RESEARCH WORK-1

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

A boot process refers to the process by which a computer starts up and loads an operating system after being turned on. The BIOS (Basic Input/Output System) is a firmware program that is responsible for initializing and testing the computer's hardware components and starting the boot process. The BIOS performs a series of checks on the hardware and system configuration, and then it starts to load the operating system. It also provides an interface for accessing and configuring the computer's hardware settings, such as the system time and date, the boot order, and other hardware-related settings. When the BIOS finishes its checks and configuration, it passes control of the boot process to the operating system, which then takes over and loads the necessary drivers, services, and applications to complete the boot process.

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

An operating system (OS) is the main software that manages all the hardware and software resources of a computer system. The main tasks of an operating system are:

1. Resource management: The OS is responsible for allocating and managing the resources of the system, such as CPU time, memory, and storage.
2. Memory management: The OS manages the memory by allocating space for running programs, storing data, and caching data for quick access.
3. Process management: The OS creates, schedules, and manages the execution of processes, which are the running instances of programs.
4. Input/Output management: The OS communicates with the hardware and software components of the system to perform input and output operations, such as reading from a keyboard or writing to a disk.
5. Security management: The OS enforces security policies, such as access control, to prevent unauthorized access to resources and protect against malware and other malicious activities.

In summary, the operating system acts as an intermediary between the computer hardware and the applications running on the computer, providing a stable and consistent environment for programs to run in.

3. What are the Single Board Computers(SBC)?List down 5 examples

Single Board Computers (SBCs) are complete computer systems integrated on a single circuit board, typically without the need for a separate motherboard or peripheral components. They are designed to be compact, low power, and low cost, making them popular in applications such as embedded systems, industrial control, and hobby projects.

Examples of SBCs include:

1. Raspberry Pi
2. Arduino
3. Odroid
4. BeagleBone Black
5. Jetson Nano (from Nvidia)

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

The System-on-Chip (SoC) used in Raspberry Pi, Beagle Board Black, Banana Pi, Jetson Nano, and Coral Dev Board are:

1. Raspberry Pi: Broadcom BCM2835
2. Beagle Board Black: Texas Instruments AM3359
3. Banana Pi: Allwinner A20
4. Jetson Nano: NVIDIA Tegra X1
5. Coral Dev Board: Google Edge TPU.

5.What is Real-Time Operating System?

A Real-Time Operating System (RTOS) is a type of operating system that is designed to provide a predictable and deterministic response to external events within a specified time constraint. It is optimized for applications that require fast and accurate response times, such as those in industrial control, automotive systems, medical devices, and embedded systems. The RTOS has a small footprint, low overhead, and is designed to handle multiple tasks concurrently with high efficiency. The key feature of an RTOS is its ability to process real-time data and to respond to real-world events in a timely manner, without any compromise on performance. They are also commonly used in avionics, military, and telecommunications applications that require real-time data processing and analysis.