

# 1.Kill processes by name

- ❖ ps aux grep firefox is only showing the **grep command itself**, not an actual Firefox process.  
So when you run kill 8674, Linux says “**No such process**” because that PID already exited and Firefox was not running.

```
Feb 2 5:13 PM
m309@m309-BY-OEM:~
```

```
m309@m309-BY-OEM: $ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START  TIME COMMAND
root        1  0.1  0.1  23736 14604 ?        Ss  15:44  0:06 /sbin/init splash
root        2  0.0  0.0      0     0 ?        S   15:44  0:00 [kthreadd]
root        3  0.0  0.0      0     0 ?        S   15:44  0:00 [pool_workqueue_release]
root        4  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-rcu_gp]
root        5  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-sync_wq]
root        6  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-kvfree_rcu_reclaim]
root        7  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-slab_flushwq]
root        8  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-netns]
root       11  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/0:0H-events_highpri]
root       13  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/R-mm_percpu_wq]
root       14  0.0  0.0      0     0 ?        I   15:44  0:00 [rcu_tasks_kthread]
root       15  0.0  0.0      0     0 ?        I   15:44  0:00 [rcu_tasks_rude_kthread]
root       16  0.0  0.0      0     0 ?        I   15:44  0:00 [rcu_tasks_trace_kthread]
root       17  0.0  0.0      0     0 ?        S   15:44  0:00 [ksoftirqd/0]
root       18  0.0  0.0      0     0 ?        I   15:44  0:00 [rcu_preempt]
root       19  0.0  0.0      0     0 ?        S   15:44  0:00 [rcu_exp_par_gp_kthread_worker/0]
root       20  0.0  0.0      0     0 ?        S   15:44  0:00 [rcu_exp_gp_kthread_worker]
root       21  0.0  0.0      0     0 ?        S   15:44  0:00 [migration/0]
root       22  0.0  0.0      0     0 ?        S   15:44  0:00 [idle_inject/0]
root       23  0.0  0.0      0     0 ?        S   15:44  0:00 [cpuhp/0]
root       24  0.0  0.0      0     0 ?        S   15:44  0:00 [cpuhp/1]
root       25  0.0  0.0      0     0 ?        S   15:44  0:00 [idle_inject/1]
root       26  0.0  0.0      0     0 ?        S   15:44  0:00 [migration/1]
root       27  0.0  0.0      0     0 ?        S   15:44  0:00 [ksoftirqd/1]
root       29  0.0  0.0      0     0 ?        I<  15:44  0:00 [kworker/1:0H-events_highpri]
root       30  0.0  0.0      0     0 ?        S   15:44  0:00 [cpuhp/2]
root       31  0.0  0.0      0     0 ?        S   15:44  0:00 [idle_inject/2]
root       32  0.0  0.0      0     0 ?        S   15:44  0:00 [migration/2]
root       33  0.0  0.0      0     0 ?        S   15:44  0:00 [ksoftirqd/2]
```

```
m309@m309-BY-OEM:~$ ps aux | grep firefox
root      8550  0.0  0.0      0     0 ?        I<  17:12  0:00 [kworker/u17:0]
m309      8557  1.7  0.6 698712 56156 ?        Ssl 17:12  0:00 /usr/libexec/gnome-terminal-server
m309      8572  0.0  0.0 11024  4976 pts/0    Ss  17:12  0:00 bash
m309      8672  0.0  0.0 13748  4592 pts/0    R+  17:12  0:00 ps aux
m309@m309-BY-OEM:~$ ps aux | grep firefox
m309      8674  0.0  0.0  9144  2248 pts/0    S+  17:12  0:00 grep --color=auto firefox
m309@m309-BY-OEM:~$ kill 8674
bash: kill: (8674) - No such process
m309@m309-BY-OEM:~$
```

## 2.Kill a process based on the process name

ps aux | grep firefox is only matching the grep command itself, meaning Firefox is not running. So kill 8674 and killall firefox fail because there is no Firefox process to terminate.

```
Feb 2 5:15 PM
m309@m309-BY-OEM: ~
m309      8672  0.0  0.0  13748  4592 pts/0    R+   17:12  0:00 ps aux
m309@m309-BY-OEM: $ ps aux | grep firefox
m309      8674  0.0  0.0  9144  2248 pts/0    S+   17:12  0:00 grep --color=auto firefox
m309@m309-BY-OEM: $ kill 8674
bash: kill: (8674) - No such process
m309@m309-BY-OEM: $ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START  TIME COMMAND
root        1  0.1  0.1  23736 14604 ?      Ss  15:44  0:06 /sbin/init splash
root        2  0.0  0.0      0     0 ?      S  15:44  0:00 [kthreadd]
root        3  0.0  0.0      0     0 ?      S  15:44  0:00 [pool_workqueue_release]
root        4  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-rcu_gp]
root        5  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-sync_wq]
root        6  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-kvfree_rcu_reclaim]
root        7  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-slub_flushwq]
root        8  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-netns]
root       11  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/0:0H-events_highpri]
root       13  0.0  0.0      0     0 ?      I< 15:44  0:00 [kworker/R-mm_percpu_wq]
root       14  0.0  0.0      0     0 ?      I  15:44  0:00 [rcu_tasks_kthread]
root       15  0.0  0.0      0     0 ?      I  15:44  0:00 [rcu_tasks_rude_kthread]
root       16  0.0  0.0      0     0 ?      I  15:44  0:00 [rcu_tasks_trace_kthread]
root       17  0.0  0.0      0     0 ?      S  15:44  0:00 [ksoftirqd/0]
root       18  0.0  0.0      0     0 ?      I  15:44  0:00 [rcu_preempt]
root       19  0.0  0.0      0     0 ?      S  15:44  0:00 [rcu_exp_par_gp_kthread_worker/0]
root       20  0.0  0.0      0     0 ?      S  15:44  0:00 [rcu_exp_gp_kthread_worker]
root       21  0.0  0.0      0     0 ?      S  15:44  0:00 [migration/0]
root       22  0.0  0.0      0     0 ?      S  15:44  0:00 [idle_inject/0]
root       23  0.0  0.0      0     0 ?      S  15:44  0:00 [cpuhp/0]
root       24  0.0  0.0      0     0 ?      S  15:44  0:00 [cpuhp/1]
root       25  0.0  0.0      0     0 ?      S  15:44  0:00 [idle_inject/1]
root       26  0.0  0.0      0     0 ?      S  15:44  0:00 [migration/1]
root       27  0.0  0.0      0     0 ?      S  15:44  0:00 [ksoftirqd/1]
```

```
Feb 2 5:16 PM
m309@m309-BY-OEM: ~
root      8057  0.0  0.0      0     0 ?      I  17:10  0:00 [kworker/1:0-events]
m309      8072 13.9  3.1 34288796 256160 ?      Sl 17:11  0:38 /snap/chromium/3010/usr/lib/chromium-browser/chrome --password-store
m309      8154  0.0  0.0 33568844 3592 ?      Sl 17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome_crashpad_handler
m309      8156  0.0  0.0 33560632 3376 ?      S  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome_crashpad_handler
m309      8160  0.0  0.7 33926264 60872 ?      S  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
m309      8161  0.0  0.7 33926252 60688 ?      S  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
m309      8163  0.0  0.1 33926280 15620 ?      S  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
m309      8174  0.6  0.9 541476 80312 ?      Sl 17:11  0:01 /usr/bin/Xwayland :0 -rootless -noreset -accessx -core -auth /run/us
m309      8183  0.0  0.9 762948 76152 ?      Ssl 17:11  0:00 /usr/libexec/gsd-xsettings
m309      8208  0.0  0.3 267132 24792 ?      Sl 17:11  0:00 /usr/libexec/ibus-x11
m309      8214  0.2  1.2 1153320 97740 ?      Sl 17:11  0:00 /usr/libexec/mutter-x11-frames
m309      8271  1.9  2.4 34441436 195104 ?      Sl 17:11  0:05 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=gpu-proce
m309      8288  1.1  1.3 33913600 110892 ?      Sl 17:11  0:03 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=utility -
m309      8298  0.0  0.6 33976752 53120 ?      Sl 17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=utility -
m309      8428  0.5  1.9 1212101844 157244 ?      Sl 17:11  0:01 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
m309      8440  0.0  0.5 67523116 46096 ?      Sl 17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=utility -
m309      8452  0.2  1.6 1212098540 133984 ?      Sl 17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
m309      8477 36.1  5.8 1215605132 468332 ?      Sl 17:11  1:35 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
root      8550  0.0  0.0      0     0 ?      D< 17:12  0:00 [kworker/u17:0+i915_flip]
m309      8557  0.8  0.7 699860 57308 ?      Ssl 17:12  0:01 /usr/libexec/gnome-terminal-server
m309      8572  0.0  0.0 11024 4976 pts/0    Ss 17:12  0:00 bash
m309      8747  0.0  0.1 462200 8764 ?      Sl 17:13  0:00 /usr/libexec/gvfsd-network --spawner :1.20 /org/gtk/gvfs/exec_spaw/1
m309      8763  0.0  0.1 390548 8880 ?      Sl 17:13  0:00 /usr/libexec/gvfsd-dnssd --spawner :1.20 /org/gtk/gvfs/exec_spaw/3
root      8862  0.0  0.0      0     0 ?      I  17:14  0:00 [kworker/2:1]
m309      8864  0.0  0.8 1212078408 68100 ?      Sl 17:14  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
m309      8882 100  0.0 13748 4568 pts/0    R+ 17:15  0:00 ps aux
m309@m309-BY-OEM: $ ps aux | grep firebox
m309      8897  0.0  0.0  9144  2248 pts/0    S+ 17:16  0:00 grep --color=auto firebox
m309@m309-BY-OEM: $ killall firebox
firebox: no process found
m309@m309-BY-OEM: $
```



### 3.Kill a single process at a time with the given process ID

ps aux | grep chrome shows **many Chrome child processes**, and PID **8156** exited on its own before the kill command ran. So kill and kill -9 return “**No such process**” because that specific PID no longer exists.

```
Feb 2 5:18 PM m309@m309-BY-OEM:~
```

```
m309      9025 100 0.0 13748 4584 pts/0    R+   17:18  0:00 ps aux
m309@m309-BY-OEM:~$ ps aux | grep chrome
m309      8072 11.4 3.1 34288156 255108 ?      Sl  17:11  0:51 /snap/chromium/3010/usr/lib/chromium-browser/chrome --password-store
=basic --disable-features=TFLiteLanguageDetectionEnabled
m309      8154 0.0 0.0 33568844 3592 ?      Sl  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome_crashpad_handler
--monitor-self --monitor-self-annotation=ptype=crashpad-handler --database=/home/m309/snap/chromium/common/chromium/Crash Reports --an
notation=channel=snap --annotation=lsb-release=Ubuntu Core 22 --annotation=plat=Linux --annotation=prod=Chrome_Linux --annotation=ver=1
31.0.6778.139 --initial-client-fd=5 --shared-client-connection
m309      8156 0.0 0.0 33560632 3376 ?      S   17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome_crashpad_handler
--no-periodic-tasks --monitor-self-annotation=ptype=crashpad-handler --database=/home/m309/snap/chromium/common/chromium/Crash Reports
--annotation=channel=snap --annotation=lsb-release=Ubuntu Core 22 --annotation=plat=Linux --annotation=prod=Chrome_Linux --annotation=
ver=131.0.6778.139 --initial-client-fd=4 --shared-client-connection
m309      8160 0.0 0.7 33926264 60872 ?      S   17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
no-zygote-sandbox --string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable
m309      8161 0.0 0.7 33926252 60688 ?      S   17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable
m309      8163 0.0 0.1 33926280 15620 ?      S   17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=zygote --
string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable
m309      8271 2.1 2.3 34427040 185656 ?      Sl  17:11  0:09 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=gpu-proce
ss --string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable --gpu-preferences
=AAAAAAAAAAgAAAAEAAAAAAAAAAAbgAAEAAAAAAAAAAAAAAAQAAAABAAAAAAEAAAAAAIAAAAAAAAGAAAAAAA --sha
red-files --field-trial-handle=3,i,14902952784849514346,9959533870011433259,262144 --disable-features=EyeDropper,TFLiteLanguageDetectio
nEnabled --variations-seed-version
m309      8288 0.7 1.3 33913600 110924 ?      Sl  17:11  0:03 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=utility -
-utility-sub-type=network.mojom.NetworkService --lang=en-US --service-sandbox-type=none --string-annotations --crashpad-handler-pid=815
4 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable --shared-files=v8_context_snapshot_data:100 --field-trial-handle=3,
i,14902952784849514346,9959533870011433259,262144 --disable-features=EyeDropper,TFLiteLanguageDetectionEnabled --variations-seed-versio
n
m309      8298 0.0 0.6 33976752 53120 ?      Sl  17:11  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=utility -
-utility-sub-type=storage.mojom.StorageService --lang=en-US --service-sandbox-type=utility --string-annotations --crashpad-handler-pid=
8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable --shared-files=v8_context_snapshot_data:100 --field-trial-handle=
```

```
Starting annotations crashpad-monitor pid=8154 enable-crash-reporter_jsnap change-stack-guard-on-fork enable lang=en-US num-threads=2
aster-threads=2 --enable-main-frame-before-activation --renderer-client-id=10 --time-ticks-at-unix-epoch=-1770027278097276 --launch-time-ticks=5189675089 --shared-files=v8_context_snapshot_data:100 --field-trial-handle=3,i,14902952784849514346,9959533870011433259,262144
--disable-features=EyeDropper,TFLiteLanguageDetectionEnabled --variations-seed-version
m309      8477 27.6 5.5 1215597516 446052 ?      Sl  17:11  2:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
--string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable --lang=en-US --num-threads=2
aster-threads=2 --enable-main-frame-before-activation --renderer-client-id=12 --time-ticks-at-unix-epoch=-1770027278097276 --launch-time-ticks=5191883523 --shared-files=v8_context_snapshot_data:100 --field-trial-handle=3,i,14902952784849514346,9959533870011433259,262144
--disable-features=EyeDropper,TFLiteLanguageDetectionEnabled --variations-seed-version
m309      9012 0.0 0.8 1212078408 68036 ?      Sl  17:17  0:00 /snap/chromium/3010/usr/lib/chromium-browser/chrome --type=renderer
--string-annotations --crashpad-handler-pid=8154 --enable-crash-reporter=snap --change-stack-guard-on-fork=enable --lang=en-US --num-threads=2
aster-threads=2 --enable-main-frame-before-activation --renderer-client-id=37 --time-ticks-at-unix-epoch=-1770027278097276 --launch-time-ticks=5585528792 --shared-files=v8_context_snapshot_data:100 --field-trial-handle=3,i,14902952784849514346,9959533870011433259,262144
--disable-features=EyeDropper,TFLiteLanguageDetectionEnabled --variations-seed-version
m309      9044 0.0 0.0 9144 2140 pts/0    S+  17:18  0:00 grep --color=auto chrome
m309@m309-BY-OEM: $ kill 8156
m309@m309-BY-OEM: $ kill -9 8156
bash: kill: (8156) - No such process
m309@m309-BY-OEM: $
```

## 2. Write a program for process creation using C

- Orphan Process

The screenshot shows a terminal window titled "m309@m309-BY-OEM: ~". The file being edited is "orphan.c". The code implements a simple process creation logic:

```
GNU nano 7.2          orphan.c *
#include <stdio.h>
#include <unistd.h>

int main() {
    int pid = fork();

    if (pid > 0) {
        // Parent process
        printf("Parent Process ID: %d\n", getpid());
        sleep(2);
    } else {
        // Child process
        sleep(5);
        printf("Child Process ID: %d\n", getpid());
        printf("New Parent Process ID: %d\n", getppid());
    }
    return 0;
}
```

The terminal also displays the following keyboard shortcuts at the bottom:

<sup>^G</sup> Help	<sup>^O</sup> Write Out	<sup>^W</sup> Where Is	<sup>^K</sup> Cut	<sup>^T</sup> Execute	<sup>^C</sup> Location	<sup>M-U</sup> Undo	<sup>M-A</sup> Set Mark
<sup>^X</sup> Exit	<sup>^R</sup> Read File	<sup>^A</sup> Replace	<sup>^U</sup> Paste	<sup>^J</sup> Justify	<sup>^I</sup> Go To Line	<sup>M-E</sup> Redo	<sup>M-G</sup> Copy

The terminal window shows the following session:

```
m309@m309-BY-OEM:~$ nano orphan.c
m309@m309-BY-OEM:~$ gcc orphan.c -o orphan
m309@m309-BY-OEM:~$ ./orphan
Parent Process ID: 9285
m309@m309-BY-OEM:~$ Child Process ID: 9286
New Parent Process ID: 2262
```

- Zombie Process

The screenshot shows a terminal window titled "zombie.c" with the date and time "Feb 2 5:25 PM". The terminal is running the "nano" editor. The code in the editor is:

```
GNU nano 7.2
#include <stdio.h>
#include <unistd.h>

int main() {
    int pid = fork();

    if (pid == 0) {
        // Child process
        printf("Child process exiting\n");
    } else {
        // Parent process
        sleep(10);
        printf("Parent process running\n");
    }
    return 0;
}
```

The screenshot shows a terminal window with the following session:

```
m309@m309-BY-OEM:~$ nano zombie.c
m309@m309-BY-OEM:~$ gcc zombie.c -o zombie
m309@m309-BY-OEM:~$ ./zombie
Child process exiting
Parent process running
m309@m309-BY-OEM:~$
```

### 3.The process using fork () system call.



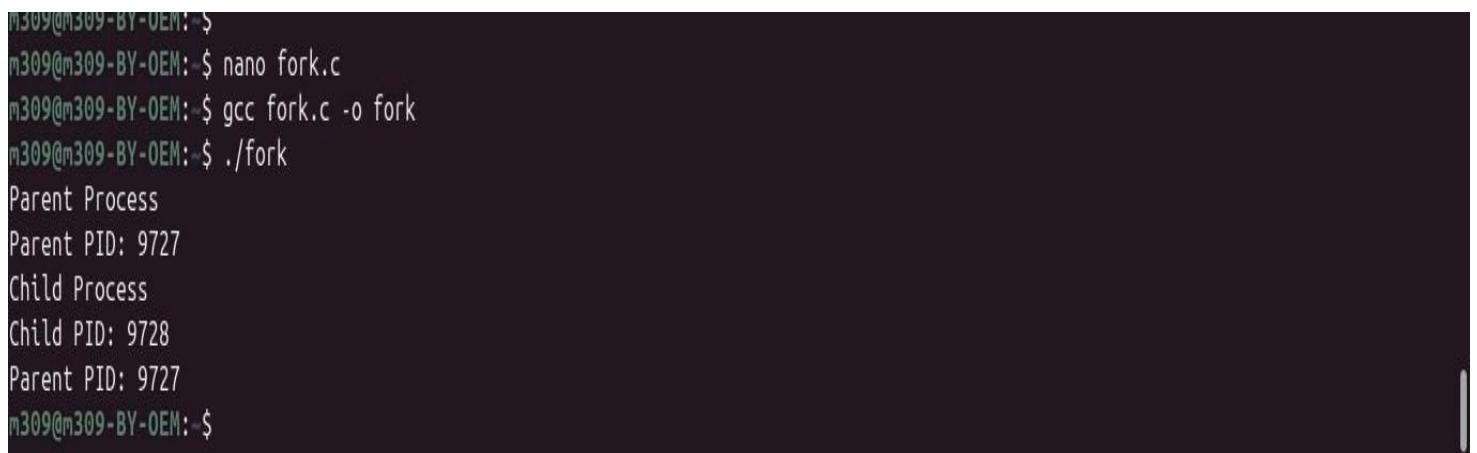
```
GNU nano 7.2                                     fork.c *
Feb 2 5:26 PM
m309@m309-BY-OEM: ~

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

int main() {
    pid_t pid = fork();

    if (pid == 0) {
        printf("Child Process\n");
        printf("Child PID: %d\n", getpid());
        printf("Parent PID: %d\n", getppid());
    } else {
        printf("Parent Process\n");
        printf("Parent PID: %d\n", getpid());
    }
    return 0;
}

^G Help      ^O Write Out     ^W Where Is     ^K Cut          ^T Execute     ^C Location     M-U Undo      M-A Set Mark
^X Exit      ^R Read File     ^\ Replace      ^U Paste        ^J Justify     ^/ Go To Line   M-E Redo      M-6 Copy
```



```
m309@m309-BY-OEM: ~
m309@m309-BY-OEM: ~$ nano fork.c
m309@m309-BY-OEM: ~$ gcc fork.c -o fork
m309@m309-BY-OEM: ~$ ./fork
Parent Process
Parent PID: 9727
Child Process
Child PID: 9728
Parent PID: 9727
m309@m309-BY-OEM: ~$
```

- Infinite loop on fork

The screenshot shows a terminal window titled "loop.c" with the following C code:

```
GNU nano 7.2
m309@m309-BY-OEM: ~

#include <stdio.h>

int main() {
    while (1) {
        printf("Infinite loop running...\n");
    }
    return 0;
}
```

The terminal window has a dark background and light-colored text. At the bottom, there is a menu bar with various keyboard shortcuts for file operations like Help, Exit, Write Out, Read File, Where Is, Replace, Cut, Paste, Execute, Justify, Location, Go To Line, Undo, Redo, Set Mark, and Copy. A status bar at the bottom indicates "[ Read 8 lines ]".

The screenshot shows a terminal window with the following output:

```
Feb 2 5:29 PM
m309@m309-BY-OEM: ~

Infinite loop running...
```

The terminal window has a dark background and light-colored text. The output consists of multiple lines of the string "Infinite loop running..." repeated.