

COMSATS UNIVERSITY ISLAMABAD, ABBOTTABAD CAMPUS

Operating Systems

**Assignment # 1**

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Assignment Question # 01

**Clustered system vs. microprocessors Systems**

Clustered systems and microprocessors both are the type of parallel computing system, but with different architecture and purpose.

Clustered system are the collection of independent computers that are connected by means of network. However multiprocessor systems have multiple processor in a single machine with same memory. Clustered systems are more diverse and scalable in terms of hardware and operating system while microprocessors have tightly coupled architecture and also require careful synchronization to function properly.

**Clustered Systems**

* Cooperation for highly available service:

Two machines belonging to a cluster to provide highly available service; they need a redundant hardware, shared storage system and a software that enable failover mechanisms. They uses the techniques like: load balancing and replication to ensure continuous services even if one of them fails to work.

**Multiprocessor Systems**

* Cooperation for highly available service:

Multiprocessor do not provide the same level of fault tolerance as clustered systems provide. But they can still cooperate to provide highly available service by using techniques like: physical security insurance, redundancy in cooling systems and power failures, backup & recovery procedures.

Assignment Question # 02

**Challenges of designing OS for mobile devices:**

A careful balance is required to design OS for mobile devices to provide powerful functionalities and better performance within limitations of hardware. Let’s discuss the challenges faced in designing of mobile devices as compared to traditional PC’s:

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| **Challenges** | **Mobile devices** | **Traditional PC’s** |
| **Recourse limitations / restrictions** | Limited storage, battery life and processing power. | More processing power, RAM and large batteries. |
| **Hardware diversity** | Wide range of configuration among multiple devices. | Standardized hardware thus make software optimization easier. |
| **UI** | Touch base interfaces that are responsive | Rely on I/O devices like keyboard etc. |
| **Power management** | To have a longer battery life these devices need sophisticated power management. | PC’s usually have a stable power source connection. |
| **Connection** | Need a seamless switching between networks like cellular or Wi-Fi. | Generally stable as compared to mobile devices and wired. |
| **App environment** | Often controlled by the providers of platform like Apple app store. | Diverse distribution channels like third party options. |
| **Security issues** | Portability risks & increased loss or theft of devices. | Significant risks but less as compared to mobile devices. |
| **Multitasking** | Require efficient multitasking & memory management because of less resources. | Having more recourses for smother working (multitasking). |
| **Updates** | Require the management of software updates because of resources. | Because of less variation in hardware they are easier to adapt updates. |

Assignment Question # 03

**Advantages & disadvantages of open-source operating systems:**

**Advantages:**

1. Cost:

Open source OS are available to anyone; easy to access. Advantageous for: Individuals & Organization with low budget

1. Customizability

Open source are easy to modify and use according to need thus making it customizable for every user. Advantageous for: Developers or tech people, Business with specific requirements

1. Community support

Communities provide support, updates and array of software. Good for: developers who are looking for collaboration or business seeking supportive community.

1. Innovation

Open-source is on rapid innovation because of worldwide collaboration by developers. Advantageous for: industries where advancements are crucial.

**Disadvantages:**

1. Support

As compared to commercial OS they have limited official support. Disadvantageous for: non-technical users, enterprise which require dedicated support.

1. Complex

Due to Customizability complexity occurs thus making it challenging for non-technical users. Disadvantageous for: non-technical users, individuals who are seeking for straightforward solutions.

1. Compatibility

Some software & hardware may not be available for open-source OS. Specialized hardware may lack drivers. Disadvantageous for: users relying on proprietary software’s or hardware needs, gamers relying on specialized graphics.

1. Security

Open source code may have malicious vulnerabilities. Disadvantageous for: large enterprises, organizations with strict security issues.

Assignment Question # 04

**Services provided by OS**

1. File management

Convenience: allows users to manipulate files easily; read, write, delete, update.

User level limitations: user-level programs don’t necessary permissions and direct access to hardware.

1. Memory management

Convenience: OS manages memory allocation and enable efficient usage of RAM

User level limitations: user programs don’t directly allocate memory of system.

1. Process management

Convenience: allow multiple processes to run concurrently

User level limitations: user level can’t manage other processes or use resources without OS control.

1. Device management

Convenience: for seamless user interaction OS handles communication with hardware devices

User level limitations: lack direct access to hardware devices for stability.

1. Security control

Convenience: OS ensures data integrity by access control and user permissions.

User level limitations: user programs cannot implement security measures.

Assignment Question # 05

**Similarities & Difference between IOs and Android**

**Similarities:**

1. Both have institutive UI featuring folders, app icons, widgets etc.
2. Both platforms have allocated app stores thus providing millions of apps for user to compute.
3. Both android and IOs allow their users to customize devices like notifications, wallpaper etc.
4. Both have connectivity support to network Wi-Fi, Bluetooth.
5. Both support multitasking among multiple apps and also allow to switch between them.
6. Both have security features like boot processes, encryption, and permissions to protect data.
7. Both allow us to integrate with cloud services.
8. Both platforms give software updates, including new features thus ensuring security and enhance user experience.

**Differences:**

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| --- | --- | --- |
|  | IOS | Android |
| Developed by | Developed by Apple Inc. | Developed by OHA |
| Customization options & UI | Limited customization with uniform UI | High level customizations with diverse UI |
| Diversity in hardware | Limited | wide range of devices |
| File management | Limited access to file system | More access to file system |
| System updates | Apple itself pushes updates to their devices as compared to android | Their updates depends on manufacturers |
| Malware | Have low vulnerabilities due to strict policies | Have high vulnerabilities due to many app sources |
| Multitasking | IOS has limited background processes for applications. | More extensive then iOS |
| Backup | ICloud | Usually Gdrive |