



KEMENTERIAN PENGAJIAN TINGGI



MANAGEMENT INFORMATION SYSTEM

Penulis:

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PERDAGANGAN





MANAGEMENT INFORMATION SYSTEM

First Publish 2021

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PREFACE

Management Information System is written for students pursuing their Diploma courses, based on sub topic in the syllabus prescribed by the Ministry of Education for Polytechnic students at the Diploma level.

Management Information System an introduces the concepts of data and information management using information system. This course provides students with the knowledge of telecommunication systems and e-business. It also explores ethic, privacy and information security. The concept in this e-book are explained in a simple, clear with a few examples, pictures and tables. Every chapter also ended with the exercise for enhance student's knowledge.

We are welcome for constructive comments and suggestion from lecturers and students for future improvements. We hope that the e-book is very useful to serve its purpose in helping the students to gain better understanding and hopefully student will enjoy learning and understanding.





ACKNOWLEDGEMENTS

Alhamdulillah, we have completed our e-book, Management Information System. Thank you to our family and friends for being the support team to complete this e-book. We also would like to thank you to our Head of Commerce Department, Madam Noraihan Binti Mamat Zambi and Head of Business Study Programme, Miss Azlina Binti Azmi for giving us this opportunity. Finally, thank you also to e-book team Politeknik Tuanku Sultanah Bahiyah especially Madam Fatim Fauziani Bt Hussin. Very difficult in the beginning, but we succeeded in the end. Thanks again to everybody that give encouragement, supported, involved and contributed either direct or indirectly in the production of this e-book.





Acknowledgements

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OVERVIEW OF MANAGEMENT INFORMATION SYSTEM

_YSIS

- 1.1 The Overview Of Information System
- 1.1.1 The Difference between Information Technology and Information System
 - Information technology (IT) consists of all the hardware and software that a firm needs to use in order to achieve its business objectives.
 - Information system (IS) can be defined as a set of interrelated components that collect or retrieve, process, store and distribute information to support decision making and control in an organization.
 In addition to support decision making, coordination and control, information systems may also help managers and workers analyze problems, visualize complex subjects and create new products
- 1.1.2 The History of Management Information System



Figure 1.1 Five Phases in Development of Computing Technologies

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Figure 1.2 Mainframe/Minicomputer

Mainframe and Minicomputer Era (1959 to Present)

Mainframe

- First commercial computer
- Powerful operating system that could provide time sharing, multitasking and virtual memory in more advanced models.
- Support thousands of online remote terminals connected to the centralized mainframe using communication protocols and data lines.

Minicomputer

- Offered powerful machines at lower process than mainframes
- Making possible decentralized computing, customized to the specific needs of individual departments or business units rather than time sharing on a single huge mainframe.
- Examples of mainframe computers include the IBM zSeries, System z9 and System z10 servers



Figure 1.3 Personal Computer

Personal Computer Era (1981 to Present)

• Using DOS operating system, a text – based command language and later the Microsoft Windows Operating System and Macintosh OS.

 In early 1990s launched personal desktop productivity software tools – word processors, spreadsheets, electronics presentation software and small data management programs – that were very valuable to both home and corporate users.

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Figure 1.4 Client/Server

Client

Client

Client/Server Era (1983 to Present)

- Desktop or laptop computers are clients to server computers
- Server provides the client computers with a variety of services and capabilities.

Client

Client

- Client/Server computing enables businesses to distribute computing work across a series of smaller, inexpensive machines that cost much less than centralized mainframe systems.
- The client is the user point of entry, whereas the server processes and stores shared data, serves up Web pages or manages network activities.
- Server refers to software application and the physical computer on which the network software runs.



Enterprise Computing Era (1992 to Present)

- Enterprise wide network enable information flow freely across the organization and between the firm and other organizations.
- It can link different types of computer hardware, including mainframes, servers, Personal Computers and mobile devices and it includes public infrastructures such as the telephone system, the Internet and public network services.



Figure 1.6 Cloud and Mobile Computing

Cloud and Mobile Computing Era (2000 to Present)

- Provides access to a shared pool of computing resources (computers, storage, applications and service) over a network, often the Internet.
- Cloud computing can be accessed from any connected device and location.
- Hundreds of thousand computers are located in cloud data centres, where they can be accessed by desktop computers, laptop computers, tablet, entertainment centres, smart phones and other client machines linked to the Internet
- Software firms such as Google, Microsoft, SAP, Oracle and Salesforce.com sell software applications as services delivered over the Internet

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1.2 The Dimension Of Information System

1.2.1 Basic Activities of Information System

• Input

- ✓ Capturing and assembling data that enter the system to be processed.
- ✓ Activities include data entry, recording or editing.
- Example: Data on a sale transaction may be recorded using online order form. The data would then be entered into a computer system by sales personnel.
- Process
- Any data that has been entered into a computer system by activities include calculation, comparison, sorting, classifying and summarizing to produce meaningful output.
- ✓ This stage of processing converts raw data into a meaningful set of information for the end user
- Output
- ✓ Involves the data that have been produced by a transformation process
- ✓ The main goal of the output activity is to produce appropriate information for end users, includes messages, reports, forms, graphic images, video, audio responses, paper products or multimedia.
- Example: A Sales Manager may view a video display to check on the performance of a salesperson



Figure 1.7 Management Information System Model



Figure 1.9 Example of Management Information System

1.2.2 Identify the Components of Information System

a. Technology refer to :

• Hardware

- ✓ Tangible component visible to the user.
- ✓ Example: Printer, scanner, monitor, keyboard, trackball, video screen

Software

- ✓ Set of instructions to the computer hardware to perform a specific task.
- ✓ Such as programs or application.
- ✓ It used for processing data and presenting it in meaningful form to aid managerial decision making.

ANALYSIS

✓ There are System Software, Application Software, Cloud Computing and Open Sources Software

• Data

- ✓ Raw fact representing events occurring in the organization and environment before they have been
- organized and arranged into a meaningful form.
- ✓ Data creates value to an organization's resources.
- Data can be create, store, retrieved, manipulated, edit, process and analyze in multimedia format such as text, image, video and audio.
- In business transaction system, data is collect during the recording of transaction, process and analyzed later for decision-making.

Data Resources	Examples
Alphanumeric Data	Numbers, letters and other characters that describe any transaction
Audio Data	Human voice and other sounds
Image Data	Videos and photographic images, graphic shapes
Text Data	Sentences and paragraph used in written communication

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Table 1.1 Examples of Data Resources

• People

The most important component in achieving successful operation of Information system, namely Information System Specialists and end users

Information System Specialists

- ✓ Who are a group of people who actually develop and operate information systems.
- ✓ They include Systems Analysts, Software Developers, Programmers, System Operators, Testers, Computer Operators, other Managerial, Technical and Clerical Information System Personnel.

End Users

- ✓ Are people who are known as users or clients
- ✓ Groups of people who participate in the usage of information system or the outcome it produces.
- ✓ They can be Accountants, Salespersons, Engineers, Clerks, Customers or Managers.
- ✓ They are normally found at all levels in an organization.
- ✓ They are often referred to as knowledge workers which means, people who spend most of their time communicating and collaborating in teams and work groups to create, use and distribute information
- **Process** is a series of steps undertaken to achieve a desired outcome or goal. Process which involves a transformation process that converts input into output. Information Processing refer to:

Input

- ✓ Capturing and assembling data that enter the system to be processed.
- ✓ Activities include data entry, recording or editing.
- ✓ Example: Data on a sale transaction may be recorded using online order form. The data would then be entered into a computer system by sales personnel.

Processing

- ✓ Any data that has been entered into a computer system by activities include calculation, comparison, sorting, classifying and summarizing to produce meaningful output.
- This stage of processing converts raw data into a meaningful set of information for the end user

Output

✓ Involves the data that have been produced by a transformation process

- ✓ The main goal of the output activity is to produce appropriate information for end users, includes messages, reports, forms, graphic images, video, audio responses, paper products or multimedia.
- ✓ Example: A Sales Manager may view a video display to check on the performance of a salesperson

> Feedback

- ✓ Refers to response received on the performance of a system.
- ✓ Example: Data received on sales performances is feedback to a Sales Manager
- > Control
- Monitoring and evaluating feedback received in order to decide whether a system is achieving its goal or not.
- Example: A Sales Manager enforces control when he reassigns salesperson to new sales territories after evaluating feedback on their performance
- Storage
- ✓ Data is retained in an organized manner for later use in processing and can also be retrieved by end users
- 1.3 System Innovation In Business Today
- 1.3.1 Identify the Role of Information System in Business
- Business Transformation
- ✓ Business use smartphone, texting, e mail and online conferencing, media social, web as tool of business
- Globalization Opportunities
- ✓ By using Internet, costs of operating reduced and transaction made over a global.
- ✓ Example: Google and eBay offer its services worldwide without different layout

• Digital Firm

- ✓ Time shifting = business being conducted continuously 24 hours a day
- ✓ Space shifting = work and business conducted virtual and takes place in a global

EXERCISES



4. Fill in the blanks with the correct answers.

Data Resources	Examples
	Numbers, letters and other characters that describe any transaction
	Human voice and other sounds
	Videos and photographic images, graphic shapes
1 march 1	Sentences and paragraph used in written communication

- 5. State FOUR (4) examples of hardware.
- 6. Who are information system specialists? State **THREE (3)** of them.

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- 7. What means by business transformation?
- 8. Give TWO (2) examples of globalization opportunities.
- 9. What means by time shifting.
- 10. What means by space shifting.

(4 marks)

(4 marks)

(5 marks)

(2 marks)

(2 marks)

(2 marks)

(2 marks)

TOPIC2

HARDWARE, SOFTWARE, NETWORKING AND SECURITY

2.1 The Computer Hardware And Software

2.1.1 The Computer Hardware

a. Categories of Computer

There are 6 major computer categories:

- Mobile Computers
- ✓ Have great mobility
- ✓ It can be carried from one place to another.
- ✓ It also small in size and can be handheld.
- ✓ It can be connected to another device via Bluetooth and to the Internet using a wireless network or network cable.
- ✓ Examples of Mobile Computers:
- Notebook Computer or laptop computer are thin and lightweight personal computers with a keyboard which are attached to a monitor that operates on batteries or electricity via a cable

Figure 2.1 Notebook Computer

- > Tablet enable touch screen interactions using fingers or a stylus.
- > Example: Apple iPad, Samsung Tab and Microsoft Surface





Smart Phones offer many other functions besides making phone calls and sending short messages (SMS) such as managing personal information, photo – taking, data sharing and internet access capabilities

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Figure 2.3 Smart Phone

E – book Readers are designed for viewing and reading electronic and digital publications such as e – books, e – magazines and e – newspapers. Among the common e –readers are the Amazon Kindle, the Barnes and Noble Nook and the Sony Reader



Figure 2.4 E – book Readers

Handheld Computers are devices designed with industry – specific functions and features to be used by mobile workers like utility readers or documents delivery staff



Portable Media Player enables downloading, storing and playing of digital media such as mp3 music, pictures and videos



Figure 2.6 Portable Media Player

Digital Cameras are devices used to capture, store and play digital images and videos. Pictures and videos can also be downloaded to a computer using a cable or a card reader



Figure 2.7 Digital Camera

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• Microcomputers

- ✓ Known as Personal Computer (PC) or desktop computer
- ✓ Generally fit the size of a table and are mainly used by individuals at home and in the office.
- ✓ Consists of a system unit, input, storage and output device.
- ✓ PC caters for use of a single user. If a computer is networked, then the number of users would increase.
- ✓ PC is connected to the Internet through a network cable.
- ✓ PC compatible that use Microsoft Windows as the Operating System and Apple computers have the Macintosh as the Operating System



Figure 2.8 Microcomputer

- Server
- ✓ Higher performing capabilities than PC and mobile computers.
- ✓ They serve as an access controller and connector for resources such as input devices, output devices, storage devices, data and information within a network.
- ✓ Servers are also used to store centralized data and files within the organization.
- ✓ This information can also be accessed by internal users through the organization's intranet.
- ✓ Most companies' websites content and files are stored in a server that is connected to the Internet and meant for external users.
- ✓ A server is slightly bigger in size than a PC.
- ✓ Due to the large amounts of data, it is usually installed in a locked room for security purposes.



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• Mainframe

- ✓ Mainframe is larger and more expensive computer than a server.
- ✓ It is used to process large amounts of transactions in an organization.
- ✓ Due to its large physical size, a partial room is required to fit a mainframe computer.
- ✓ Example: Managing customers' transactions and managing large amounts of internal data and information on inventory, production, sales and market research. It is usually owned by large business corporations such as banks, insurance agencies, market research companies and universities.

Figure 2.10 Mainframe

- Supercomputers
- ✓ Supercomputer are the largest, fastest, most powerful and expensive computer.
- ✓ It is mainly used to perform complex and sophisticated calculations and simulations by nuclear energy research agencies, weather forecast agencies, aerospace related industries and medical industries.
- ✓ It covers a large space, more like an entire floor.
- ✓ It can be connected to more than a thousand users at a time.



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Figure 2.11 Supercomputer

• Embedded Computers

- ✓ Devices built with computer chips and software embedded within.
- ✓ They are found in consumer electronics, home automation devices, automobiles, process controllers, robotics, computer devices and office machines
- ✓ Example: Anti Lock braking system, satellite radio, built in navigation system, speed and direction sensors and airbag control system, smart homes and driverless cars













Single Board PC tel Robot Developer Kit

Embedded Linux Raspberry Pi

Programmable - Networked Arduino MKR1000, Particle, Arduino 101/TinyTile

Figure 2.12 Embedded System Types

- b. Other Digital Devices
- The System Unit
- ✓ It is a set of electronic components that process data and run computer instructions.
- ✓ It includes motherboard, processor, cooling device, memory, slots, cards, ports, buses and power supply

> Motherboard

- It is a single integrated circuit board, which are connected to all electronic components of a computer.
- It consists of millions of transistors which are used an electronic switch for electrical charges within the motherboard.
- The motherboard will hold and connect the processors, memory, cards and cooling devices using buses and transistors.

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Figure 2.13 Motherboard

- Processor
- Is a computer instructions and operations that are carried out by a central processing unit.
- The speed of the processing depends on the number of processors and its processing capacity in the computer.
- This computer processor chip, which consists of 2 or more processors, is known as a multi core processor.
- Currently, it is common to find computer chips with dual core processors (a chip with 2 processor core) and quad – core processors (a chip with 4 processor cores).
- The latest computer are now equipped with 6 core or 8 core processors.

Memory

- Memory consists of 2 major types:
- RAM Random Access Memory:
- Memory which loses its contents when the computer's power is switched off
- 4 The number of the instructions that can be stored in the RAM depends on it size.
- The computer would respond faster if the RAM size is larger.
- **4** Most computers now come with 2GB (gigabytes) of memory size.
- ROM Read only memory, flash memory and CMOS:
- Memory which retain its contents even after the power is switched off
- Also known as firmware, stores permanent data, instructions or information that cannot be erased even after the power is switched off.
- **4** This information is produced during the manufacturing of the device.
- + The data cannot be modified or changed, hence the name, read only memory.

Figure 2.14 Type of Memory

RAM - ROM

- Input Technologies
- ✓ Data or instructions entered into a computer memory are known as input.
- ✓ It comes in the form of a program (series of related instructions), command (instructions to perform a specific task) or user response (replies to the questions posed by the program).
- ✓ Entering such inputs would require an input device.
- ✓ Example: Keyboard, pointing device, touch screen, pen input, game controller, digital camera, voice input, video input, scanner and readers, microphone, optical readers, biometric input



Figure 2.15 Keyboard

- Keyboard
- It is the most popular input device used, especially for personal computers.
- It consists of keys used to type data into a computer.
- A standard keyboard would consist of 101 to 105 keys comprising the letters A to Z and numbers 0 to 9, navigation keys (arrows, home, page up, page down and etc), functional keys (control, alternate, delete, shift, enter and F1 F12) and applications keys.
- Keyboards are connected to the central processing unit (CPU) through a cable to a USB port or wireless technology such as Bluetooth or infra – red light.

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Figure 2.16 Pointing Devices

- Pointing devices such as computer mouse, trackball, touchpad and pointing stick used to control the movements and actions of the pointer on the screen, to select text, image or objects and to click on images and links.
- Digital camera
- Allows users to take digital pictures and video clips.
- These pictures can be downloaded from the memory card into a hard disk before posted in online photo albums



> A microphone is used to record voice and sound



Figure 2.18 Scanner

> Scanners are used to capture printed material such as text and images and convert into digital forms



Figure 2.19 Optical Readers

Optical readers such as optical character recognition, optical mask recognition, bar code readers and magnetic ink character recognition, which uses light to read characters, marks and codes



Figure 2.20 Finger Print

Biometric input which uses physical and behavioural characteristics of users as input data, such as finger prints, iris patterns, facial features, digital signatures and keystrokes monitoring

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• Output Technologies

- ✓ Output is any data, information or result processed by the system unit.
- The result of this process is information, which is also known as output and can be used to convey message or for decision making.
- These outputs will be displayed, conveyed and transmitted to users through output devices such as monitors, printers, speakers, data projectors, headphone or ear bud
- ✓ Types of output include:
- i. Printed text : Letters, Newspaper, Memos, Documents, Reports and Books
- ii. Images: Photos, Clipart, Animated Graphics, Graphs and Charts
- iii. Audio: Conversations, Songs, Music and Pod Casts
- iv. Video: Video Clips and Streaming



Figure 2.21 Display Devices

- > Display devices
- Monitors, plasma monitor, liquid crystal display (LCD) screens are the common output devices used with desktop computers and notebooks.
- For presentation purposes, text and images can be projected and displayed on larger screens for the viewing audience, such as students attending lectures, corporate presentation or talks in meeting rooms or auditorium.
- Some offices and classrooms use interactive whiteboards where data and information are displayed on the board from a networked computer.

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Figure 2.22 Types of Printers

> Printers help transform softcopies from the display device into physical mediums like papers or cards.



Figure 2.23 Audio Output Devices

Audio output such as speakers, headphones or ear bud can be connected to the computer through cable, butsome computers have built – in speakers installed in its display devices or keyboard

Computer Storage Media

- ✓ Computer Storage is a secondary storage
- \checkmark Storage media hold the data, instructions and information in the computer.
- ✓ Primary storage media is the memory, which is component of the system unit.

- ✓ Memory has the fastest transfer rate among all storage media.
- ✓ Storage medium is measured by capacity and calculated in bytes which are kilobytes (KB) to megabytes (MB) and gigabytes (GB) and terabytes (TB).
- ✓ Example: Hard Disk, Cloud storage, Express card, External Hard Disk, Internal Hard Disk, Magnetic Strip, Memory Cards, Micro Film, Miniature Hard Disk, Network Storage Device, Optical Disk, Smart Card, **Solid State Drive**







Memory Stick



Removable Hard – Dri

Figure 2.24 Computer Storage Media

- 2.1.2 The Computer Software
- Software can be classified into 2 types:
- ✓ System Software or Operating System
- Manage the activities of a computer system and provide utilities to manage creation, deletion and storage file.
- Control and provide support to the operation of computer system, control input output devices and communication links.
- Example: Desktops or personal computers use Microsoft Windows 10 while mobile operating systems include android and iOS
- Android is an open source operating system for mobile devices such as smart phones and tablet computers while Apple's mobile operating system use iOS for the iPhone, iPad and iPod
- System software is software which interacts primarily with the hardware.

- When the computer is switched on and until it is shut down, users are interacting with the systems software.
- It enables the computer to run properly and smoothly
- Controls the function of a computer.



Figure 2.25 Categories of Operating System

- ✓ Application Software
- It is a program that processing information and produces a particular output.
- It caters to business requirement and transaction processing.
- It also a type of program that receives and process input or raw data from end user and transform them into a report, set of information or complete document.
- To support many tasks related to personal use
- To help organizations to produce many activities
- This program is designed to help users in their daily activities to produce common tasks such as:
- Browsing the Internet using Internet Explorer
- Writing letters using word processing software such as Microsoft Word or Corel WordPerfect Office X8
- Organizing data using database software like Microsoft Access and Oracle
- Creating and designing brochures and cards using Microsoft Publisher
- Application software also can be used to do specific tasks and can only be used by specialized users. These tasks include:
- Writing programming language to develop a system by programmers using Microsoft Visual Basic
- Performing statistical analysis using SPSS
- Creating Multimedia projects using Adobe Flash
- Solving and implementing mathematical equations using MATLAB

- Creating and drawing design using AutoCAD and Adobe Illustrator
- Creating websites by web programmers using Adobe Dreamweaver or Microsoft Front Page
- Editing audio/video using Adobe Premier

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Creating Gantt charts using Project Management Software such as Microsoft Project



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Figure 2.26 Types of Application Software

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2.2 Communications Networks and Types Of Network

2.2.1 Types of Network

- Computer networks are usually identified by their size and purpose.
- The size of a network can be distinguished based on geographical area it occupies and the number of computers on the network.

SIS

a. Local Area Network (LAN)

- Connects computers and devices in a limited geographical area (within a half mile or 500 meter radius).
- It consists of a computer network in a single office building (connect a few computers in a small office, all the computers in one building or all the computers in several buildings in close proximity).
- LAN offers high speed and it can be low cost.
- The smallest LAN can be built using two computers and a larger LAN is capable of supporting up to thousands of computers.
- LAN relies on wired connections for increased speed and better security; however, it can also have wireless connections or Wireless LAN (WLAN).

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Figure 2.31 Setup for Local Area Network (LAN)

b. Campus Area Network (CAN)

- CAN usually used to form a bigger network, commonly designed for a campus environment.
- It covers up to 1,000 meters (a mile), a college campus or corporate facility

c. Metropolitan Area Network (MAN)

- MAN is larger than LAN.
- It connects LANs across an entire city, campus or region.
- Depending on the configuration, a MAN can cover up to tens of miles.
- MAN is a network that spans a metropolitan area, usually a city and its major suburbs.
- Its geographic scope falls between a WAN and a LAN.



Figure 2.32 Layout for Metropolitan Area Network (MAN)

d. Wide Area Network (WAN)

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• WAN is a network that covers a large geographical area such as a country or the entire world.

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- It can contain multiple smaller networks like LANs or MANs.
- The Internet is a good example of a wide area network



Figure 2.33 Wide Area Network (WAN) Connections

Table 2.1 Types of Networks

	· · · · · · · · · · · · · · · · · · ·
Туре	Area
Local Area Network (LAN)	Up to 500 meters (half of mile), an office or Floor of a building
Campus Area Network (CAN)	Up to 1,000 meters (a mile), a college campus or corporate facility
Metropolitan Area Network (MAN)	A City or Metropolitan Area
Wide Area Network (WAN)	A transcontinental or global area

e. Internet

- The internet is a world wide connection of networks involving governments, agencies, business, education bodies and individuals.
- It is huge network that provides information and communication facilities that include many other interconnected networks using standardized communication protocols.

f. World Wide Web

- It is a system with universally accepted standards for storing, retrieving, formatting and displaying information using a client/server.
- Web pages are formatted using hypertext with embedded links that connect documents to one another and that also link pages to other objects such as sound, video or animation files.
- When you click a graphic and a video clip plays, you have clicked a hyperlink

2.3 Threats To Information Security

2.3.1 Malicious Software

a. Viruses

 Computer viruses that occur in the system can damage data, steal information or cripple the system's function.

NALYSIS

- The destructive program codes attach themselves to a host in a file or program of a computer system.
- By hosting themselves to a file, they are able to copy themselves and spread to other hosts via e mail.
- Computer viruses can also be spread when users download files from the internet or when users open a corrupted file.
- Computer viruses are written by individuals with the intention of creating serious damage to private, business and government computers.
- Viruses are a rogue software program that attaches itself to other software program or data files, usually without user knowledge or permission.
- Most computer viruses deliver a payload.
- The payload may be relatively benign, such as instructions to display a message or image or it may be highly destructive – destroying programs or data, clogging computer memory, reformatting a computer's hard drive or causing programs to run improperly.
- Viruses typically spread from computer to computer when human take an action, such as sending an email attachment or copying an infected file

b. Worms

- Do not have to attach themselves to a computer program
- They are independent programs that replicate or copy themselves by sending copies of files to other computers in the network.
- The network infected by the computer worms is damaged as a lot of bandwidth is used to send millions of messages in the form of span emails.
 - Affect the computer memory and cause the system to be unresponsive
 - Unlike viruses, worms can operate on their own without attaching to other computer program files and rely less on human behaviour in order to spread from computer to computer.

- Computer worms spread much more rapidly than computer viruses.
- Worms destroy data and programs as well as disrupt the operation of computer networks

ANALYSIS

c. Trojan Horses

- Independent and legitimate software program.
- The Trojan Horse attaches itself to the computer system and once it is triggered by a pre set event or date in the computer system, it starts to destroy files or disks
- Trojan horse is a software programs that appears to be benign but then do something other than expected.
- The Trojan horse is not itself a virus because it does not replicate
- Example: MMarketPay is a Trojan Horses for Android phones. This Trojan is hidden in several apps that appear to be legitimate, including travel and weather apps. It places orders for applications and movies automatically without the user's permission, potentially causing users to be hit with unexpectedly high phone bills.

d. Spyware

- ✓ Spyware is an independent software program embedded in computer systems.
- ✓ Spyware is used to gather private personal information that is then relayed to third parties that have interests in the information.
- ✓ Spyware applications can monitor keystrokes, scan files and snoop on other applications.
- ✓ Spyware can also read cookies and change the default homepage on the web browser.
- ✓ Spyware is often installed while a person visits a website by clicking on a disguised pop up window or when downloading a file from the Internet.
- ✓ Spyware steals serial numbers for software to launch Internet attacks, to gain access to e mail accounts, to obtain passwords to protected computer system or to pick up personal information such as credit card numbers.
- ✓ Example: The Zeus Trojan stole financial and personal data from online banking and social networking sites by tracking users' keystrokes as they entered data into their computers.
- ✓ Example: Other Spyware programs reset Web Browser home pages, redirect search requests or slow performance by taking up too much memory

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2.3.1 Describe Computer Crime

a. Hackers and Crackers

- Hackers are an individual who intends to gain unauthorized access to a computer system for which they do not have legitimate access and committing a criminal offence.
- Hacker refers to someone who enjoys going into a system and using it extensively in order to understand how the entire system works, so that they become an expert in that particular system.
- Crackers are people who try to break into the systems through common methods such as cracking passwords, exploiting known security weaknesses and spoofing of a network.
- Hacking and cracking are malicious acts by people inside or outside the organization.
- They are trying to harm and disrupt an organization.
- Malicious attacks from people within organizations are the most dangerous, especially those who are former employees.
- Malicious attacks can also come from outside the organizations who try to access and browse through computer systems to reveal confidential information to the public.
- Hackers' activities include theft of goods and information, system damage and Cyber vandalism, the intentional disruption, defacement or destruction of a Web site or Corporate Information System.
- Example: Cyber vandals have turned many of the MySpace "group" sites, which are dedicated to interests such as animal welfare into cyber graffiti walls, filled with offensive comments and photographs
- The motive of Hackers and Crackers for going into an organization's computer system is normally to disrupt services and the continuity of business operations by using denial – of – service attack tools.
- Many of these Hackers and Crackers may also want to steal information to sell it to competitors

b. Spoofing

- Email messages that appear to have been sent from someone with malicious intention, such as virus writers and individuals who send spam mail.
- They disguise themselves as someone using an email that is not their own.
- They hide their true identities; misrepresent themselves by using fake e mail addresses or masquerading as someone else.
- It involves redirecting a Web Link to an address different from the intended one with the site masquerading as the intended destination.

• Example: If hackers redirect customers to a fake Web Site that looks almost exactly like the true site, they can collect and process orders, effectively stealing business as well as sensitive customer information from the true site

c. Sniffing

- The type of eavesdropping program that monitor information over a network.
- When use legitimately, sniffers help identify potential network trouble spots or criminal activity on networks but when used for criminal purposes, they can be damaging and very difficult to detect.
- Sniffers enable hackers to steal information from anywhere on a network, including e mail messages, company files and confidential reports

d. Denial of Service (DOS) Attack

- Sometimes organizations receive vast amount of fake requests sent through their server by hostile users.
- These requests can cause the server to crash, making it difficult for the organizations to establish a connection between its server and its legitimate clients.
- The difficulty to establish connections between servers and legitimate clients is termed as DOS attack
- Hackers use this condition to their advantage by hijacking and controlling thousands of computers remotely to launch massive and coordinated attacks.
- Massive DOS attacks within the organization can paralyze a network system, resulting in significant server downtime and financial loss
- Hackers flood a network server or Web server with many thousands of false communications or requests for services to crash the network.
- Although DOS attacks do not destroy information or access restricted areas of a company's information systems, they often cause a Web site to shut down, making it impossible for legitimate users to access the site.

e. Identity Theft

- The act of pretending to be someone else by using someone else's identity as one's own or use of a false identity.
- Illegal migration, terrorism and blackmail are often made possible by means of identity theft.
- Crime in which an imposter to obtains the personal information of and may be used to obtain credit

f. Click Fraud

- Occurs when an individual or computer program fraudulently clicks on an online advertisement without any intention of learning about the advertiser or making a purchase.
 - Become a serious problem at Google and other Web sites that feature pay-per-click online advertising.
 - When you click on an advertising displayed by a search engine, the advertiser typically pays a fee for each click, which is supposed to direct potential buyers to its products.

g. Cyber Terrorism and Cyber Warfare

- State sponsored activity designed to defeat another state by penetrating its computer or networks for the purposes of causing damage and disruption.
- Example: Stolen plans for missile tracking system, satellite navigation devices, surveillance drones and leading jet fighters
- It poses a serious threat to the infrastructure of modern societies, since their major financial, health, government and industrial institutions rely on the Internet for daily operations.

VALUA

2.4 Information Security

2.4.1 Information Systems Controls

a. General Controls

• Control the design, security and use of computer programs and the security of data files in general throughout the organization's information technology infrastructure.

ALYSIS

 Apply to all computerized applications and consist of a combination of hardware, software and manual procedures that create an overall control environment.

Table 2.2 General Controls

	Type of General	Description
	Control	
	Software Controls	Monitor the use of system software and prevent unauthorized access of software
		programs, system software and computer programs. System software is an
		important control area because it performs overall control functions for the
		programs that directly process data and data files
DIF	Hardware	Ensure that computer hardware is physical secure and check for equipment
Same Same	Controls	malfunction. Computer equipment should be specially protected against fires and
		extremes of temperature and humidity. Organizations that are dependent on their
		computers also must make provisions for backup or continued operation to
-	11	maintain constant service
	Computer	Oversee the work of the computer department to ensure that programmed
<i>(</i>)	Operations	procedures are consistently and correctly applied to the storage and processing of
	Controls	data. They include controls over the setup of computer processing jobs and
		computer operations and backup and recovery procedures for processing that ends
1510	N	abnormally
	Data Security	Ensure that valuable business data files on either disk or tape are not subject to
	Controls	unauthorized access, change or destruction while they are in use or in storage

ImplementationAudit the systems development process at various points to ensure that the processControlsis properly controlled and managed. The systems development audit looks for the
presence of formal reviews by users and management at various stages of
development, the level of user involvement at each stage of implementation and
the use of a formal cost benefit methodology in establishing system feasibility. The
audit should look for the use of controls and quality assurance techniques for
program development, conversion and testing and for complete and through
system, user and operations documentation

AdministrativeFormalize standards, rules, procedures and control disciplines to ensure that the
organization's general and application controls are properly executed and enforced

b. Application Controls

- Specific controls unique to each computerized application, such as payroll or order processing.
- They include both automated and manual procedures that ensure that only authorized data are completely and accurately processed by that application.
- Application controls can be classified as:
- Input controls
- Check data for accuracy and completeness when they enter the system.
- There are specific input controls for input authorization, data conversion, data editing and error handling.
- ✓ Processing controls- establish that data are complete and accurate during updating.
- ✓ Output controls- ensure that the results of computer processing are accurate, complete and properly distributed.

2.4.2 Information Resources Controls

a. Authentication

- ✓ The ability to know that a person is who claims to be.
- \checkmark To gain access to a system, a user must be authorized and authenticated.

✓ It can be Password, Token, Smart card or Biometric Authentication.

- Password
- Authentication is often established by using password known only to authorize users.
- User uses a password to log on to a computer system and may also use passwords for accessing specific systems and files.
- Users often forget passwords, share them or choose poor passwords that are easy to guess, which compromises security.
- Passwords can also be "sniffed" if transmitted over a network or stolen through social engineering.

Token

- A token is a physical device, similar to an identification card that is designed to prove the identity of a single user.
- Tokens are small gadgets that typically fit on key rings and display passcodes that change frequently.

A smart Card

- Smart card is a device about the size of a credit card that contains a chip formatted with access permission and other data.
- Used in electronic payment systems.
- A reader device interprets the data on the smart card and allows access.
- Biometric Authentication
- Uses systems that read and interpret individual human traits, such as fingerprints, irises, faces, retinal images and voices, in order to access.

b. Firewalls

- Prevent unauthorized users from accessing private networks.
- Combination of hardware and software that controls the flow of incoming and outgoing network traffic.

- It is generally placed between the organization's private internal networks and distrusted external networks, such as the Internet.
- Used to protect one part of a company's network from the rest of the network.
- Acts like a gatekeeper who examines each user's credentials before access is granted to a network
- Identifies names, IP addresses, applications and other characteristics of incoming traffic.
- It checks this information against the access rules that have been programmed into the system by the network administrator.
- Prevents unauthorized communication into and out of the network.



The firewall is placed between the firm's private network and the public Internet or another distrusted network to protect against unauthorized traffic.



c. Intrusion Detection System (IDS)

- Protect against suspicious network traffic and attempts to access files and databases.
- Full-time monitoring tools placed at the most vulnerable points or "hot spots" of corporate networks to detect intruders
- The system generates an alarm if it finds a suspicious event.
- Scanning software looks for patterns indicative of known methods of computer attacks, such as bad passwords, checks to see if important files have been removed or modified and sends warnings of vandalism or system administration errors.
- Monitoring software examines events as they are happening to discover security attacks in progress.
- IDS can also be customized to shut down a particularly sensitive part of a network if it receives unauthorized traffic.

d. Antivirus and Antispyware Software

- Antivirus software prevents, detects and removes malware, including computer viruses, computer worms, Trojan horses, spyware and adware.
- Most antivirus software is effective only against malware already known when the software was written.
- To remain effective, the antivirus software must be continually updated.
- e. Unified Threat Management System (UTMS)
- A combination into a single appliance various security tools, including firewalls, virtual private networks, intrusion detection systems, Web content filtering and antispam software.
- Help businesses reduce costs and improve manageability.
- Available for all sizes of networks, initially aimed at small and medium-sized businesses.

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• Example: Crossbeam, Fortinent and Check Point.

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EXERCISES

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CHAPTER 2 : MANAGEMENT INFORMATION SYSTEMS BASIC: HARDWARE, SOFTWARE, NETWORKING AND SECURITY

1) State THREE (3) features of mobile computers. (3 marks) 2) Give FOUR (4) examples of mobile computers. (4 marks) 3) State FOUR (4) features of microcomputer (4 marks) 3) What is the function of mainframe. (2 marks) _are the largest, fastest, most powerful and expensive computer. 4) (1 mark) 5) _is a single integrated circuit board, which are connected to all electronic components of a computer. (1 mark) 6) Memory consist of **TWO (2)** major types. Named it and explain each of them. (8 marks)

EVALUATION



DATA AND DATABASE

3.1 Data Management

3.1.1 Term of Data Management

- a. Data
- Data is a stream of raw fact representing event occurring in organizational
- It is raw, unprocessed information, unorganized forms (such as text, images, audio, video, alphabets, numbers, fact, figures, object, thing or symbols) that refer to or represent conditions, ideas or objects.
- Data is always collected with an objective in mind.
- Data should be of high quality, it is important to ensure that they can be easily accessed.

b. Information

- Information is a valuable resource for successful running of the business.
- It also a data that have been processed, interpreted, organized or structured to provide context and presented in different format to assist decision makers.
- It has been shaped into a form that is meaningful, useful and has specific meanings to human beings and it is normally accurate information that is free of error.
- Example: If a manager is told his/her company's net profit decreased in the past month, he/she may use this information as a reason to cut financial spending for the next month
- Information is relevant when it is useful and appropriate for the decisions that require it.
- Information is timely when it is available to decision makers when it is needed.

c. Knowledge

- Knowledge is a familiarity, awareness or understanding of something, such as facts, information, descriptions or skills through experience or education by perceiving, discovering or learning.
- Knowledge is a cognitive, even a physiological, event that takes place inside people's heads.

- It is also stored in libraries and records, shared in lectures, and stored by firms in the form of business processes and employee know-how.
- Knowledge can refer to a theoretical or practical understanding of a subject.
- Example, you must know when to perform a procedure as well as how to perform it.
- 3.1.2 An Information Policy for Data Management

a. Information Policy

- Specifies the organization's rules for sharing, disseminating, acquiring, standardizing, classifying and inventorying information.
- Lays out specific procedures and accountabilities
- Identifying which users and organizational units can share information, where information can be distributed and who is responsible for updating and maintaining the information.
- Example: A typical information policy would specify that only selected members of the payroll and human resources department would have the right to change and view sensitive employee data, such as an employee's salary or social security number and that these departments are responsible for making sure that such employee data are accurate.

b. Data Administration

- Responsible for the specific policies and procedures through which data can be managed as an organizational resource.
- These responsibilities include developing information policy, planning for data, overseeing logical database design and data dictionary development and monitoring how information systems specialists and end-user groups use data.

c. Data Governance

• Deals with the policies and processes for managing the availability, usability, integrity and security of the data employed in an enterprise, with special emphasis on promoting privacy, security, data quality and compliance with government regulations.

d. Database Administration

• A large organization will also have a database design and management group within the corporate information systems division that is responsible for defining and organizing the structure and content of the database and maintaining the database.

ANALYSIS

 In close cooperation with users, the design group establishes the physical database, the logical relations among elements and the access rules and security procedures.

3.1.3 Knowledge Management

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a. Definition of Knowledge Management

- Set of business processes developed in an organization to create, store, transfer and apply knowledge.
- It can increase the ability of the organization to learn from its environment and to incorporate knowledge into its business processes.
- KMS lets an organization gather, organize and share business knowledge within an organization.
- KMS contains a central repository of information that is well structured and employs a variety of search tools which are effective and easy to use to help users find answers to questions fast.
- Example: The Doctor discovers a new method of treating a certain illness and shares this knowledge in the repository. This can lead to better treatment methods or perhaps even better drugs. Users are going to frequently access the knowledge repository and this will result in the development of best practices, policies and business solutions based on this knowledge. So it becomes a new culture and evolves as a result of innovation. This knowledge of course can be used to facilitate decision making, which points to the first imperative

EVALUAT

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Figure 3.1 Components of Knowledge Management

3.2 The Database Approach to Data Management

3.2.1 The Term of Database Approach to Data Management

- a. Traditional Database
- Typically, all information is gathered using the manual system.
- This system uses paper, kept in files and locked in cabinets for security purposes.
- There are limitations in traditional file processing. They include:

✓ Separation of Data

- Data those are separated in many files are difficult to access.
- When more than one type of data located in different files are needed, it must be synchronized in order to get accurate results

✓ Data Redundancy

- Duplicate data in multiple data files
- Same data are stored in more than one place or location.
- Data redundancy occurs when different groups in an organization independently collect the same data and stores it independently of each other.
- > Data redundancy wastes storage resources and it may cause to be inaccurate

✓ Program Data Dependence

- > Data that are located in various files are dependent on each other.
- > Any changes to data in one file should also be updated and saved in the other files

✓ Lack of Flexibility

> A traditional file system cannot deliver ad hoc reports or respond immediately

✓ Poor Security

- > Access and dissemination of information may be out of control, because there is little control
- Management do not know who is accessing or making changes to the organization's data
- ✓ Incompatible File Formats
- Each file must be in the same format.
- If files are in different formats, the data may be difficult to access.

✓ Lack of Data Sharing and Availability

- Because of information in different files and cannot be related to one another, it is impossible for information to be shared or accessed in a timely manner.
- > Information cannot flow freely across different functional areas or different parts of the organization.

✓ Data Inconsistency

- > Data inconsistency is where the same attributes may have different values.
- Example: in instances of the entity COURSE illustrated in Figure 3.2, the data may be updated in some systems but not in others. The same attribute, Student_ID, may also have different names in different systems throughout the organization. Some systems might use Student_ID and others might use ID.

EVALUATI



Figure 3.2 Traditional File Processing

Addition confusion might result from using different coding systems to represent values for an attribute. For instance, the sales, inventory and manufacturing systems of a clothing retailer might use different codes to represent clothing size. One system might represent clothing size as 'extra large' whereas another might use the code 'XL' for the same purpose. The resulting confusion would make it difficult for companies to create customer relationship management, supply chain management or enterprise system that integrate data from different sources

b. Database Management System (DBMS)

- To overcome the problems of manual filing systems, the DBMS has been developed.
- DBMS are collections of application programs that have specific purposes.
- It is more efficient as everything is computerized, grouped and data are stored electronically using computers.
- DBMS is a software or program that permits an organization to centralize data, manage them efficiently and provide access to the stored data by application programs.
- A DBMS interacts with users and other application software.
- It allows users to create, store and access data by adding, deleting, modifying, analysing and managing
- Tool for maintaining data, managing security and integrity of data and providing data recovery.
- DBMS performs 4 major operations, namely:
- ✓ Creating and entering data into the database

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Figure 3.3 Data Entry Form in Access

✓ Accessing data in the database

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Figure 3.4 Data Acquisition or Accessing Data Directly from Database and Data Server

EVALUATION

✓ Querying data from the database



Figure 3.5 Querying Data from the Database

Displaying data from the database

Displaying DB data using Angular in MVC5

Full Name	Email	DOB	Phone	Address	Designation
Chanakya	chani@live.com	05-03-1993	87775878776	US	Game designer
Mark twain	markt@outlook.com	03-11-1992	1029328433	Washington	UI designer
Raviteja	ravi@gmail.com	02-10-1994	9034902348	Hyderbad	Dotnet developer
snr chowdary	snrchowdary@gmail.com	05-03-1995	897236225672	Bangalore	Network admin
Thomas	thomas@yahoo.com	03-03-1995	8762766326	Chennai	Java Developer

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Figure 3.6 Displaying Data from the Database

As illustrate in figure 3.7, when the application programs call for a data item such as gross pay, the DBMS find the item in the database and presents it to the application program. Using the traditional data files, the programmer would have to specify the size and format of each data element used in the program and then tell the computer where they were located.



Figure 3.7 Human Resources Database with Multiple Views

- The Advantages of DBMS:
- Reduces data redundancy Data in the database is integrated with each other, thus multiple copies of files are impossible
- ✓ Increase data consistency By reducing data redundancy, the possibility of data being inconsistent is lowered, because data is updated automatically in all related files when changes is made in one file
- Increase data security and integrity Database provides data security as passwords only authorized users may access the database
- Allows data access and sharing Data can be shared by many users and can also be easily accessed, as all the data is integrated
- ✓ Increase productivity Users may access data in different areas without interference from one another and it may increases productivity of data in the database
- The Disadvantages of DBMS:
- ✓ A database system is a complex because it contains many integrated files
- ✓ The size is very large and its storage capacity would be bigger
- The cost of DBMS is higher because its own special software, extra hardware and others costs related to human labour

EVALUAT

✓ Slow in performance

3.2.2 Types of Database Management System (DBMS)

- a. Relational Database Management System
- Relational database represent data as two dimensional tables called relation.
- Table may be referred to as file.
- Each table contain data on an entity and its attributes.
- A relational database refers to a database that stores data in a structured format, using rows and columns. This makes it easy to locate and access specific values within the database.
- It is "relational" because the values within each table are related to each other. Tables may also be related to other tables. The relational structure makes it possible to run queries across multiple tables at once.
- It is the software that executes queries on the data, including adding, updating and searching for values.
- It also provides a visual representation of the data. For example, it may display data in a table like
 a spreadsheet, allowing you to view and even edit individual values in the table. Some programs allow
 you to create forms that can streamline entering, editing, and deleting data.
- Example:
- Microsoft Access is a relational DBMS for desktop system
- ✓ DB2, MySQL, Oracle Database and Microsoft SQL Server are relational DBMS for large mainframes and midrange computers
- ✓ MySQL is a popular open source DBMS
- Oracle Database Lite is a DBMS for mobile computing device



Figure 3.8 Relational Database Organizes Data in the Form of Two Dimensional Tables

b. Hierarchical Database Management System

- In a hierarchical database management systems model, data is stored in a parent-children relationship nodes.
- In a hierarchical database, besides actual data, records also contain information about their groups of parent or child relationships.
- In a hierarchical database model, data is organized into a tree like structure.
- The data is stored in form of collection of fields where each field contains only one value.
- The records are linked to each other via links into a parent-children relationship.
- In a hierarchical database model, each child record has only one parent. A parent can have multiple children.
- To retrieve a field's data, we need to traverse through each tree until the record is found.
- Hierarchical structure is simple, it is inflexible due to the parent-child one-to-many relationship.
- Hierarchical databases are widely used to build high performance and availability applications usually in banking and telecommunications industries.
- The IBM Information Management System (IMS) and Windows Registry are two popular examples of hierarchical databases.





Figure 3.9 Hierarchical Database Management System

. Network Database Management System

- Network database management systems use a network structure to create relationship between entities.
- Network databases are mainly used on a large digital computer.

- Network databases are hierarchical databases but unlike hierarchical databases where one node can have one parent only, a network node can have relationship with multiple entities. A network database looks more like a cobweb or interconnected network of records.
- In network databases, children are called members and parents are called occupier. The difference between each child and member can have more than one parent.
- The approval of the network data model is similar to a hierarchical data model. Data in a network database is organized in many-to-many relationships.
- Some of the popular network databases are Integrated Data Store (IDS), IDMS (Integrated Database Management System), Raima Database Manager, TurbolMAGE and Univac DMS-1100.



Figure 3.10 Network Database Management System

- d. Object Oriented Database Management System
- In this Model we have to discuss the functionality of the object oriented Programming.
- It takes more than storage of programming language objects.
- Object DBMS's increase the semantics of the C++ and Java.
- It provides full-featured database programming capability, while containing native language compatibility.
- It adds the database functionality to object programming languages. This approach is the analogical of the application and database development into a constant data model and language environment.
 - Applications require less code, use more natural data modelling and code bases are easier to maintain.
 - The object-oriented database derivation is the integrity of object-oriented programming language systems and consistent systems.

- The power of the object-oriented databases comes from the cyclical treatment of both consistent data, as found in databases and transient data, as found in executing programs.
- Object-oriented databases use small, recyclable separated of software called objects. The objects themselves are stored in the object-oriented database. Each object contains of two elements:
 - ✓ Piece of data (example: sound, video, text or graphics).
 - ✓ Instructions or software programs called methods for what to do with the data.
- Some popular software is TORNADO, Gemstone, ObjectStore, GBase, VBase, InterSystems Cache, Versant Object Database, ODABA, ZODB, Poet. JADE and Informix.



Figure 3.11 Object – Oriented Database Management System

3.2.3 Discuss Data Warehouse and Data Mining

a. Data Warehouse

- Database can store large amounts of data
- Capable of accessing and analysing data in need to decision makers throughout the company.
- Data can be accessed faster and more effectively.
- It is scattered in many different locations using a network connection.
- Organized according to the organization's requirement
- The data originate in many core operational transaction systems, such as systems for sales, customer accounts and manufacturing and may include data from Web site transactions.

- These data are combined with data from external sources and transformed by correcting inaccurate and incomplete data and restructuring the data for management reporting and analysis before being loaded into the data warehouse.
- Makes the data available for anyone to access as needed, but it cannot be altered.
- Provides a range of ad hoc and standardized query tools, analytical tools and graphical reporting

Characteristic of a Data Warehouse:

- Data are organized by subject
- Data are consistent as different database are encoded
- Data can stored for many years and can be accessed at any time
- Data remain as it is once it is stored
- Data are stored permanently and cannot be removed

The Advantages of Using a Data Warehouse are:

- End users can access data easily and quickly
- Data can be analysed accurately and efficiently
- Data in a data warehouse are integrated with each other and it will be easier for users to access data
- Ease the use of data among the end users
- Organizations have the potential to achieve high returns
- Enables organizations to increase their productivity





b. Data Mining

- Process of accessing and analysing data in a data warehouse or data mart.
- More discoveries driven.
- Provides insights into corporate data that cannot be obtained with OLAP by finding hidden patterns and relationships in large databases
- The patterns and rules are used to guide decision making and forecast the effect of those decisions.
- Discovers hidden patterns and operates on a more detailed level instead of a summary level.
- The information obtainable from data mining include associations, sequences, classifications, clusters and forecasts

- Example: Data Mining could be used to gain awareness of customer behaviour or patterns in the region.
- These systems perform high level analyses of patterns or trends but they can also drill down to provide more detail when needed.
- One popular use for data mining is to provide detailed analyses of patterns in customer data for one to

 one marketing campaigns or for identifying profitable customers

EVALUATION

• Supports decision makers through a process referred to as knowledge discovery.

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EXERCISES

CHAPTER 3: DATA AND DATABASE

1.	Define data.	(2 marks)
2.	Define information.	(2 marks)
3.	Define knowledge.	(2 marks)
4.	What means by information policy.	(2 marks)
5.	"Set of business processes developed in an organization to create, store, transfer	and apply
A	knowledge".	
	This statement refer to	(1 mark)
6.	List 6(SIX) components of knowledge management.	(6 marks)
7.	What is the differences between traditional database and Database Management System	n (DBMS).
~		(5 marks)
8.	DBMS performs FOUR(4) major operations. What are the major operations? Named it.	(4 marks)
9.	Give THREE(3) advantages of DBMS.	(3 marks)
10.	State THREE(3) disadvantages of DBMS.	(3 marks)
	Identify Types of Database Management System (DBMS). Give FOUR(4) types of DBMS.	(4 marks)
12.	State TWO(2) characteristics of a data warehouse.	(2 marks)
13.	What are the advantages of using a data warehouse? Give THREE(3) advantages.	(3 marks)
14.	"Process of accessing and analysing data in a data warehouse or data mart." This state	ement refer
	to	(1 mark)

EVALUATION

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ANSWER SCHEME

CHAPTER 1

1. State the difference between Information Technology and Information System. (5 marks)

Information technology (IT) consists of all the hardware and software that a firm needs to use in order to achieve its business objectives.

Information system (IS) can be defined as a set of interrelated components that collect or retrieve, process, store and distribute information to support decision making and control in an organization. In addition to support decision making, coordination and control, information systems may also help managers and workers analyze problems, visualize complex subjects and create new products

2. State FIVE (5) phases in development computing technology.

(5 marks)

(3 marks)

(4 marks)

- Mainframe / mini computers
- Personal computer
- Client/ sever computing
- Web-based enterprise applications
- Cloud computing/ mobile device
- 3. Identify basic activities of Information System.

input process output

4. Fill in the blanks with the correct answers.

Data Resources	Examples
Alphanumeric Data	Numbers, letters and other characters that describe any transaction
Audio Data	Human voice and other sounds
Image Data	Videos and photographic images, graphic shapes

Text Data

- 5. State FOUR (4) examples of hardware.
 - Printer
 - scanner
 - monitor
 - keyboard
- 5. Who are information system specialists? State THREE (3) of them. (5 marks)

-They are a group of people who actually develop and operate information systems.

- -They include:
- 1) Systems Analysts
- 2) Software Developers
- 3) Programmers
- 7. What means by business transformation?

Business transformation means business use smartphone, texting, e – mail and online conferencing, media social, web as tool of business

- 8. Give TWO (2) examples of globalization opportunities.
 - Google
 - e-Bay
- What means by time shifting.
 Time shifting = business being conducted continuously 24 hours a day



(4 marks)

(2 marks)

(2 marks)

(2 marks)

ANSWER SCHEME

CHAPTER 2

- 1) State **THREE (3)** features of mobile computers.
- Mobile Computers
- ✓ Have great mobility
- ✓ It can be carried from one place to another.
- It also small in size and can be handheld.
- It can be connected to another device via Bluetooth and to the Internet using a wireless network or network cable

2) Give FOUR (4) examples of mobile computers.

- Notebook computer
- Tablet
- Smartphone
- Handheld computer
- 3) State FOUR (4) features of microcomputer.
- ✓ Known as Personal Computer (PC) or desktop computer
- ✓ Generally fit the size of a table and are mainly used by individuals at home and in the office.
- ✓ Consists of a system unit, input, storage and output device.
- ✓ PC caters for use of a single user. If a computer is networked, then the number of users would increase.
- ✓ PC is connected to the Internet through a network cable.
- ✓ PC compatible that use Microsoft Windows as the Operating System and Apple computers have the Macintosh as the Operating System
- 4) What is the function of mainframe.
- ✓ Mainframe is larger and more expensive computer than a server.
- ✓ It is used to process large amounts of transactions in an organization.
- ✓ Due to its large physical size, a partial room is required to fit a mainframe computer.

(4 marks)

(4 marks)

(2 marks)

<u>59</u>

(3 marks)

5) **<u>Supercomputer</u>** are the largest, fastest, most powerful and expensive computer.

(1 mark)

6) <u>Motherboard</u> is a single integrated circuit board, which are connected to all electronic components of a computer.

(1 mark)

(8 marks

7) Memory consist of TWO (2) major types. Named it and explain each of them.

- RAM Random Access Memory:
 - ✓ Memory which loses its contents when the computer's power is switched off
 - ✓ The number of the instructions that can be stored in the RAM depends on it size.
 - The computer would respond faster if the RAM size is larger.
 - ✓ Most computers now come with 2GB (gigabytes) of memory size.
- ROM Read only memory, flash memory and CMOS:
 - ✓ Memory which retain its contents even after the power is switched off
 - Also known as firmware, stores permanent data, instructions or information that cannot be erased even after the power is switched off.
 - \checkmark This information is produced during the manufacturing of the device.
 - The data cannot be modified or changed, hence the name, read only memory.

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