Course: Fundamental of Computers (8403) **Semester: Spring, 2023**

Level: BBA (4 Years)

Assignment no 1

Q. 1 Six Types of Computers Designed for Use by a Single Person

Computers designed for use by a single person are known as personal computers (PCs). There are six main types of personal computers:

1. **Desktop Computers:** These are the traditional PCs that are designed to be placed on a desk or table. They consist of a separate monitor, keyboard, mouse, and the main processing unit (CPU) housed in a tower or a compact form factor. Desktop computers are versatile and can be customized with various hardware components.
2. **Laptop Computers:** Also known as notebooks, laptops are portable PCs that integrate the monitor, keyboard, and touchpad (or trackpad) into a single unit. Laptops are lightweight and compact, making them ideal for users who need to work on the go.
3. **Tablet Computers:** Tablets are handheld devices with touchscreens that allow users to interact with the device directly using their fingers or a stylus. They are more portable than laptops and are commonly used for entertainment, browsing, and productivity tasks.
4. **Ultrabooks:** Ultrabooks are a specific category of laptops that emphasize portability, thinness, and performance. They typically feature faster processors and solid-state drives (SSDs) for quicker boot times and application loading.
5. **Convertible or 2-in-1 Computers:** These devices offer a hybrid form factor, allowing users to switch between laptop and tablet modes. They often have a detachable keyboard or a 360-degree hinge, enabling versatile use.
6. **All-in-One Computers:** All-in-one PCs combine the monitor and CPU into a single unit, resulting in a space-saving design. They are similar to desktop computers but have a neater and more integrated appearance.

Detailed Explanation:

1. **Desktop Computers:** Desktop computers are the most common type of personal computer found in offices and homes. They offer high performance, extensive customization options, and room for expansion with additional

hardware components like graphics cards, RAM, and storage drives. They are best suited for tasks that require substantial computing power, such as video editing, gaming, and professional work.

2. **Laptop Computers:** Laptops provide the convenience of portability, allowing users to carry their computing power with them. They are suitable for general tasks like web browsing, word processing, and multimedia consumption. Laptops come in various sizes and specifications to cater to different needs, ranging from budget-friendly models to high-end performance laptops for gaming and content creation.
3. **Tablet Computers:** Tablets are lightweight and easy to use with touch gestures. They are popular for entertainment, reading e-books, watching videos, and browsing the internet. While they are not as powerful as laptops or desktops, tablets offer portability and convenience, making them ideal for casual users.
4. **Ultrabooks:** Ultrabooks are a subset of laptops known for their sleek design and high performance. They prioritize portability without compromising on power, making them suitable for professionals who need a lightweight device for work on the go.
5. **Convertible or 2-in-1 Computers:** These devices combine the functionalities of a laptop and a tablet, offering versatility and flexibility. Users can use them as traditional laptops with a keyboard for productivity tasks or fold the screen back or detach it to use them as tablets for touch-based interactions.
6. **All-in-One Computers:** All-in-one PCs have a streamlined design where the monitor and CPU components are integrated into a single unit. They save space and reduce cable clutter on the desk. All-in-one computers are suitable for general computing tasks, multimedia consumption, and light productivity work.

Q. 2 How Data is Stored on Magnetic Discs and Optical Discs

i) Magnetic Disc:

Magnetic discs, such as hard disk drives (HDDs), use magnetic storage to store data. The surface of the disc is coated with a ferromagnetic material. Data is recorded on the disc using a read/write head, which magnetizes tiny regions on the disc's surface. These regions represent binary data, with 1s and 0s indicated by the direction of magnetization (e.g., north for 1 and south for 0).

When data is to be read, the read/write head detects the magnetic orientation of the regions, converting it back into binary data. The spinning motion of the disc allows the read/write head to access different areas of the disc rapidly. This non-volatile storage enables data to be retained even when the power is turned off.

ii) Optical Disc:

Optical discs, such as CDs, DVDs, and Blu-ray discs, use optical storage to store data. The surface of the disc is covered with a thin layer of reflective material (typically aluminum) sandwiched between two layers of clear plastic. Data is stored as microscopic pits and lands on the reflective layer.

To write data onto the disc, a laser beam is used to create pits on the reflective layer. Pits represent 0s, and lands (the flat areas between pits) represent 1s. The laser alters the reflective properties of the material, making the pits appear darker when the disc is read by a laser beam. This pattern of pits and lands forms the data, and a series of pits and lands represent individual bytes of information.

Reading the data involves shining a laser beam onto the surface of the disc. The laser's light is reflected differently by pits and lands, and a sensor detects these reflections, converting them into binary data. Unlike magnetic storage, optical storage is read-only, meaning data can be read from the disc but not written or modified.

Q. 3 Four Different Ways to Acquire Software

1. **Commercial Off-The-Shelf (COTS) Software:** COTS software refers to pre-packaged software solutions developed by software vendors and available for purchase in the market. Examples include Microsoft Office, Adobe Photoshop, and antivirus software. Users can buy COTS software licenses directly from vendors or authorized retailers. COTS solutions are often feature-rich and widely used, suitable for a broad range of users.
2. **Custom Software Development:** Custom software is specifically designed and developed to meet the unique requirements of a particular organization or individual. It involves collaboration between the software development team and the client to define and implement the desired functionalities. Custom software is tailored to address specific business needs and offers greater flexibility and scalability. However, it is typically more expensive and time-consuming to develop compared to COTS software.
3. **Open-Source Software:** Open-source software is freely available and distributed with its source code, allowing users to view, modify, and distribute the code as per the terms of the open-source license. Examples include the Linux operating system and web development frameworks like WordPress. Open-source software encourages community collaboration and fosters innovation through collective contributions from developers worldwide.
4. **Software as a Service (SaaS):** SaaS is a cloud computing model where software applications are provided over the internet on a subscription basis. Users can access and use the software through web browsers without the need

for installation or maintenance. Examples of SaaS include online productivity suites like Google Workspace and cloud-based customer relationship management (CRM) systems like Salesforce. SaaS offers scalability, automatic updates, and cost-effectiveness for users.

Q. 4 Computer Program, Flowcharts, and Pseudo Code in Programming

Computer Program: A computer program is a sequence of instructions written in a programming language that directs a computer to perform specific tasks or operations. It is the fundamental component of software that enables the computer to execute desired functions, process data, and produce results. A program can be as simple as a calculator app or as complex as an operating system.

Flowcharts: Flowcharts are graphical representations of a sequence of steps or actions in a process. In programming, flowcharts visually represent the logical flow of a computer program, illustrating how the program executes different operations and makes decisions. Each step in the flowchart is represented by a shape, and arrows indicate the direction of the flow from one step to another. Flowcharts are beneficial during the design and planning phase of a program, as they help visualize the program's structure and logic.

Pseudo Code: Pseudo code is a high-level, human-readable representation of a computer program's algorithm or logic. Unlike flowcharts, pseudo code is written in plain language with informal syntax that closely resembles the structure of a programming language. It does not follow strict rules or conventions and is primarily used as a way to express the logic of a program algorithmically before actual coding begins. Pseudo code helps programmers outline the steps and conditions in a program's logic without worrying about specific programming language syntax.

The use of flowcharts and pseudo code aids in programming in the following ways:

- **Planning and Design:** Flowcharts and pseudo code allow programmers to plan the program's structure and logic before writing the actual code. They provide a clear visual representation of the program's flow, making it easier to identify potential issues and optimize the algorithm.
- **Communication:** Flowcharts and pseudo code facilitate communication between team members and stakeholders involved in the programming process. They present the program's logic in a simple, visual manner that is easily understandable to non-programmers.

- **Debugging and Troubleshooting:** By having a clear flowchart or pseudo code representation of the program, programmers can trace the logic and identify bugs or errors more efficiently during the debugging process.

Q. 5 The Role of an Operating System in Running Software Programs

An operating system (OS) is a fundamental software component that manages and controls computer hardware and provides a platform for running software programs. The OS acts as an intermediary between application software and hardware, enabling software to communicate with the underlying system resources. The following are the key roles of an operating system in running software programs:

1. Process Management: The OS manages the execution of multiple software programs concurrently, known as processes. It allocates system resources such as CPU time, memory, and input/output (I/O) devices to different processes, ensuring each process gets fair access to resources.

2. Memory Management: The OS handles memory allocation, ensuring that each running program has sufficient memory space to execute without interfering with other programs. It manages virtual memory, allowing applications to access more memory than physically available through techniques like paging and swapping.

3. Device Management: The operating system controls the interaction between software programs and hardware devices. It manages input devices (e.g., keyboard, mouse) and output devices (e.g., display, printer), enabling applications to communicate with these devices without directly accessing hardware components.

4. File Management: The OS provides file system services, allowing software programs to read, write, and organize data on storage devices such as hard drives and solid-state drives. It manages files and directories, ensuring data integrity and access control.

5. User Interface: The operating system provides a user interface that allows users to interact with the computer system and execute software applications. It can be a graphical user interface (GUI) with icons and windows or a command-line interface (CLI) where users type commands.

6. Resource Allocation: The OS prioritizes and allocates resources to different software programs based on their priority and requirements. It ensures that critical system processes get the necessary resources to run efficiently.

Example: Consider a word processing software running on a computer with an operating system. When the user opens the word processing application, the OS manages the process of launching the software, allocates memory to the application, and handles input from the keyboard and mouse. When the user saves a document, the OS coordinates the process of writing the file to the storage device. If multiple applications are running simultaneously, the OS schedules and switches between them, ensuring each application gets the required CPU time and resources to function smoothly. Overall, the operating system provides a stable and controlled environment for software programs to run efficiently and interact with the computer hardware.