

ĐẠI HỌC QUỐC GIA THÀNH PHỐ HỒ CHÍ MINH TRƯỜNG ĐẠI HỌC CÔNG NGHỆ THÔNG TIN



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TRƯỜNG ĐẠI HỌC
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Bài Thực Hành 3 Môn: Hệ Điều Hành

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1) Trình biên dịch gcc

1.1 Ví dụ 1

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ gcc main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ ./main
Hello, I am Trung,
Welcome to IT007!
hoangtrung1999@hoangtrung1999:~/Documents$
```

1.2 Ví dụ 2

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ gcc main.c hello.c -o hello
hoangtrung1999@hoangtrung1999:~/Documents$ ./hello
Hello, World!
hoangtrung1999@hoangtrung1999:~/Documents$
```

2) Makefile

2.1 Ví dụ 1

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make all
./hello
Hello, World!
hoangtrung1999@hoangtrung1999:~/Documents$
```

3) Trình gỡ lỗi

3.1 Ví dụ 1

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ gcc -g main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ gdb main
GNU gdb (Ubuntu 8.1-0ubuntu3) 8.1.0.20180409-git
Copyright (C) 2018 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from main...done.
(gdb) break 10
Breakpoint 1 at 0x76a: file main.c, line 10.
(gdb) run
Starting program: /home/hoangtrung1999/Documents/main
Enter the number: 10

Breakpoint 1, main () at main.c:10
10      j = j*i;
(gdb) print i
$1 = 1
(gdb) print j
$2 = 1
(gdb) print number
No symbol "number" in current context.
(gdb) print num
$3 = 10
(gdb)
```

4) Tạo tiến trình

4.1 Ví dụ 1

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make compileMain run
gcc main.c -o main
./main
Parent Process, pid=6793
Child Process, pid=0
hoangtrung1999@hoangtrung1999:~/Documents$
```

4.2 Ví dụ 2

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make compileMain run
gcc main.c -o main
./main

```

foo.c
~/Documents

Open Save

C Tab Width: 8 Ln 1, Col 1 INS

4.3 Ví dụ 3

```
hoangtrung1999@hoangtrung1999:~/Documents$ gcc main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ ./main
Hello IT007! I will open vim editor now ^_^

[1]+  Stopped                  ./main
hoangtrung1999@hoangtrung1999:~/Documents$
```

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
#include <stdio.h>
#include "hello.h"

void hello()
{
    printf("Hello, World!\n");
}

hoangtrung1999@hoangtrung1999: ~/Documents
```

5) Kết thúc tiến trình

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make compileMain run
gcc main.c -o main
./main
Child Process, pid=0
Parent Process, pid=7131
hoangtrung1999@hoangtrung1999:~/Documents$
```

6) Tạo tiêu trình

[illegible]

7) Dừng tiêu trình

7.1 Ví dụ 1

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ gcc -pthread main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ ./main
I'm Main Thread: create Thread: #0
I'm Main Thread: create Thread: #1
Hello IT007! I'm a Thread #0^_^!!!
Hello IT007! I'm a Thread #1^_^!!!
```

7.2 Ví dụ 2

The screenshot shows a Linux terminal window with two panes. The left pane displays the output of the `top` command, showing system statistics and a list of running processes. The right pane shows the output of a C program compiled with `gcc -pthread main.c -o main` and executed with `./main`. The program output shows the main thread creating two child threads, each printing a message and then exiting.

```
top - 15:32:48 up 2:20, 1 user, load average: 1.25, 1.06, 0.90
Tasks: 230 total, 1 running, 176 sleeping, 3 stopped, 2 zombie
%Cpu(s): 10.3 us, 0.9 sy, 0.0 ni, 85.4 id, 0.1 wa, 0.0 hi, 0.1 si, 0.0 st
MiB Mem : 8033008 total, 4256448 free, 1908572 used, 1867988 buff/cache
KiB Swap: 7999484 total, 7999484 free, 0 used, 5671256 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR     S    %CPU  %MEM     time+   COMMAND
 3983 hoangtr 20   0 2165560 399936 182808 S    38.9   5.0   33:13.44 Web Content
 3989 hoangtr 20   0 2562820 387616 189684 S    22.2   4.8   15:38.29 Firefox
18028 hoangtr 20   0 457464   432    3712 R    16.7   0.1    0:00.05 top
 1015 root      20   0 681996 149000 109556 S    11.1   1.9    9:07.29 Xorg
 569 root     -51   0      0      0      0 S    5.0   0.0   1:35.22 irq/133-nvidia
1523 hoangtr  9 -11 1689168 14188  18824 S    5.0   0.2   4:15.34 pulseaudio
1623 hoangtr 20   0 3408792 365376 89332 S    5.0   4.5    7:40.63 cinnamon
   1 root      20   0 225908   9712  6784 S    0.0   0.1    0:01.97 systemd
   2 root      20   0      0      0      0 S    0.0   0.0    0:00.00 kthreadd
   4 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kworker/0:0H
   6 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 mm_percpu_wq
   7 root      20   0      0      0      0 S    0.0   0.0    0:00.07 ksoftirqd/0
   8 root      20   0      0      0      0 S    0.0   0.0    0:00.03 rcu_sched
   9 root      20   0      0      0      0 S    0.0   0.0    0:00.00 rcu_bh
  10 root      rt   0      0      0      0 S    0.0   0.0    0:00.00 migration/0
  11 root      rt   0      0      0      0 S    0.0   0.0    0:00.02 watchdog/0
  12 root      20   0      0      0      0 S    0.0   0.0    0:00.00 cpuphp/0
  13 root      20   0      0      0      0 S    0.0   0.0    0:00.00 cpuphp/1
  14 root      rt   0      0      0      0 S    0.0   0.0    0:00.02 watchdog/1
  15 root      rt   0      0      0      0 S    0.0   0.0    0:00.00 migration/1
  16 root      20   0      0      0      0 S    0.0   0.0    0:00.17 ksoftirqd/1
  18 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kworker/1:0H
  19 root      20   0      0      0      0 S    0.0   0.0    0:00.00 cpuphp/2
  20 root      rt   0      0      0      0 S    0.0   0.0    0:00.02 watchdog/2
  21 root      rt   0      0      0      0 S    0.0   0.0    0:00.00 migration/2
  22 root      20   0      0      0      0 S    0.0   0.0    0:01.07 ksoftirqd/2
  24 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kworker/2:0H
  25 root      20   0      0      0      0 S    0.0   0.0    0:00.00 cpuphp/3
  26 root      rt   0      0      0      0 S    0.0   0.0    0:00.02 watchdog/3
  27 root      rt   0      0      0      0 S    0.0   0.0    0:00.00 migration/3
  28 root      20   0      0      0      0 S    0.0   0.0    0:00.07 ksoftirqd/3
  30 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kworker/3:0H
  31 root      20   0      0      0      0 S    0.0   0.0    0:00.00 kdevtmpfs
  32 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 netns
  33 root      20   0      0      0      0 S    0.0   0.0    0:00.00 rcu_tasks_kthre
  34 root      20   0      0      0      0 S    0.0   0.0    0:00.00 kauditd
  38 root      20   0      0      0      0 S    0.0   0.0    0:00.00 khungtaskd
  39 root      20   0      0      0      0 S    0.0   0.0    0:00.00 oom_reaper
  40 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 writeback
  41 root      20   0      0      0      0 S    0.0   0.0    0:00.00 kcompactd0
  42 root      25   5      0      0      0 S    0.0   0.0    0:00.00 ksmd
  43 root      39  19      0      0      0 S    0.0   0.0    0:00.00 khugepaged
  44 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 crypto
  45 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kintegrityd
  46 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 kblockd
  48 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 ata_sff
  49 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 md
  50 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 edac-poller
  51 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 devfreq_wq
  52 root      0 -20   0      0      0 S    0.0   0.0    0:00.00 watchdogd
```

```
hoangtrung1999@hoangtrung1999: ~/Documents
hoangtrung1999@hoangtrung1999:~/Documents$ gcc -pthread main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ ./main
I'm Main Thread: creating Thread: #0
Hello IT007!, I'm Thread #0 ^_~!!!
I'm Main Thread: creating Thread: #1
Hello IT007!, I'm Thread #1 ^_~!!!
hoangtrung1999@hoangtrung1999:~/Documents$
```

8) Hợp và gỡ tiểu trình

The screenshot shows a Linux terminal window with the output of a C program. The program output shows the main thread creating two child threads, each printing a message and then exiting.

```
hoangtrung1999@hoangtrung1999: ~/Documents
hoangtrung1999@hoangtrung1999:~/Documents$ gcc -pthread main.c -o main
hoangtrung1999@hoangtrung1999:~/Documents$ ./main
I'm Main Thread: creating Thread: #0
Hello IT007!, I'm Thread #0 ^_~!!!
I'm Main Thread: creating Thread: #1
Hello IT007!, I'm Thread #1 ^_~!!!
hoangtrung1999@hoangtrung1999:~/Documents$
```


9) Truyền dữ liệu vào tiêu trình

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make comileThread run
gcc main.c -pthread -o main
./main
X
X
X
X
X
X
hoangtrung1999@hoangtrung1999:~/Documents$
```

10)Signal (Truyền thông giữa các tiến trình)

```
hoangtrung1999@hoangtrung1999: ~/Documents
File Edit View Search Terminal Help
hoangtrung1999@hoangtrung1999:~/Documents$ make comileThread run
gcc main.c -pthread -o main
./main
^C
CRT+C is press
hoangtrung1999@hoangtrung1999:~/Documents$
```