Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Empowered Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wanadongri, Nagpur - 441 110
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Department of Computer Science & Engineering (IOT)

Vision of the Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of where you want.	**Mission:** Means to achieve Vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2	**Core Competence**	**E: Environment (Learning Environment)**	
PEO3	**Breadth**	**P: Professionalism**	
PEO4	**Professionalism**	**C: Core Competence**	
PEO5	**Learning Environment**	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)

Keywords of POs:
Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
Bhushan V. Tayade
10-08-2025

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Session	**2025-26 (ODD)**	**Course Name**	**Operating System Lab**
Semester	**5**	**Course Code**	**23IOT1504**
Roll Number	**035**	**Name of Student**	**Bhushan V. Tayade**

Practical Number	1
Course Outcome	1. Understand Computer System Configuration and Simulate system resources efficiently using Linux Commands (CO1) 2. Analyse operating system functionalities utilizing system calls, thread programming and process scheduling algorithms (CO2) 3. Apply Synchronization primitives to implement a Deadlock-free solution(CO3) 4. Simulate Disk scheduling, Memory allocation, File allocation, page replacement algorithms (CO4)
Aim	Explore Configuration details of Computer System Hardware and Operating System of your personal computer/Laptop with respect to: A. Processor model B. RAM size C. Processor frequency D. Cache memory size E. SSD and HDD capacities F. Operating system (32-bit or 64-bit) G. Hyper-threading support: Indicate if the processor supports hyperthreading and provide a brief explanation.
Problem Definition	In modern computing, understanding the detailed configuration of a computer system is essential for evaluating its performance and compatibility with various applications. The problem focuses on identifying and analyzing the hardware and operating system specifications of a personal computer or laptop. This involves examining critical system parameters such as processor model, RAM capacity, clock frequency, cache memory size, and storage details (SSD and HDD). Additionally, determining the operating system architecture (32-bit or 64-bit) and assessing hyper-threading support are necessary to understand system efficiency, multitasking capabilities, and

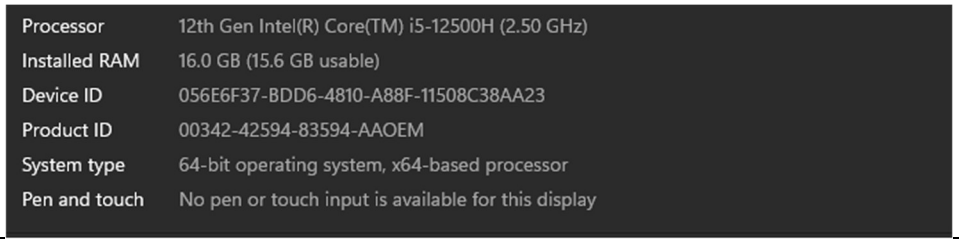
	performance optimization.
Theory (100 words)	1. Processor Model: The Central Processing Unit (CPU) serves as the primary component and the "brain" of a computer system, responsible for executing all computational and control operations. When input data is provided through an input device, the CPU processes it through a sequence of steps: fetching instructions from memory, decoding them to determine the required operation, executing the instruction, and finally storing or displaying the result. The CPU is composed of three essential units: • Arithmetic Logic Unit (ALU): Performs all arithmetic and logical operations. • Control Unit (CU): Manages and directs the flow of data and instructions within the system. • Registers: Provide high-speed temporary storage for intermediate data and instructions. 2. RAM Size: Random Access Memory (RAM) functions as the system's temporary storage, enabling quick access to data and instructions while programs are running. When an application is launched, it is loaded into RAM, allowing the processor to retrieve information rapidly and ensure smooth operation. Technicians can identify the type and capacity of RAM installed, replace or upgrade modules, and diagnose memory-related issues. Before performing maintenance, it is advisable to back up critical data to prevent loss of important files. Understanding various RAM types, their speeds, and error correction mechanisms is essential for optimal system performance. 3. Processor Frequency: Processor frequency, commonly referred to as clock speed, denotes the number of cycles the CPU executes per second and is measured in gigahertz (GHz). A higher frequency generally corresponds to faster processing capability; however, overall system performance also depends on factors such as core count, cache size, and architecture efficiency. The CPU handles numerous instructions per second, ranging from simple arithmetic to complex logical operations, and its frequency directly influences how quickly these tasks are performed. 4. Cache Memory Size:

Cache memory is a small but extremely fast type of memory located within or close to the CPU. It temporarily stores copies of frequently accessed data and instructions from the main memory (RAM), thereby reducing access time and improving processing speed. Modern processors utilize multiple levels of cache (L1, L2, and L3) to balance speed and capacity, ensuring efficient data retrieval and minimizing latency during computation.

5. SSD and HDD Capacities:
   Hard Disk Drives (HDDs) and Solid State Drives (SSDs) are primary data storage devices used in computers. HDDs use magnetic platters to store data, while SSDs employ flash memory chips, resulting in faster data access, lower latency, and improved durability. Although HDDs offer larger storage at a lower cost, SSDs provide superior performance, quicker boot times, and enhanced reliability due to the absence of mechanical parts. The total storage capacity depends on the system configuration and user requirements.

6. Operating System (32-bit or 64-bit):
   Processors are typically designed with either 32-bit or 64-bit architectures, which determine the amount of memory the system can efficiently access and manage.
   - A 32-bit system can address up to 2^{32} memory locations, equivalent to approximately 4 GB of RAM.
   - A 64-bit system, however, can theoretically address 2^{64} memory locations—amounting to several quintillion bytes—allowing it to handle much larger memory capacities. Modern computing systems predominantly use 64-bit architectures for enhanced performance, stability, and compatibility with high-memory applications.

7. Hyper-Threading Support:
   Hyper-Threading Technology (HTT), developed by Intel, enables a single physical processor core to function as two logical cores. This allows simultaneous execution of multiple instruction threads, thereby enhancing parallel processing and system responsiveness. Hyper-threading is particularly advantageous in multitasking environments and for applications optimized for multi-threaded performance, such as data processing, virtualization, and rendering tasks.

	Configuration of Your system (Desktop, Laptop and Mobile): 1. Device name: AryanPalsapure 1. Processor: 12th Gen Intel(R) Core(TM) i5-12500H (2.50 GHz) 2. Installed RAM : 16.0 GB (15.6 GB usable) 3. Device ID : 056E6F37-BDD6-4810-A88F-11508C38AA23 4. Product ID : 00342-42594-83594-AAOEM 5. System Type : 64-bit operating system, x64-based processor 6. Pen and Touch : No pen or touch input is available for this display Mobile Specifications: 1. Device Name : Moto g62 5G 2. Android version : 13 3. RAM : 8GB 4. ROM : 128 GB 5. Display : 2400 * 1080, 120Hz 6. Camera : Front 16 MP / rear 50 MP + 2 MP + 8 MP 7. Chipset: Qualcomm SM 4350 8. GPU : Adreno 619 9. Battery Capacity : 5000 mAh
Procedure and Execution (100 Words)	Step for Implementation: -
	Code: -
	Output: 
Output Analysis	The hardware and software configuration of the analyzed devices was successfully examined to determine their key system parameters. The personal laptop under observation featured a 12th Generation Intel® Core™ i5-12500H processor operating at a base frequency of 2.50 GHz, supported by 16 GB of RAM and a 64-bit operating system architecture. The processor incorporates advanced multi-core design and supports hyper-threading technology, enabling efficient multitasking and parallel execution of processes. The cache memory and processor frequency collectively enhance the

	system's speed and responsiveness, while the SSD storage contributes to faster data access, reduced boot times, and overall system stability. The absence of a touch interface is compensated by strong CPU-GPU integration, ensuring smooth performance for computational and multimedia tasks. For the mobile device (Moto G62 5G), specifications revealed an 8 GB RAM, 128 GB ROM, and a Qualcomm SM4350 chipset paired with an Adreno 619 GPU, providing balanced performance for daily use, gaming, and multitasking. The 5000 mAh battery ensures extended uptime, while the 120 Hz display offers fluid visual performance. Collectively, these results demonstrate that both the laptop and mobile device possess modern configurations suitable for high-performance computing and communication tasks.
Link of student Github profile where lab assignment has been uploaded	"https://github.com/Bhushan-Tayade/YCCN-23071391.git"
Conclusion	The practical analysis successfully explored and documented the configuration details of the computer system hardware and operating systems used in both the personal laptop and mobile device. The study highlighted the significance of understanding each hardware component—such as processor model, RAM capacity, cache size, and storage type—in assessing the system's computational efficiency. The findings confirmed that the analyzed laptop operates on a 64-bit Windows environment with Intel's hyper-threading technology, providing strong support for multitasking and performance-intensive applications. Similarly, the mobile device demonstrated an optimized configuration suitable for modern smartphone operations. Overall, this experiment reinforced the importance of hardware-software compatibility and performance awareness, enabling users to make informed decisions about system maintenance, upgrades, and efficient utilization of computing resources.

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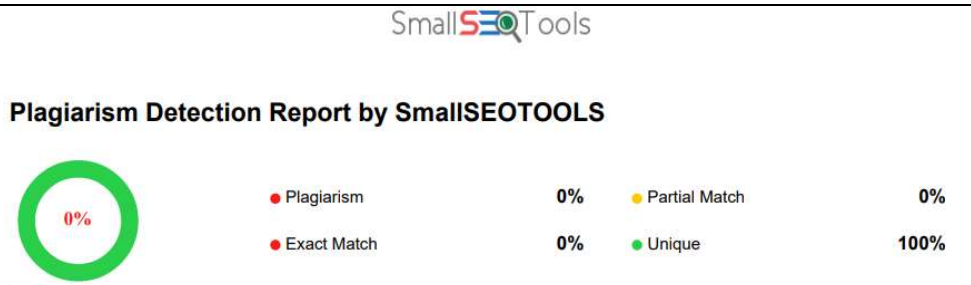
Plag Report (Similarity index < 12%)	
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