

CS347(M): Operating Systems

Assignment – 1

1. Collect the following basic information about your machine using proc file system. Write the required commands and answer the following questions:

- **CPU:**

- *How many CPU cores does the machine have?*

- 8 cores

```
processor      : 7
vendor_id     : GenuineIntel
cpu family    : 6
model         : 60
model name    : Intel(R) Core(TM) i7-4720HQ CPU @ 2.60GHz
stepping      : 3
microcode     : 0x1c
cpu MHz       : 2591.468
cache size    : 6144 KB
```

- *What is the frequency of CPU?*

- 2.60 GHz

- **Memory:**

- *How much memory does your system have?*

- 8 GB

```
nihal@nihal-X550JX:/proc$ cat meminfo
MemTotal:      8061292 kB
MemFree:       4369152 kB
MemAvailable:  5364252 kB
Buffers:       216296 kB
Cached:        1292116 kB
SwapCached:    0 kB
Active:        2364120 kB
Inactive:     1018340 kB
```

○ ***How memory is divided and what does it mean?***

A computer can address more memory than what is physically present. This illusion of having large amounts of memory, is called virtual memory. This kind of memory is made available using a process called paging. Logical memory is divided into pages. Physical memory is divided into frames. A page table is used to translate logical addresses to physical addresses. Even though the memory is limited, each process can be theoretically granted a large (infinite) amount of memory by intelligently moving the required files from disk to RAM, in pages and emptying up the used memory when it hasn't been requested for a while.

- MemTotal (nearly 8 GB) – Total amount of physical RAM (shown in KB)
- MemFree (nearly 4 GB) – Total amount of physical RAM (in KB) left unused by the system
- MemAvailable (nearly 5 GB) – The amount of physical RAM (in KB) that is available for starting new applications. This includes memory that can be reclaimed in addition to MemFree.
- Buffers (nearly 200 MB) – The amount of memory (in KB) used in file buffers. This is where files are temporarily stored while they are copied from the disk. This is a small part of the memory.
- Cached (nearly 1.2 GB) – Memory (in KB) in the page cache. Frequently read pages will be stored here.
- SwapCached (0 KB here) – Memory that is present within main memory, but also in the swapfile. If memory is needed this area, it does not need to be swapped out again because it is already in the swapfile. This saves I/O and increases performance if machine runs short on memory.
- Active (nearly 2.3 GB) – The amount of memory (in KB) that has been used more recently and is usually not reclaimed unless absolutely necessary.
- Inactive (nearly 1 GB) – The amount of memory (in KB) that has been used less recently and is more eligible to be reclaimed for other purposes.

- **Process Centric:**

[illegible]

- *How many context switches has the system performed since bootup?*

The “**ctxt**” value is the total number of context switches happened since bootup- 32821628 (nearly 7000 per second)

- **How much memory is free and available?**

```
nihal@nihal-X550JX:/proc$ cat meminfo
MemTotal:      8061292 kB
MemFree:       3404576 kB
MemAvailable:  4571544 kB
```

- MemFree (nearly 8 GB) - The amount of physical RAM (in KB) left unused by the system.
- MemAvailable (nearly 5 GB) - The amount of physical RAM (in KB) that is available for starting new applications. (includes some memory that can be reclaimed in addition to MemFree)

2. B. Try to find the 'pid' of the process created by copy.sh

```

nihal@nihal-X550JX:~/CS347/Assignment-1/Question2$ lsot | grep "copy.sh"
copy.sh 27923      nihal  cwd      DIR      8,6  4096  10365200 /home/nihal/CS347/Assignment-1/Question2
copy.sh 27923      nihal  rtd      DIR      8,6  4096  2
copy.sh 27923      nihal  txt      REG      8,6  1037528 6553680 /bin/bash
copy.sh 27923      nihal  mem      REG      8,6  2981280 10489792 /usr/lib/locale/locale-archive
copy.sh 27923      nihal  mem      REG      8,6  1868984 9445589 /lib/x86_64-linux-gnu/libc-2.23.so
copy.sh 27923      nihal  mem      REG      8,6  14608 9445578 /lib/x86_64-linux-gnu/libdl-2.23.so
copy.sh 27923      nihal  mem      REG      8,6  167240 9441905 /lib/x86_64-linux-gnu/libtinfo.so.5.9
copy.sh 27923      nihal  mem      REG      8,6  162632 9441825 /lib/x86_64-linux-gnu/ld-2.23.so
copy.sh 27923      nihal  mem      REG      8,6  26258 10758074 /usr/lib/x86_64-linux-gnu/gconv/gconv-modules.cache
copy.sh 27923      nihal  0u      CHR      136,2 0t0 5 /dev/pts/2
copy.sh 27923      nihal  1u      CHR      136,2 0t0 5 /dev/pts/2
copy.sh 27923      nihal  2u      CHR      136,2 0t0 5 /dev/pts/2
copy.sh 27923      nihal  255r    REG      8,6  355 10365207 /home/nihal/CS347/Assignment-1/Question2/copy.sh

```