating Systems
- Computer Networks
- Data Communication
- Computer Programs
- Flowchart and Pseudocode



# Introducing Computer Systems

- Exploring computers and their uses
  - ❑ The computer defined
  - ❑ Computers for individual users
  - ❑ Computers for organizations
  - ❑ Computers in society
- Looking inside the computer system
  - ❑ The parts of a computer system
  - ❑ The information processing cycle
  - ❑ (Essential computer) hardware
  - ❑ Software (brings machine to life)
  - ❑ Computer data
  - ❑ Computer users



# 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 to make data



# Computers for Individual Use

- Desktop computers or microcomputers
  - ❑ Once, the most common type of computers
  - ❑ Sit on desk or floor
  - ❑ Performs a variety of tasks
- Workstations
  - ❑ Specialized computers
  - ❑ Optimized for science or graphics
  - ❑ More powerful than a desktop



Source: <http://www.alphr.com/features/388555/how-to-decommission-or-sell-an-old-pc>



# Computers for Individual Use (cont.)

- Notebook computers
  - ❑ Small portable computers
  - ❑ Weighs between 3 and 8 pounds
  - ❑ About 8  $\frac{1}{2}$  by 11 inches
  - ❑ Typically as powerful as a desktop
  - ❑ Can include a docking station



Source: <http://ultrabooknews.com/2012/09/24/make-your-own-modular-docking-station>



# Computers for Individual Use (cont.)

- Tablet computers
  - ❑ Newest development in portable computers
  - ❑ Input through pen or touch
  - ❑ Run specialized versions of office products and apps



Source: <http://www.sonymobile.com/global-en/products/tablets/xperia-tablet-s>



# Computers for Individual Use (cont.)

## ➤ Personal Digital Assistants (PDAs)

- ❑ Handheld computers
- ❑ Very small computers
- ❑ Note taking or contact management
- ❑ Data can synchronize with desktop



## ➤ Smart phones

- ❑ Hybrid of cell phone and PDA
- ❑ Web surfing, e-mail access



Source: <http://www.a2z-support.com/psion-series-5-a-personal-digital-assistant-1997>  
[http://www.bell.ca/Mobility/Smartphones\\_and\\_mobile\\_internet\\_devices](http://www.bell.ca/Mobility/Smartphones_and_mobile_internet_devices)

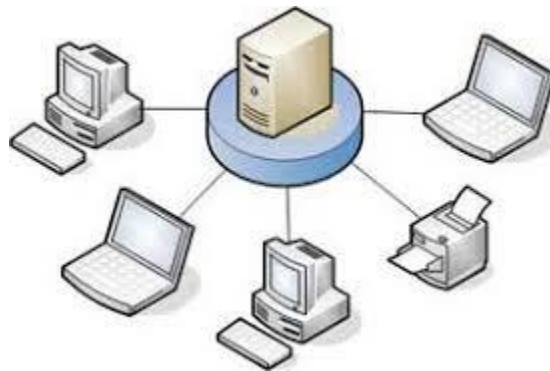




# Computers for Organizations

## ➤ Network servers

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



Source: <http://atronicsys.com/servers.htm>



# Computers for Organizations (cont.)

- Mainframes
  - ❑ Used in large organizations
  - ❑ Handle thousands of users
  - ❑ Users access through a terminal



Source: <http://blog.syncsort.com/2014/07/offloading-mainframe-hadoop-much-can-save>

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# Computers for Organizations (cont.)

- Supercomputers
  - ❑ The most powerful computers
  - ❑ 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
  - ❑ Computers provide information to users
  - ❑ Information is critical to society
  - ❑ Managing information is difficult without computer



# Computers in Society (cont.)

- Computers at home
  - ❑ Many homes have multiple computers
  - ❑ Many Pakistani homes have Internet
  - ❑ Computers are used for
    - Online shopping
    - Entertainment
    - Communication
    - Learning



# Computers in Society (cont.)

- Computers in education
  - ❑ Computer literacy required at all levels
  - ❑ Computer knowledge a must for several educational degrees
- 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 (cont.)

## ➤ Computers in government

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

## ➤ Computers in technology

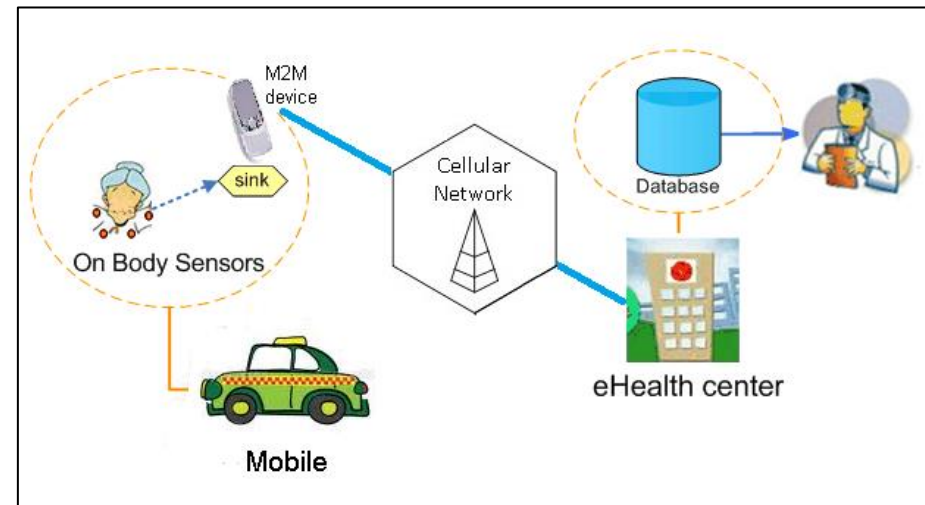
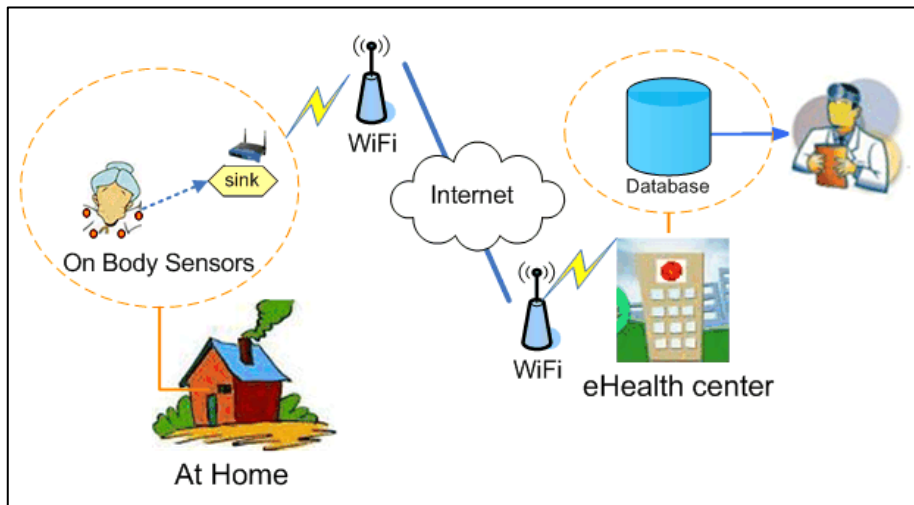
- ❑ Advancement in any technological field without computers unthinkable
- ❑ All technologies dependent on computer
- ❑ Application areas
  - Energy monitoring
  - Construction
  - Agriculture
  - Automobile
  - Textile
  - Transport



# Computers in Society (cont.)

## ➤ Computers in healthcare

- ❑ Revolutionized healthcare
- ❑ New treatments possible
- ❑ Scheduling of patients improved
- ❑ Delivery of medicine is safer
- ❑ E-healthcare, relationship between healthcare organization and patient
  - Application of internet and related technology
  - Improve access, efficiency, effectiveness, quality of health processes



Source: <http://bbcr.uwaterloo.ca/~x27liang/seehealthbib.htm>