CSE3241: Operating System and System Programming

Class-5

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Know PID of Our Program

Run the following program in one terminal and check its PID and parent's PID in another terminal:

- $ sudo apt install htop [if htop is not installed]
- $ htop
- $ pstree -ps <PID>
- $ kill -9 <PID> [terminate infinitely running process.]

```c
#include<stdio.h>

int main(){
        for(int i = 0; i <1; i--)
                printf("Hi\n");

        return 0;
}
```

Figure: InfiniteLoop.c

Know PID Inside Our Program

Run the following program again and again and see PIDs.

- getpid() is used to know PID of the process when the executable file of this C code runs.
- getppid() is used to know parent's PID of the process.

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

int main(){
        pid_t myPID, parentPID;

        myPID = getpid();
        parentPID = getppid();

        printf("PID of this process: %u\n", myPID);
        printf("PID of parent process: %u\n", parentPID);

        return 0;
}
```

Figure: PID.c

Process Tree

Processes are arranged in a tree structure, therefore, except the root process, each process has a parent process and $0 - n$ number of child processes.

In Ubuntu:

- **sched** has PID: 0.
- **init / systemd** has PID: 1.
  - it is directly or indirectly the parent process of all processes.
  - it starts as soon as the computer starts and continue running till, it is shutdown.

To see the process tree, type:

- $ pstree
- $ pstree -p
- $ pstree -ps <PID> [e.g., $ pstree -ps 1656]

Schematic diagram of Process Tree in Ubuntu