

VE482 Homework 2

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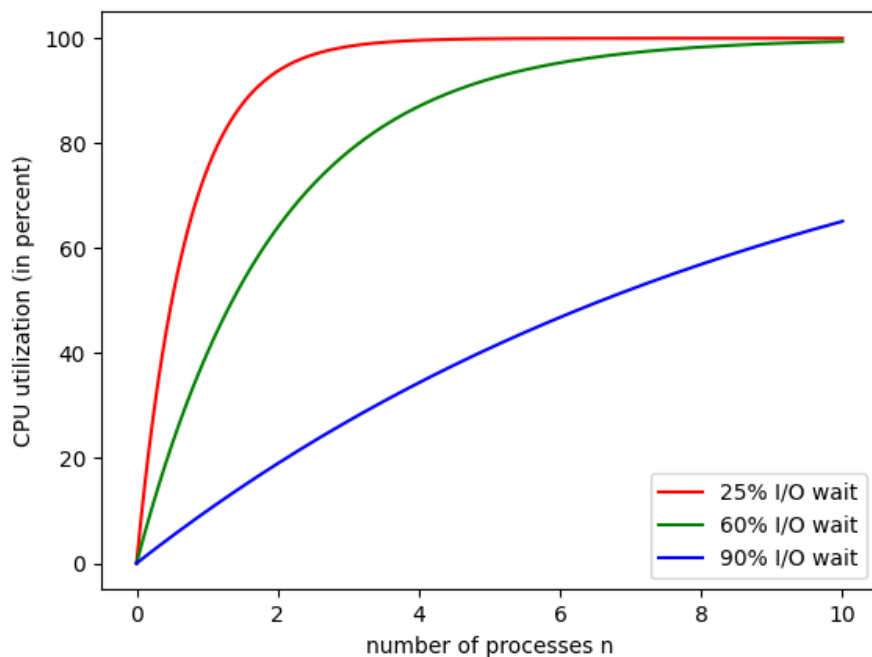


Ex.1 Multiprogramming

1. Probability of n processes waiting at the same time: p^n

CPU utilization: $1 - p^n$

2.



3. a). $\lfloor (256 - 96) \rfloor \div 48 = 3$

3 processes can be stored.

b). CPU utilization is $1 - 0.9^3 = 27.1\%$

c).

- 256 MB: CPU utilization: 57.0%, which is 0.117% per MB added.
- 512 MB: CPU utilization: 77.1%, which is 0.098% per MB added.
- 1024 MB: CPU utilization: 92.0%, which is 0.063% per MB added.

Therefore, adding **256 MB** would be the most beneficial.

Ex. 2 Keymap in Minix3

Map Shift + F7 to display how many processes are currently running.

1. Modify `dmp.c` file (`/usr/src/servers/is/dmp.c`) and find the struct `hook_entry`. Add the entry

```
{SF7, procnt_dmp, "Display the number of running processes"},
```

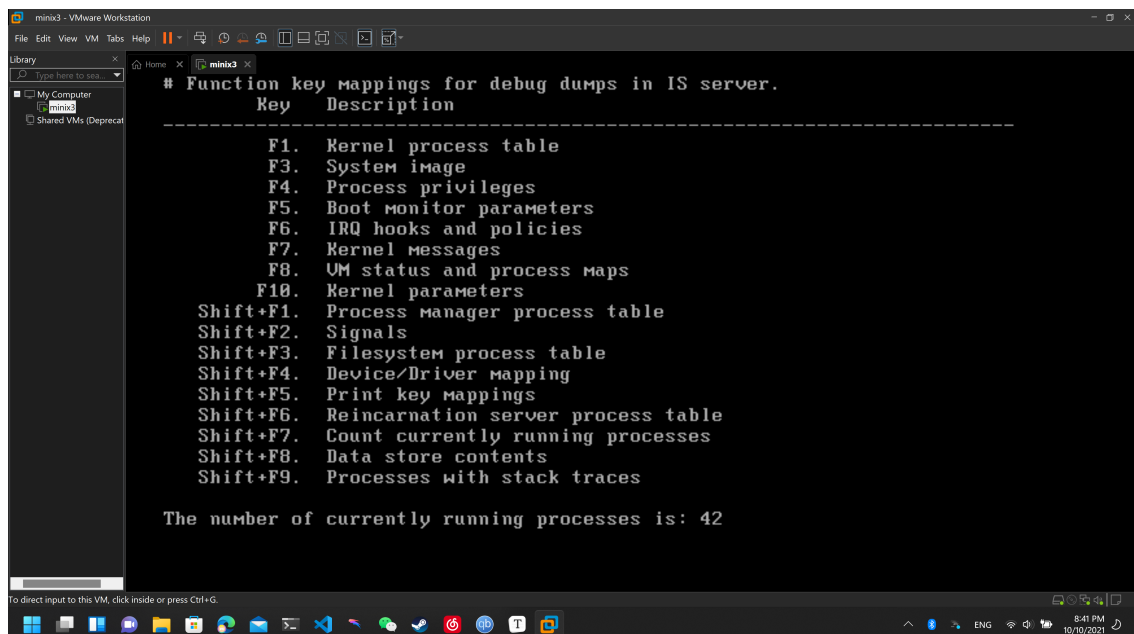
2. Modify `dmp_kernel.c` file (`/usr/src/servers/is/dmp_kernel.c`), adding the function `void procnt_dmp();`

```
void procnt_dmp()
{
    int ret;
    if((ret = sys_getproctab(proc)) != OK)
    {
        printf("Problem occurred when getting process table : %d\n", ret);
    }
    int proc_cnt = 0;
    register struct proc *rp;
    for(rp = BEG_PROC_ADDR; rp < END_PROC_ADDR; rp++)
    {
        if(isempty(rp)) continue;
        proc_cnt++;
    }
    printf("The number of currently running processes is: %d\n", proc_cnt);
}
```

3. Modify the `proto.h` file (`/usr/src/servers/is/proto.h`). Add declaration `void procnt_dmp(void);`

4. `cd /usr/src`
recompile the kernel and reboot
`make build`
it took me 11 minutes to recompile, with 256MB memory...
`reboot`

5. Result:



```
# Function key mappings for debug dumps in IS server.
Key      Description
-----
F1.      Kernel process table
F3.      System image
F4.      Process privileges
F5.      Boot monitor parameters
F6.      IRQ hooks and policies
F7.      Kernel messages
F8.      UM status and process maps
F10.     Kernel parameters
Shift+F1. Process manager process table
Shift+F2. Signals
Shift+F3. Filesystem process table
Shift+F4. Device/Driver mapping
Shift+F5. Print key mappings
Shift+F6. Reincarnation server process table
Shift+F7. Count currently running processes
Shift+F8. Data store contents
Shift+F9. Processes with stack traces

The number of currently running processes is: 42
```