

## TP2: PROCESS & THREAD

### 1. What is process?

- Process is an action or thing that are executed by program in system. For example, we write program c to calculate summation of 2 numbers. So when we execute that program, it becomes a running process that do its task to calculate a result of the 2 inputted numbers.

### 2. What are the attributes characteristics of a process?

- The following attributes characteristics are:
  - + **Process ID**: is the unique number assigned by OS to represent a process. Process ID has a unique 2-part number:
    - a. The first part is an index that corresponds directly to the address of an entry control block(ECB)
    - b. The second part is a counter that is incremented each time an ECB is reused. It reduces the risk of using a leftover process ID of an ECB that have been reused
  - + **Process State**: From the creation until completion, the process passes through many different states (New, Ready, Suspend ready, Running, Block or Wait, Suspend wait & Completion or termination)
  - + **CPU registers**: a small set of data holding places
  - + **Accounts information**: comprises the processes, procedures and systems that capture accounting data from business processes, record the accounting data in the appropriate records, classifying, summarizing and consolidating
  - + **I/O status information**: provides information about which input/output devices are to be allocated for a particular process
  - + **CPU scheduling information**: a process of determining which process will own CPU for execution while another process is on hold.

### 3. What is Process Life Cycle in Operating System? Explain each states.

- New: When a program is executed by OS into the main memory is called a **new process**
- Ready: After a process is created, it enters ready state. It waits for the CPU to be assigned
- Suspend ready: A process in ready state which is moved to secondary memory from main memory because of resource insufficient is called suspend ready state
- Running: One process in ready state will be chosen by OS depending on process scheduler
- Block or Wait: A process in running state can stay in **Block or Wait State** depending on process scheduler
- Suspend wait: Beside of removing the process in ready queue, it is better to remove the blocked process instead that wait for resource in the main memory. By doing this, it brings that blocked process to wait in the secondary memory to free space for other processes with higher priority in the main memory

- Completion or Termination: When a process finishes its execution, its comes to termination state which all context of that process will be deleted to free allocation space for other.
4. What is thread?
    - Thread is a single sequential flow of control created by program or process.
  5. What is Multithreading?
    - Multithreading is the ability that a program or process allows execution for multiple threads and can be executed independently.
  6. Explain the difference between thread and process
    - Process is basically the program that are dispatched from the ready state and are scheduled in the CPU for execution, while thread is the segment of a process which means a process can have multiple threads and these multiple threads are contained within a process.
  7. Following the snippet code below, how many 'A', 'B' and 'C' will be printed?

```
#include <stdio.h>
#include <unistd.h>
int main(int argc, char *argv[]){
    printf("A\n");
    fork();
    printf("B\n");
    fork();
    printf("C\n");
    return 0;
}
```

There exist 1 A, 2 B, 4 C

8. Following the snippet code below:
  - a. How many process will be created?
  - b. Draw the process hierarchy created by executing this code.
  - c. For each process in the hierarchy, indicate its output sequence (the order in which it executes printf).

```

#include <stdio.h>
#include <unistd.h>

int main(){
    printf("A\n");
    pid_t pid=fork();
    if(pid==0) {
        printf("B\n");
    } else {
        printf("C\n");
    }
    printf("D\n");
    fork();
    return 0;
}

```

a. 5 process will be created

b&c:

