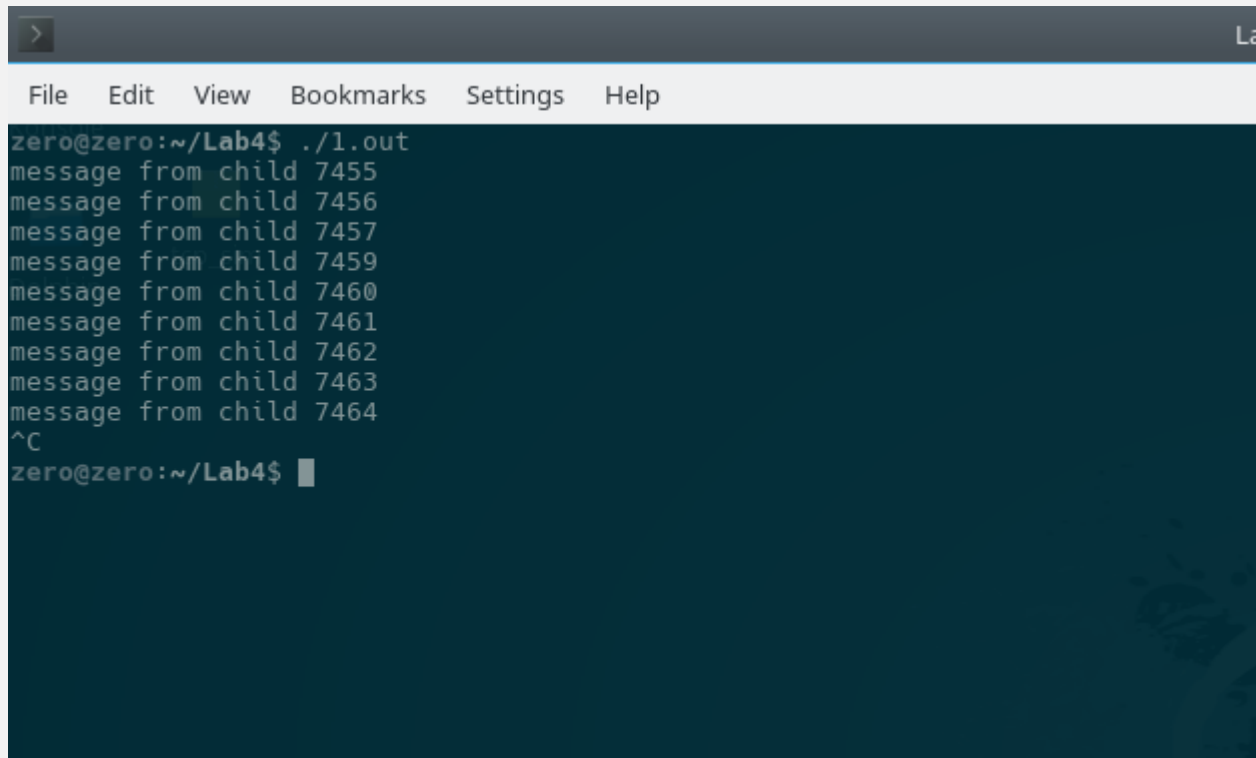


Q1)

شماره PID ها نشان دهنده این است که حتی پس از تمام شدن یک پروسه، شمارش پروسه ها ریست نمیشود، یعنی هر شماره فقط یکبار استفاده میشود.



```
>
File Edit View Bookmarks Settings Help
zero@zero:~/Lab4$ ./1.out
message from child 7455
message from child 7456
message from child 7457
message from child 7459
message from child 7460
message from child 7461
message from child 7462
message from child 7463
message from child 7464
^C
zero@zero:~/Lab4$
```

Q2)

Normal sleep

The screenshot displays two terminal windows. The left window, titled 'Lab4:2.out — Konsole', shows a series of messages where a parent process checks the status of four child processes (numbered 0 to 3). Each child is initially 'alive' and has a PID of 7713, 7714, 7715, and 7716 respectively. After a series of checks, a message indicates that child 7714 was waited for for 329 seconds and is now 'dead, creating new child'. The right window, titled 'Lab4:top — Konsole', shows the output of the 'top' command at 12:59:37. It reports system statistics: 4 users, load average of 0.36, 0.18, 0.14. CPU usage is 18.6% (150 total tasks, 1 running, 149 sleeping, 0 stopped, 0 zombie). Memory usage is 3084592 total, 1624324 free, 612316 used, 847952 buffer/cache, 2305684 available. Below the statistics is a table of processes with columns: PID, USER, PR, NI, VIRT, RES, SHR, S, %CPU, %MEM, TIME+, and COMMAND. The table lists various system processes like kthreadd, ksoftirqd, kworker, rcu_sched, rcu_bh, migration, lru-add-dra, watchdog, cpuphp, kdevtmpfs, kungtaskd, oom_reaper, writeback, kcompactd, ksm, khugepaged, crypto, integrityd, and bioset.

High CPU usage sleep

The screenshot displays two terminal windows. The left window, titled 'Lab4:2.out — Konsole', shows a series of messages where a parent process checks the status of four child processes (numbered 0 to 3). Each child is initially 'alive' and has a PID of 7953, 7954, 7955, and 7956 respectively. After a series of checks, a message indicates that child 7953 was waited for for 481 seconds and is now 'dead, creating new child'. The right window, titled 'Lab4:top — Konsole', shows the output of the 'top' command at 13:09:29. It reports system statistics: 4 users, load average of 4.32, 3.41, 1.80. CPU usage is 99.5% (149 total tasks, 5 running, 144 sleeping, 0 stopped, 0 zombie). Memory usage is 3084592 total, 1620976 free, 615376 used, 848240 buffer/cache, 2302592 available. Below the statistics is a table of processes with columns: PID, USER, PR, NI, VIRT, RES, SHR, S, %CPU, %MEM, TIME+, and COMMAND. The table lists various system processes, including several instances of 'zero' (PIDs 7956, 7954, 7955, 864, 7442, 7482) which are using high CPU percentages (57.3%, 56.3%, 56.0%, 23.5%, 5.0%, 0.3% respectively). Other processes like kthreadd, ksoftirqd, kworker, rcu_sched, rcu_bh, migration, lru-add-dra, watchdog, cpuphp, kdevtmpfs, kungtaskd, oom_reaper, writeback, kcompactd, ksm, khugepaged, crypto, integrityd, and bioset are also listed.

Q3)

```
> Lab4 : bash — Konsole

File Edit View Bookmarks Settings Help

zero@zero:~/Lab4$ ./3.out
Enter path to the executable (e.g. /bin/ls) [1024 chars]:/bin/ps
Enter arguments[1024 chars]:
  PID TTY          TIME CMD
 7447 pts/1    00:00:00 bash
 8393 pts/1    00:00:00 3.out
 8394 pts/1    00:00:00 ps
-----
## Date           Time           Exec Time(msec)   Path
## 2021-10-20      13:10          9                 /bin/ps
-----
Enter path to the executable (e.g. /bin/ls) [1024 chars]:/bin/ls
Enter arguments[1024 chars]:-l -U
total 56
-rwxr-xr-x 1 zero zero 13480 Oct 20 13:01 2.out
-rwxr-xr-x 1 root root 14144 Oct 20 12:07 3.out
-rw-r--r-- 1 zero zero  382 Oct 20 08:07 1.c
-rw-r--r-- 1 zero zero 1537 Oct 20 13:00 2.c
-rwxr-xr-x 1 root root 8960 Oct 20 05:49 1.out
-rw-r--r-- 1 zero zero 2662 Oct 20 12:07 3.c
-----
## Date           Time           Exec Time(msec)   Path
## 2021-10-20      13:11          2                 /bin/ls
-----
Enter path to the executable (e.g. /bin/ls) [1024 chars]:^C
zero@zero:~/Lab4$ █
```