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Tecnia Institute of Advanced Studies, GGSIPU

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Authored by

Deepak Sonker

From

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TECNIA INSTITUTE OF ADVANCED STUDIES

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COURSE PLAN

Syllabus per BCA Scheme & Syllabus GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI.										
Program	20	Program	Bachelor of Computer	Session	L	3	T/P	1		
Course	105	BCA-Fundamentals of	Core Course	Type:						Credits : 4
Name of Faculty:			1 Credit (Theory)= 15							
EARNING OBJECTIVES:										
<ul style="list-style-type: none"> 1. Awareness of evolution of Computers, various types of computers its characteristics, usage, and limitations. 2. Identification of different categories of computers, their peripherals and memory. 3. Knowledge about operating system, their types, MS-Office various software. 4. Understanding of computer network fundamentals and various communication networks. 5. Overview of emerging technologies in IT i.e. AI and Machine Learning, IOT, Data Analytics etc. 										
PREREQUISITE: None										
Course Outcome & Mapping, Course Articulation										

Dr. Deekal HOD
HOD I C T BCA-TIAS

Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies
Familiarized with Business environment and Information Technology and its Applications in different domains
Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs
Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
Understand the front end and backend of software applications.
Gain expertise in at least one emerging technology.
Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc
Apply techniques of software validation and reliability analysis to the development of computer programs.
Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.

Dr. Deekha
 HOD
 I C B C A T I A S

Describe computer with its characteristics	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acquire knowledge	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apply	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Sr. No.	Lecture No.	Unit No.	Lecture Contents	Lecture Outcome (Student would be able to)	Problem Solving Methodologies	Participative Learning	Experiential Learning	ICT Tools	Mapping with CO	Mode of Assessment	Class Material	Additional Material
1	L1	1	Definition and Characteristics of Computer	Understand basic concepts of computer and its characteristics		Lecture through PPT	Demonstration of Hardware of Computer	Youtube https://www.youtube.com/watch?v=5-5603mV	CO1	PPT		https://www.tutorialspoint.com/computer_concepts/computer_concepts_characteristics_of_computer_system.htm
2	L2	1	Computer Generation from First Generation to Fifth Generation	Understand the Generations of Computer		Discussion		Youtube https://www.youtube.com/watch?v=5-5603mV	CO1	Viva (CIA)	PPT	https://www.geeksforgeeks.org/generations-of-computers-computer-fundamentals/

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3	L3	1	Computer Generation from First Generation to Fifth Generation	Understand the Generations of Computer	Discussion	Youtube https://www.youtube.com/watch?v=z1sb0urq04	CO1	Viva (CIA)	PPT	https://www.geeksforgEEKS.org/generations-of-computers-computer-fundamentals/
4	L4	1	Classification of Computers: Micro, Mini,	Define the Classifications of Computers	Debate	Youtube https://www.youtube.com/watch?v=z1sb0urq04	CO1	Debate on classification of computers	PPT	https://www.youtube.com/watch?v=z1sb0urq04
5	L5	1	Classification of Computers: Micro, Mini,	Define the Classifications of Computers	Debate	Youtube https://www.youtube.com/watch?v=z1sb0urq04	CO1	Debate on classification of computers	PPT	https://www.youtube.com/watch?v=z1sb0urq04
6	L6	1	Revision of Classification					Viva-Vose (CIA)	PPT	
7	L7	1	Revision of Generation of		Discussion				PPT	
8	L8	1	Computer Hardware: Major Components of a digital computer, Block Diagram of a	Classify the Block Diagram of Computer	Brainstorming	E-Books https://books.google.co.in/books?id=XVac69F1MOE	CO1		PPT	https://www.tutorialsmate.com/2020/04/block-diagram-of-computer.html

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HOD I.C.T.
A.T.I.A.S
HOD

9	L9	1	Computer Hardware: Block Diagram of a computer	Classify the Block Diagram of Computer	Brainstorming		E-Books (https://books.google.co.in/books?id=XVac69F1MOE)	CO1	Assignment	PPT	https://www.tutorialsmate.com/2020/04/block-diagram-of-computer.html
10	L10	1	Input-output devices	Identify Input/Output	Discussion		https://www.youtube.com/watch?v=ZvgN8-K4x6U	CO1	Assignment	PPT	https://d2cyt36b7wnvt9.cloudfront.net/exams/wb-ont-net/exams/wb-ont-net/what-is-memory-hierarchy#:~:text=Memory%20hierarchy%20ic%20arrangement%20
11	L11	1	Computer Memory: Memory Hierarchy	State Memory Hierarchy			Youtube https://www.youtube.com/watch?v=ZvgN8-K4x6U	CO1		PPT	https://www.tutorialspoint.com/what-is-memory-hierarchy#:~:text=Memory%20hierarchy%20ic%20arrangement%20
12	L12	1	Revision of Memory	Understand the computer memory	Discussion on computer Memory						
13	L13	1	Primary Memory - RAM and its	Primary Memory - RAM and its			https://www.youtube.com/watch?v=sWAsRA-9DgQ	CO1	Presentation by students (CIA)	PPT	https://www.youtube.com/watch?v=sWAsRA-9DgQ
14	L14	1	Secondary Memory, Cache	Understand the concept of Secondary &	Discussion		https://www.youtube.com/watch?v=rzVdTHLdC44	CO1		PPT	https://www.youtube.com/watch?v=rzVdTHLdC44
15	L15	1	Secondary Storage Devices -	Classify the Hard Disk and its work		Flip Classroom	https://www.youtube.com/watch?v=ZvgN8-K4x6U	CO1		PPT	https://www.youtube.com/watch?v=ZvgN8-K4x6U
16	L16	1	Secondary Storage Devices -	Classify the Hard Disk and its work			https://www.youtube.com/watch?v=ZvgN8-K4x6U	CO1		PPT	https://www.youtube.com/watch?v=ZvgN8-K4x6U
17	L17	1	Revision of Secondary	State secondary	Discussion						

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18	L18	1	DVD, Flash memory	Understand the basic operation of					https://www.lifewire.com/what-is-a-flash-drive-2625794	PPT	
19	L19		Revision	Discussion							
20	L20	2	Interaction with Computers:	Explain the basic concept of Software				Demonstration by Teachers	https://www.youtube.com/watch?v=BTB86HeZVwk	PPT	Viva (CIA)
21	L21	2	System software	Classify about system software				Demonstration by Teachers(In	https://www.youtube.com/watch?v=gRAB7iJnSc	PPT	
22	L22	2	Assemblers, Compilers, Interpreters,	Classify about translators and its work	Lecture through PPT				https://www.youtube.com/watch?v=qcEBXrqFLe8	PPT	
23	L23	2	linkers, loaders	Classify the Application	Lecture through				https://www.youtube.com/watch?v=4sPWotthkgw	PPT	Viva (CIA)
24	L24	2	Introduction to MS Office (MS-Word,	understand & apply MS Office	Practical				https://www.youtube.com/watch?v=YrZqw_O9CEO	PPT	
25	L25	2	Operating Systems: Elementary Operating	Understand the basic concept of Operating	Brainstorming				https://www.youtube.com/watch?v=_NEJVGiGp8Q	PPT	
26	L26	2	Different types of	explain the types of an					https://www.youtube.com/watch?v=PY6zEUJLn8s	PPT	
27	L27	2	DOS: Booting sequence; Concepts of	Understand about DOS					https://www.youtube.com/watch?v=MNwErTxfkUA	PPT	Presentation by students (CIA)
28	L28	2	DOS: Booting sequence; Concepts of	Understand about DOS				Flip Classroom	https://www.youtube.com/watch?v=MNwErTxfkUA	PPT	


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29	L29	2	Types of DOS commands.	apply the DOS Commands	Problem Analysis		https://www.youtube.com/watch?v=ws4U4nHyjBY	CO1, CO2	PPT	https://www.youtube.com/watch?v=ws4U4nHyjBY
30	L30	2	Computer Languages: Introduction to Low-Level Languages	Understand about the type of Languages	Brainstorming		https://www.youtube.com/watch?v=9vF2W-	CO1	PPT	https://www.geeksforgeeks.org/difference-between-high-level-and-low-level-languages/
31	L31	2	Revision		Discussion					
32	L32	3	Computer Number System: Positional	Apply the Concept of positional & Non Positional	Numerical		https://www.youtube.com/watch?v=	CO1, CO2	PPT	https://www.youtube.com/watch?v=AE-27BSbkJ4
33	L33	3	Binary, Decimal	Use of conversion of Binary and	Numerical		https://www.youtube.com/watch?v=	CO1, CO2	PPT	https://www.youtube.com/watch?v=Fz-rxsT964U
34	L34	3	Octal and Hexadecimal Number Systems and	Demonstrate the concept of octal & hexadecimal	Numerical		https://www.youtube.com/watch?v=	CO1, CO2,	PPT	https://www.youtube.com/watch?v=C5EkxfNEMjE
35	L35	3	Binary Arithmetic: Addition,	Demonstrate the concept of Binary	Numerical		https://www.youtube.com/watch?v=	CO1, CO2	PPT	https://www.youtube.com/watch?v=HbCt10_cKkl
36	L36	3	Revision	Understand binary Addition and subtraction	Discussion on Binary Addition & Subtraction					

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37	L37	3	Multiplication and Division.	Demonstrate the concept of multiplication	Numerical				https://www.youtube.com/watch?v=9UxAXb_Bk3M	PPT	
38	L38	3	Use of complement method to	Apply Binary Complement	Numerical				https://www.youtube.com/watch?v=9UxAXb_Bk3M&t=325s	PPT	
39	L39	3	1's complement,	Use of 1's complement,	Numerical				https://www.youtube.com/watch?v=9UxAXb_Bk3M	PPT	Presentation by students (CIA)
40	L40	3	subtraction using 1's complement	Apply and Use of Subtraction	Numerical				https://www.youtube.com/watch?v=9UxAXb_Bk3M	PPT	
41	L41	3	Introduction to Binary	solve BCD		Discussion			https://www.youtube.com/watch?v=OgRkzN02M6E	PPT	
42	L42	3	ASCII Codes, EBCDIC	Solve concept ASCII &		Discussion			https://www.youtube.com/watch?v=F17iRZ53Hxg	PPT	
43	L43	3	Revision	understand		Discussion					
44	L44	4	Computer Network & Internet:	Understand the Basic concept of					https://www.youtube.com/watch?v=Hizdc4XVJIE	PPT	
45	L45	4	Basic elements of a communication	Understand the Communication		Discussion			https://www.youtube.com/watch?v=qhjj6WG7Rgc	PPT	Viva-Vose (CIA)
46	L46	4	Data Transmission speed, Data transmission	explain the Transmission Media					https://www.youtube.com/watch?v=xHyjNkiGRd8	PPT	
47	L47	4	Digital and Analog Transmission,	Describe the concept of Analog and Digital Transmission		Debate			https://www.geeksforgeeks.org/difference-between-analog-communication-and-digital-communication/	PPT	Debate

Debate

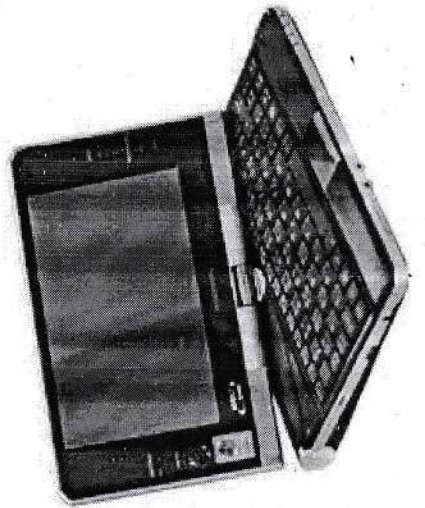
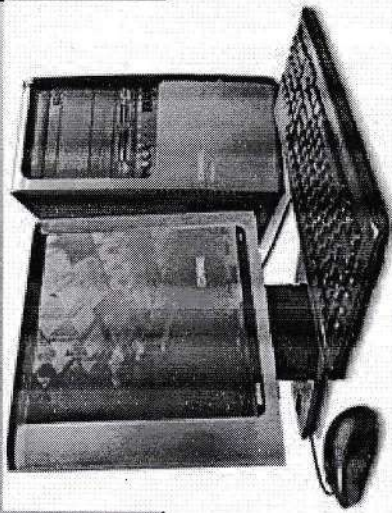
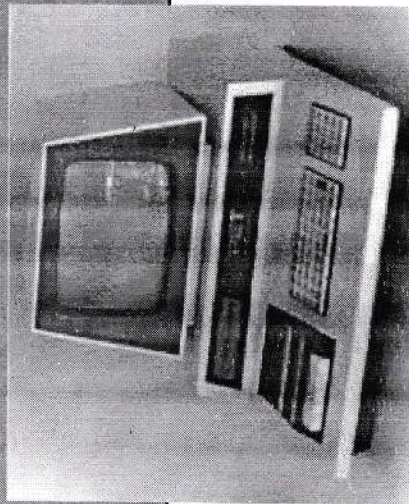
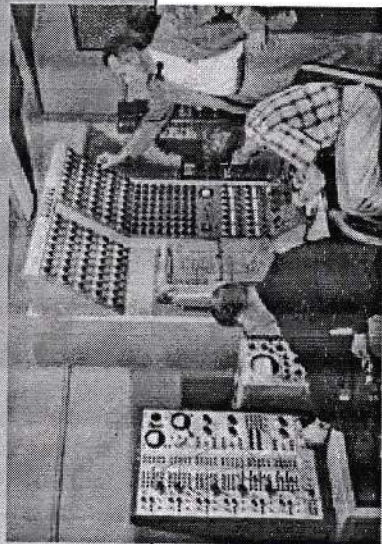
48	L48	4	Network topologies, Network	Explain the concept of LAN, WAN & Network			https://www.youtube.com/watch?v=LN1NIN5Q3YI	CO1, CO2	Debate (CIA)	PPT	https://www.youtube.com/watch?v=LN1NIN5Q3YI
49	L49	4	Basics of Internet and Intranet.	Understand the concept of Internet & Intranet.			https://www.geeksforgoeks.org/difference-between-internet-and-intranet/	CO1, CO2	Debate (CIA)	PPT	https://www.geeksforgoeks.org/difference-between-internet-and-intranet/
50	L50	4	Internet: Terminologies related to	Describe the concept of Internet	Group Discussion	Presentation by Teachers	https://www.youtube.com/watch?v=fzuZHFv3_E	CO1, CO3	Debate (CIA)	PPT	https://www.youtube.com/watch?v=fzuZHFv3_E
51	L51	4	Protocol, Domain name, Internet	Classify about Protocols		Youtube (https://www.youtube.com/watch?v=ly8ikWtAY7s)	https://www.youtube.com/watch?v=ly8ikWtAY7s	CO1, CO3	Debate (CIA)	PPT	https://www.youtube.com/watch?v=ly8ikWtAY7s
52	L52	4	IP address,	Discuss about IP Address		Demonstration	https://www.investopedia.com/terms/i/ip-address.asp	CO1, CO3	Discussion (CIA)	PPT	https://www.investopedia.com/terms/i/ip-address.asp
53	L53	4	URL	Explain the concept of URL			https://www.youtube.com/watch?v=sh7fe05mUfA	CO1, CO2	Discussion (CIA)	PPT	https://www.youtube.com/watch?v=sh7fe05mUfA
54	L54	4	World Wide Web	Understand the concept of WWW			https://www.youtube.com/watch?v=yoJPysX1xzU	CO1, CO2	Discussion (CIA)	PPT	https://www.youtube.com/watch?v=yoJPysX1xzU
55	L55	4	Introduction to Client-Server	Understand the concept of Client-Server			https://www.computerhope.com/jargon/s/searengi.htm	CO1, CO2	Debate (CIA)	PPT	https://www.computerhope.com/jargon/s/searengi.htm
56	L56	4	Search Engine, Voice over Internet	Understand the concept of Search Engine, Voice over Internet			https://afteracademy.com/blog/what-are-routers-hubs-switches-bridges#:~:text=Routers%2C%20all-the-ways-to-connect-devices,2020	CO1, CO2	Debate (CIA)	PPT	https://afteracademy.com/blog/what-are-routers-hubs-switches-bridges#:~:text=Routers%2C%20all-the-ways-to-connect-devices,2020
57	L57	4	Repeater, Bridge, Hub, Switch, Router,	Understand the concept of Repeater, Router etc	Debate		https://www.youtube.com/watch?v=ly8ikWtAY7s	CO1, CO2	Debate (CIA)	PPT	https://www.youtube.com/watch?v=ly8ikWtAY7s
58	L58	4	Gateway, Firewall, Bluetooth	Demonstrate the concept of Firewall, Bluetooth			https://www.youtube.com/watch?v=ly8ikWtAY7s	CO1, CO3	Debate (CIA)	PPT	https://www.youtube.com/watch?v=ly8ikWtAY7s

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59	L59	4	Advanced Trends in IT Applications - Brief Introduction to Cloud	Explain the concept Advanced Trends in IT Applications like IOT, AI, ML	Discussion		https://www.youtube.com/watch?v=LlhmzVL5bm8	CO1, CO2	Viva (CIA)	PPT	https://towardsdatascience.com/the-role-of-cloud-computing-in-artificial-intelligence-507ffd68ca46
60	L60	4	Revision of		Discussion						

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The Five Generations of Computers



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Generations of Computer

- The computer has evolved from a large-sized simple calculating machine to a smaller but much more powerful machine.
- The evolution of computer to the current state is defined in terms of the generations of computer.
- Each generation of computer is designed based on a new technological development, resulting in better, cheaper and smaller computers that are more powerful, faster and efficient than their predecessors.

Generations of Computer

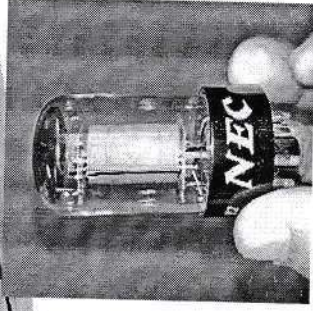
- Currently, there are five generations of computer. In the following subsections, we will discuss the generations of computer in terms of the technology used by them (hardware and software), computing characteristics (speed, i.e., number of instructions executed per second), physical appearance, and their applications.

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First Generation Computers

(1940-1956)



- The first computers used vacuum tubes (a sealed glass tube containing a near-vacuum which allows the free passage of electric current.) for circuitry and magnetic drums for memory.
- They were often enormous and taking up entire room.
- First generation computers relied on machine language.
- They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions (defect or breakdown).
- The UNIVAC and ENIAC computers are examples of first-generation computing devices.

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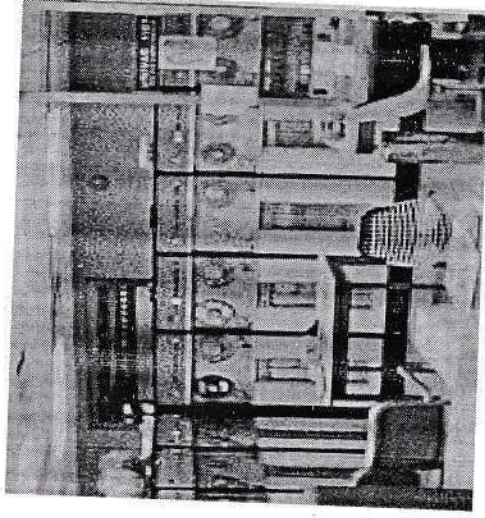
First Generation Computers

Advantages :

- It was only electronic device
- First device to hold memory

Disadvantages :

- Too bulky i.e large in size
- Vacuum tubes burn frequently
- They were producing heat
- Maintenance problems



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Second Generation Computers

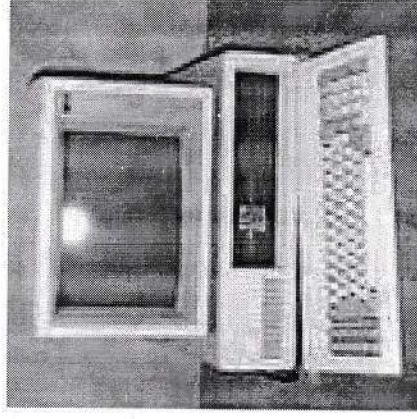
(1956-1963)

- Transistors replaced vacuum tubes and ushered in the second generation of computers.
- Second-generation computers moved from cryptic binary machine language to symbolic.
- High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN.
- These were also the first computers that stored their instructions in their memory.

Second Generation Computers

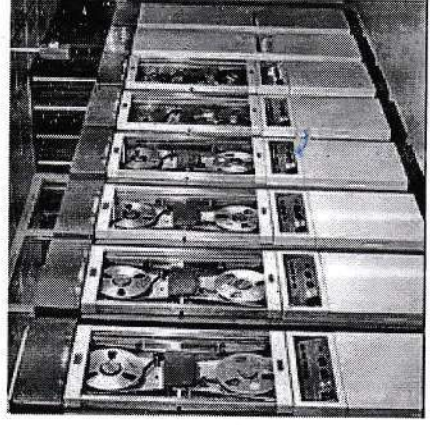
Advantages :

- Size reduced considerably
- The very fast
- Very much reliable



Disadvantages :

- They over heated quickly
- Maintenance problems



Chapter 2 :
Storage Devices and Interfacing

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Visit for more Learning Resources

Recording Techniques :

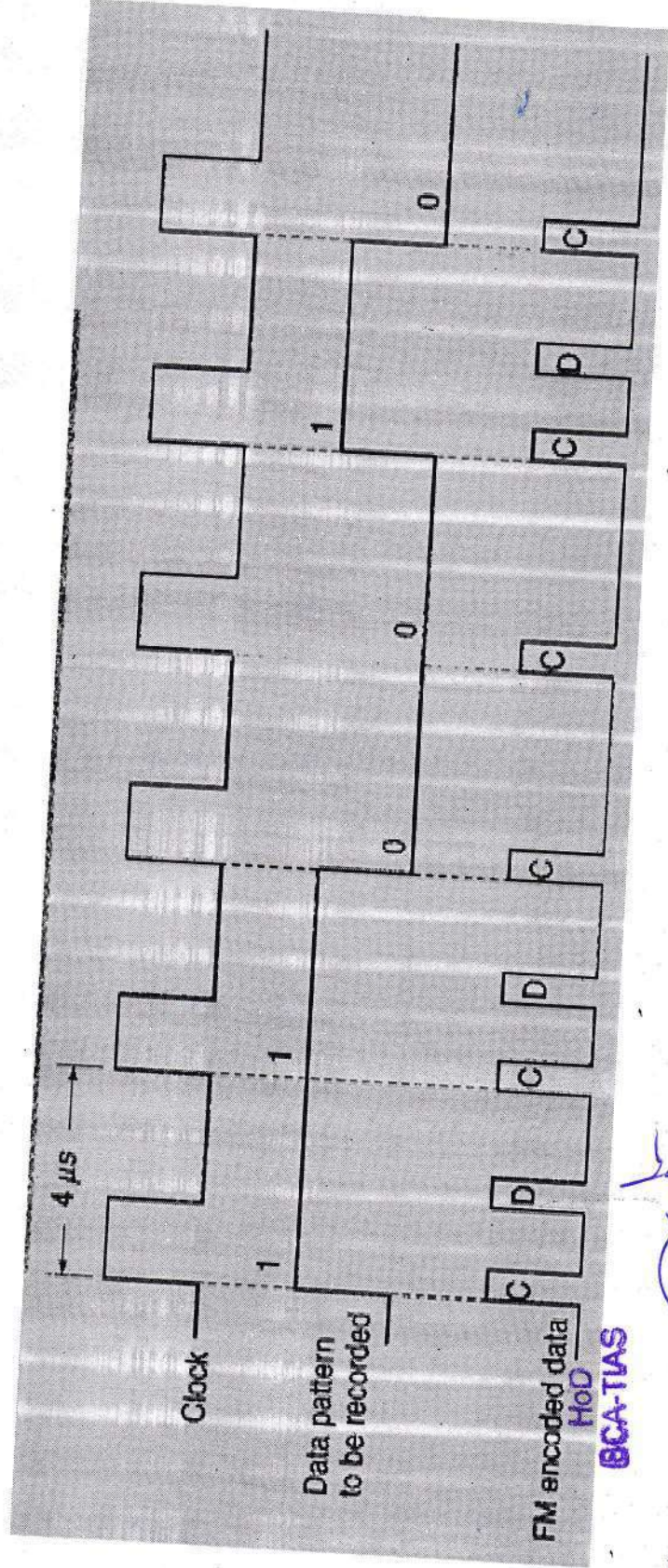
1. FM encoding method
2. MFM encoding method
3. RLL encoding method



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1.FM Encoding Scheme:

- This method of data encoding is also known as the “Single density recording”.
- In this FM method of data recording a 1 bit is stored as two pulses (one clock pulse and one data pulse), and a 0 bit is stored as a one pulse and one gap or no pulse.
- For example, a binary number 1011 will be stored as PP PN PP PP



Dr. P. K.

2. MFM Encoding Scheme:

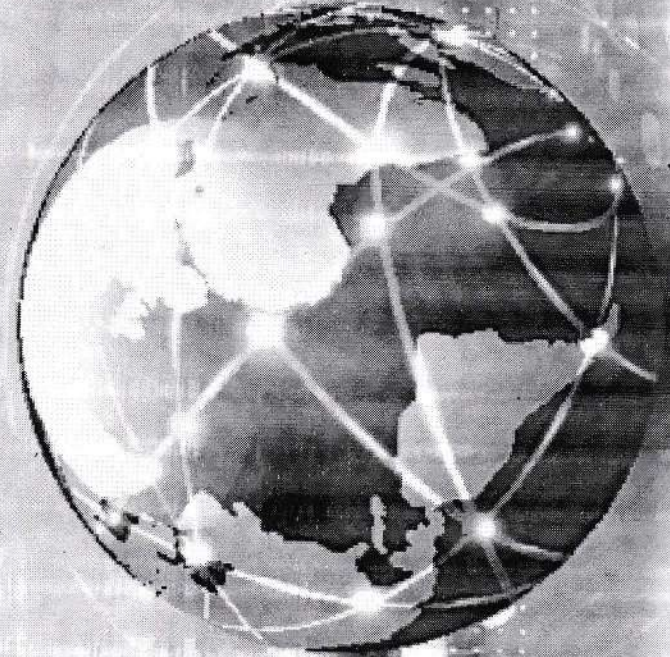
- More data can be stored on the same surface or the data storage density can be increased, if the number of pulses required to store the data can be minimized.
- In MFM recording the 0s and 1s are encoded as given below
 - 1 is always stored as no pulse, and a pulse(NP)
 - 0, when preceded by another 0, is stored as a pulse, and no pulse(PN)
 - 0, when preceded by a 1, is stored as two no pulses(NN)

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Chapter 3

Software



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Learning Objectives

Upon successful completion of this chapter, you will be able to:

- Define the term software
- Describe the two primary categories of software
- Describe the role ERP software plays in an organization
- Describe cloud computing and its advantages and disadvantages for use in an organization
- Define the term open source and identify its primary characteristics



Dr. P. S. Reddy

Types of Software

Software is the set of instructions that tells the hardware what to do

Two main types of software:

1. Operating Systems
2. Application Software
 1. Productivity software
 2. Utility software
 3. Programming software
 4. Applications for the Enterprise (ERP)

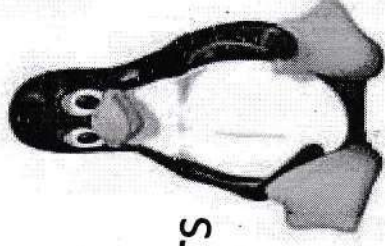
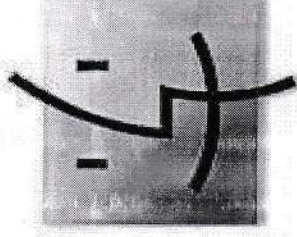
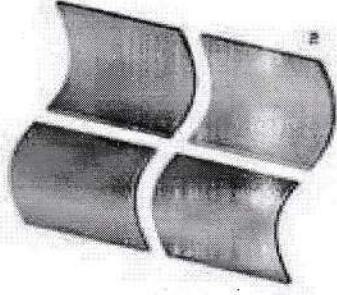


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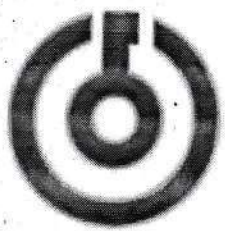
Durbar

Operating Systems

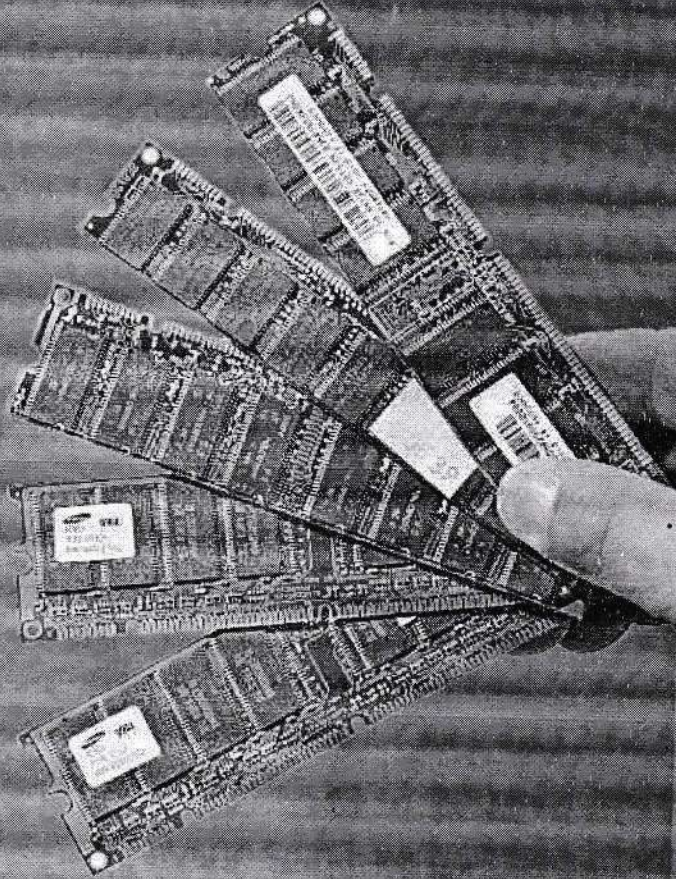
- All devices have an operating system
- Software which manages the hardware
- Creates the interface between the hardware and the user
- Functions performed by the operating systems:
 - Managing the hardware resources of the computer
 - Providing the user-interface components
 - Providing a platform for software developers to write applications
- Most popular are Microsoft Windows, Apple Mac OS, and Linux



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Computer Memory



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Content

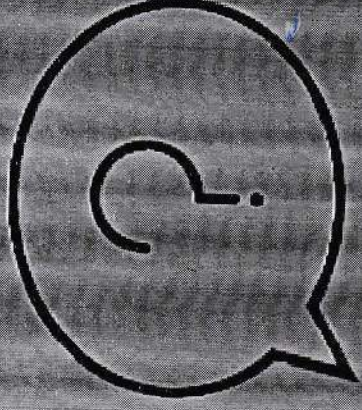
- ◉ What is Computer Memory?
- ◉ Why is memory important or needed for a computer?
- ◉ Types of Computer Memory
- ◉ Primary Memory
- ◉ Secondary Memory
- ◉ Primary Vs Secondary Memory
- ◉ Memory Units
- ◉ References

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What is Computer Memory

- ◉ Computer **memory** is any physical device capable of storing information temporarily, like RAM (random access memory), or permanently, like ROM (read-only memory).
- ◉ Memory devices utilize integrated circuits and are used by operating systems, software, and hardware.



Why is memory important or needed for a computer?

- ◉ Each device in a computer operates at different speeds and computer memory gives your computer a place to quickly access data.
- ◉ If the CPU had to wait for a secondary storage device, like a hard disk drive, a computer would be much slower.

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Secondary Storage Management

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Secondary Storage

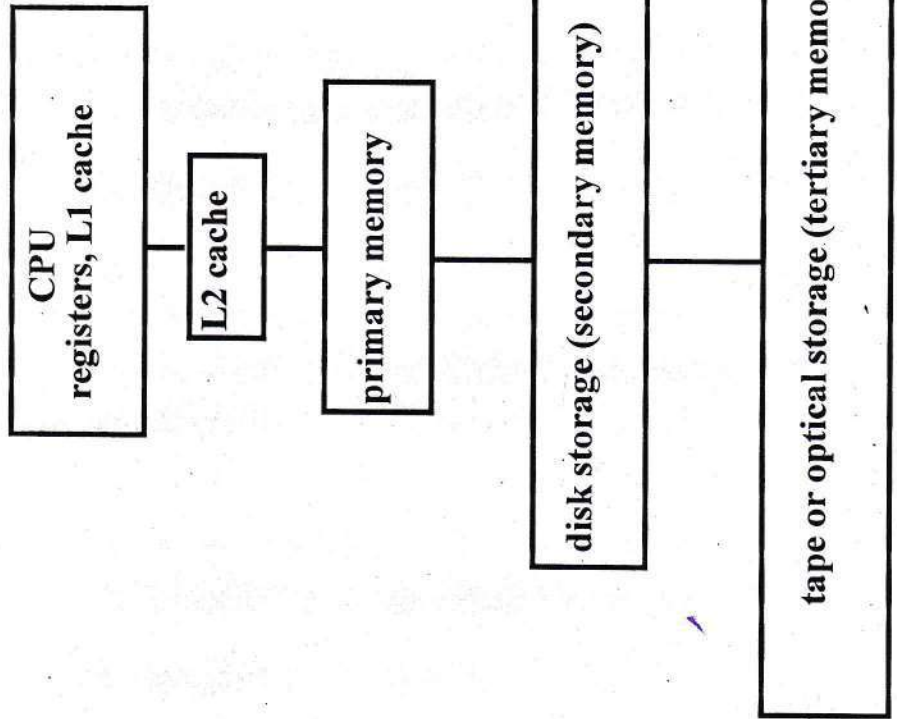
Secondary Storage is usually:

- anything outside of "primary memory"
- storage that does not permit direct instruction execution or data fetch by load/store instructions
- it's large
- it's cheap
- it's non-volatile
- it's slow

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The Memory Hierarchy

Memory is arranged as a hierarchy



Each level acts as a cache of data from the level below.

random access

sequential access

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Ms. Vandana

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Home automation (Controlling)	Dr. Deepak Sonker	Computer Application Department	INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN	21-Feb	2278-1021	https://www.ugcjournal-list-website/journal/353/Int		Yes, UGC Care list
Measurement of Temperature	Dr. Deepak Sonker	Computer Application Department	Journal of Engineering, computing & Architecture	21-May	1934-7197	http://journaleca.com/Volume-11-Issue-5-MAY-2021/		Yes, UGC Care list
Smart Door Using Ultrasonic Sensors	Dr. Deepak Sonker	Computer Application Department	International Journal of Advanced Research in Science, Communication and	21-Jun	2581-9429	http://ijarsct.co.in/june1.html		Yes, UGC Care list
Bluetooth Car Controlled	Dr. Deepak Sonker	Computer Application Department	International Journal of Advanced Research in Science, Communication and Technology	Sep-21	2581-9429	https://doi.org/10.48175/IJARSCT-1963	https://ijarsct.co.in/sep1.html	Yes, UGC Care list
LED blink/fade with Node MCU	Dr. Deepak sonker	Computer Application Department	International Journal of Science, Communication and Technology	21-Sep	2581-9429			Yes, UGC Care list
A survey of drone using IOT	Dr. Arti Bajaj	Computer Application Department	International Journal of science, communication and technology.	23-Mar	2581-9429	http://ijarsct.co.in/Mar312.html	http://ijarsct.co.in/Mar312.html	Yes, UGC Care list
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The concept of Fog Computing with IOT algorithms and challenges	Ms. vandana	Computer Application Department	Education and society	23-May	ISSN 2278-6864			

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Impact of Artificial Intelligence on Jobs	Ms. Sania Kukkar	Computer Application Department	Journal of Fisheries Science	1-Apr	http://sifisheriesciences.com/index.php/journal/article/view/1518			
A Study on Wireless Communication	Ms. Sania Kukkar	Computer Application Department	Conference Proceedings	1-Jun				
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