

Operating Systems Lab

Experiment No. 8

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IT

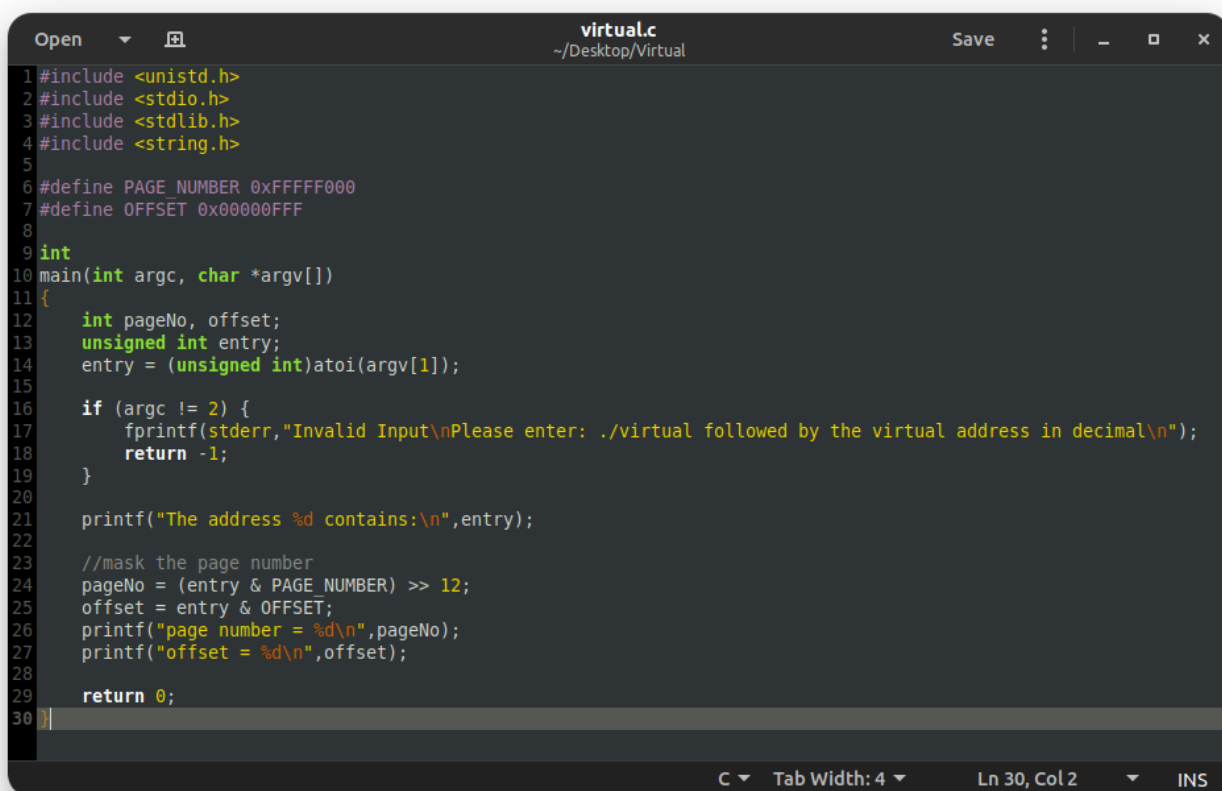
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Aim

Assume that a system has a 64-bit virtual address with a 4KB page size.

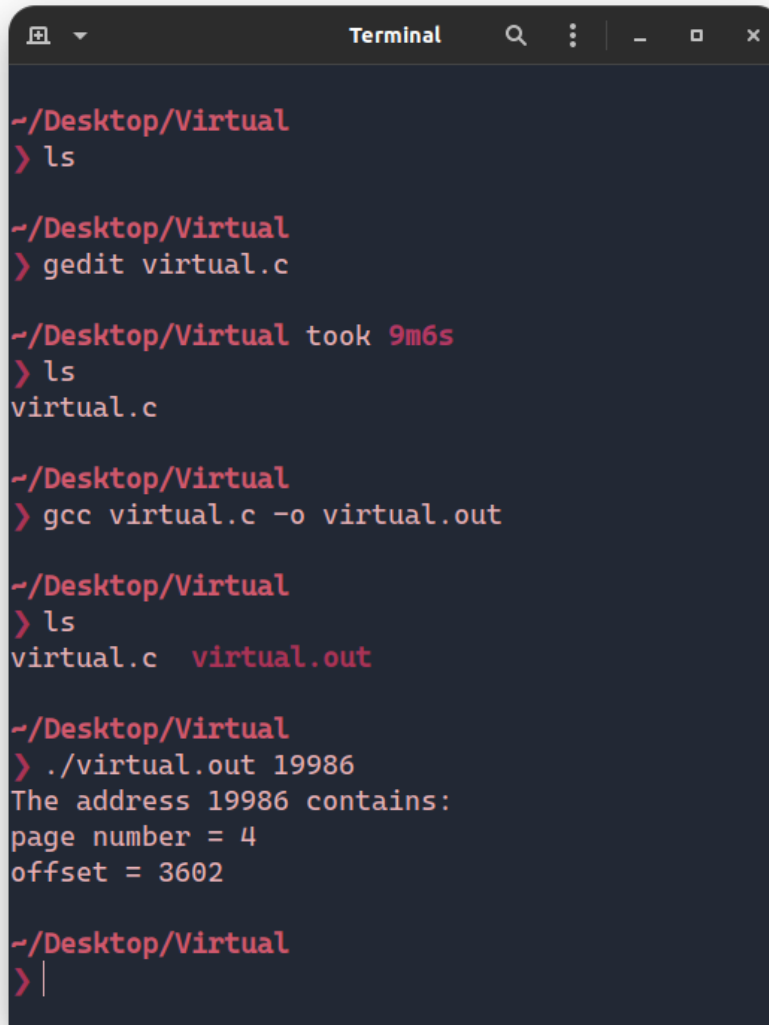
Write a C program that is passed a virtual address (in decimal) on the command line and have it output the page number and offset for the given address.

Program

A screenshot of a code editor window titled 'virtual.c' with the path '~/Desktop/Virtual'. The editor contains a C program that takes a virtual address as a command-line argument and calculates its page number and offset. The program includes headers for unistd, stdio, stdlib, and string. It defines constants for PAGE_NUMBER (0xFFFFF000) and OFFSET (0x00000FFF). The main function checks for exactly two arguments. If not, it prints an error message. Otherwise, it converts the address to an unsigned integer, masks the page number, and calculates the offset. The results are printed to the console.

```
1 #include <unistd.h>
2 #include <stdio.h>
3 #include <stdlib.h>
4 #include <string.h>
5
6 #define PAGE_NUMBER 0xFFFFF000
7 #define OFFSET 0x00000FFF
8
9 int
10 main(int argc, char *argv[])
11 {
12     int pageNo, offset;
13     unsigned int entry;
14     entry = (unsigned int)atoi(argv[1]);
15
16     if (argc != 2) {
17         fprintf(stderr, "Invalid Input\nPlease enter: ./virtual followed by the virtual address in decimal\n");
18         return -1;
19     }
20
21     printf("The address %d contains:\n", entry);
22
23     //mask the page number
24     pageNo = (entry & PAGE_NUMBER) >> 12;
25     offset = entry & OFFSET;
26     printf("page number = %d\n", pageNo);
27     printf("offset = %d\n", offset);
28
29     return 0;
30 }
```

Output



```
~/Desktop/Virtual
> ls

~/Desktop/Virtual
> gedit virtual.c

~/Desktop/Virtual took 9m6s
> ls
virtual.c

~/Desktop/Virtual
> gcc virtual.c -o virtual.out

~/Desktop/Virtual
> ls
virtual.c  virtual.out

~/Desktop/Virtual
> ./virtual.out 19986
The address 19986 contains:
page number = 4
offset = 3602

~/Desktop/Virtual
> |
```