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#### **LAB 10**

kill -s process id
The list of signals for -s argument can be seen from the following:

```
(base) tazmeen@afroz:~$ kill -l
                 SIGINT
                                                                  SIGTRAP
 1) SIGHUP
                                 SIGQUIT
                                                  4) SIGILL
 SIGABRT
                 7) SIGBUS
                                 8) SIGFPE
                                                  9) SIGKILL
                                                                 10) SIGUSR1
11) SIGSEGV
                12) SIGUSR2
                                13) SIGPIPE
                                                 14) SIGALRM
                                                                 15) SIGTERM
16) SIGSTKFLT
                17) SIGCHLD
                                18) SIGCONT
                                                 19) SIGSTOP
                                                                 20) SIGTSTP
21) SIGTTIN
                22) SIGTTOU
                                23) SIGURG
                                                 24) SIGXCPU
                                                                 25) SIGXFSZ
                                28) SIGWINCH
26) SIGVTALRM
                27) SIGPROF
                                                 29) SIGIO
                                                                 30) SIGPWR
31) SIGSYS
                34) SIGRTMIN
                                35) SIGRTMIN+1
                                                 36) SIGRTMIN+2
                                                                 37) SIGRTMIN+3
38) SIGRTMIN+4
                39) SIGRTMIN+5
                                40) SIGRTMIN+6
                                                 41) SIGRTMIN+7
                                                                 42) SIGRTMIN+8
43) SIGRTMIN+9
                44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9
                                                 56) SIGRTMAX-8
                                                                 57) SIGRTMAX-7
58) SIGRTMAX-6 59) SIGRTMAX-5
                                60) SIGRTMAX-4
                                                61) SIGRTMAX-3
                                                                 62) SIGRTMAX-2
63) SIGRTMAX-1 64) SIGRTMAX
(base) tazmeen@afroz:~$
```

## kill -9 process id

```
Signals are an inter-process communicato which a signal is going to be delivered. The
                                                                                                                                                                                                                                                                                                                                                                                   Q ≡
              Ħ.
                                                                                                                                                                                                                      tazmeen@afroz: ~
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tazmeen@afroz: ~
4) SIGILL 5) SIGTRAP

13) SIGPPE 9) SIGKILL 10) SIGUSR1

13) SIGPIPE 14) SIGALRM 15) SIGTERM

13) SIGPIPE 14) SIGALRM 15) SIGTERM

22) SIGTTOU 23) SIGURG 24) SIGXFCPU 25) SIGKFSZ

23) SIGURG 24) SIGXFCPU 25) SIGKFSZ

24) SIGYSS 34) SIGRTMIN 35) SIGRTMIN+1 36) SIGRTMIN+2 37) SIGRTMIN+3

25) SIGRTMIN+4 39) SIGRTMIN+5 40) SIGRTMIN+6 41) SIGRTMIN+7 42) SIGRTMIN+8

27) SIGRTMIN+9 44) SIGRTMIN+15 50) SIGRTMIN+6 41) SIGRTMIN+12 47) SIGRTMIN+13

28) SIGRTMAN-14 49) SIGRTMIN+15 50) SIGRTMAN-14 51) SIGRTMAN-13 52) SIGRTMAN-12

29) SIGRTMAN-15 50) SIGRTMAN-9 56) SIGRTMAN-8 57) SIGRTMAN-7

29) SIGRTMAN-6 59) SIGRTMAN-5 60) SIGRTMAN-4 61) SIGRTMAN-3 62) SIGRTMAN-7

29) SIGRTMAN-1 64) SIGRTMAN

20) SIGRTMAN-1 64) SIGRTMAN

20) SIGRTMAN-1 64) SIGRTMAN

21) SIGRTMAN-1 64) SIGRTMAN

22) SIGRTMAN-1 64) SIGRTMAN

23) SIGRTMAN-1 64) SIGRTMAN

24) SIGRTMAN-1 65) SIGRTMAN-2 66) SIGRTMAN-3 66) SIGRTMAN-3 67) SIGRTMAN-7

25) SIGRTMAN-1 64) SIGRTMAN

25) SIGRTMAN-1 64) SIGRTMAN

26) SIGRTMAN-1 64) SIGRTMAN

27) SIGRTMAN-1 64) SIGRTMAN

28) SIGRTMAN-1 64) SIGRTMAN

29) SIGRTMAN-1 64) SIGRTMAN

20) SIGRTMAN-1 64) SIGRTMAN

21) SIGRTMAN-1 64) SIGRTMAN

22) SIGRTMAN-1 64) SIGRTMAN

23) SIGRTMAN-1 64) SIGRTMAN

24) SIGRTMAN-1 64) SIGRTMAN

25) SIGRTMAN-1 64) SIGRTMAN

26) SIGRTMAN-1 64) SIGRTMAN

27) SIGRTMAN-1 64) SIGRTMAN

28) SIGRTMAN-1 64) SIGRTMAN

29) SIGRTMAN-1 64) SIGRTMAN

20) SIGRTMAN-1 64) SIGRTMAN

21) SIGRTMAN-1 64) SIGRTMAN

22) SIGRTMAN-1 64) SIGRTMAN

23) SIGRTMAN-1 64) SIGRTMAN

24) SIGRTMAN-1 65) SIGRTMAN

25) SIGRTMAN-1 65) SIGRTMAN

26) SIGRTMAN-1 65) SIGRTMAN

27) SIGRTMAN-1 65) SIGRTMAN

28) SIGRTMAN-1 65) SIGRTMAN

29) 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                base) tazmeen@afroz:~$ echo hello
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ello
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  base) tazmeen@afroz:~$ ps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PID TTY
5789 pts/0
5895 pts/0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 TIME CMD
00:00:00 bash
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 00:00:00 ps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                base) tazmeen@afroz:~$ echo "Hello" > hello.txt
base) tazmeen@afroz:~$ ps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PID TTY
5789 pts/0
5905 pts/0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 TIME CMD
00:00:00 bash
00:00:00 ps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  base) tazmeen@afroz:~$
```

the second terminal is closed after executing this command because 9 is SIGKILL and it kill the process.

#### **5.1.1.1** Exercise

(signal 15) is a request to the program to terminate. If the program has a SIGTERM signal handler for SIGTERM that does not actually terminate the application, this kill may have no effect. This is the default signal sent by kill.

The integer representation for the SIGTERM signal is 15 current process running id 6133

```
Ŧ
                                  tazmeen@afroz: ~
                                                                           (base) tazmeen@afroz:~$ ps
    PID TTY
                     TIME CMD
  6133 pts/0
                 00:00:00 bash
  6152 pts/0
                 00:00:00 ps
(base) tazmeen@afroz:~$ ps -ef | grep bash
            5939
                                           00:00:00 bash
                    5771 0 08:28 pts/1
                 5771 0 08:36 pts/0
6133_ 0 08:38 pts/0
                                           00:00:00 bash
            6133
tazmeen
tazmeen
            6248
                                           00:00:00 grep --color=auto bash
(base) tazmeen@afroz:~$
```

```
(base) tazmeen@afroz:~$ kill -15 6133
(base) tazmeen@afroz:~$
```

```
(base) tazmeen@afroz:~$ ./test
Parent process (PID: 7294) waiting for child (PID: 7295)
Child process running (PID: 7295)
Child working...
Terminated
```

```
(base) tazmeen@afroz:~$ ps
PID TTY TIME CMD
7297 pts/2 00:00:00 bash
7310 pts/2 00:00:00 ps
(base) tazmeen@afroz:~$ kill -15 7294
(base) tazmeen@afroz:~$ ps au | grep bash
tazmeen 5939 0.0 0.0 11756 5248 pts/1 Ss+ 08:28 0:00 bash
tazmeen 6133 0.0 0.0 11756 5120 pts/0 Ss+ 08:36 0:00 bash
tazmeen 7297 0.0 0.0 11756 5376 pts/2 Ss 08:47 0:00 bash
tazmeen 7345 0.0 0.0 9432 2432 pts/2 S+ 08:48 0:00 grep --color=auto bash
(base) tazmeen@afroz:~$ kill -15 7294
bash: kill: (7294) - No such process
(base) tazmeen@afroz:~$
```

### KILL CALL()

### code:

```
C 1.c > 分 main()
     #include <stdio.h>
     #include <signal.h>
 4 #include <unistd.h>
     #include <stdlib.h>
 6
     int main() {
     printf("Tazmeen Afroz\n");
     printf("22P-9252\n");
     printf("BAI-5A\n");
12 int sum = 0;
13 int a = 6, b= 5;
     sum = a + b;
     printf("sum = %d\n", sum);
     printf("Killing the current process\n");
     // sleep(2);
     kill(getpid(), 9);
     printf("doesnot print\n");
```

## output:

```
(base) tazmeen@afroz:~/lab10$ gcc 1.c -o 1
(base) tazmeen@afroz:~/lab10$ ./1
Tazmeen Afroz
22P-9252
BAI-5A
sum = 11
Killing the current process
Killed
(base) tazmeen@afroz:~/lab10$
```

#### **SIGTERM**

```
C 1_b.c > 分 main()
 1 #include <stdio.h>
     #include <sys/types.h>
    #include <signal.h>
 4 #include <unistd.h>
   #include <stdlib.h>
 6 int main() {
 8
 9 printf("Tazmeen Afroz\n");
10 printf("22P-9252\n");
printf("BAI-5A\n");
12 int sum = 0;
13 int a = 6, b= 5;
14 sum = a + b;
    printf("sum = %d\n", sum);
   printf("Killing the current process\n");
17 // sleep(2);
18 kill(getpid(), 15);
   printf("doesnot print\n");
```

## Output:

```
(base) tazmeen@afroz:~/lab10$ gcc 1_b.c -o b
(base) tazmeen@afroz:~/lab10$ ./b
Tazmeen Afroz
22P-9252
BAI-5A
sum = 11
Killing the current process
Terminated
```

## 5.1.2.1 Exercise part a

```
(base) tazmeen@afroz:~/lab10$ gcc 2.c -o 2
(base) tazmeen@afroz:~/lab10$ ./2
Parent process
Parent process id: 10054
Child process id: 10055
Killing the child process
```

# in parent process killing the child process and output of ps shows defunct zombie process

```
(base) tazmeen@afroz:~
PID TTY
                      TIME CMD
  10058 pts/5
                 00:00:00 bash
  10071 pts/5
                 00:00:00 ps
(base) tazmeen@afroz:
USER
             PID %CPU %MEM
                                     RSS TTY
                                                   STAT START
                                                                 TIME COMMAND
tazmeen
            1341 0.0
                       0.0 162744
                                   5888 tty2
                                                   Ssl+ 07:53
                                                                 0:00 /usr/libexec/gdm-wayland-session env GNOME_SHELL_SESSION_MOD
                                                        07:53
tazmeen
            1344
                  0.0
                       0.1 223396 15360 tty2
                                                   Sl+
                                                                 0:00 /usr/libexec/gnome-session-binary --session=ubuntu
                                                                 0:00 bash
tazmeen
            6133 0.0
                       0.0
                             11756
                                    4608 pts/0
                                                   Ss+
                                                        08:36
                                                                 0:00 bash
tazmeen
            7297
                  0.0
                       0.0
                             11756
                                    4224 pts/2
                                                   Ss+
                                                        08:47
                                    5504 pts/3
                                                                 0:00 /usr/bin/bash --init-file /usr/share/code/resources/app/out/
tazmeen
            8324
                  0.0
                       0.0
                             11788
                                                   Ss+
                                                        09:01
            8858
                                    5248 pts/4
                                                                 0:00 bash
tazmeen
                  0.0
                        0.0
                             11760
                                                   Ss
                                                        09:06
                                                                 0:00 ./2
0:00 [2] <defunct>
0:00 bash
           10054 0.0
                       0.0
                                    1408 pts/4
                                                        09:30
tazmeen
                              2776
                                                   S+
           10055
                  0.0
                        0.0
                                       0 pts/4
                                                        09:30
tazmeen
tazmeen
           10058
                        0.0
                                     5120 pts/5
                                                        09:31
                                                                 0:00 ps au
           10079 0.0
                       0.0
                             13024
                                    3328 pts/5
                                                        09:31
tazmeen
(base) tazmeen@afroz:
```

### part b

```
This indicates the state of the process. S stands for sleeping.
    Child process
Child process id: 10305
Parent process id: 10304
     Killing the parent process
    Killed
    (base) tazmeen@afroz:~/lab10$ ps au
USER PID %CPU %MEM VSZ
                                             RSS TTY
                                                           STAT START
                  1341 0.0 0.0 162744
1344 0.0 0.1 223396
     tazmeen
                                           5888 tty2
                                                                          0:00 /usr/libexec/gdm-wayland-session env GNOME_SHELL_SESSION_MODE=ubunt
                             0.1 223396 15360 tty2
                                                                         0:00 /usr/libexec/gnome-session-binary --session=ubuntu
0:00 bash
                                                           Sl+ 07:53
     tazmeen
                  6133
                        0.0 0.0
                                   11756
                                                                 08:36
                                           4608 pts/0
     tazmeen
                                           4224 pts/2
                                                                 08:47
                                                                          0:00 bash
     tazmeen
     tazmeen
                  8324
                        0.0
                              0.0
                                   11788
                                           5504 pts/3
                                                           Ss+
                                                                09:01
                                                                         0:00 /usr/bin/bash --init-file /usr/share/code/resources/app/out/vs/work
                        0.0
                                           5248 pts/4
                                                                         0:00 bash
0:00 bash
                  8858
                             0.0
     tazmeen
                                   11760
                                                           Ss+
                                                                 09:06
                 10058
                                   11756
                                           5120 pts/5
                                                                 09:31
     tazmeen
                 10227
                        0.0
                                     2776
                                             768 pts/5
                                                                 09:34
                                                                          0:00
     tazmeen
                                     2776
     tazmeen
                 10255
                        0.0
                              0.0
                                             768 pts/5
                                                                 09:34
                                                                         0:00
                 10289
                        0.0
                              0.0
                                     2776
                                             768 pts/5
                                                                 09:35
                                                                         0:00
     tazmeen
     tazmeen
                10318 0.0 0.0 13024 3328 pts/5
     tazmeen
                                                                09:36
                                                                         0:00 ps au
    (base) tazmeen@afroz:~/lab10$ gcc 3.c -o 3 (base) tazmeen@afroz:~/lab10$ ./3
     Child process
```

The Ss state in the ps command output indicates that the process is in an interruptible sleep state and is the session leader.

- •S: The process is sleeping, meaning it is waiting for an event to complete.
- •s: The process is a session leader, which means it is the first process in a session and can control terminal input/output.

After some time no process is shown as it terminates the whole programming

## ctrl +c with signal call

```
(base) tazmengafroz:-/lab10$ gcc 4.c -o 4
(base) tazmengafroz:-/lab10$ ./4
Hello Dears
```

## ctrl +c without signal call

```
(base) tazmeen@afroz:-/lab10$ gcc 4.c -o 4
(base) tazmeen@afroz:-/lab10$ ./4
Hello Dears
Hello Dears
Hello Dears
^c
(base) tazmeen@afroz:-/lab10$
```