



Introduction to Computing

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Computer Files



Files, Records and Fields

Files

098 - 40 - 1370 Fiske, Steven 01-05-1985
549 - 77 - 1001 Buckley, Bill 02-17-1979
005 - 10 - 6321 Johns, Francine 10-07-1997

(Personnel file)

Records

098 - 40 - 1370 Fiske, Steven 01-05-1985

(Record containing SSN, last and first name, hire date)

Fields

Fiske (Last name field)

Characters
(Bytes)

1000100 (Letter F in ASCII)



Files, Records and Fields (2)

- File
 - Collection of related information
 - Made of records
 - Record
 - Collection of related data item
 - Data items make up records are called **fields**
 - Field
 - Made of characters
-



Records

- Fixed or variable in length
- Record identification
 - Primary key

Employee #	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1997	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1985	598

Key field

Attributes (fields)

Entities (records)

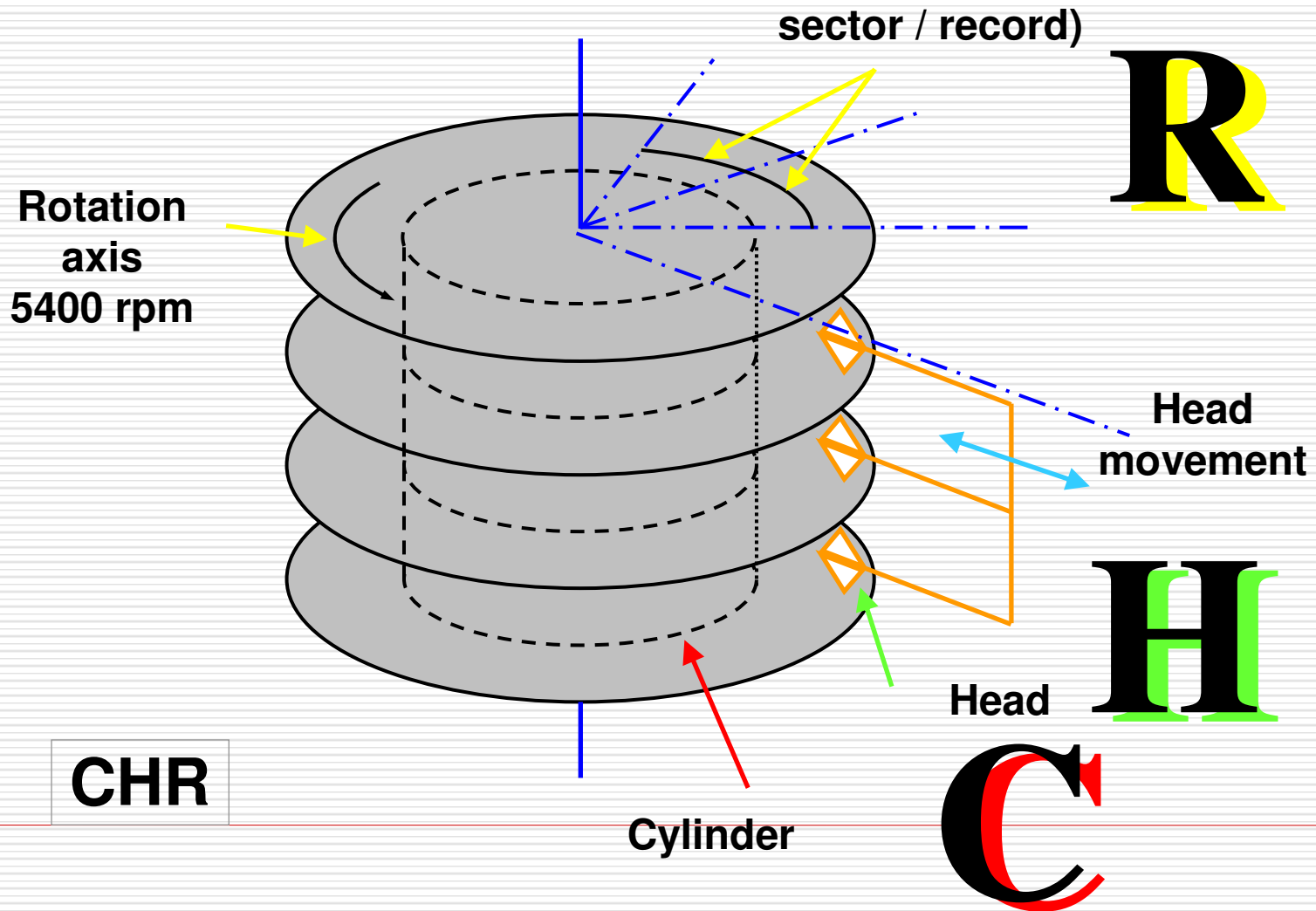


File Storage Media

- Serial access media
 - All preceding records need to be read to a particular record in a file
 - Non-addressable
 - E.g. magnetic tapes
- Direct access media
 - Allow direct access to individual records
 - Addressable
 - E.g floppy disks, hard disks, etc.



Magnetic Disk





Addressing in Magnetic Disks

- Sectors
 - A sector is a smallest physical area on a disk that can be addressed, referred to as a **block**
- Tracks
 - Concentric circles on a disk
- Cylinders
 - A group of tracks on different disks having the same radius
- Addressing: Cylinder->Track->Sector



File Organisation using Magnetic Disk

- Serial
 - Records are placed on disk one after another in no particular sequence
- Sequential
 - Records are ordered by their primary keys
- Indexed sequential
 - Records are ordered by keys
 - Index is used to allow direct access to records
- Random
 - Records are placed on disk randomly not in any particular sequence



Accessing Disk Files

- Serial files
 - Serially one after another
- Sequential files
 - Sequentially one after another ordered by primary keys
- Indexed sequential files
 - Sequentially
 - Selective or skip sequential
 - Randomly
- Random files
 - Randomly



Computer File Systems

- ❑ A method for storing and organising computer files and the data they contain to locate and access them
- ❑ E.g. FAT32, NTFS, SMB, Linux File Systems
- ❑ Logical management of computer files
- ❑ Files and directories



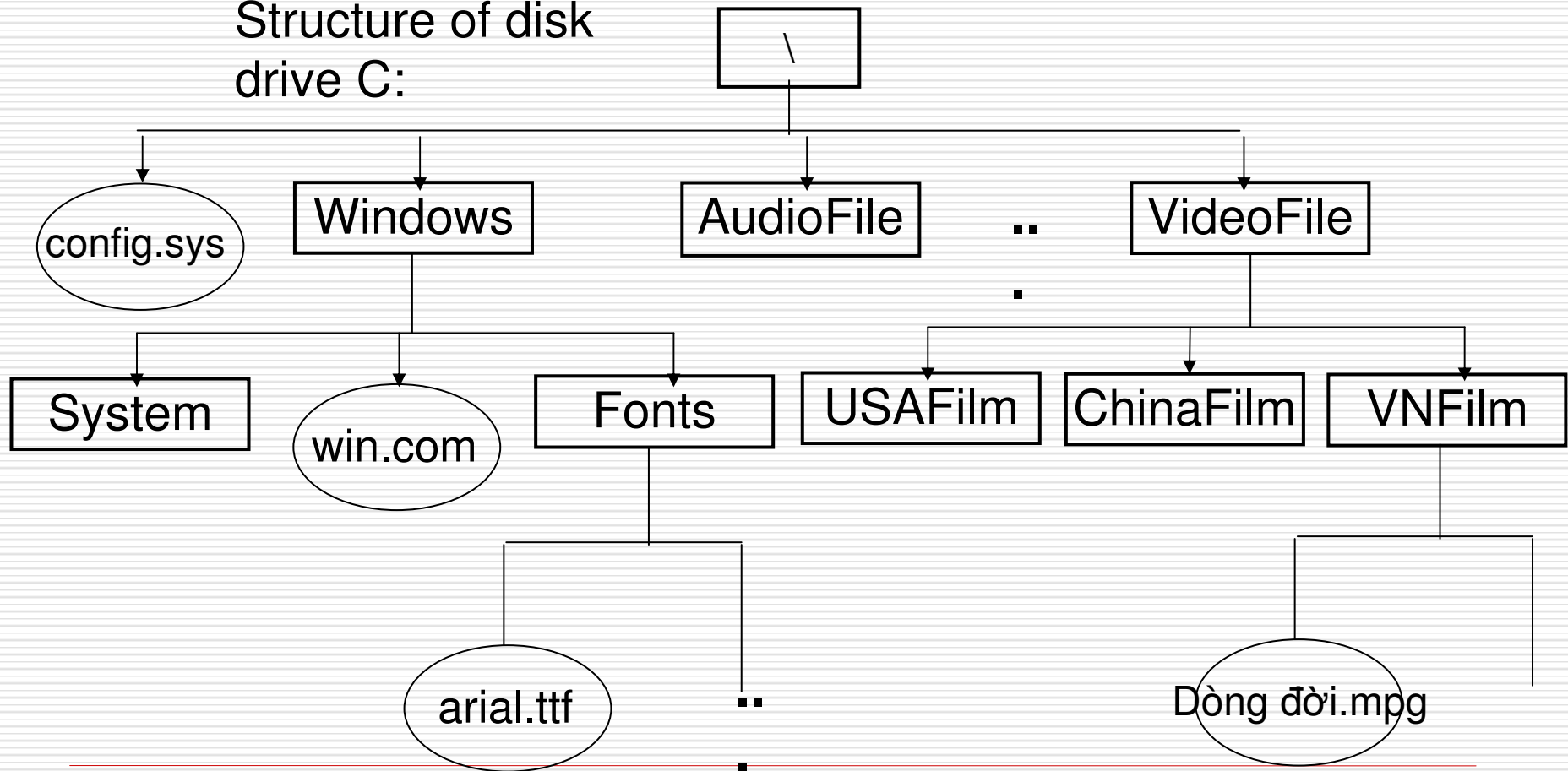
Computer File Systems (2)

- File names
 - Associated to physical files by a file allocation table
- Directories
 - Logical containers of files
 - Directories are commonly structured in hierarchy
- Metadata
 - Book keeping information associated to files



Hierarchical File Systems

Structure of disk drive C:



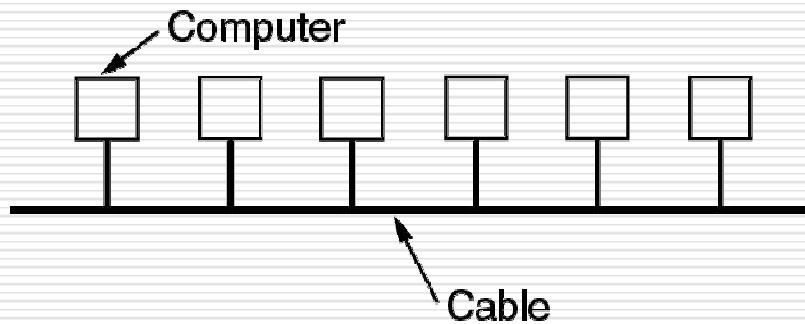


Computer Networks

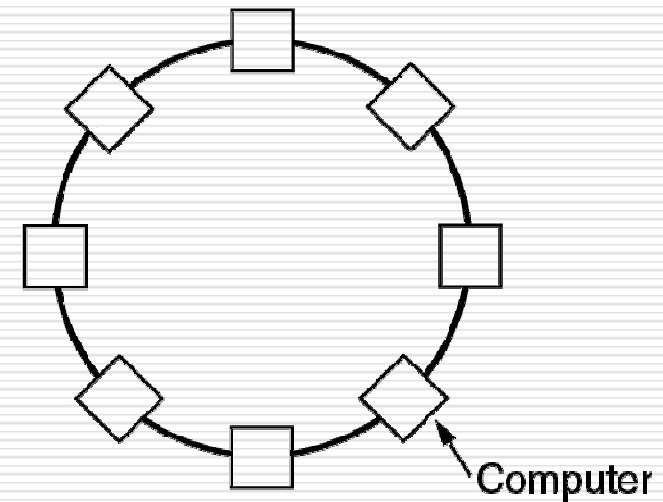


Local Area Networks

- Two broadcast networks
- (a) Bus
- (b) Ring



(a)

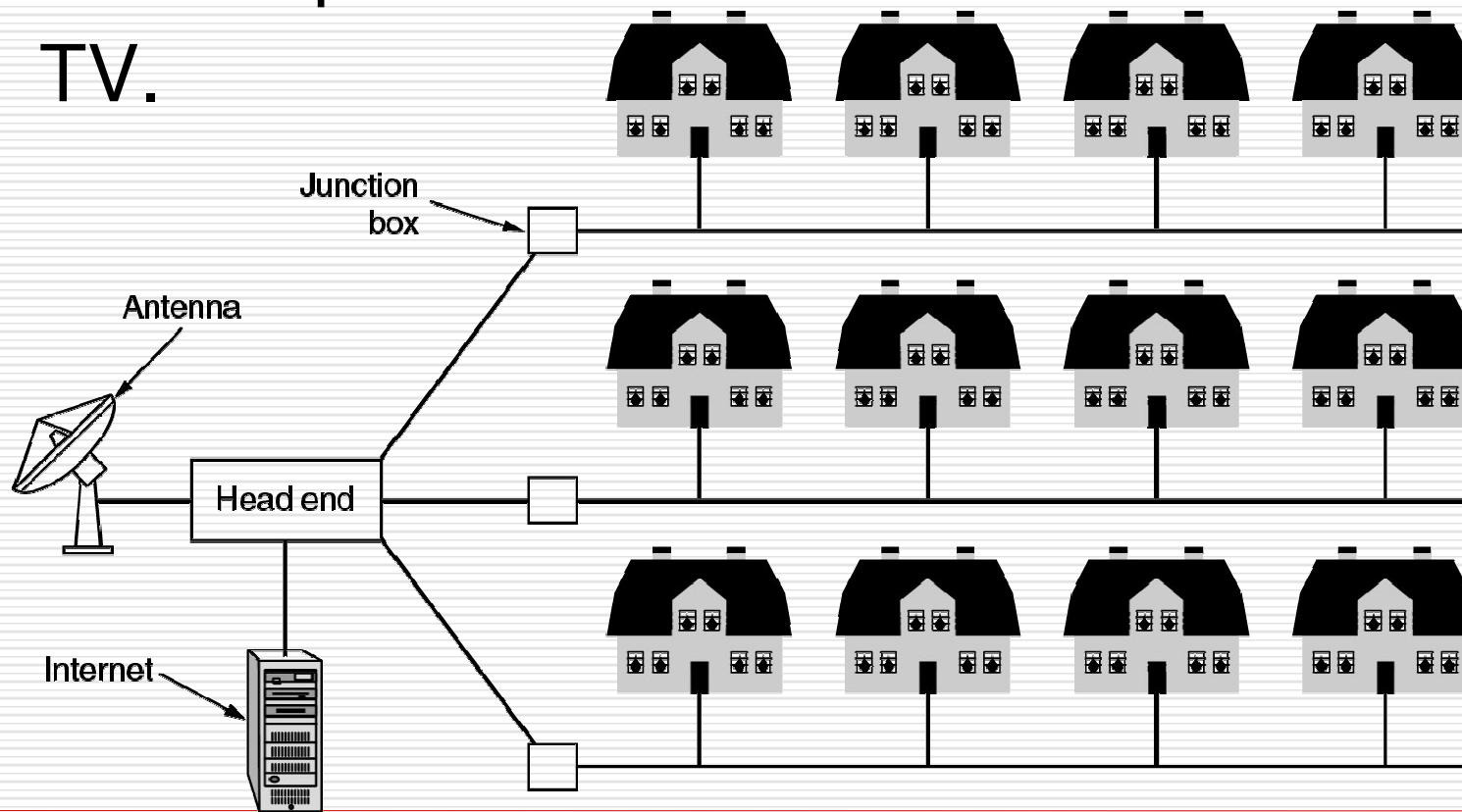


(b)



Metropolitan Area Networks

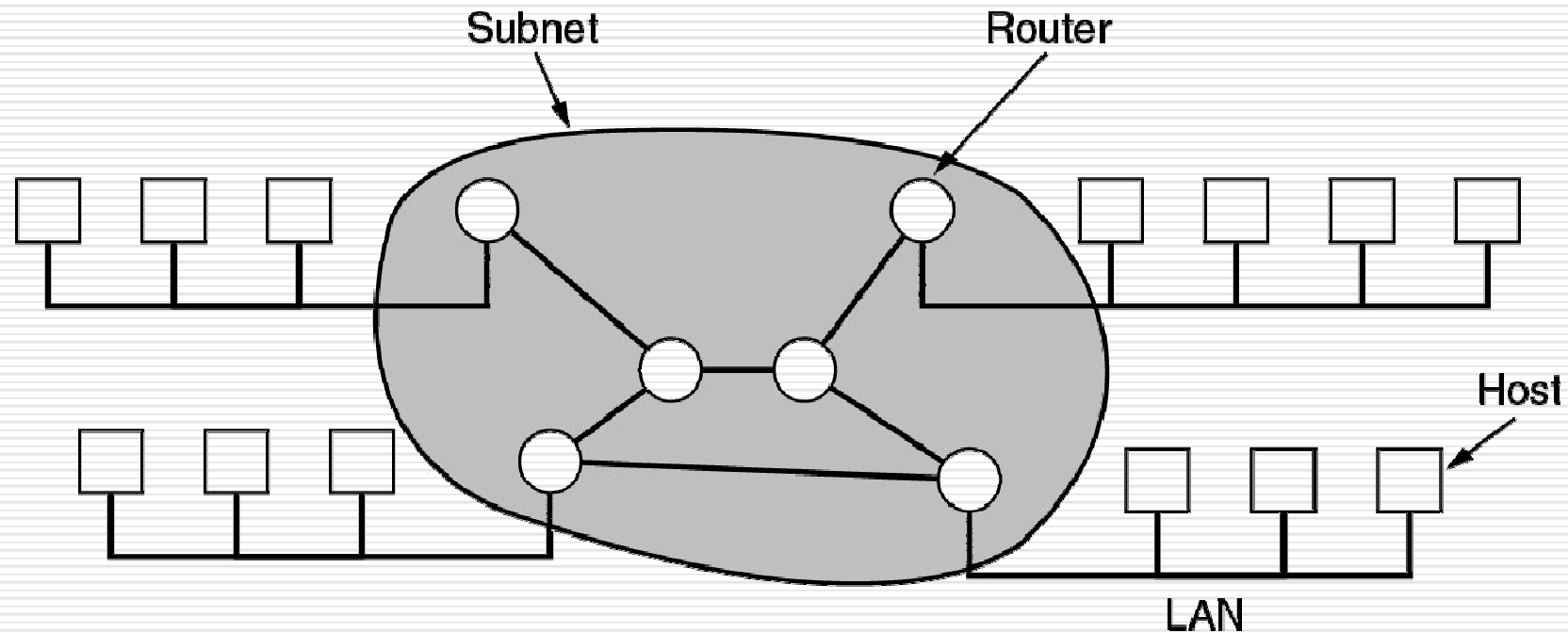
- A metropolitan area network based on cable TV.





Wide Area Networks (1)

- Relation between hosts on LANs and the subnet.





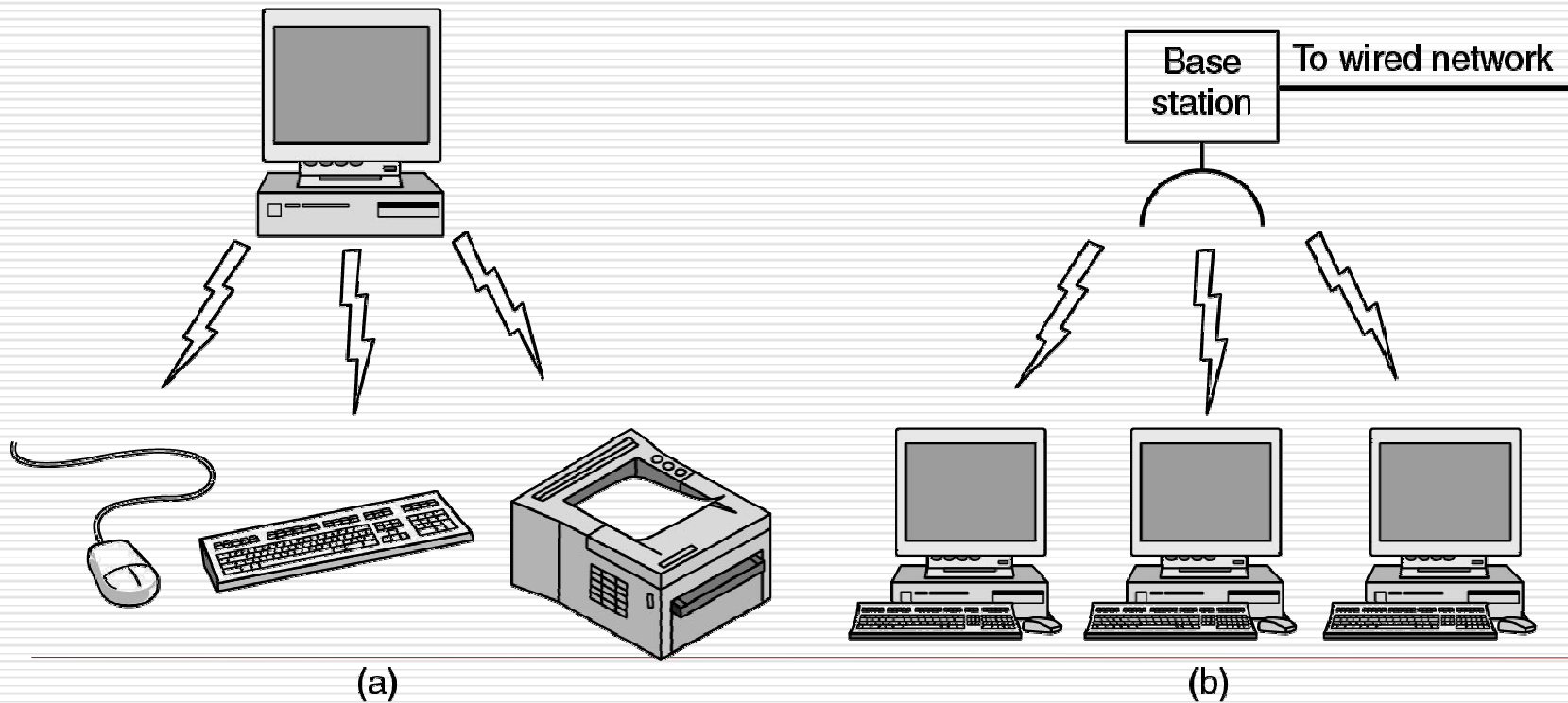
Wireless Networks (1)

- Categories of Wireless Networks
 - System interconnections
 - Wireless LANs
 - Wireless WANs



Wireless Networks (2)

- (a) Bluetooth configuration
- (b) Wireless LAN



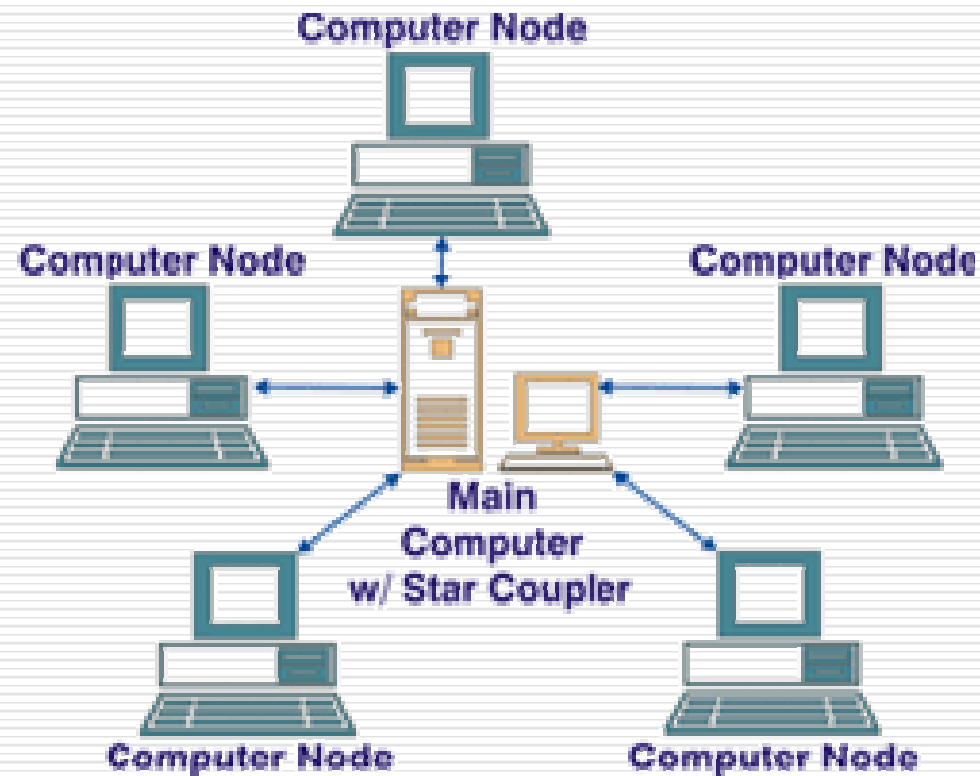


Network Topologies

- ❑ Star network
- ❑ Ring network
- ❑ Star/ring network – IBM token ring
- ❑ Bus network

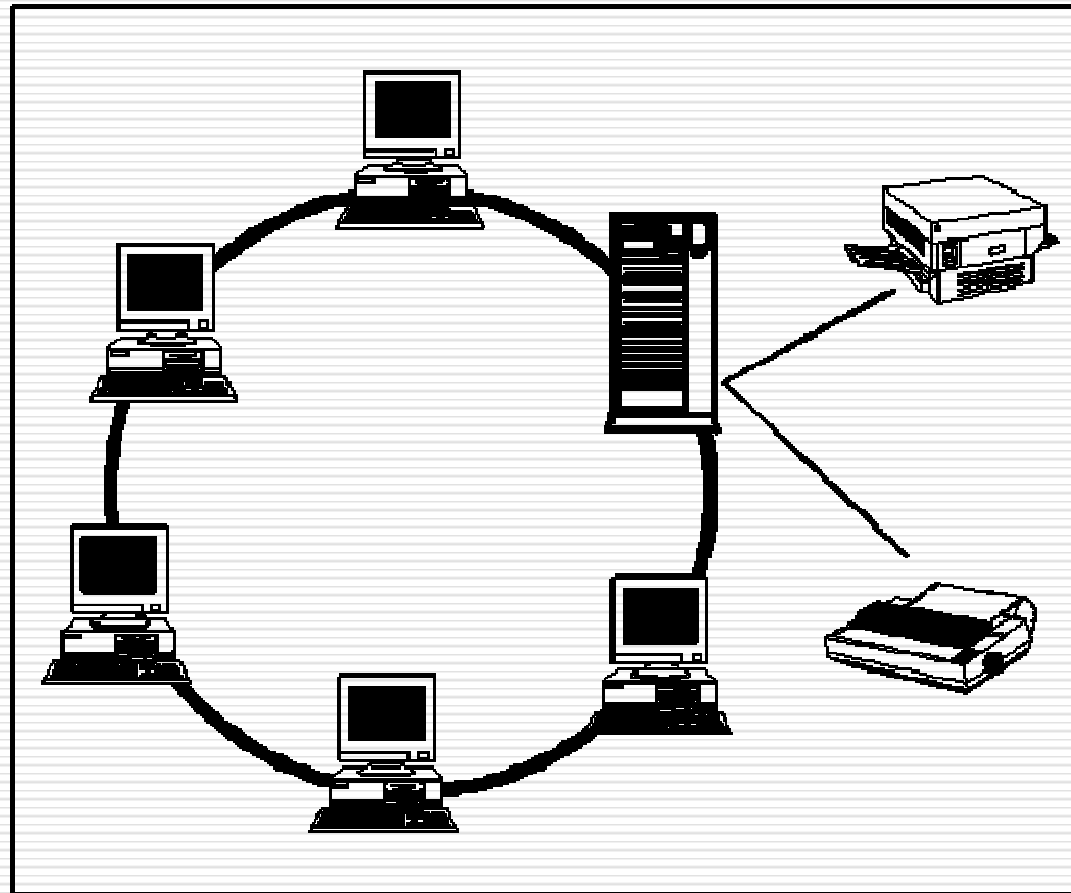


Star Network



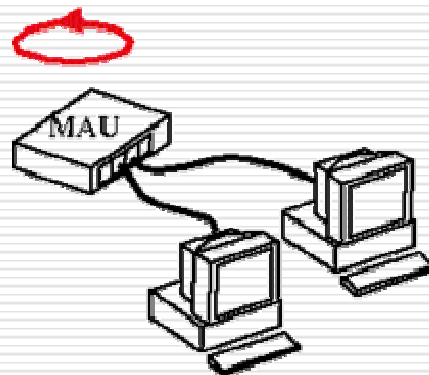


Ring Network

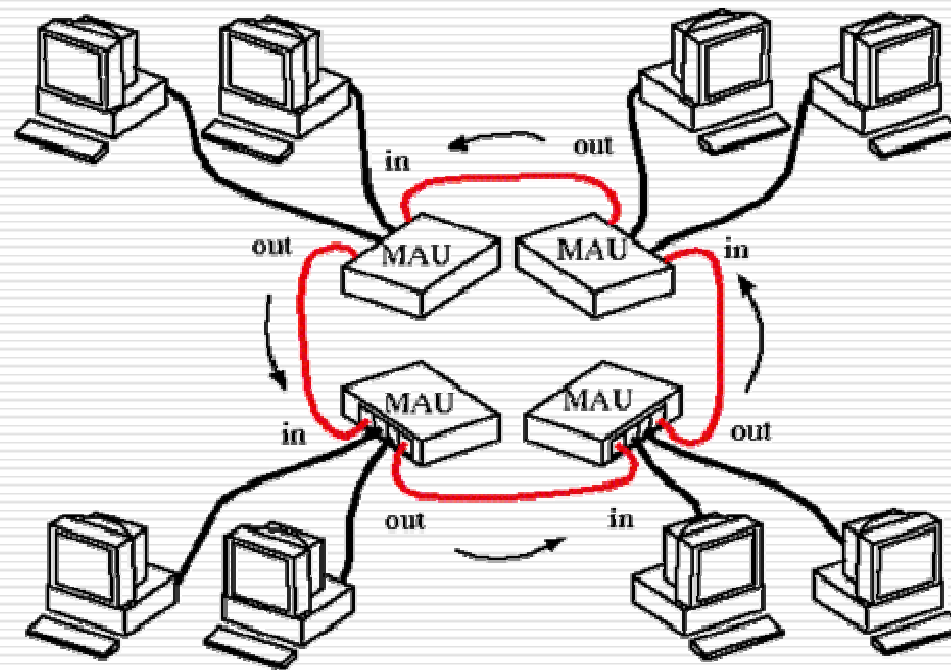




IBM Token Ring



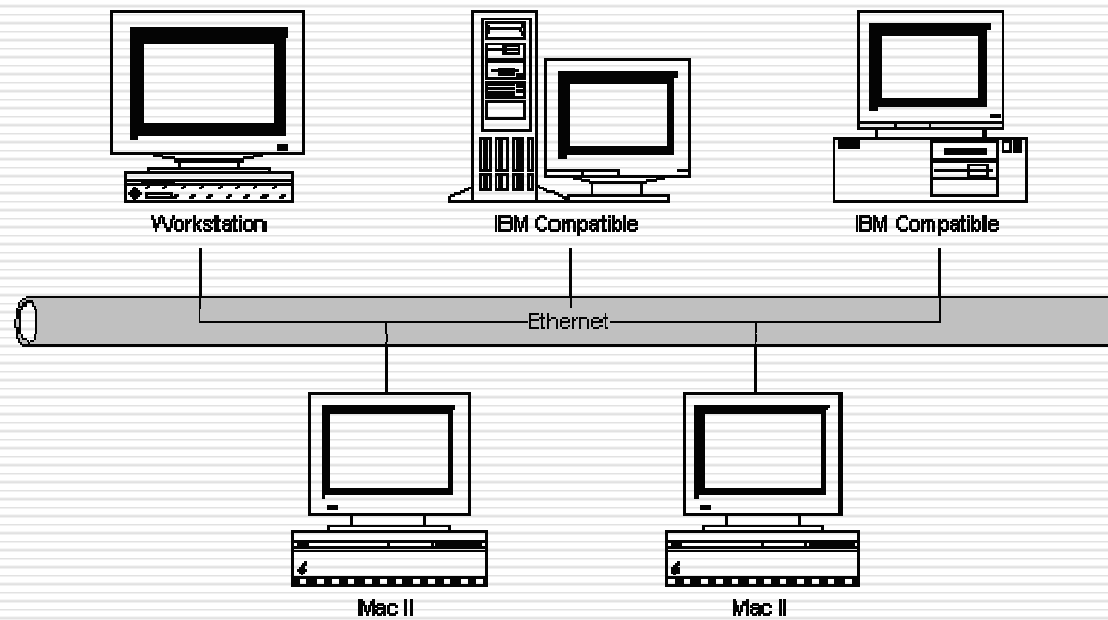
a)



b)



Bus Network





Network Cabling

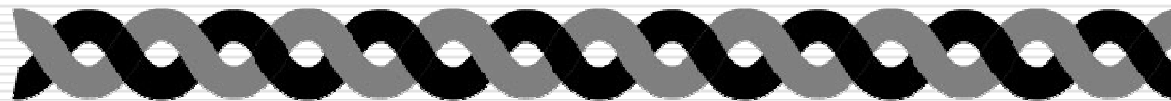
- ❑ Twist pair
- ❑ Coaxial
- ❑ Fibre optic



Twisted Pair



(a)



(b)

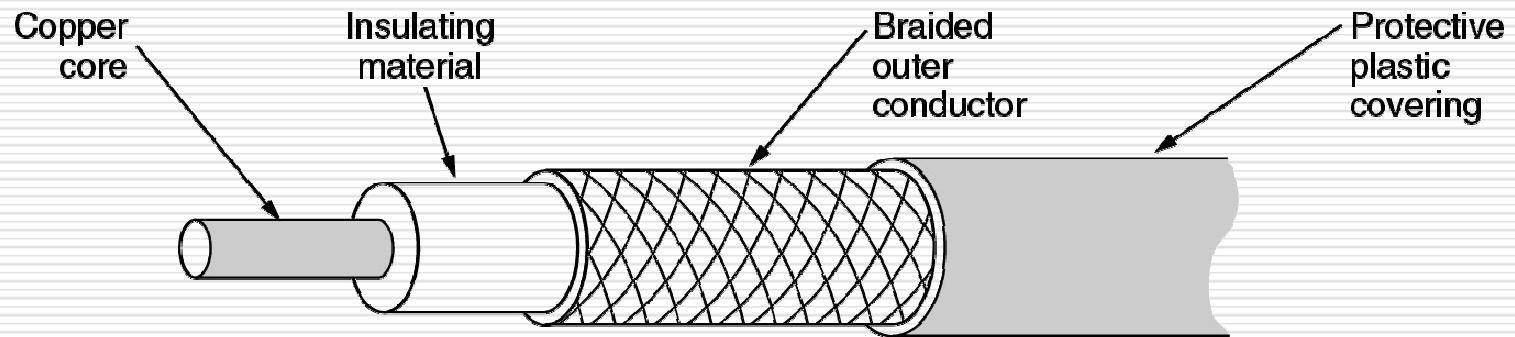
(a) Category 3 UTP.

(b) Category 5 UTP.



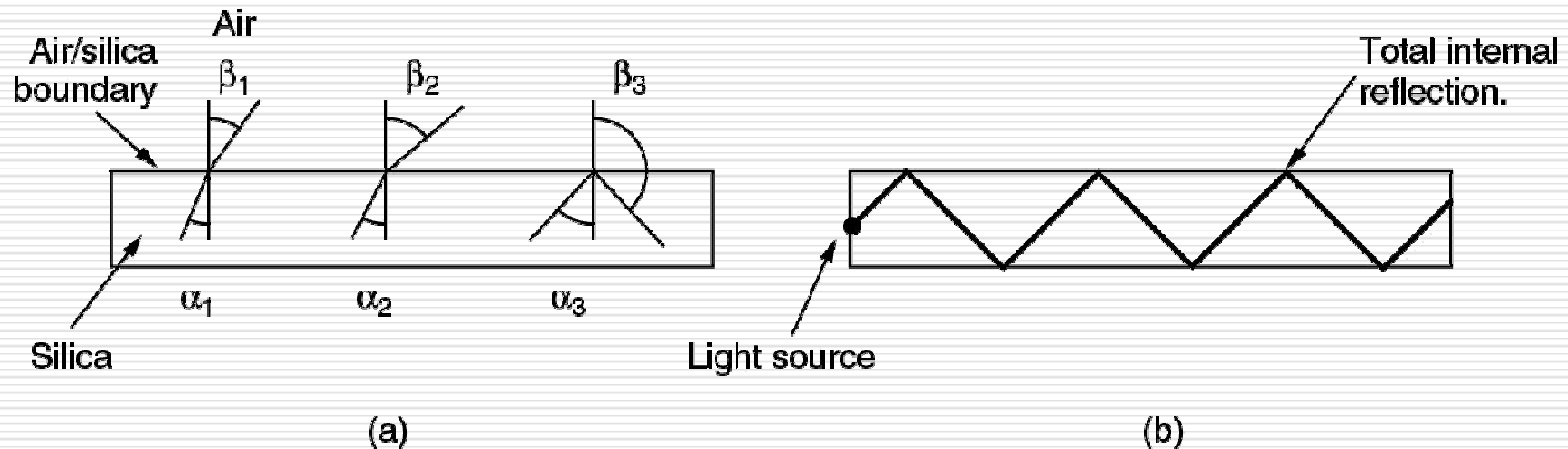
Coaxial Cable

A coaxial cable.





Fiber Optics

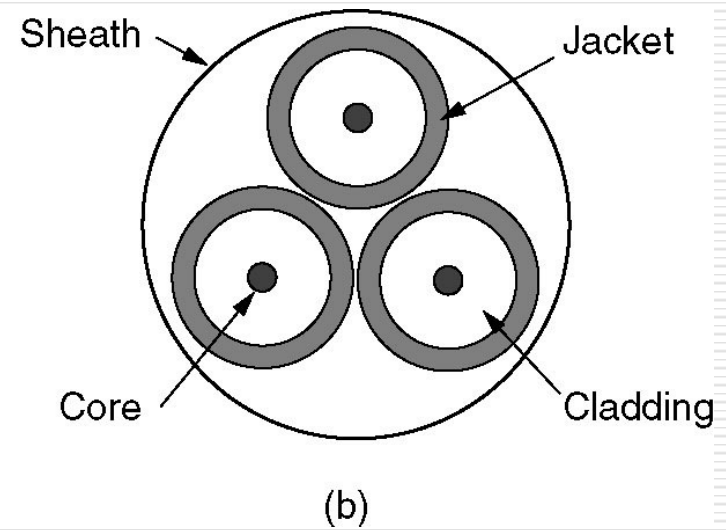
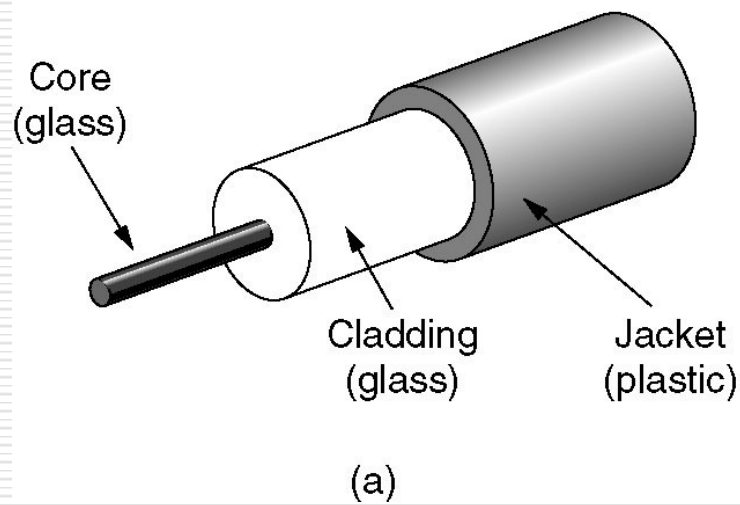


- (a) Three examples of a light ray from inside a silica fiber impinging on the air/silica boundary at different angles.
- (b) Light trapped by total internal reflection.



Fiber Cables

- (a) Side view of a single fiber.
- (b) End view of a sheath with three fibers.





Networking Devices

- Repeaters
- Hubs
- Bridges
- Switches
- Modem
- Routers
- Wireless Access Points



Benefits of Computer Networks

- Sharing hardware and software
 - Printer sharing
 - Network applications
- Sharing data
 - Windows file sharing network
 - P2P file sharing
- Sharing processing activities
 - Client-server applications
 - P2P networks



Network Applications

- Business applications
 - Business to business
 - Business to customer
 - Customer to customer
- Scientific applications
 - Grid computing
- Home applications
 - Gaming
 - P2P file sharing