

HSC Information Processes & Tech

Adam M. Brimo
Marcellin College Randwick
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Project Work

Project Management

- Development of a Project Plan
 - Project plan - summary of a project that specifies who, what, when how and why. It clarifies what needs to be done and helps people to understand how they fit into the project.
 - Project goal - result of the project if successful
 - Deliverable - tangible item expected from the task
 - Schedule - timing of major tasks and who will do the work
 - Information management software helps individuals on a project to manage information and schedule.
 - Project management software is a tool used to effectively plan, manage and communicate information about a large project.
 - Gantt chart - a bar chart with each bar representing a task or stage in the SDC
- Communication Skills
 - Strategies Include
 - Active listening
 - Conflict resolution
 - Negotiation skills
 - Interview techniques
 - Team building
 - Project leader - develops schedules, checks work and resolves conflicts while ensuring the project is meeting it's goals

Social and Ethical Design

- Social and Ethical Issues
 - Machine centred systems - simplify what the computer must do at the expense of participants
 - Human centred systems - make work as satisfying as possible
 - The system should be user friendly, that is people will find it easy to use
 - Nature of Work
 - Use of skills
 - Meaningful work
 - Nature of the workplace
 - Social relationships
 - Equity - equal rights for all people, and all people having access to the benefits of information technology
 - Gender equity - the belief that women are not taking advantage of information technology in the same numbers as men

Understanding the Problem

- Understanding the Problem
 - Consists of refining the problem and identifying it's important elements
 - A preliminary investigation and a requirement report which outlines the aims and objectives of the new system

- Prototypes
 - Working model of a system designed to understand the requirements of the system
 - Used when the problem is not easy to understand
 - It is a repetitive process of prototype modification and participants feedback until the problem is understood
 - Can form the basis for further system development

Making Decisions

- Feasibility Study
 - Report which analyses potential solutions in terms of known contrasts and makes a recommendation, elements of report:
 - Economic - costs and benefits
 - Technical - information technology requirements
 - Schedule - time constraints
 - Organisational - system fitting into the organisation
- Analysis Report
 - Provides the basis of the new system along with details of the new system
 - Contains design specifications, that is the hardware configuration of the new system
 - Project Plan
 - Details the time frame
 - Details the sub-projects and their time frames
 - Identifies participants
 - Identifies information technology
 - Identifies data / information

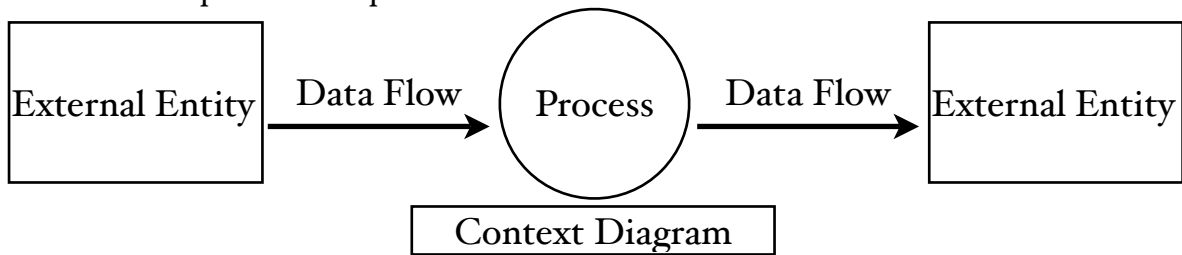
Designing Solutions

- Participant Development
 - Occurs when people within the information system develop the solution
 - Participants can solve small problems using application packages
 - Participant development is more responsive to participant needs and can save time and money

• Design Tools

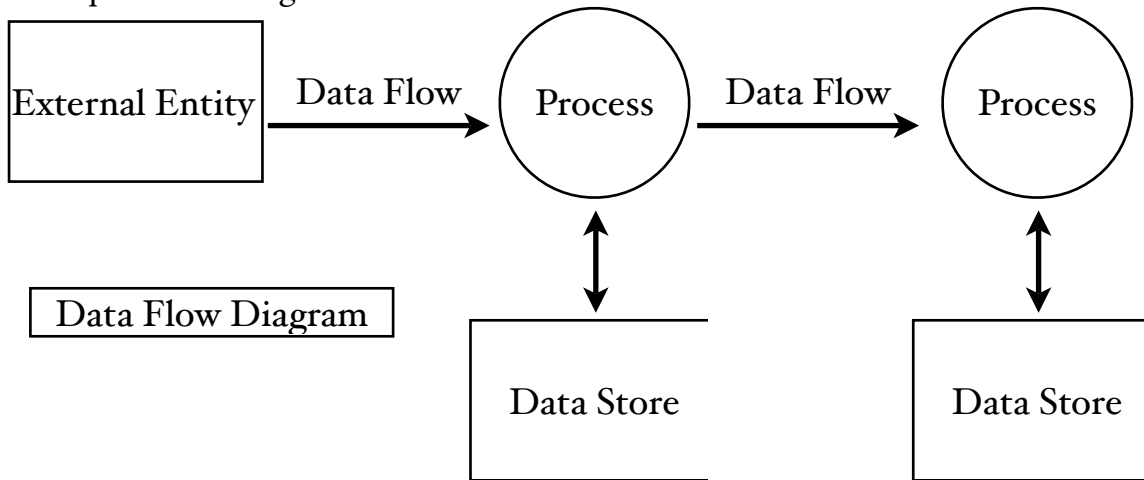
• Context Diagrams

- A graphical method of representing a system that uses a single process together with inputs and outputs



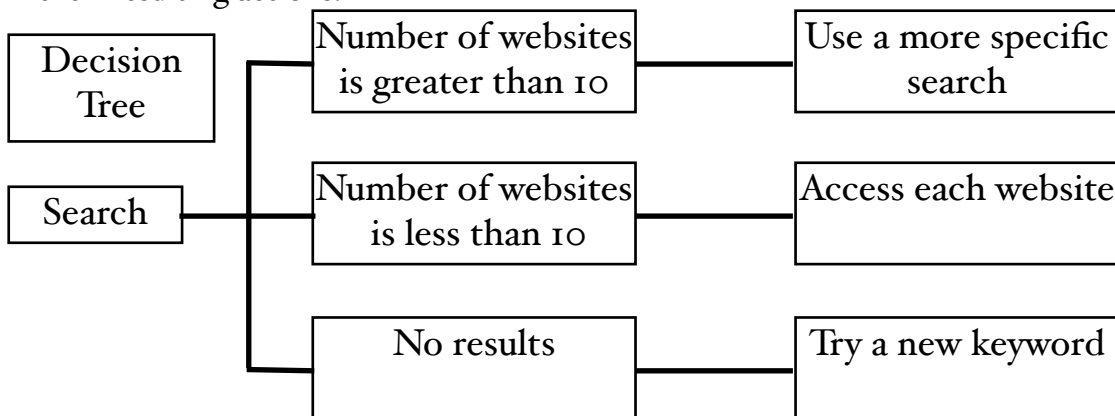
• Data Flow Diagram

- Represent a system that uses a number of processes together with inputs, outputs and storage



• Decision Tree

- Diagrammatic way of representing all possible combinations of decisions and their resulting actions.



• Decisions Table

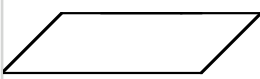
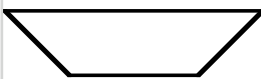
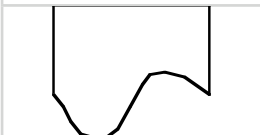

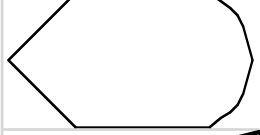
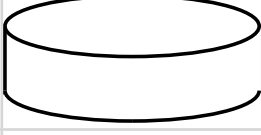
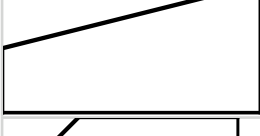


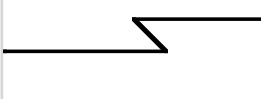
- Represents all possible conditions and actions, it includes alternatives from different conditions and actions based on rules.




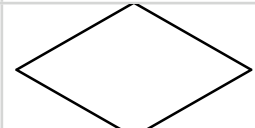
Conditions	Rules		
Number of websites is greater than 10	Y	X	X
Number of websites is less than 10	X	Y	X
No results	X	X	Y
Actions			
Use a more specific search	Y	X	X
Access each website	X	Y	X
Try a new keyword	X	X	Y

- Data Dictionary
 - Describes data within the system, it is a tool used to manage information resources

Data Item	Description	Example
Website	Domain name of website	www.google.com
Internet Address	Unique address	66.102.7.99
Author	Name of author	Larry Page
Start	Date created (dd/mm/yy)	28/09/95
Keyword	List of keywords	search, internet

- System Flowchart
 - Graphical method of representing the flow of data and the logic of a system

Symbol	Meaning	Symbol	Meaning
	Input/output		Manual operation
	Paper document		Magnetic tape
	Online display		Direct access storage device
	Online input		Flow-line
	Punched card		Telecommunications link

Symbol	Meaning	Symbol	Meaning
	Process		Predefined process
	Terminal		Decision

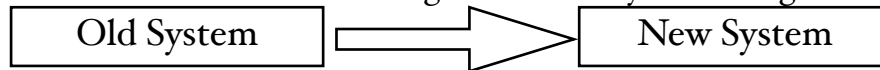
Implementing

• Implementation Plan

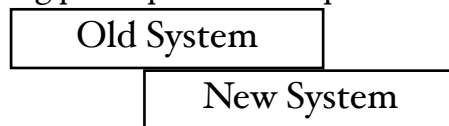
- Participant training - ensures that all participants can use the new system and understand it's benefits, the training provided depends on the existing knowledge of employees.

• Conversion Methods

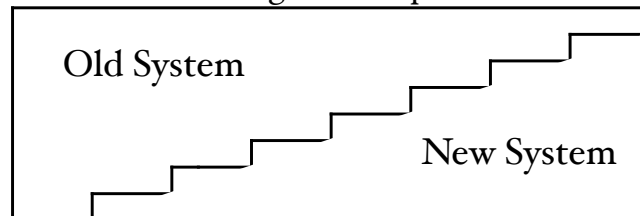
- Direct conversion - immediate change to the new system on a given date



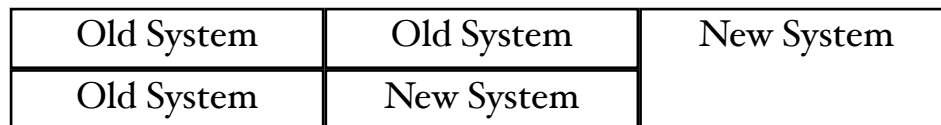
- Parallel conversion - the old and new systems work together at the same time, allowing participants to compare each system



- Phased conversion - the gradual implementation of the new system



- Pilot Conversion - the trialing of the new system in a small portion of the organisation



- System testing - tests are designed to examine the system operation under all possible conditions

Testing, Evaluating and Maintaining

• Test and Evaluating

- Performance of the system is tested and evaluated throughout the system development cycle
- Checking to see if original objectives of the system have been achieved

• Operations Manual

- Details procedures the participants follow when using the new system

Information Systems and Databases

Information Systems

- Characteristics of an Information System
 - Organisation of Data
 - Data must be organised before it can be stored and analysed by the information system.
 - Analysis of Information
 - Access to information and the resulting knowledge is the purpose of an information system.
- Types and Purposes of Information Systems
 - Transaction Processing Systems
 - Collect, store, modify and retrieve the daily transactions of an organisation
 - Batch processing - collects the transaction data into a group and processes it at a later date
 - Real time processing - each transaction is completed or processes immediately and provides instant confirmation of the transaction
 - Decision Support Systems
 - Assist people to make decisions by providing information, models, and analysis tools, e.g. stock market analysis
 - Expert Systems
 - Provide information and solve problems that would otherwise require a person experienced in that field.
 - Management Information Systems
 - Provide information for the organisations managers. A MIS presents basic facts about the performance of the organisation.
 - Office Automation Systems
 - Provide people with effective ways to complete administration tasks in an organisation, using a range of software tools.
- Examples of Database Information Systems
 - School databases holding information on teachers, subjects, classrooms and students
 - The roads and traffic authority holding information on automobiles and holders of drivers licences
 - Video stores holding information on borrowers and videos

Organisation Methods

- Non-Computer Methods of Organising
 - Telephone books and card systems
 - Easily and inexpensively organised data and it does not require a computer or computer skills
 - Data is not as flexible as far as displaying
- Computer Based Methods of Organising
 - Flat-File Database
 - Organising data into a single table
 - File - block of data

- Record - collection of facts about one specific entry into a database
- Field - specific category of data in a database
- Character - the smallest unit of data that people can use
- Keys - fields that are used to sort and retrieve information
 - Single - field in which each item of data is unique
 - Composite - made by joining two or more fields together
 - Primary - single or composite key that must have a value
 - Secondary - a field that contains useful items of data
- Relational Database
 - Organising data using a series of related tables
 - Schema - organised plan of the entire database showing how and where the data is found
 - Entities - a specific thing about which information is collected and stored, i.e. a table
 - Attribute - a defined property of an entity, i.e. a field
 - Relationship - the way in which entities are related to each other
 - Foreign key - an attribute of a table that is a primary key of another table
- Views of Data for Different Purposes
 - Table - the organisation of data into columns and rows
 - Forms - Used to view, enter and change data in a table
- Data Modelling
 - The process of identifying entities, the relationships between those entities and the attributes of those entities
 - Data dictionary - description of each field in the database
 - Meta-data - information about data
 - Schematic diagrams - graphical tools that help define the database and develop a schema
 - Normalisation - process of organising data into tables, the refinement process is aimed at reducing data redundancy
- Hypermedia and Hypertext
 - Hypermedia - combination of media whose locations are linked electronically to provide an easy way to navigate between information
 - Hypertext - a system that allows documents to be cross linked in such a way that you can move from one document to another by clicking a link
 - URL - address of a file or resource
 - Story-board - series of frames, each representing a different action or screen image
 - HTML - set of instructions dictating how parts of a document will be displayed and navigated

Storage and Retrieval

- Database Management System
 - A software package that allows users to access a database so they can enter, maintain and view the data allows users to:
 - Organise data using a data dictionary
 - Showing relationships between entities
 - Checking for errors in data entry
 - Restricting access to data
 - Provide information about performance of the database

- **Methods of Accessing Data**
 - Sequential access - data is accessed in sequence, only method of accessing data in a magnetic tape
 - Direct access - occurs when data is accessed without accessing previous data items
 - Indexed access - direct access which uses an index or a table detailing the location of data
- **Distributed Databases**
 - Database located at more than one site
 - Two phase commit - part of a DBMS used to maintain consistency across a distributed database
- **Storage Media**
 - Hard disks - disk made of metal or glass and covered with magnetic material
 - CD-ROM - polycarbonate plastic disk with a reflective layer of metal covering the surface
 - Cartridges and tapes - hard disk encased in a metal or plastic cartridge and can be removed like a floppy disk
- **Security**
 - Encryption - process of encoding data, often involves a complex manipulation of bit patterns
 - Asymmetric encryption - requires a different key for encrypting and decrypting the data, public key encryption is a common example of this
 - Symmetric encryption - requires the same key for encryption and decryption
 - Data security - a series of safeguards to protect data
 - Firewall - used on any network to authenticate all incoming and outgoing data
- **Tools for Storage and Retrieval**
 - Searching - the process of examining the database to retrieve data
 - Sorting - process of arranging data in a particular order
 - Query - search of a database for records that meet a certain criteria
 - Operators - represents actions to be performed in a query
 - Relational - indicated a relationship between two expressions
 - Wild-card operators - represent one or more unknown characters
 - (*) - multiple unknown characters
 - (?) - one unknown character
 - Logical operators - combine queries, (AND) (OR) (NOT)
 - Query language - specialised language designed to search a database
 - Structured query language - used to access and manipulate data in a relational database

Keyword	Values	Description	Example
Select	Field(s)	Data to be displayed	Select Firstname, last-name
From	Table(s)	Source of the data	From Students
Where	Search Criteria	The query	Where lastname = "Mullin"

Keyword	Values	Description	Example
Order By	Field(s)	Order to be displayed	Order By Lastname DESC

- Hypermedia and Searching
 - Search engine is a database of indexed web-sites
 - Search robot - program that accesses web-sites and gathers information for search engine indexes
 - Meta-data - data about data
 - Report - formatted and organised representation of data, purpose, determine
- Issues
 - Data sources
 - Primary
 - Secondary
 - Informal
 - Formal
 - Privacy - ability of an individual to control personal data, privacy is eroded by linking databases
 - Accuracy of data - extent to which data is free from errors
 - Data integrity - reliability of data is accurate, current and relevant
 - Data Validation
 - Range check - used when data is restricted to a small range of values
 - List check - used when data can be compared to a set of accepted data
 - Type check - used to determine whether data is correct
 - Check digit - a digit calculated from the digits of a code number and then added to that number as an extra digit
 - Access to data - extent data is available to people
 - Data warehouse - database that collects information from different data sources
 - Data mining - process that looks for relationships and patterns in the data stored in a database

Communication Systems

Characteristics of Communication Systems

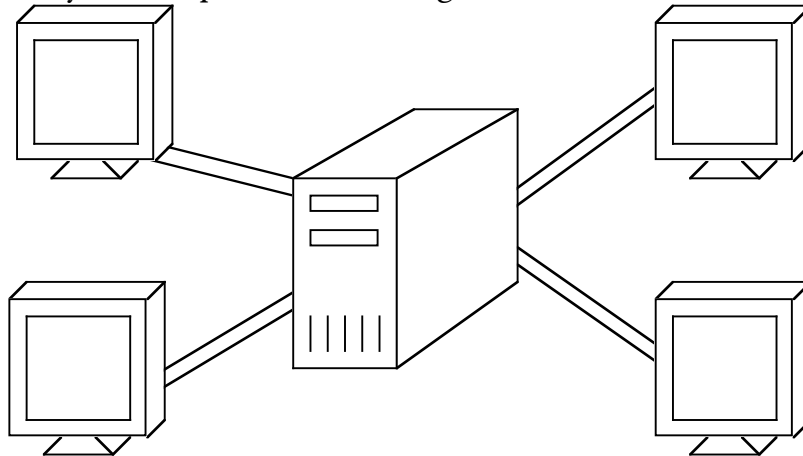
- Communication Systems
 - Those that enable users to send and receive data and information, requires:
 - Data source
 - Transmitter
 - Transmission medium
 - Receiver
 - Destination
 - Protocols
 - Set of rules that govern the transfer of data between computers, defines how information is transmitted and how errors are detected
 - OSI Reference Model
 - Divides data into 7 layers, the bottom layers are responsible for the transfer of data between application programs
 - Handshaking
 - An agreement about which protocol to use to accomplish the exchange of information, it is a series of signals that flow between devices using during data transmission.
 - Methods of handshaking
 - Hardware flow control uses a dedicated connection such as a wire RTS / CTS protocol
 - Software flow control uses a special code sent with the data, used for long distance communications XON / XOFF, X = transmit
 - Speed of Transmission
 - Bandwidth - capacity of the channel or transmission medium
 - Bits per second - maximum number of bits that can be transmitted in a second
 - Baud rate - maximum number of data symbols or electrical signals that can be transmitted in one second
 - Error Checking
 - Parity checking - uses an additional bit added to the end of a byte
 - Odd parity - number of ones must be odd
 - Even parity - number of ones must be even
 - Checksum - counts the number of ones in a data packet (total data is divided into smaller groups to create the data packet) the count of bits is attached to the data packet, if the count matches then it is assumed a complete transmission was received.
 - Cyclic Redundancy Check - data is divided into predetermined lengths and divided by a divisor, the remainder of the calculation is attached and sent with the data. When the data is received the remainder is recalculated, this can be done with either a 16 or 32 bit key.
 - Error correction is carried out by retransmitting the data
- Examples of Communication Systems
 - Teleconferencing allows a meeting to occur at the same time at different locations
 - Messaging Systems
 - Traditional
 - Telephone
 - Fax

- Recent
 - Voicemail
 - Electronic mail
- E-Commerce
 - Buying and selling of goods and services over the internet
 - Credit cards or EFTPOS are used to transfer funds
 - E-banking allows customers to perform transactions and view financial records over the internet.

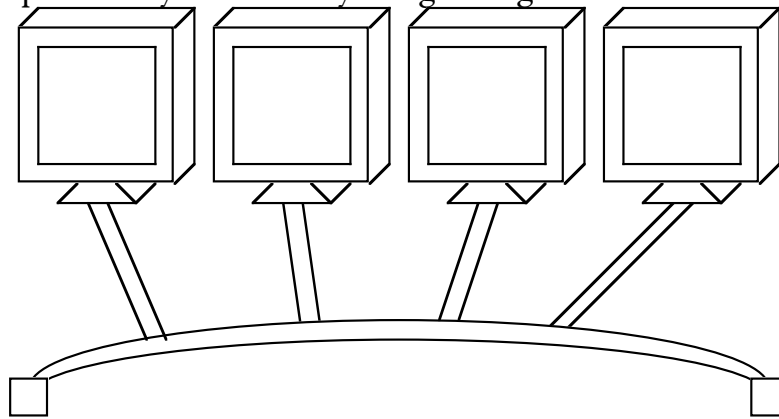
Transmitting and Receiving in Communication Systems

- Communications Concepts
 - Data Transmission
 - Parallel - transmission of data simultaneously using separate channels
 - Serial - transmission of data one after the other
 - Asynchronous - non constant rate, specifies each byte with start and stop bits
 - Synchronous - constant rate, synchronised by each device using a clock, faster and more efficient than asynchronous
 - Direction of Data Flow
 - Simplex - one direction only, e.g. radio
 - Half duplex - both directions but not at the same time, e.g. walkie talkie
 - Full duplex - both directions at the same time e.g. telephone
 - Protocols - define how a link is established and how data is transmitted and how errors are detected and corrected
 - Handshaking - sending signals to indicate the type of protocol to be used
 - Network - a number of computers and their peripheral devices connected together in the same way
 - Node - a device on a network
 - Terminals - devices that send data and receive data from another computer system
 - LAN - connects computers within a building or group of buildings on one site, covers a small geographical area
 - WAN - connects computers over hundreds or thousands of kilometres (large geographical area) consists of a mainframe computer called a host. Private or leased line is dedicated to the network and offers faster and more secure data transfer
 - Packet switching - a technique that divides messages into small data packets, transmits the packets, and later joins them to form the original message
 - Network Topologies
 - The physical arrangement of devices on a network

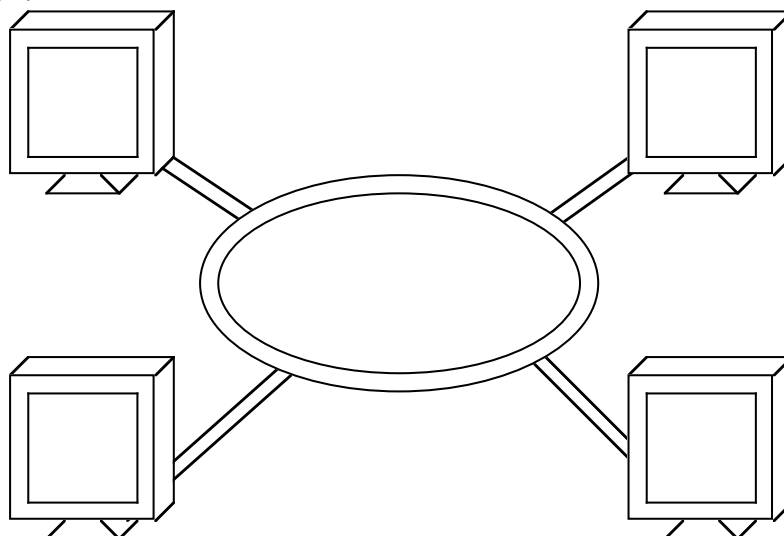
- Star Topology
 - Has a central computer that serves as a switch with each device connected directly to it, requires extra cabling.



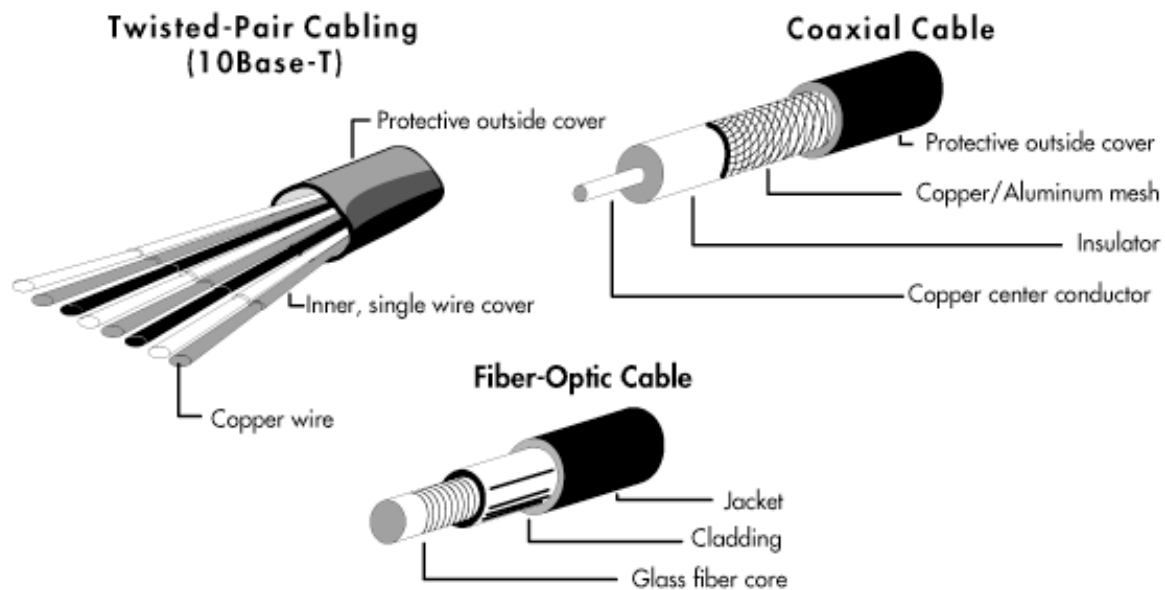
- Bus Topology
 - All devices are attached to a direct line called the bus, each device has a unique identity and can only recognise signals intended for it



- Ring Topology
 - All devices are attached, each device has a unique address, data flow is in one direction only, moving from device to device until it reaches its destination.



- Network Access Methods
 - Ethernet
 - Industry standard LAN protocol
 - Data can be transmitted simultaneously to all nodes in a network
 - Collisions occur so it uses CSMA/CD (carrier sense multiple access with collision detection)
 - Token Ring
 - Protocol based on the ring topology
 - Operates by continually passing special data packets called tokens between nodes on a network
- Network Hardware
 - Server - a computer that provides services to other computers on a network
 - File server - controlling computer in a network that stores the programs and data to be printed
 - Print server - computer on a network that controls one or more printers and stores data to be printed
 - Web server - provides a connection to the internet and/or stores and serves files on the internet or intranet
 - Mail server - computer that provides e-mail facilities and stores incoming mail for distribution to users and forwards outgoing mail
 - Router - device that determines where to send a data packet between at-least two networks
 - Switch - device that directs data packets along a path, it may include the function of a router although it is simpler and faster than a router
 - Bridges and Gateways
 - Bridge - combination of hardware and software that links two similar networks, often connects LANs that use the same protocol
 - Gateway - combination of hardware and software that links two different types of networks
 - Repeater - used to rebuild a fading signal to it's original strength
 - Hub - central connecting device on a network, data arrives at the hub and is forwarded out, intelligent hubs may contain a CPU and a NOS.
 - Transmission Media
 - Wired Transmission
 - Twisted Pair
 - Thin insulated copper wires twisted into a spiral, twisting reduces the amount of interference from other cabling, the wire can be shielded or unshielded.
 - Coaxial
 - Single copper wire surrounded by an insulator, grounded shielding and an outer insulator, shielding prevents distortion.
 - Fibre-Optic
 - Uses a laser of light to carry data in small glass fibres about the diameter of a human hair.
 - It is free from electromagnetic and radio interference
 - It is very secure and can transmit data at high speeds without errors
 - Diagram of Cabling



- Baseband - uses the entire capacity of the cable to transmit one signal at a time
- Broadband - Divides the cable so that multiple signals can be transmitted at one time
- Wireless Transmission
 - Microwave
 - High frequency radio signal sent through space in a straight line from one antenna to another, antennas are placed on tall buildings or mountain tops.
 - Satellite
 - Specialised receiver and transmitter that orbits the earth, signal sent from a ground station and is then retransmitted to another ground station by satellite.
 - Wireless LANs
 - Uses radio waves to transmit data
 - Problems occur with maintaining signal quality and electromagnetic radiation
 - Mobile Phones
 - Transmit data to a grid of cellular stations
- Network Software
 - Network Administrator
 - Manages a network within an organisation
 - Duties include: security, software upgrades, installing and providing backups and enforcing licensing agreements
 - Network Operating Systems
 - Controls the flow of data between the devices on the network and controls the requests for data.
 - Tasks Include
 - Administration including adding and removing users
 - File management and the provision of a file system
 - Applications - handles requests from users to share data and applications
 - Resource management including the sharing printers and modems

- Security by monitoring and restricting access to network resources
- Log-on - procedure used to gain access to the network, user identified by user id and password
- Log-off - process of disconnecting the user from the network
- Intranet - private network which consists of a series of inter-linked LANs, it is designed to share information and computing resources among the users of the organisation.
- Extranet - an intranet which is accessible to customers, suppliers or others outside the organisation

Other Information Processes in Communication Systems

- Collecting Data
 - ATM terminals for electronic banking
 - EFTPOS terminals for a retail store
 - Telephones for voicemail
 - Keyboards for electronic mail
 - Video cameras for a surveillance system
- Processing Data
 - The manipulation of data, after it is collected it must be converted into a form for transmission.
 - Encoding - Involves converting data from its original form into another form for transmission
 - Decoding - Converting of data from the form used for transmission back into the original form
 - Analogue data - represented using continuous variable physical quantities such as voltage
 - Digital data - represented in the form of digits or numbers
 - Encoding and Decoding Methods
 - Analogue data to analogue signal - the wave shape of the data is encoded into the signal
 - Digital data to analogue signal - series of zeros and ones is encoded into a continuous wave
 - Digital data to digital signal - series of zeros and ones is transmitted by sending it through a channel as a series of on and off pulses
 - Analogue data to digital signal - the wave shape of the data is encoded into a series of zeros and ones, the process of generating digits is called digitising.
 - Client-server architecture - describes the software relationship between the client (user) and the server, a client sends a request to the server according to an agreed upon protocol and the server responds.
- Displaying
 - The presentation of information in the form of text, numbers, images, audio or video.
 - Telephone - contains a transmitter that converts sound into a signal suitable for the transmission medium and a receiver that converts the signal back into sound. When a message retrieved from voice mail, the telephone is the display device used to listen to the message.
 - EFTPOS terminal - contains a screen to display the product details and transaction information, it may also print a receipt of the customer.

Issues Related to Communication Systems

- **Messaging Systems**
 - Social context - ideas delivered by messaging systems appear less forceful and caring than ideas delivered personally.
 - Danger in misinterpretation - meaning can depend on the tone of voice or body language, both of which are lacking in messaging systems
 - Power relationships - messaging systems can change peoples relationships within an organisation by providing an avenue for communication
 - Privacy and confidentiality - messages may be stored indefinitely and subject to unauthorised access
 - Electronic junk mail
 - Information overload - refers to the enormous amount of information people have to absorb

- **Internet Trading (E-Commerce)**
 - Taxation - difficulty of taxing goods and transactions over the internet
 - Employment ramifications - requires more people employed in the IT industry resulting in fewer shop-fronts
 - Nature of business - traditional businesses that provide opportunities for human interaction are giving way to e-commerce
 - Trade barriers - developments in communication technology have made trade barriers far less relevant in the exchange of goods internationally

- **Censorship**
 - It is difficult to censor content on the internet due to the large amount of web sites created daily.
 - Internet Industry Association works to block some offensive material in Australia

- **Internet Banking**
 - Security - data encryption is used to ensure the data transfer between the customer's computer and the banks computer is secure
 - Changing nature of work - people working at the bank no longer carry out tasks performed by internet banking, instead banks hire people with IT skills rather than people with bank skills
 - Branch closures and job loss - with more people using internet banking and ATMs there is less need for physical bank branches

- **Working From Home**
 - Telecommuting - working at home and electronically communicating with the office
 - Virtual Organisations
 - Organisations whose employees work almost entirely through telecommunications
 - Advantages include:
 - Greater flexibility in work hours
 - Saving money on transport
 - Mainly benefits those who are physically impaired or are required to look after small children
 - Disadvantages
 - Security of documents created at home

- Cost of information technology to support telecommuting
- Employer loyalty may not be as strong if the person is rarely at the physical work site

- Trends in Accessing Media and the Internet
 - Radio is broadcast around the world using the internet as a delivery medium, it is less expensive and easier to cater to multiple tastes and groups
 - Video is being transmitted over the internet and is used to training, sales and a multitude of other purposes including entertainment. The cost of bandwidth may be a factor in distribution however it is still less expensive than physical distribution methods

Transaction Processing Systems

Characteristics of Transaction Processing Systems

- Characteristics
 - Rapid response
 - Reliability
 - Inflexibility
 - Controlled processing
- Batch Transaction Processing
 - Collects transaction data as a group and processes it at a later date
 - Waits for a large volume of data before processing
 - Results in a lower cost per transaction
 - Generally carried out by large organisations using a mainframe or midrange computer and is often run at night
 - All processes must wait until a set time
 - Errors cannot be corrected in real time
 - Sorting transaction data is expensive and time consuming
- Real Time Transaction Processing
 - Immediate manipulation of data and provides instant confirmation of a transaction but requires access to an online database
 - Concurrency - ensures that two users cannot change the same data at the same time
 - Atomicity - ensures that all steps involved in a transaction are completed successfully as a group, if one step fails then no other should be completed
 - Every real time TPS has a user response time delay caused by its transaction processing activities
- Data Validation
 - Used to check the entry of transaction data, and to ensure that transactions are correct and have been accurately stored in the database.
 - Transaction initiation - used to acknowledge that the transaction monitor is ready to receive the transaction data
 - Field checking - occurs when the transaction data is entered into a database, checked using:
 - Range check
 - Type check
 - List check
 - Check digit
- Manual Transaction Processing Systems
 - Business systems that operate without the use of machines
 - People are used to record data about the business activities

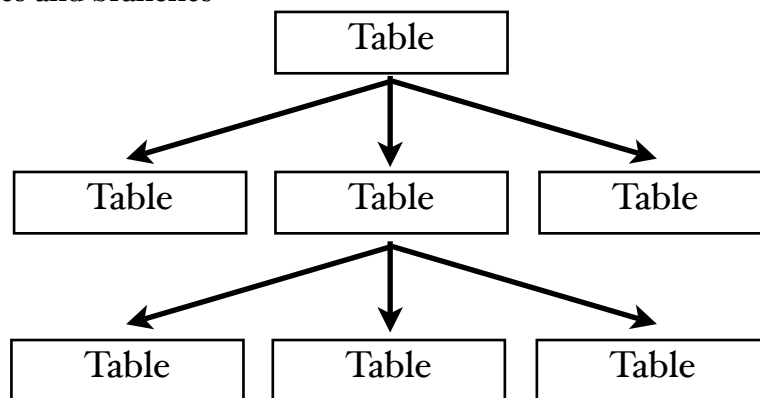
Examples of Transaction Processing Systems

- Components of a TPS
 - Users - often take the data provided by the TPS and use it in another type of information system

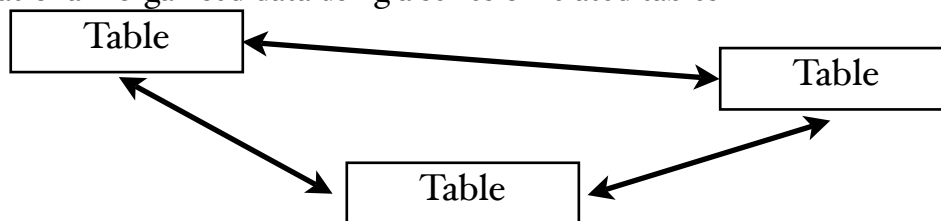
- Participants - people who conduct the information processing
- People from the environment are becoming participants in real time TPSs by directly entering transactions and performing validation
- Examples of TPS
 - Real Time
 - Reservation systems
 - Point of sale terminals
 - Library loan systems
 - Batch Processing
 - Clearing of presented cheques
 - Generation of bills
 - Some systems may appear to real time by computerising transactions as they occur, however actual updating is processed in a batch, such as credit card transactions.

Storing / Retrieving in Transaction Processing Systems

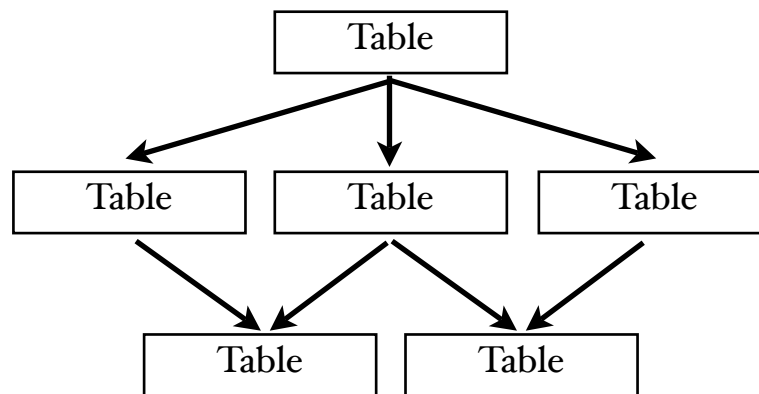
- Storage of Digital Data in Databases and Files
 - Database - an organised collection of data
 - Hierarchical - organised data in a series of levels, uses a top down structure consisting of nodes and branches



- Relational - organised data using a series of related tables



- Network - Organised data in a series of nodes linked by branches



- Databases and Files
 - Features of a Real Time TPS
 - Good data placement - the placement of frequently accessed data together
 - Short transactions - shorter transactions can be processed quickly, this can help improve concurrency
 - Real time backup - database backups must be scheduled at times of low activity to minimise effects on the users
 - High normalisation - redundant information is kept at a minimum to increase the speed of updates and improve concurrency
 - Archiving of historical data - rarely referenced data should be archived or moved out of heavily updated tables thus improving backup times and query performance
 - Good hardware configuration - hardware must be able to handle a large number of users to provide quick response times
 - Files
 - Master file - contains information about an organisation's business situation
 - Transaction file - collection of transaction records, the data is used to update the master file
 - Report file - contains data which has been formatted for presentation to a user
 - Work file - temporary system file used during processing
 - Program file - contains instructions for processing of data
- Data Warehousing
 - Provides data which is:
 - Consolidated - data organised using consistent naming conventions, measurements, attributes and semantics
 - Subject orientated - data warehouse organises only the key business information from operational sources so that it is available for analysis
 - Historical - real time TPS represent the current value at any moment in time for various aspects of the business
 - Read only - data is not changed unless the data is incorrect
- Backup Procedures
 - Grandfather-father-son - backup procedure that refers to at-least three generations of backups of the master file
 - Off-site storage - data should be stored in a different location as to protect it from physical damage occurring on the main site
 - Secure on-site storage - data is kept in a secure area on premise
 - Partial backups - occurs when only part of the master file as backed up

- Differential - full copy of all the files from time to time
- Incremental - copies of all files that have changed since the last backup of any kind
- Recovery Management Program
 - Recovery testing - determines which is the most appropriate recovery method
 - Backward recovery - used to undo unwanted changes
 - Forward recovery - processes the transactions in the transaction journal that occurred between the time the backup was made and the present time
- Magnetic Tape
 - Can store large quantities of data inexpensively
 - Consists of a long thin strip of plastic, coated with a thin layer of magnetic material, often wound around two reels
- Backup software - designed to manage the copying of selected files to backup media, generally offers automated scheduling
- Sequential access - starts at the beginning and reads all the data
- Updating in a Batch or Real Time
 - Batch
 - Used when transactions are recorded on paper
 - Historically, updating in a batch was the only feasible method when transaction details were stored on punch cards or magnetic tape. The information technology did not exist to allow immediate processing of all transaction data
 - Sequential access is convenient, reliable and economical
 - Steps involved in a batch update:
 1. All changes are made to the transaction file
 2. The transaction file is sorted by a key field to be in the same sequential order as the master file
 3. Files are matched by the key field and the relevant records in the master file are updated
 - Information technology required:
 - Hardware:
 - Large capacity tape drive with tapes
 - Server and collecting peripherals
 - Software:
 - Operating system
 - TPS software
 - User interface is less important in batch systems
 - Real Time
 - Random access to data once a primary key is specified
 - Steps involved in a real time update:
 1. Enter data
 2. Retrieve records
 3. Update the records
 4. Send response to participant
 - Information technology required:
 - Hardware:
 - Quick and direct access storage
 - Software:
 - Software which enables online input
 - User-friendly interface

Other Information Processes in Transaction Processing Systems

- Collecting in Transaction Processing
 - Hardware
 - MICR - magnetic ink character recognition - used by banks to read account numbers on cheques
 - ATM - automatic teller machine - banking terminal which performs common banking transactions
 - Barcode readers - collects product information at the point of sale, used to keep track of stock movement
 - Forms
 - Paper forms - person fills out the form which is processed in a batch
 - On-screen forms - created for computerised data entry purposes to populate fields in a database
 - Web-forms - filled out on the internet and may be processed in real time or in a batch
- Analysing Data
 - Decision Support Systems
 - Assist people to make decisions by providing information, models and analysis tools
 - Data mining - process of finding patterns and relationships in the data stored in a database
 - Management Information Systems
 - Provides information for the organisation's managers
 - Types of reports generated
 - Periodic reports - produced on a regular basis for all levels of management
 - Detail reports - organised list relating to a product or an activity to be performed
 - On-demand report - produced in response to an unscheduled request for information
 - Summary report - generally combine data showing totals over different areas or times
 - Exception report - contain information which is outside the normal range

Issues Related to Transaction Processing Systems

- Changing Nature of Work
 - Automation of Jobs
 - Generally replaces people with information technology
 - Workers must continually improve and learn new skills
 - Can limit or expand the scope of a user's job
 - ATMs replace some bank clerks
 - Non-computer Procedures
 - In the case that a blackout or breakdown has occurred, a non-computer system should exist in order to allow the business to function and avoid chaos
 - Bias in Data Collection
 - Bias - a systematic inaccuracy due to methods used in the collecting, processing or representing of data
 - Strict data collection procedures must be adhered to

- At processing and presentation stages, bias can occur by manipulating tables and charts and how much data is actually presented
- Importance of Data in Transaction Processing
 - Data security - protection of data once it has been collected
 - Security is maintained by:
 - Passwords
 - Biometrics identification such as retina and fingerprint scans
 - Data encryption - coding of data for transmission and storage
 - Firewalls - verify and authenticate all incoming and outgoing data, also checks passwords of users
 - Data accuracy - the extent to which data is free from errors
 - Data collection errors are those made during the inputting of data from collection forms due to poor handwriting
 - Data entry errors - where the person inputting data makes a typographical error
 - Out of date errors - occur when a persons details change
 - Mismatching errors - when data entered relates to a different person
 - Methods for improving data accuracy:
 - Careful design and wording of data collection forms
 - Checking for data accuracy at data entry time
 - Missing or out of range data should be deleted
 - Data integrity - the reliability of the data in real time, transactions must pass the ACID test
 - Atomicity - all steps involved in the transaction are completed
 - Consistency - when the transaction successfully transforms the system
 - Isolation - transaction is processed concurrently as if it were the only transaction being carried out
 - Durability - occurs if the changes made to the database become permanent
 - Control in Transaction Processing
 - Control is critical in transaction processing as the volume of information is so immense and people only see parts of the operation.

Multimedia Systems

Characteristics of Multimedia Systems

- Multimedia Systems as Information Systems
 - Combination of different types of media
 - Text, hypertext and numbers
 - Hypertext - allows the user to navigate through a multimedia product, it is a system that allows documents to be cross-linked in such a way that the user can move from one document to another by clicking on a link.
 - Audio - sound which has been digitised
 - Images - pictures, drawings or photographs
 - Pixel - the smallest part of the screen which can be controlled by the computer
 - Resolution - the total number of pixels on the screen
 - Bit-mapped Graphics
 - Treat each pixel on the screen individually and represent this by bits in memory.
 - They produce good quality images where shading and detail are needed
 - Aliasing - the process of enlarging each pixel in a bit-mapped graphic thus creating a staircase pattern
 - They are often stored in compressed formats such as GIF and JPEG
 - Vector Graphics
 - Made up of objects such as a straight line, curve, or a shape
 - Each object is defined by its characteristics such as position, line width and pattern
 - Animation - the movement of a graphic
 - Cell - each frame of an animation
 - Video - combines pictures and sounds displayed over time
 - Video starts with a continuous event and breaks it up into discrete frames
 - Individual pictures are then displayed sequentially to create the illusion of motion
- Print and Multimedia
 - Modes of Display
 - Printed information is displayed using a printer or plotter whereas a multimedia product is displayed using a screen and speakers.
 - Screen - a display surface that provides immediate feedback about what the computer is doing
 - Speaker - a device used to produce sounds
 - Interactivity
 - Allows the user to choose the sequence and content of information
 - Hypertext and hypermedia are used to navigate through a multimedia product
 - Interactive multimedia accepts input from a mouse, touch screen or keyboard and performs some action
- Hardware Demands by Multimedia Systems
 - Hardware of a multimedia system places limits on the quality and size of the multimedia product that can be produced or displayed
 - Image Storage
 - Frame buffer - section of memory reserved for the image presently displayed
 - High resolution images require more memory

- Bit mapping - the relationship between the image on the screen and the bits in memory, it is dependant on bit depth
- Bit depth - also called colour or pixel depth, the number of bits per pixel, one or more bits must be stored for each pixel on the screen
- Determining File Size:

File size of a black and white image with a resolution of
640 by 400 pixels

$$\begin{aligned} \text{File Size} &= \frac{\text{Horizontal} \times \text{Vertical} \times \text{Bit Depth}}{8 \times 1024} (= 1 \text{ Kb}) \\ &= \frac{640 \times 400 \times 1}{8 \times 1024} \\ &= 31.25 \text{ Kb} \end{aligned}$$

- Bit Depth and Tones

Bit Depth	Number of Tones	Relationship
1	2	$2^1 = 2$
2	4	$2^2 = 4$
3	8	$2^3 = 8$
4	16	$2^4 = 16$
6	64	$2^6 = 64$
8	256	$2^8 = 256$
16	65,536	$2^{16} = 65,536$
24	16,777,216	$2^{24} = 16,777,216$
32	4,294,967,296	$2^{32} = 4,294,967,296$

- Audio Storage
 - A sound wave is analogue data and thus represented by continuous variable quantities, therefore audio is sound which has been digitised
 - Sampling - the method used by the analogue to digital converter to digitise a sound wave.
 - Sampling rate - the number of times a sample is taken from the sound wave, during a sample, the amplitude of a sound wave is measured and converted to a number.
 - Sample size - also called the bit resolution, is the number of bits per sample, most common sampling sizes are eight and sixteen bit
 - Mono - uses a single channel of sound
 - Stereo - uses two channels for sound and is generally regarded as better
 - Determining File Size

File size of CD quality audio that uses a sample rate of 44.1 kHz with a 16 bit sample and a track lasting 3 min.

$$\begin{aligned} \text{File Size} &= (\text{Sample Rate} \times \text{Sample Size} \times \text{Time}) \times 2 \\ &= (44,100 \times 16 \times 180) \times 2 \\ &= 254,016,000 \text{ bits} \\ &= 31,752,000 \text{ bytes} \\ &= 30.28 \text{ Mb} \end{aligned}$$

- Video Processing
 - An excellent medium in which to display content however it places extra demands on the multimedia system.
 - Frame rate - the speed of a video or animation, it is measured by frames per second

Frames Per Second	Examples
30	Screen refresh for monitors
25	Video speed for PAL system
24	Film speed for motion pictures
12	Cartoon animation speed
8	Min speed for illusion of motion

- File size is calculated by multiplying the frame rate by the time in seconds, then multiplying that value by the file size of each frame
- Animation Processing
 - Cell-based Animation
 - Involves drawing and displaying individual frames or cells
 - Each frame is stored separately and loaded into a graphics page of primary memory, the frames are then displayed rapidly and sequentially
 - Requires a fast processor and large storage device
 - Path-based Animation
 - Displaying the movement of objects onto a fixed background in a particular sequence or path
 - The background image pixels do not change only those of the moving object
 - Saves memory and processing time
 - Animation is achieved by drawing the object, wiping it, and then drawing the object in a new location
 - Tweening - the process of generating intermediate frames between two objects
 - Morphing - the smooth change between two different images, it transforms the shape, size, dimensions and colour of one image into those of another.
 - Warping - the transforming or distorting of a portion of the image, it divides the image into objects that can be manipulated.

- People in Multimedia Systems
 - Multimedia products are usually designed by a group of people who have expertise in a particular field
 - Content providers - people who provide the material for the multimedia product
 - System designer - plans and organises the hardware and software for the presentation, may also act as the project manager or provide technical support
 - Project manager - organises the scheduling of various components of the product, provides overall supervision of the components and ensures that all components are delivered on time.
 - Technical staff - includes a variety of artists and technicians who edit the graphic and video material, text and all other material into appropriate formats for the final document.
 - People may be multi-skilled and work in different aspects of the multimedia product

Examples of Multimedia Systems

- Major Areas of Multimedia Use
 - Education and Training
 - Multimedia better maintains a user's interest
 - Computer based training - a type of multimedia product used for education and training
 - The interactive nature of multimedia makes it an effective educational tool
 - Leisure and Entertainment
 - Computer games
 - Information
 - Multimedia allows the user to determine when, how and what information will be displayed, it is also easier for the user to search for specified material.
 - An example would be a multimedia encyclopaedia or Information kiosks
 - Virtual Reality and Simulations
 - Virtual reality - the use of computer modelling and simulation to enable a person to interact with an artificial environment
 - An example would be flight simulators which are used to train airline pilots
- Advances in Technology
 - World Wide Web
 - An internet network that allows people at one computer to collect information stored on another.
 - Web site - a group of documents that present information on a particular topic
 - The web is an interactive environment with hyper-links instantly connecting to other pages
 - Increased download speeds due to the proliferation of broadband and increased personal computing power are factors which have impacted the development of the world wide web.
 - CD-ROM
 - Meaning: compact disk with read only memory
 - Disks are 12 centimetres wide and have a capacity of 650-700 MB
 - The speed of CD-ROM drives has increased resulting in faster access to data
 - DVD
 - DVD originally stood for 'Digital Video Disk' however due to the numerous applications of the technology it can also stand for 'Digital Versatile Disk.'

- The same physical size as a CD however the storage capacity can range from 4.7 Gb to 17Gb.
- Text, video, image and audio have the same file structures called UDF (universal disk format)
- DVDs are formatted for either PAL or NTSC drives (Australia uses PAL)

Displaying in Multimedia Systems

- Hardware
 - Screens - a display surface providing immediate feedback about computer's activity
 - CRT - Cathode Ray Tube
 - Produces images by firing a stream of electrons onto the inside of the screen, which is coated with tiny dots or pixels made of phosphor.
 - Monochrome monitors use one stream where as colour monitors use three
 - When the stream of electrons hits the pixel, the phosphor glows to produce the image.
 - Cross fade - the process where the colour of a pixel gradually changes
 - Raster scan - the firing of the electron beam in a zigzag pattern starting from the upper left-hand corner
 - Refreshing - the process of maintaining an image on the screen by repeating a raster scan
 - Interlaced - speeds up the refresh process by first scanning all the odd lines first from top to bottom and then scanning the even lines.
 - LCD - Liquid Crystal Displays
 - Consists of a layer of liquid crystal material placed between two polarising sheets. Light is passed through the liquid crystal material, and current is applied at particular points.
 - LCD technology takes up little space, produces no heat, have no glare and create no radiation
 - Touch Screens
 - Enter data by detecting the touch of the users finger
 - The screen may be heat sensitive or use a matrix of infrared light beams to detect the location of the user's finger
 - Projection Devices
 - Data projection panel - used together with a standard overhead projector, it uses LCD technology without a backing, thus allowing light to pass through the screen where it is then projected onto a wall or screen
 - Data projectors - take the video signal directly from the computer and projected onto a wall or screen
 - Speakers
 - Devices which produce sounds
 - Audio signals from a computer are translated into analogue sound waves for transmission through speakers.
 - Head-up Displays
 - Devices worn on the head and used to display information
 - Originally developed for virtual reality
- Software
 - Presentation Software

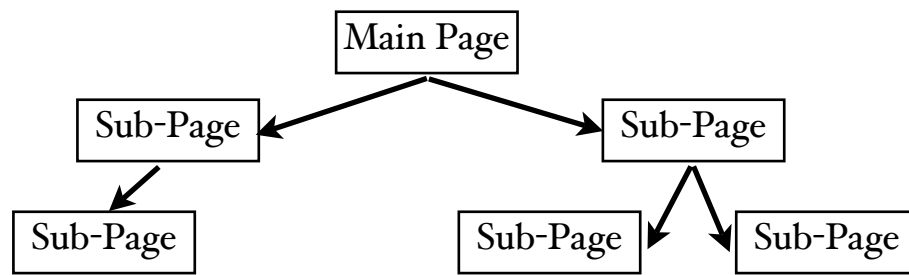
- A presentation consists of a series of slides which may contain text, graphics, animation, audio and video
- Examples would be Microsoft's Powerpoint or OpenOffice's Impress
- Application Software
 - Software which is used for a specific task
 - Examples of such software include:
 - Word processors
 - Spreadsheets
 - Graphics software
 - Audio software
 - Video software
 - Project management software
- Authoring Software
 - Used to combine text, graphics, animation, audio and video into a multimedia product
- Animation Software
 - takes individual images and creates the illusion of movement
 - 2D animation software uses 2D images and combines them to create animation
 - 3D animation software uses a mathematical model of a 3D object to realistically portray objects with depth
- Web Browsers
 - A software program that allows access to the web
- HTML Editors
 - HTML (hypertext markup language) is a set of instructions that indicates how parts of a document will be displayed
 - It is a software program which specialises in writing html code

Other Information Processes in Multimedia Systems

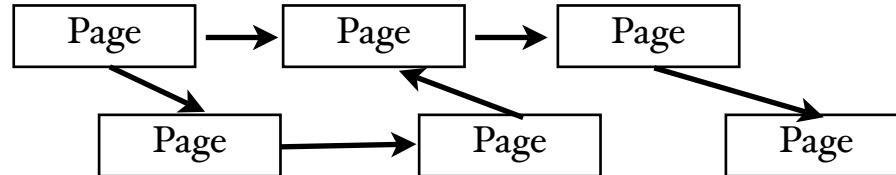
- Collecting
 - Methods of Digitising
 - Scanners - electronically capture text and images and converts them into digital data, uses a software standard known as TWAIN which allows the digital images to be used in a range of applications.
 - Hand held scanner
 - Flatbed scanners
 - Overhead scanners
 - Digital cameras - input devices that capture and store images in digital form
 - Video cameras - used to create a video clip in analogue or digital form
 - Microphones
- Organising
 - Storyboards
 - Linear - simple sequential path that is set up quickly


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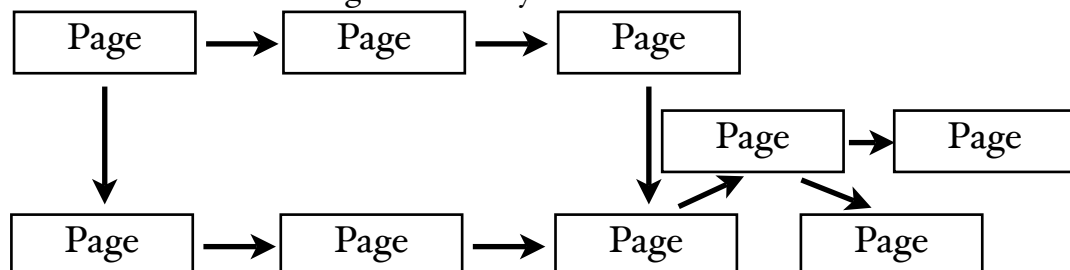
graph LR
  A[Page] --> B[Page]
  B --> C[Page]
  C --> D[Page]
              
```
 - Hierarchical - a sequential path in a top-down design in which the user starts at the beginning and moves down through the multimedia product



- Non-linear - no structure, the user moves between different layouts in any direction



- Combination - a blending of all the layouts



- Processing
 - Integration of Data
 - Multimedia software is used to integrate text, number, image, animation, audio and video data.
 - Compression and Decompression
 - Compression - reduces the number of bits required to represent information, allowing the user to store data and access it quicker
 - Images are often stored in GIF (limited to 256 colours) or JPEG formats
 - CODEC - coder-decoder - used to encode or decode various types of data
 - Convert analogue video signals into compressed video signals, e.g. MPEG
 - Convert analogue sound signals into digitised sound, e.g. RealAudio
 - Hypermedia
 - Involves the linking of different types of media
- Storing and Retrieving
 - Compression Techniques
 - Compression ratio - the amount a file is compressed, it describes how much smaller the compressed file is compared to the uncompressed file.
 - Lossy compression - removes a number of data bytes from the file, the resulting file is smaller in size but the quality is reduced
 - Lossless compression - allows the original file to be recovered in full. It works by replacing repeated data with something that takes up less room
 - File Formats
 - JPEG (Joint Photographic Experts Group)
 - Compresses bit-mapped graphics with a compression ratio of up to 100:1
 - A lossy compression method
 - Works by reducing the number of tones or colours in an image
 - GIF (Graphics Interchange Format)

- A lossless compression method for bit-mapped graphics
- Compresses files using 8-bit colour and achieves a compression ratio of 2:1
- Works by replacing common colours or tones with a short string of bits, then storing the meaning of those strings in an index.
- EPS (Encapsulated Postscript)
 - Printer language used for high-end publishing
 - Stores vector graphics
- MP3 (MPEG Audio Layer 3)
 - Compresses CD quality sound using a compression ratio of 11:1
 - Works by removing the sounds which fall outside the audio spectrum which humans can generally recognise.
- Quicktime
 - Video and animation format developed by Apple Computer
 - Combine sound, text, animation and video into a single file
- MPEG (Motion Picture Experts Group)
 - Industry standard lossy compression technique
 - Works by only storing changes from one video frame to another

Issues Related to Multimedia Systems

- Copyright
 - The right to use, copy or control the work of authors and artists
 - It is against the law to break copyright
 - The following information must be included when citing an internet source:
 - Author's or organisation's name
 - Title of the completed work or web page
 - URL of web page
 - Date of publication
 - Download date
- Appropriate use of the Internet
 - New developments in technology raise questions about privacy
 - Live video data and Google Maps raise this question of privacy
- Merging of Technologies
 - Technologies such as radio and television are being delivered over the internet
 - VOIP - voice over internet telephony - is the technology which allows telephone calls to be placed over the internet.
 - Digital television systems are designed to present interactive multimedia
- Data Integrity
 - Described the reliability of data
 - Involves the accuracy, currency, and relevance of data
 - The sources of data need to be cross referenced

IPT Keyword List

1. **Access to Data:** Is the extent data is available to people. (*location: 2.5*)
2. **Accuracy:** The extent to which the data is free from errors. Inaccuracies may be caused by mistakes in gathering or entering the data. (*location: 2.5*)
3. **Active Listening:** Involves restating, reflecting, and summarizing the speakers major ideas and feelings. (*location: 1.1*)
4. **Aliasing:** The process of enlarging each pixel in a bit-mapped graphic thus creating a staircase pattern. (*location: 7.1*)
5. **Analog Data:** Represented by using continuous variable physical quantities such as voltages. (*location: 3.4*)
6. **Analog Data to Analog Signal:** The wave shape of the data is encoded into the signal. (*location: 3.4*)
7. **Analog Data to Digital Signal:** The wave shape of the data is encoded into a series of 0s and 1s; the process of generating digits or numbers is called digitizing. (*location: 3.4*)
8. **Analysis Report:** Provides a detailed basis for further system development. (*location: 1.4*)
9. **Archiving of Historical Data:** Data that is rarely referenced should be archived into separate databases or moved out of the heavily updated tables. (*location: 4.3*)
10. **Asymmetric Encryption:** Requires a key for encryption and a key for decryption. A common asymmetric encryption system is public key encryption. It involves a public key that is widely available and a private key that is kept secret. (*location: 2.3*)
11. **Asynchronous Transmission:** A type of serial transmission, It is the sending of data by identifying each byte with special start and stop bits. It has become the standard on personal computers, part of the protocol agreement is to specify how many start and stop bits. (*location: 3.3*)
12. **Atomicity:** Ensures that all steps involved in a transaction are completed successfully as a group. If any step fails, no other steps should be completed. (*location: 4.1*)
13. **Atomicity:** Occurs when all of the steps involved in a transaction are completed successfully as a group. (*location: 4.5*)
14. **Attribute:** A defined property of an entity. (*location: 2.2*)
15. **Audio Conference:** A single telephone call involving three or more people at different locations. (*location: 3.2*)
16. **Automation of Jobs:** The use of information technology to perform tasks once performed by people. (*location: 4.5*)
17. **Backup:** Another copy of the data that can be used to rebuild the system. A DBMS creates a backup at a specified time. (*location: 2.3*)
18. **Backup:** Another copy of the data that could be used to rebuild the system. (*location: 4.3*)
19. **Backward Recovery:** Used to back out or undo unwanted changes to the database. (*location: 4.3*)
20. **Bandwidth:** The capacity of the channel or transmission medium. A transmission medium with a high bandwidth can transfer more data. (*location: 3.1*)
21. **Base-band:** Uses the entire capacity of the cable to transmit only one signal at a time. (*location: 3.3*)
22. **Batch Transaction Processing:** Collects the transaction data as a group, or batch, and processes it later. It has a time delay. Transactions are collected and held for processing until it is convenient or economical to process them. (*location: 4.1*)

23. **Baud Rate:** The maximum number of data signals or electrical signals that can be transmitted in one second. (*location: 3.1*)
24. **Bit Depth:** The number of bits per pixel, one or more bits can be stored for each pixel on the screen. (*location: 7.1*)
25. **Bit-mapped Graphics:** Treat each pixel on the screen individually and represent this by bits in memory. They produce good quality images where shading and detail are needed. (*location: 7.1*)
26. **Bits Per Second:** Bits per second or bps is the maximum number of bits that can be transmitted in one second. This measure of speed includes special bits used in asynchronous transmission and any error checking bits. (*location: 3.1*)
27. **Bridge:** A combination of hardware and software to link two similar networks. (*location: 3.3*)
28. **Broadband:** Divide the cable so that several signals can be transmitted at the same time. (*location: 3.3*)
29. **Bus Topology:** An arrangement where all the devices are attached to a direct line called a bus. (*location: 3.3*)
30. **CD-ROM:** Stands for compact disk with read only memory, has a capacity of 650-700 Mb and is 12 centimeters in diameter (*location: 7.2*)
31. **Cell-based Animation:** Involves drawing and displaying individual frames or cells. (*location: 7.1*)
32. **Changing Nature of Work:** People working at the bank are not carrying out services provided by internet banking. Banks require more people with information technology skills and fewer people with banking skills. (*location: 3.5*)
33. **Check Digit:** A digit calculated from the digits of a code number and then added to that number as an extra digit. (*location: 2.5*)
34. **Checkpoint:** The DBMS periodically suspends all processing to synchronize its files and journals. All transactions in progress are completed, and the journal entries are updated. (*location: 4.3*)
35. **Checksum:** A method of checking for errors in data transmission by counting the number of bits in a data packet. A data packet is created by dividing the total data into smaller groups. The count of in a data packet is attached to the data packet. (*location: 3.1*)
36. **Client-server Architecture:** The software relationship between the client and the server. The client server architecture provides a convenient way to interconnect programs that are distributed across different locations of a network. (*location: 3.4*)
37. **Coaxial Cable:** Consists of a single copper wire surrounded by an insulator, grounded shielding and an outer layer. (*location: 3.3*)
38. **CODEC:** Used to encode and decode various types of data. (*location: 7.4*)
39. **Combination Layout:** A blending of linear, hierarchical and non-linear layouts. (*location: 7.4*)
40. **Communication System:** Enables people to send and receive data and information. (*location: 3.1*)
41. **Composite Video Systems:** Sends all the video information using one signal. (*location: 7.4*)
42. **Compression:** Reduces the number of bits required to represent information. (*location: 7.4*)
43. **Compression Ratio:** Describes how much smaller the compressed file is compared to the uncompressed file. (*location: 7.4*)
44. **Computer Based Training:** A type of multimedia product used for training and education (*location: 7.2*)

45. **Computer Operators:** They perform tasks on the equipment, such as monitoring performance, starting up, running jobs, and backing up. (*location: 1.7*)
46. **Concurrency:** Ensures that two users cannot change the same data at the same time. (*location: 4.1*)
47. **Conflict Resolution:** Solves problems and disputes by listening to the other person's views. (*location: 1.1*)
48. **Consistency:** Occurs when a transaction successfully transforms the system and the database from one valid state to another. (*location: 4.5*)
49. **Consolidated:** Data is organized using consistent naming conventions, measurements, attributes and semantics. (*location: 4.3*)
50. **Constraint:** A factor that affects the system and prevents it from achieving the desired objectives. (*location: 1.4*)
51. **Context Diagram:** A graphical method of representing a system that uses only a single process together with inputs and outputs. (*location: 1.5*)
52. **Copyright:** The right to use, copy or control the work of authors and artists. (*location: 7.5*)
53. **CRT Monitor:** Produces images by firing a stream of electrons onto the inside of the screen, which is coated with tiny dots or pixels made of phosphor. (*location: 7.3*)
54. **CSMA / CD:** Carrier Sense Multiple Access and Collision Detection, the method ethernet uses to overcome errors. (*location: 3.3*)
55. **Cyclic Redundancy Check:** A method of checking for errors in data transmission using a division process. The data is divided into predetermined lengths and divided by a fixed divisor. The remainder of the calculation is attached and sent with the data. When the data is received the remainder is recalculated, if the remainders do not match, an error in the transmission has occurred. (*location: 3.1*)
56. **Data Accuracy:** The extent to which data is free from errors. Errors can be caused by mistakes in gathering the data, mistakes in data entry etc. (*location: 4.5*)
57. **Data Bits:** The number of bits in each group of data, each data group is usually sent as a byte. (*location: 3.1*)
58. **Data Dictionary:** Describes the data within the system. (*location: 1.5*)
59. **Data Flow Diagram:** A graphical method of representing a system that uses a number of processes together with inputs, outputs, and storage. (*location: 1.5*)
60. **Data Integrity:** Describes the reliability of data. Reliable data is accurate, current, and relevant. (*location: 2.5*)
61. **Data Integrity:** Describes the reliability of the data. It involves the accuracy, currency and relevance of the data. ACID test must be passed. (*location: 4.5*)
62. **Data Mining:** A process that looks for relationships and patterns in the data stored in a database. (*location: 2.5*)
63. **Data Mining:** Used in decision support systems to find relationships and patterns in the data stored in a database. (*location: 4.4*)
64. **Data Projection Panel:** A device which can be used together with a standard overhead projector to project an image from a computer screen onto a wall or white screen, the projection panel uses LCD technology. (*location: 7.3*)
65. **Data Projectors:** Take the video signal directly from a computer and project it onto a wall or screen. (*location: 7.3*)
66. **Data Security:** Involve a series of safeguards to protect the data. The first line of defense is to only allow access to the data by authorized people using passwords and biometric devices. (*location: 2.3*)
67. **Data Source:** The source of the data is the person or organization that developed the data. (*location: 2.5*)

68. **Data Validation:** Used to check the entry of transaction data. It involves procedures to ensure that transactions are correct and have been accurately stored in the database. (*location: 4.1*)
69. **Data Warehouse:** A database that collects information from different sources, it is a storage area of raw data that can be analyzed to assist organization in making decisions. (*location: 2.5*)
70. **Data Warehouse:** A database that collects information from different data sources. Data gathered in real-time transactions can be used for analysis in an efficient manner if it is stored in a data warehouse. (*location: 4.3*)
71. **Database:** An organized collection of data. (*location: 4.3*)
72. **Database Information Systems:** Information systems that use a database. (*location: 2.1*)
73. **Database Management System:** Software package that allows users to access a database so they can enter, maintain, and view the data. (*location: 2.3*)
74. **Decision Support Systems:** Assist people to make decisions by providing information, models and analysis tools. (*location: 2.1*)
75. **Decision Support Systems:** Assist people in making decisions by providing them with information, models and analysis tools. (*location: 4.4*)
76. **Decision Table:** A table that represents all possible conditions and actions, it indicates the alternatives for decisions and actions based on rules. (*location: 1.5*)
77. **Decision Tree:** Diagrammatic way of representing all possible combinations of decisions and their resulting actions. (*location: 1.5*)
78. **Decoding:** It converts data from the form used for transmission back into the original form. (*location: 3.4*)
79. **Deliverable:** A tangible item expected from a task. (*location: 1.1*)
80. **Delta Information:** The information which describes the difference between two screens. (*location: 7.3*)
81. **Design Specifications:** Gives the general hardware configuration of the new system and designs for both input and output. (*location: 1.4*)
82. **Design Tools:** Assist in the development of a new system. They describe the information processes and rules within the system. (*location: 1.5*)
83. **Designing a Solution:** The transformation of the specifications into appropriate hardware, software, and information processes. (*location: 1.5*)
84. **Destination:** The receiver of the information (*location: 3.1*)
85. **Details:** This section displays most of the information. (*location: 2.4*)
86. **Digital Data:** Represented in the form of digits or numbers, digital signals are represented as a series of 0s and 1s. (*location: 3.4*)
87. **Digital Data to Analog Signal:** A series of 0s and 1s is encoded into a continuous wave. A modem encodes (modulates) digital data from a computer into analog signals for the telephone line. When the analog signal is received by another modem, it decodes (demodulates) the analog signal into digital data. (*location: 3.4*)
88. **Digital Data to Digital Signal:** A series of 0s and 1s is transmitted by sending it through a channel as a series of on and off pulses. Data transmitted in a LAN is digital data using a digital signal. (*location: 3.4*)
89. **Direct Access:** When data is accessed without accessing previous data items. Data is stored in a particular storage location based on a mathematical procedure or algorithm. (*location: 2.3*)
90. **Direct Access:** Occurs when data is accessed without accessing previous data items. (*location: 4.3*)

91. **Direct Conversion:** Involves the immediate change to the new system on a chosen date. On that date the old system ends and the new system starts. (*location: 1.6*)
92. **Directories:** Are lists of web sites organized into categories. (*location: 2.3*)
93. **Distributed database:** A database located at more than one site. It acts as a single collection of data but is geographically dispersed, they also reduce the data transmission costs. (*location: 2.3*)
94. **Durability:** Occurs if all the changes that a transaction makes to the database become permanent when the transaction is committed. (*location: 4.5*)
95. **DVD:** Originally stood for digital video disk however the increasing number of applications for the technology gives it the meaning, digital versatile disk. It is the same physical size as a CD however can store up to 17Gb of data. (*location: 7.2*)
96. **Economic Feasibility:** Compares the cost of developing the new system with the expected benefits. A financial analyst is often asked to assess economic feasibility. Economic feasibility is also called cost / benefit feasibility. (*location: 1.4*)
97. **Electronic Commerce:** The buying and selling of goods and services via the internet. (*location: 3.2*)
98. **Electronic Mail:** Allows communication with other email users by sending and receiving electronic messages using a computer. (*location: 3.2*)
99. **Encoding:** Involves converting data from its original form into another form for transmission. (*location: 3.4*)
100. **Encryption:** The process of encoding data, and decryption is the process of changing it back (decoding). It is the most effective way of achieving data security during the transmission of data. (*location: 2.3*)
101. **Entity:** A specific thing about which information is collected and stored. (*location: 2.2*)
102. **Equity:** All people should have equal access to the benefits of information technology. (*location: 1.2*)
103. **Ergonomics:** The relationship between people and their work environment. (*location: 1.2*)
104. **Ethernet:** Allows data to be transmitted simultaneously to all nodes on the network in both directions. (*location: 3.3*)
105. **Evaluation:** Evaluation determines whether the system is working as expected or whether changes are required. (*location: 1.7*)
106. **Export Systems:** Provide information and solve problems that would otherwise require a person experienced in that field. (*location: 2.1*)
107. **Extranet:** An intranet which is accessible to customers, suppliers or others outside the organization. (*location: 3.3*)
108. **Feasibility Study:** A short report that analyses potential solutions in terms of the known constraints and makes a recommendation. (*location: 1.4*)
109. **Fibre-optic Cable:** A cable consisting of a bundle of glass fibres with a strong steel core used for the transmission of information in the form of light signals. (*location: 3.3*)
110. **File:** A block of data, a file in a database is divided into a set of records (*location: 2.2*)
111. **File (database):** A block of data , it is divided into a set of related records. (*location: 4.3*)
112. **Firewall:** Can be used on the internet or any network to verify and authenticate all incoming data. (*location: 2.3*)
113. **Flat File Database:** Organizes data into a single table and is suitable for many small applications. (*location: 2.2*)
114. **Flow Control:** The software handshaking protocol. (*location: 3.1*)

115. **Forward Recovery:** Starts with a backup copy of the database. It then reprocesses the transactions in the transaction journal that occurred between the time the backup was made and the present time. (*location: 4.3*)
116. **Frame Buffer:** The space set aside in memory for the image which is currently displayed. (*location: 7.1*)
117. **Frame Grabber:** Captures and digitizes images from a video. (*location: 7.4*)
118. **Frame Rate:** The speed of a video or animation, measured in frames per second. (*location: 7.1*)
119. **Full Duplex Mode:** Allows transmission in both directions at the same time. e.g., telephone (*location: 3.3*)
120. **Furniture:** Furniture needs to be adjusted to suit each person's body. (*location: 1.2*)
121. **Gantt Chart:** A bar chart with each bar representing a task or stage in the system development cycle. (*location: 1.1*)
122. **Gateway:** A combination of hardware and software to link two different networks. (*location: 3.3*)
123. **Good Data Placement:** The database should be designed to access patterns of data use and to place frequently accessed data together. (*location: 4.3*)
124. **Good Design Principles:** Good web design principles include consistent navigation, which is easy to understand, and a simple design layout. (*location: 7.2*)
125. **Good Hardware Configuration:** The hardware needs to be able to handle a large number of concurrent users and to provide quick response times. (*location: 4.3*)
126. **Grandfather-Father-Son:** A backup procedure that refers to at least three generations of backup master files. The most recent backup is the son, second is the father, and last is the grandfather. (*location: 4.3*)
127. **Half Duplex Mode:** Allows transmission in both directions but not at the same time. e.g., walkie talkie. (*location: 3.3*)
128. **Handshaking:** An agreement about which protocol to use to accomplish the exchange of information. It is a series of signals that flow between devices during data transmission. (*location: 3.1*)
129. **Hard Disk:** A disk made of metal or glass and covered with magnetic material. (*location: 2.3*)
130. **Hardware Flow Control:** Uses a dedicated connection such as a wire. It is only practical when devices are close enough to be linked by a cable. (*location: 3.1*)
131. **Head-up Displays:** Devices worn on the head to display information, they were originally developed for virtual reality (*location: 7.3*)
132. **Hierarchical Database:** Organizes data in a series of levels . It uses a top-down structure consisting of nodes and branches. Each node can have many branches, but each lower level node (child) is linked to only one higher-level node (parent). (*location: 4.3*)
133. **Hierarchical Layout:** A sequential path in a top-down design in which the user starts at the beginning and moves down through the multimedia product. (*location: 7.4*)
134. **High Normalization:** Redundant information is kept to a minimum whenever possible to increase speed of updates and improve concurrency. (*location: 4.3*)
135. **HTML Editor:** A software program that specializes in writing HTML code. (*location: 7.3*)
136. **Human-centered Systems:** Make the participants work as effective and satisfying as possible. (*location: 1.2*)
137. **Hypermedia:** Involves the linking of information in different types of media. (*location: 7.4*)

138. **Implementation Plan:** Details participant training, conversation method and system testing. (*location: 1.6*)
139. **Implementation Stage:** Delivers the new system to the participants. It involves using the solution to solve the problem. (*location: 1.6*)
140. **Index:** A table that contains information about the location of the data. (*location: 2.3*)
141. **Index:** A table that contains information about the location of data. A search engines database is built by regularly scanning the web for new site and accepting submissions from web page authors. (*location: 2.3*)
142. **Information Kiosks:** Allow people to use a touch screen and select information about an organization or service. (*location: 7.2*)
143. **Information Management Software:** Helps individuals on a project to manage information and schedule tasks. (*location: 1.1*)
144. **Information Overload:** Refers to the enormous amount of information that people have to absorb. (*location: 3.5*)
145. **Internet Industry Association:** Represents Australian ISPs in dealing with and creating a code of conduct that deals with censorship online. (*location: 3.5*)
146. **Internet Trading:** Commerce over the internet, implications include taxation, employment ramifications, nature of business and trade barriers. (*location: 3.5*)
147. **Interview Techniques:** Involves carefully preparation, implementation, and follow-up. (*location: 1.1*)
148. **Intranet:** A private network that uses a similar interface to the web. It usually has a connection to the internet and consists of many interlinked LANs. (*location: 3.3*)
149. **Intranet:** A private network that uses a similar interface to the web. It usually has a connection to the internet and consists of many interlinked LANs. (*location: 3.3*)
150. **Isolation:** Occurs if a transaction is processed concurrently with other transactions and still behaves as if it were the only transaction executing the system (*location: 4.5*)
151. **Journal:** Maintains an audit trail of transactions and database changes. Two types are the transaction log and the database change log. (*location: 4.3*)
152. **LCD:** Liquid crystal displays are a flat screen, the consist of a layer of liquid crystal material placed between two polarizing sheets. Light is passed through the liquid crystal material and current is applied at particular points. (*location: 7.3*)
153. **Linear Layout:** A simple sequential path that is set up quickly. (*location: 7.4*)
154. **List Check:** A type of data validation that is used when the data can be compared to a set of accepted data. (*location: 2.5*)
155. **Local Area Network:** Connect computers within a building or group of building on a single site. (*location: 3.3*)
156. **Logical Operators:** Are used to combine queries so that a search is carried out on one or more fields. (AND OR NOT) (*location: 2.3*)
157. **Logon:** The procedure used to get access to the network, the user is identified by means of a suer ID and password. (*location: 3.3*)
158. **Lossless Compression:** Allows the original file to be recovered in full, it works by replacing repeated data with something that takes up less room. (*location: 7.4*)
159. **Lossy Compression:** Removes a number of data bytes from the file resulting in smaller file size but reduced quality. (*location: 7.4*)
160. **Machine-centered Systems:** Simplify what the computer must do at the expense of participants. (*location: 1.2*)
161. **Magnetic Tape:** A long, thin strip of plastic coated with a thin layer of magnetic material. The tape is often wound on two sets of reels inside a cartridge. It can store large amounts of data however it can only be accessed sequentially. (*location: 4.3*)

- 162.**Magnetic Tape:** A very long, thin strip of plastic, coated with a thin layer of magnetic material, the tape is wound on two wheels inside a cartridge. (*location: 2.3*)
- 163.**Maintenance:** The modification of the system by making minor improvements. (*location: 1.7*)
- 164.**Management Information Systems:** Provide information for the organization's managers. An MIS presents basic facts about the performance of the organization. (*location: 2.1*)
- 165.**Management Information Systems:** Provides information for the organization's managers. (*location: 4.4*)
- 166.**Managers:** Responsible for the effective use of the system, they oversee the computer operation and ensure that the participants and machines work efficiently. (*location: 1.7*)
- 167.**Manual Transaction System:** Business systems that operate without the use of machines. People are used to record the data about the business activities. (*location: 4.1*)
- 168.**Master File:** Contains information about an organization's business situation. The master file stores the operational database as well as the transaction file. (*location: 4.3*)
- 169.**Messaging System:** Used to send messages to people in different locations who may receive the message at a later time. (*location: 3.2*)
- 170.**MICR:** Magnetic Ink Character Recognition, used to read account numbers on cheques. (*location: 4.4*)
- 171.**Microwave:** A high-frequency radio signal sent through space in a straight line from one antenna to another. Weather conditions or objects can obstruct the signal and affect the transmission. (*location: 3.3*)
- 172.**Mobile Phones:** Transmit data to a grid of cellular stations that are linked to the wire-transmission telephone network, they use radio waves to communicate with cellular stations. (*location: 3.3*)
- 173.**Nature of the Workplace:** The expectation that workers will continually change jobs throughout their career. (*location: 1.2*)
- 174.**Negotiation Skills:** Discussing a problem and arriving at a consensus. (*location: 1.1*)
- 175.**Network:** A number of computers and their peripheral devices connected together in some way. (*location: 3.3*)
- 176.**Network Administrator:** A person who manages a network within an organization. Responsibilities include network security, installing new applications, distributing software upgrades, monitoring daily activity, enforcing licensing agreements, developing a storage system and providing routine backups. (*location: 3.3*)
- 177.**Network Database:** Organizes data as a series of nodes linked by branches. Each node can have many branches, and each lower-level node (child) may be linked to more than one higher-level node (parent). (*location: 4.3*)
- 178.**Network Operating System:** Operating system that is designed primarily to support computers connected to a LAN, one part of the network operating system resides in each node and another resides in the server. Tasks include: administration, file management, applications, resource management and security. (*location: 3.3*)
- 179.**Network Topology:** The physical arrangement of the devices in a network. There are many possible network topologies, such as star, bus and ring. (*location: 3.3*)
- 180.**Non-linear Layout:** No structure, the user moves between different layouts in any direction. (*location: 7.4*)
- 181.**Office Automation Systems:** Provide people with effective ways to complete administration tasks in an organization. (*location: 2.1*)

182. **Offline Storage:** Uses a peripheral device that is not under the user's direct control, such as a centralized database. (*location: 2.3*)
183. **Online Storage:** Uses a peripheral device that is under the user's direct control, such as a hard disk on a personal computer. (*location: 2.3*)
184. **Operations Manual:** Details procedures participants follow when using a new system, participants need to be instructed about and assisted with the major features and functions of the system. (*location: 1.7*)
185. **Optical Disk:** Polycarbonate plastic disk with a reflective layer of metal covering the surface. (*location: 2.3*)
186. **Organizational Feasibility:** Determines whether the new system will fit into the organization and meet the current goals and objectives. (*location: 1.4*)
187. **Organizing:** The process of arranging, representing and formatting data. It involves the concept of a database. (*location: 2.2*)
188. **OSI Reference Model:** Open Systems Interconnection reference model divides data communication into seven layers. Each layer expresses the standard, using a protocol. The bottom layer are responsible for transfer of data from one place to another. (*location: 3.1*)
189. **Packet Switching:** A technique that divides messages into small data packets, transmits the packets and later joins the packets to form the original message. (*location: 3.3*)
190. **Page Footer:** Displays information such as the date, page number, or any other information the user wants at the bottom of every page. (*location: 2.4*)
191. **Page Header:** Displays information such as a title, column headings, or any other information needed at the top of every page. (*location: 2.4*)
192. **Parallel Conversion:** Involves the old and new systems both working together at the same time. Participants can compare both systems and obtain a good understanding of the difference between the systems. (*location: 1.6*)
193. **Parallel Transmission:** The transmission of data simultaneously using separate channels. (*location: 3.3*)
194. **Parameter:** A variable that is given a constant value for a particular application. (*location: 3.1*)
195. **Parity:** Whether the data contains a parity bit for error detection. (*location: 3.1*)
196. **Parity Checking:** A method of checking for errors in data transmission using an additional bit called a parity bit. This bit is used only for the purpose of identifying whether the bits being moved have arrived successfully. e.g.. when an odd parity is chosen the number of ones in the nine bits must be odd, assuming 8-bit ascii code is being used. (*location: 3.1*)
197. **Partial Backups:** Occur when only parts of the master file are backup up. (*location: 4.3*)
198. **Participant Development:** Occurs when people in and information system develop a solution. (*location: 1.5*)
199. **Participants:** The people who conduct the information processing. They are the people who do the work. (*location: 4.2*)
200. **Path-based Animation:** The displaying of the movement of objects onto a fixed background in a particular sequence or path. (*location: 7.1*)
201. **People in Multimedia:** The people involved in multimedia systems include: content providers, system designers, project managers, technical staff. (*location: 7.1*)
202. **Phased Conversion:** Involves the gradual implementation of the new system. Certain operations of the new system are implemented while the remaining operations are completed by the old system. (*location: 1.6*)

203. **Pilot Conversion:** Involves trailing the new system in a small portion of the organization. The old system is still available if the new system fails or experiences problems. (*location: 1.6*)
204. **Pixel:** The smallest part of the screen that can be controlled by the computer. (*location: 7.1*)
205. **POS Terminal:** Used by retail stores to sell goods and services. The terminals send inventory data to a central computer when the sale is made. (*location: 4.2*)
206. **Preliminary Investigation:** Determines whether a quick fix of the existing system will solve the problem or a new system is necessary. (*location: 1.3*)
207. **Presentation Software:** Is used to make a professional presentation to a group of people, the presentation consists of a series of slides which may contain text, graphics, animation, audio and video. (*location: 7.3*)
208. **Privacy:** The ability of an individual to control personal data. (*location: 2.5*)
209. **Program File:** Contains instructions for the processing of data, it is create from a high-level programming language. (*location: 4.3*)
210. **Programmers:** Convert a written description of a problem into a set of programs. (*location: 1.1*)
211. **Project Goal:** Result of the project if it is successful. (*location: 1.1*)
212. **Project Leader:** Develops schedules, checks work and resolves conflict. He or she ensures that the project is meeting it's goals. (*location: 1.1*)
213. **Project Management:** Process of planning, scheduling, and controlling all the activities within each stage of the system development cycle. (*location: 1.1*)
214. **Project Management Software:** It is a tool to efficiently plan, manage, and communicate information about a large project. (*location: 1.1*)
215. **Project Plan:** A summary of a project that specifies who, what, how and when. It clarifies what needs to be done and helps people understand how they fit into the project. (*location: 1.1*)
216. **Protocol:** Is a set of rules that governs the transfer of data between computers. It define how the information is transmitted and how errors are detected. Two computers must use the same protocols when they are communicating. (*location: 3.1*)
217. **Prototype:** Working model of an information system, they are built in order to understand the requirements of the system. (*location: 1.3*)
218. **Query:** A search of a database for records that meet a certain condition. (*location: 2.3*)
219. **Query by Example:** A common method for constructing a query, it requires the user to enter a criteria against a field. (*location: 2.3*)
220. **Query Language:** A specialized language designed to search a database. (*location: 2.3*)
221. **Range Check:** A type of data validation that is used if the data is restricted to a small range of particular values. (*location: 2.5*)
222. **Raster Scan:** Fires the stream of electrons in a series of zigzag lines that start in the upper left-hand corner and moves left to right and top to bottom. (*location: 7.3*)
223. **Real-time Backup:** Backing up the entire database needs to be scheduled during times of low activity to minimize effects on users. (*location: 4.3*)
224. **Real-time Transaction Processing:** The immediate processing of data. It provides instant confirmation of a transaction but does require an online database. (*location: 4.1*)
225. **Receiver:** Decodes the signal back into the original data or an approximation of the data. (*location: 3.1*)

226. **Recovery Manager:** A program that restores the database to a correct condition and restarts the transaction processing. (*location: 4.3*)
227. **Relational Database:** Organizes data using a series of related tables. Relationships are built between the tables to provide a flexible way of manipulating and combining data. (*location: 4.3*)
228. **Relational Operators:** Characters or symbols indicating the relationship between two expressions. (=, <>, <, >, <=, >=) (*location: 2.3*)
229. **Relationship:** The way in which entities are related to each other. can be one-to-one one-to-many or many-to-many (*location: 2.2*)
230. **Removable cartridge:** A hard disk encased in a metal or plastic cartridge and can be removed like a floppy disk. (*location: 2.3*)
231. **Report:** Formatted and organized presentation of data. (*location: 2.4*)
232. **Report File:** Contains data that has been formatted for presentation to a user. (*location: 4.3*)
233. **Report Footer:** Appears once at the end of the report. It displays such items as report totals. (*location: 2.4*)
234. **Report Header:** Appears once at the beginning of the report. It contains such items as a logo, report title, and date. (*location: 2.4*)
235. **Requirement Report:** Statement about the need for a new system. It outlines the aims and objectives of the new system and how it will help the organization. (*location: 1.3*)
236. **Reservation Systems:** Used extensively in any type of business involved in setting aside a service of product for a customer. (*location: 4.2*)
237. **Resolution:** The total number of pixels on the screen. (*location: 7.1*)
238. **Ring Topology:** An arrangement where all devices are attached so that the path is the shape of a continual circle. (*location: 3.3*)
239. **Router:** A device that determines where to send a data packet between at least two networks. (*location: 3.3*)
240. **Sample Size:** Also called bit resolution, is the number of bits per sample. (*location: 7.1*)
241. **Sampling Rate:** The number of times a sample is taken from the sound wave. During the sample, the amplitude of the wave is measured and converted to a number. (*location: 7.1*)
242. **Satellite:** A specialized receiver and transmitter that is launched by a rocket and placed in orbit around the earth. A signal is sent from one ground station to the satellite, which receives and retransmits the signal to another ground station. (*location: 3.3*)
243. **Scanners:** Input devices which electronically capture text or images. (*location: 7.4*)
244. **Schedule:** The timing of major tasks and who will do the work. (*location: 1.1*)
245. **Schedule Feasibility:** Determines whether time is available to implement the new system. (*location: 1.4*)
246. **Schema:** The data definition for a database, it is an organized plan of the entire database showing how and where the data is found. (*location: 2.2*)
247. **Search Engine:** A database of indexed web sites that allows a keyword search. (*location: 2.3*)
248. **Searching:** Process of examining the database to retrieve data. (*location: 2.3*)
249. **Sequential access:** Occurs when data is accessed in a sequence. It is the only method of accessing data stored on a magnetic tape. (*location: 2.3*)
250. **Sequential Access:** Occurs when data is accessed in a sequence. (*location: 4.3*)
251. **Serial Transmission:** The transmission of data one after the other. It is used to transmit data to peripheral devices. (*location: 3.3*)

252. **Short Transactions:** Keeping transactions short enables the entire transaction to be processed quickly, which improves concurrency. (*location: 4.3*)
253. **Simplex Mode:** Allows transmission in one direction only, e.g., radio (*location: 3.3*)
254. **Social Context:** Ideas delivered by messaging system appear less forceful and caring than ideas delivered personally. (*location: 3.5*)
255. **Software Flow Control:** Uses a special code sent with the data. It is used for long distance communications. (*location: 3.1*)
256. **Sorting:** The process of arranging data in a particular order, sorts are performed in either ascending or descending order. (*location: 2.3*)
257. **SQL:** Structured Query Language is a query language used to access and manipulate data in a relational database. (*location: 2.3*)
258. **Star Topology:** Has a central computer with each device connected to it, the central computer serves as a switch. (*location: 3.3*)
259. **Stop / Start Bits:** The number of stop and start bits used in asynchronous transmission. The parameter is used to identify each byte. (*location: 3.1*)
260. **Storyboard:** A series of frames each representing a different action or screen image. (*location: 7.4*)
261. **Switch:** A device that directs data packets along a path, it may include the function of a router. (*location: 3.3*)
262. **Symmetric Encryption:** Requires the same key for both encryption and decryption. A common symmetric encryption system is the data encryption standard. (DES) (*location: 2.3*)
263. **Synchronous Transmission:** Type of serial transmission. Requires all the data to be sent at the same rate. The same number of bytes is sent each second, this is synchronized by each device using a clock. This transmission is faster and more efficient than asynchronous. (*location: 3.3*)
264. **System Development Cycle:** A series of stages used in the development of a new information system. (*location: 1.1*)
265. **System Flowchart:** A graphical method of representing both the flow of data and the logic of a system. (*location: 1.5*)
266. **Systems Analysts:** Main job is to perform the analysis to decide whether a new or updated system will solve the problem. (*location: 1.1*)
267. **Team Building:** The process of getting a group of people working together. (*location: 1.1*)
268. **Technical Feasibility:** Determines the information technology requirements of the new system and the technical demands that will be placed on the new system. (*location: 1.4*)
269. **Technical Support Staff:** People who assist participants of a system on an as-needed basis. Their services are usually provided over the phone, these staff need to be completely familiar with the system. (*location: 1.6*)
270. **Telecommuting:** Working from home and electronically communicating with the office. (*location: 3.5*)
271. **Terminal:** Devices that send data to and receive data from another computer system. (*location: 3.3*)
272. **Testing:** Testing a solution ensures that it works, testing is carried out throughout the system development cycle. (*location: 1.7*)
273. **Tilting:** The placement of a caption to accompany an image or graphic element (*location: 7.2*)
274. **Token Ring:** A protocol based on the ring topology, it operates by continually passing special data packets called tokens between nodes on a network. (*location: 3.3*)

275. **Top-down Approach:** Divides a large, complicated problem, into a series of smaller, easier to solve problems. (*location: 1.5*)
276. **Transaction File:** A collection of transaction records, the data in the transaction file is used to update the master file. (*location: 4.3*)
277. **Transaction Processing Monitor:** Software that allows the transaction processing programs to run efficiently. It manages the sequence of events that are part of a transaction. (*location: 4.1*)
278. **Transaction Processing Systems:** Collect, store, modify and retrieve the transactions of an organization. The four characteristics of a TPS are rapid response, reliability, inflexibility and controlled processing. (*location: 4.1*)
279. **Transmission Medium:** A channel, such as a cable, in which the signal is transmitted to it's destination. (*location: 3.1*)
280. **Transmitter:** Encodes the data into a signal suitable for a transmission medium. (*location: 3.1*)
281. **Tweening:** The process of generating intermediate frames between two objects. (*location: 7.1*)
282. **Twisted Pair Cable:** Consists of two thin insulated copper wires, twisted to form a spiral. (*location: 3.3*)
283. **Two-Phase commit:** Part of the DBMS used to maintain consistency across distributed databases. It checks whether both parts of the database are ready for transmission and then performs the transmission. (*location: 2.3*)
284. **Type Check:** A type of data validation used to determine whether the data type is correct. (*location: 2.5*)
285. **Understanding the Problem:** First stage of the system development cycle, It involves determining the exact nature of the problem. (*location: 1.3*)
286. **Use of Skills:** Participants may be required to retain and learn new skills. (*location: 1.2*)
287. **User-friendly:** Describes a tool that people find easy to use. (*location: 1.2*)
288. **Users of a TPS:** Take data provided by the TPS and use it in another type of information system. (*location: 4.2*)
289. **Vector Display Systems:** Direct the electron stream to draw only the lines required for the image, they are a special type of CRT monitor. (*location: 7.3*)
290. **Vector Graphics:** Made up of objects, such as a straight line, a curve, or a shape. Each object is defined by its characteristics, such as position, line width, and pattern. (*location: 7.1*)
291. **Virtual Reality:** The use of computer modeling and simulation to enable a person to interact with an artificial environment. (*location: 7.2*)
292. **Web Browser:** A software program stored on a computer that allows access to the web (*location: 7.3*)
293. **Wide Area Network:** Connect computers over hundreds or thousands of kilometers. Often consist of a mainframe computer called a host. (*location: 3.3*)
294. **Wildcard Characters:** Represent one or more unknown characters, common wildcard characters are the asterisk, and the question mark. (*location: 2.3*)
295. **Wireless LANs:** Uses radio waves as their transmission medium. (*location: 3.3*)
296. **Wireless Transmission:** Moves data through air and space, it does not need a fixed physical connection between the source and the destination. (*location: 3.3*)
297. **Work File:** A temporary file in the system used during the processing. (*location: 4.3*)
298. **World Wide Web:** An internet network that allows people at one computer to collect information stored on another. (*location: 7.2*)

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