

Linux Programming

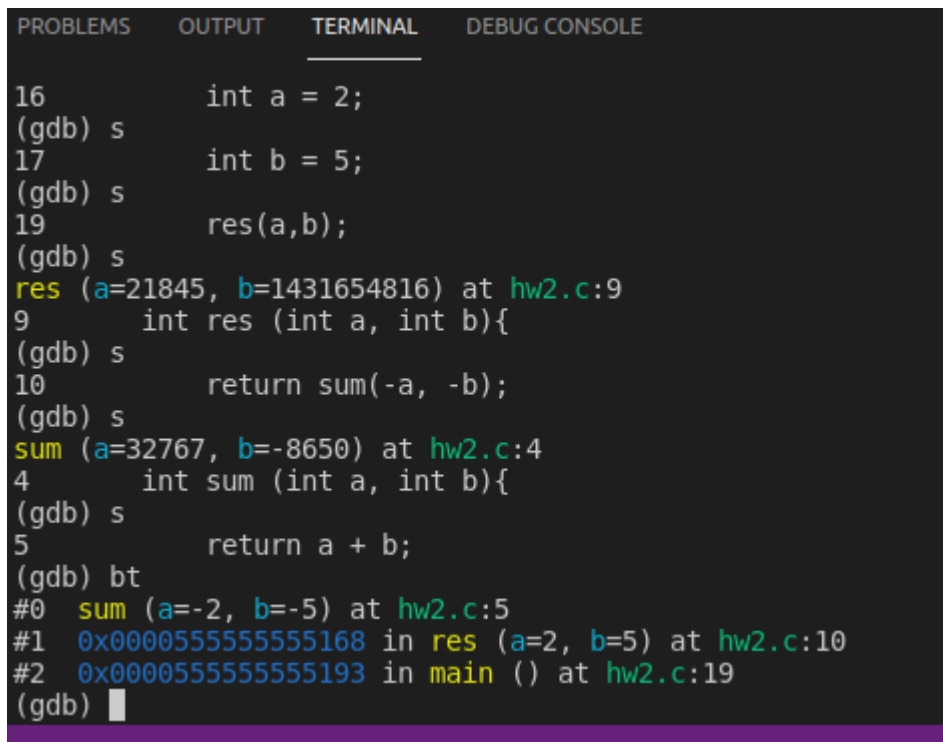
Assignment #3

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1.

A VAR process is considered to be sparse since the vast number of pages might not be used completely at a given time.

2.



```
PROBLEMS  OUTPUT  TERMINAL  DEBUG CONSOLE

16          int a = 2;
(gdb) s
17          int b = 5;
(gdb) s
19          res(a,b);
(gdb) s
res (a=21845, b=1431654816) at hw2.c:9
9      int res (int a, int b){
(gdb) s
10          return sum(-a, -b);
(gdb) s
sum (a=32767, b=-8650) at hw2.c:4
4      int sum (int a, int b){
(gdb) s
5          return a + b;
(gdb) bt
#0  sum (a=-2, b=-5) at hw2.c:5
#1  0x00005555555555168 in res (a=2, b=5) at hw2.c:10
#2  0x00005555555555193 in main () at hw2.c:19
(gdb) █
```

3.

The main role of the MMU is to translate logical addresses into physical addresses.

4.

```
alberto@ncc-alberto:~$ free -h
              total        used        free      shared  buff/cache   available
Mem:           3.8Gi        1.3Gi        715Mi        72Mi        1.8Gi        2.2Gi
Swap:          424Mi          0B        424Mi
```

The command **free** showcases the total memory, the current amount that it's being used and the total available. **-h** displays the information in a more readable way.

5.

```
-rwxrwxr-x 1 alberto alberto 17K Sep 13 20:39 test
-rw-rw-r-- 1 alberto alberto 118 Sep 13 20:39 test.c
-rwxrwxr-x 1 alberto alberto 852K Sep 13 22:02 test_st
```

(test is the dynamic linking and test_st is the static linking)

6.

As we can see test_st is smaller than test even though the file size is bigger.

```
alberto@ncc-alberto:~$ pmap 6511
6511:  ./test_st
0000000000400000      4K r---- test_st
0000000000401000    592K r-x-- test_st
0000000000495000    156K r---- test_st
00000000004bd000     12K r---- test_st
00000000004c0000     12K rw--- test_st
00000000004c3000      4K rw--- [ anon ]
000000000019f9000  140K rw--- [ anon ]
00007ffe7f677000   132K rw--- [ stack ]
00007ffe7f69d000     16K r---- [ anon ]
00007ffe7f6a1000      8K r-x-- [ anon ]
fffffffffff60000      4K --x-- [ anon ]
total                1080K
```

```
alberto@ncc-alberto:~$ pmap 6443
6443:  ./test
0000561ae90d5000      4K r---- test
0000561ae90d6000      4K r-x-- test
0000561ae90d7000      4K r---- test
0000561ae90d8000      4K r---- test
0000561ae90d9000      4K rw--- test
0000561aeabfc000    132K rw--- [ anon ]
00007f7ce3361000    148K r---- libc-2.31.so
00007f7ce3386000   1504K r-x-- libc-2.31.so
00007f7ce34fe000    296K r---- libc-2.31.so
00007f7ce3548000      4K ----- libc-2.31.so
00007f7ce3549000     12K r---- libc-2.31.so
00007f7ce354c000     12K rw--- libc-2.31.so
00007f7ce354f000     24K rw--- [ anon ]
00007f7ce3566000      4K r---- ld-2.31.so
00007f7ce3567000    140K r-x-- ld-2.31.so
00007f7ce358a000     32K r---- ld-2.31.so
00007f7ce3593000      4K r---- ld-2.31.so
00007f7ce3594000      4K rw--- ld-2.31.so
00007f7ce3595000      4K rw--- [ anon ]
00007ffda0229000    132K rw--- [ stack ]
00007ffda03f8000     16K r---- [ anon ]
00007ffda03fc000      8K r-x-- [ anon ]
fffffffffff600000     4K --x-- [ anon ]
total                2500K
```