Operating-Systems

Lab#1

Question#1:

a) A processer is a circuitry which processes the instructions of a computer and drives it. The more powerful is the processor the more faster the computer will run. Each processor has one or many cores which is the brain of processor(CPU).

b) 4 cores

c) 2 processors

d) 2993.988 MHz

e) Total Memory = 2031392 kB

f) Free memory = 352644 kB & Available memory = 1129312 kB

g) 2282 Forks

h) Involuntary context switching : 7 and Voluntary context switching :0

Question#2:

a) Pid = 7239

b) Memory utilizing = 0.0 and CPU it is consuming is 99.3%(the value was ranging though)

c) Running state(R)

Question#3:

a) Pid = 1757 , and command to get this is "ps -C 'cpu-print' -o pid="

b) Parent_pid = 1726 and command to get this is "ps -f 1757"

Hierarchy of recent process

1757 : ./cpu-print , parent_pid = 1726,

1726: bash , parent_pid = 1715,

1715 : terminal, parent_pid = 783,

0783 : system-d --user, parent_pid = 1,

0001 : Init

c) After running the statement the Pid of spawned process came out to be = '1788' and the /proc file system stats were as follows:

```
lrux-----1  0  ----- /dev/pts/1
l-wx-----1  1 ----- /tmp/tmp.txt
lrwx ---- 1  2 ----- /dev/pts/1
```

d) After compiling and executing the statement the Pid of spawned process came as '1836' and the file description was as below:

lr-x ---1 0 ------ 'pipe:[45205]'

lrwx –1 , 1 ------ /dev/pts/1

lrwx –1 , 2 ------ /dev/pts/1

e) 'cd' and 'history' are build in commands of linux which shell directly invokes and executes & , 'ls' is aliased to 'ls—color=auto' and 'ps' is hashed (/usr/bin/ps) and these are the commands which are executed by bash code.

Question#4)

For memory1.c the virtual memory for it(all the memory the process can access including memory that is swapped out , allocated memory which is not used and memory which is shared from libraries.) comes out to be '6268kB' and the RSS(Resident Set Size) memory(which is the size allocated to the process in the RAM) comes out to be '5168kB'

For memory2.c virtual memory is '6264kB' and RSS is '5088kB'.

Both the programs have same space in both VRZ and RSS despite of the fact that one uses the array and one doesn't. The difference in RSS should've expected but it didn't quite fire up much.

Question#5)

 We created 5000 copies of foo.pdf in folder "disk-files" running script make-copies.sh. After that we compiled the disk.c using command:

gcc disk.c -o disk

and ran it using:

./disk

disk.c program is reading all the files present in the disk-files folder. By running iostat, following output was shown:

```
kali@kali:~/Desktop/intro-code$ iostat
Linux 5.4.0-kali3-amd64 (kali)   03/15/2021      _x86_64_      (4 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
          18.31   11.07   17.15    6.44    0.00   47.03

Device             tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_rea
d     kB_wrtn    kB_dscd
sda             104.54      1916.01      6771.29         0.00    148141
9     5235428          0
```

To avoid reading the files from the memory, we cleared the buffer and cache memory using the command:

sudo sync && sudo sysctl vm.drop_caches=1

Now , after that compiling and running disk1.c , iostat gave output as following:

```
kali@kali:~/Desktop/intro-code$ iostat
Linux 5.4.0-kali3-amd64 (kali)   03/15/2021      _x86_64_      (4 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
          14.08    7.38   13.81    8.73    0.00   56.00

Device             tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_rea
d     kB_wrtn    kB_dscd
sda             102.57      3777.22      4620.29         0.00    429949
1     5259132          0
```

Where Disk1.c is reading a specific file from the "disk-files" folder.

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