# **Exercises-Chapter 2**

**Introduction to Architecture**

## What is the purpose of system calls? State two steps the OS needs to take to execute a system call.

System call proves the services of the OS to the user programs via API.

It provides an interface between a process and OS to allow user-level processes to request services of the OS. System calls are the only entry points into the kernel system.

Step 1) The processes executed in the user mode until the time a system call interrupts it.

Step 2) After that, the system call is executed in the kernel-mode on a priority basis

## Name five system calls relating to each major part of the OS including, processes management, memory management and file management. Briefly explain each call.

Process Control

* abort
* load
* execute
* get
* set

File Management

* create file
* delete file
* open file
* close file
* read
* write

Device Management

* request device
* release device
* read
* write
* get
* set

Information Maintenance

* get time
* get date
* set time
* set date
* get system data
* set system data

Communications

* create connection
* delete connection
* send message
* receive message
* attach remote devices
* detach remote devices

## What are the three general methods for passing parameters to the operating system when system call is made? Briefly explain each method.

The three methods of passing parameters to OS when a system call is made are:

1. Pass the parameters in registers. In some cases, there may be more parameters than registers.
2. Parameters stored in a block, or table, in memory, and address of block passed as a parameter in a register. This approach is taken by Linux and Solaris.
3. Parameters placed, or pushed, onto the stack by the program and popped off the stack by the OS

## What is the purpose of the command line interpreter? Is it part of the Kernel? Why or why not?

The purpose of the command line interpreter is that it reads commands from the user of from a file of commands and executes them, usually by turning them into one or more system calls.

It is usually not part of the kernel since the command interpreter is subject to changes.

1. State two differences between C API calls and system calls?

An API (Application Programming Interface) is a set of protocols, routines, functions that programmers use to develop software to facilitate interaction between distinct systems.

It helps to exchange data between various systems, devices, and applications.

A System Call is a programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on.

It allows a program to access services from the kernel of the operating system.

Another difference between API and System call is their usage. An API helps to exchange data between various systems, devices, and applications while a system call allows a program to access services from the kernel of the OS.

## What system calls have to be executed by a command interpreter or shell in order to start a new process?

A fork system call followed by an exec system call need to be performed to start a new process.

The fork call basically makes a duplicate of the current process, identical in almost every way (not everything is copied over)

The exec call is a way to basically replace the entire current process with a new program. It loads the program into the current process space and runs it from the entry point.

## What is the purpose of system programs?

System programs basically coordinate the activities and functions of hardware and software of a system and controls the operations of the hardware. An OS is the example of the system software. OS controls the computer hardware and acts like an interface between the application software’s.

## Name five system programs relating to each major part of OS, namely, processes management, memory management and file management. Briefly explain each program.

File Management

* create file
* delete file
* copy file
* rename file
* print file

File Modification

* Text editors to create/modify files
* Special commands
  + Search file contents
  + Transform text

Communications

* Provide mechanism for creating virtual connections among:
  + Processes
  + Users
  + Computer systems
* Allow user to send messages
* Allow user to browse webpages
* Allow user to transfer files

1. For each term below, state if it is a system call, system program or C API call or none of these

cd System Program

sys\_ write

ls System Program

scanf API, System Call

fork API, System Call

sys\_open

cp System Program

include

printf API

ps System Program

fopen API

date

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