**OS Assignment 1**

Q1)

(i) At home, a system manager may use a laptop fitted with a multiprocessor (such as dual-core architecture, i5, i7 etc.) and updated storage devices like SSD and multiple I/O devices like keyboard and mouse.

(ii) At office, a system manager uses a client server computing environment so that he can manage all his employee’s work. At office he may use virtual machine as well.

(iii) During commute, a system manager uses his phone (which is a touch screen interface) he takes pictures from his phone (the camera communicates with OS via system call).

Q2) (i) He uses windows at home (decentralized OS) because it provides easy to use GUI with buttons, icons, pictorial representation (of folder and directories).

(ii) At office, he has to use decentralized OS because he has to monitor the employees work and all employees’ computers have to request access for specific tasks from the manager(to be granted).

(iii) At commute, an his smartphone, he uses ios due to security features because ios is a closed system (less vulnerability).

Q3(i) In home, his laptop contains a dual core Pentium.it is a power efficient chip and because he does not do heavy or CPU intensive tasks symmetric processing is enough.

(ii) At office he uses a server grade PC with intel xeon (24-core multi-processor) to manage heavy tasks and virtualization which uses asymmetric multiprocessing.

(iii) In commute, on his phone he has Apple A15 bionic chip which is hexa-core and provides quick and efficient performance and processing.

Q4(i) At home, he may interact with a variety of computing devices like electronic washing machines or refrigerators or digital books (kindles).

(ii) At office, he will mostly find computers and servers or printers multimedia devices like projectors.

(iii) During commute, he interacts with cars infotainment system using features like Bluetooth to connect his phone or he may use navigation systems in his car.

Q5(i) In home, a banker check reports or employee performance from portal like software (for ex. Oracle) from home, from his personal computer. These are also software that can analyze statistics and mathematical calculations.

(ii) At office, he uses Microsoft excel to maintain a spreadsheet instead of manually keeping a balance sheet. It also can solve mathematical equations quickly than manually doing it. He can also use different programming languages to display graphs.

Q6 (i) The information system in most cars () uses API and is mostly used by drivers.

(ii) Android Auto / ios carplay allows drivers to link their smartphones with their car using Bluetooth.

Q7 (i)

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| Arduino | Raspberry pi |
| Memory management is just flash storage where sketch is stored. | Uses traditional style memory like SDRAM  Uses quad ram 1.4 GHz processor. |

(ii)

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| IOS | Android |
| GUI is mostly similar (touch screen interface button etc.) only cosmetic differences.  Both API have different programming languages | Android uses java ios uses objective c and swift. |

(iii) Simulation vs Emulation

A simulator creates an environment that mimics the behavior and configurations of a real device. On the other hand, an emulator duplicates all the hardware and software features of a real device.

Q8) Applications are OS specific due to each having its own unique system calls for e.g. their own file formats.

However, apps written in languages that include their own VM can be multi OS like java or apps written in standard languages like C, python, ruby that compile separately on each OS and have their interpreter available.

Q9)

Architecture:

Nowadays in most of our homes, we can find a multitude of smart devices usually connected through a wireless controller (for e.g. our internet routers).

These devices have a specific layered format such as:

Application network middleware perception.

Smartphones are also an example of residential based platform which is an extension of IOT.

Computing Environment:

Smart home environments try to facilitate as many as possible technology through which benefits may occur. Mainly the connectivity and ability to access features through one another (for e.g. switching on/off lights from smartphone).

Communication (in terms of OS):

As mentioned before processes may exchange information (either on same computer in between users) on a network.

It may occur through shared memory or through message passing (packets moved by OS).

An e.g. in smart homes can be that the thermostat can share information (temperature) to the heater/AC in order to automatically alter the room temperature by inc or dec AC.