Atma Ram Sanatan Dharma College

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Operating System

Practical File

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2. Write a program to report behaviour of Linux kernel including kernel version, CPU type and model (CPU information).

```c
/**
 * Write a program to report behaviour of Linux kernel
 * including kernel version, CPU type and model.
 */

#include <stdio.h>
#include <stdlib.h>

int main(void)
{
    printf("Linux Kernel Version: ");
    fflush(stdout);
    system("awk 'NR == 1 {print $3;}' /proc/version");

    printf("CPU Model: ");
    fflush(stdout);
    system("awk 'NR == 5 {$1=$2=$3=\"\\b\"; print $0;}'
/proc/cpuinfo");

    printf("CPU Frequency: ");
    fflush(stdout);
    system("awk 'NR == 8 {$1=$2=$3=\"\\b\"; printf $0; print \"
MHz\";}' /proc/cpuinfo");

    printf("CPU Core Count: ");
    fflush(stdout);
    system("grep processor /proc/cpuinfo | wc -l");

    return 0;
}
```

```
$ gcc -o main main.c
$ ./main
Linux Kernel Version: 4.19.104-microsoft-standard
CPU Model: AMD A8-7410 APU with AMD Radeon R5 Graphics
CPU Frequency: 2195.875 MHz
CPU Core Count: 4
```

3. Write a program to report behaviour of Linux kernel including information on 19 configured memory, amount of free and used memory (memory information).

```c
/**
 * Write a program to report behaviour of Linux kernel
 * information on configured memory, amount of free and
 * used memory.
 */

#include <stdio.h>
#include <stdlib.h>

int main(void)
{
    printf("Configured Memory: ");
    fflush(stdout);
    system("awk 'NR == 1 {$1=\"\\b\"; print $0;}'
/proc/meminfo");

    printf("Free Memory: ");
    fflush(stdout);
    system("awk 'NR == 2 {$1=\"\\b\"; print $0;}'
/proc/meminfo");

    printf("Used Memory: ");
    fflush(stdout);
```

```
    system("awk '/MemTotal/ {total=$2; unit=$3;} /MemFree/
{free=$2;} END {printf \"%i %s\\n\", (total-free), unit;}'
/proc/meminfo");

    return 0;
}
```

```
$ gcc -o main main.c
$ ./main
Configured Memory: 12222492 kB
Free Memory: 12079940 kB
Used Memory: 142552 kB
```

4. Write a program to print file details including owner access permissions, file access time, where file name is given as argument.

```
/**
 * Write a program to print file details including owner
 * access permissions, file access time,where file name
 * is given as argument.
 */

#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

int main(int argc, char **argv)
{
    if (argc < 2)
    {
        fprintf(stderr, "Usage: ./main <file>\n");
```

```
        return -1;
    }

    struct stat buf;

    if (stat(argv[1], &buf) < 0)
    {
        fprintf(stderr, "Could not open %s\n", argv[1]);
        return 2;
    }

    printf("File Information\n------------------\n");
    printf("Name: %s\n", argv[1]);
    printf("UID: %0.4d\n", buf.st_uid);
    printf("GID: %0.4d\n", buf.st_gid);
    printf("Regular File: %s\n", S_ISREG(buf.st_mode) ? "Y" :
"N");
    printf("Symbolic Link: %s\n", S_ISLNK(buf.st_mode) ? "Y" :
"N");
    printf("Directory: %s\n", S_ISDIR(buf.st_mode) ? "Y" :
"N");
    printf("Block Device: %s\n", S_ISBLK(buf.st_mode) ? "Y" :
"N");
    printf("Character Device: %s\n", S_ISCHR(buf.st_mode) ? "Y"
: "N");
    printf("File Mode Bits: %07o\n", buf.st_mode);
    printf("Last Access Time: %lld\n", buf.st_atime);
    printf("Owner Permissions:\n");
    printf("  Read: %s\n", S_IRUSR & buf.st_mode ? "Y" : "N");
    printf("  Write: %s\n", S_IWUSR & buf.st_mode ? "Y" : "N");
    printf("  Execute: %s\n", S_IXUSR & buf.st_mode ? "Y" :
"N");
    printf("Group Permissions:\n");
    printf("  Read: %s\n", S_IRGRP & buf.st_mode ? "Y" : "N");
    printf("  Write: %s\n", S_IWGRP & buf.st_mode ? "Y" : "N");
    printf("  Execute: %s\n", S_IXGRP & buf.st_mode ? "Y" :
"N");
    printf("Others Permissions:\n");
```

```
    printf("  Read: %s\n", S_IROTH & buf.st_mode ? "Y" : "N");
    printf("  Write: %s\n", S_IWOTH & buf.st_mode ? "Y" : "N");
    printf("  Execute: %s\n", S_IXOTH & buf.st_mode ? "Y" :
"N");

    return 0;
}
```

```
$ gcc -o main main.c
$ ./main
Usage: ./main <file>
$ ./main main.c
File Information
-----------------
Name: main.c
UID: 1000
GID: 1000
Regular File: Y
Symbolic Link: N
Directory: N
Block Device: N
Character Device: N
File Mode Bits: 0100777
Last Access Time: 1598607869
Owner Permissions:
```

```
Block Device: N
Character Device: N
File Mode Bits: 0100777
Last Access Time: 1598607869
Owner Permissions:
  Read: Y
  Write: Y
  Execute: Y
Group Permissions:
  Read: Y
  Write: Y
  Execute: Y
Others Permissions:
  Read: Y
  Write: Y
  Execute: Y
```