Name: Ayush Jain
SAP ID: 60004200132
Div: B
Computer Engineering

OS: Assignment 2

Describe workings of following operating systems.

i) XV6 OS

→ 1) XV6 is a simple, UNIX like teaching operating system developed in the summer of 2006 by MIT.

2) It provides the basic interfaces introduced by Ken Thompson and Dennis Ritchie's UNIX operating system, as well as mimicking UNIX's internal design.

3) It provides Process management, synchronization, memory management, file management functionalities.

4) XV6 takes the traditional form of kernel, a speacial program that provides services to running programs. Each running program called a process, has memory containing instructions, data and a stack. The instructions implement the program's computation. The data are variables on which the computation acts. The stack organizes the program procedure calls.

5) The system call enters the kernel, the kernel performs the services and returns. Thus a process alternates between executing in user space and kernel space.

6) The kernel uses the CPU's hardware protection mechanisms to ensure that each process executing in user space can access only its own memory.

7) The kernel executes with the hardware priviledges required to implement these protections, user program execute without these priviledges.

8) When a user program invokes a system call, the hardware raises the priviledge level and starts executing a pre-

arranged function in the kernel.

9) XV6 does not provides a nation of users or of protecting one user from another, in UNIX terms, all XV6 process run as root.

ii) Real Time OS

→ i) Real Time Os are used in environments where a large number of events, mostly external to computer system, must be accepted and processed in short time or within certain deadlines.

2) Such applications are individual control, telephone, switching equipment, flight control and real time simulations.

3) It can be of 2 types:

① Hard Real Time Operating System.

② Soft Real Time Operating System.

4) Hard Real Time Os: These operating system guarantee that critical task be completed within range of time.

⇒ Ex: air bag controls in cars.

5) Soft Real Time Os: This Os provides some relaxation in time input. Example: multimedia systems.

6) There are different types of basic functionalities of an RTOS are following.

1. Priority based Scheduling.
2. System clock interrupt routine.
3. Deterministic behaviours.
4. Synchronization and Messaging.
5. RTOS services.

→ Priority based Scheduling:

Multitasking operations is accompolished by scheduling process

for execution independently of each other. Each process is assigned a certain level of priority that corresponds to the relative importance of the event that it services. The processor is allocation to the highest priority process. This type of scheduling is called priority based scheduling.

7) System clock Interrupt Routine:

To perform the time sensitive operations the RTOS will provide some sort of system ~~cotts~~ clocks.

8) Deterministic Behaviour:

The RTOS move to great length to protect that whether you have taken 100 tasks or 10 tasks, it does not make any difference in the distance to switch context and it determine the next highest priority tasks.

9) Sychronization and Messaging:

Messaging provides a means of communication with other system and between the tasks. The messaging services includes:

(1) Semaphores.
(2) Event flags.
(3) Mailboxes.
(4) Pipes
(5) Message queues.

10) RTOS services:

The most important part of OS is the Kernel. As tasks cannot acquire CPU attention all the time, the Kernel must also provide some more services. These include:

(1) Interrupt handling services.
(2) Time services.
(3) Device Management services.
(4) Memory Management Services
(5) Input Output Services.

(iii) Mobile OS

→ 1) A mobile OS is an operating system that provides to run other application softwares on mobile devices. It is same kind of software as the famous computer operating system title Linux and windows, but they are light and simple to some extent.

2) A mobile OS typically starts up when a devices powers on presenting a screen with icons or titles that present info and provide application access. Mobile OS also manage cellular and wireless network connectivity, as well as phone access.

3) The OS found on smart phones include symbion OS, iphone OS, RIM's Blackberry, Android, Windows.

4) Mobile operating system delivers various features to users and the distinguishing feature that mobile OS offers is the ~~availability~~ ability to connect to the internet via the smartphones built in modem and a wireless service provider such as verizon and AT&T.

5) Many mobile operating system offers a native web browser application, which allows users to search the internet and visit webpages.

6) Several mobile operating system have native GPS (global positioning system) application that allows users to search to locations, follow step by step directions and share locations with other devices.