Research work -2

1. What is the boot process of a computer and what is a BIOS?

Booting is the process of starting a computer as initiated via hardware such as a button or by a software command.

BIOS identifies, configures, tests and connects computer hardware to the OS immediately after a computer is turned on. The combination of these steps is called the boot process. These tasks are each carried out by BIOS' four main functions: Power-on self-test (POST).

2. How operating system works? List down 5 tasks of an OS.

An operating system is a software package that runs applications and serves as a communication link (interface) between the computer hardware and the user.

The allocation of services and resources, like devices, memory, processors, and information, is the primary duty of an operating system. A traffic controller, a scheduler, a memory management module, a file system, and I/O programs are all included in the operating system to manage these resources.

Between the user and the computer hardware, an operating system serves as a communication bridge (interface). An operating system's objective is to provide a platform for a user to run programs in an efficient and convenient manner.

Security

To safeguard user data, the operating system employs password protection and other related measures. It also protects programs and user data from illegal access.

Control over System Performance

The operating system monitors the overall health of the system in order to optimise performance. To get a thorough picture of the system's health, keep track of the time between system responses and service requests. This can aid performance by providing critical information for troubleshooting issues.

Job Accounting

The operating system maintains track of how much time and resources are consumed by different tasks and users, and this data can be used to measure resource utilisation for a specific user or group of users.

Error Detecting Aids

The OS constantly monitors the system in order to discover faults and prevent a computer system from failing.

Coordination between Users and Other Software

Operating systems also organise and assign interpreters, compilers, assemblers, as well as other software to computer users.

3. What are the single board computers (SBC)? List down 5 examples.

A Single-Board Computer (SBC) is a complete, functioning computer in which the microprocessor, input/output functions, memory, and other features are all built on a singe circuit board, with RAM built in at a pre-determined amount and with no expansion slots for peripherals.

4. Which SoC is used in Raspberry pi, Beagle board black, Banana Pi, Jetson Nano, Coral Dev Board?

Raspberry pi

The Raspberry Pi 4 uses a Broadcom BCM2711 SoC with a 1.5 GHz (later models: 1.8 GHz) 64-bit quad-core ARM Cortex-A72 processor, with 1 MB shared L2 cache.

Beagle board black

It's based on the TI Sitara AM335- a SOC application processor with ARM Cortex A8 processor. It comes with a 512 RAM, and unlike the Raspberry Pi, it includes onboard storage in the form of 4GB eMMC Flash.

Banana Pi

It has an Allwinner H3 SoC with a quad-core CPU and an on-board Wi-Fi module. It runs Android, Debian, Ubuntu, and Raspberry Pi OS images for the Raspberry Pi.

Jetson Nano

The Jetson Nano is an 80 mm x 100 mm developer kit based on a Tegra SoC with a 128-core Maxwell GPU and quad-core Arm Cortex-A57 CPU.

Coral Dev Board

It includes NXP's iMX 8M system-on-chip (SoC), eMMC memory, LPDDR4 RAM, Wi-Fi, Bluetooth, and the Edge TPU.

5. What is Real-time operating system?

A real-time operating system (RTOS) is an operating system with two key features: predictability and determinism. In an RTOS, repeated tasks are performed within a tight time boundary, while in a general-purpose operating system, this is not necessarily so.

Common examples of real-time systems include air traffic control systems, process control systems, and autonomous driving systems.