myV2p— xv6-CS450 man page

Retrieve the physical address corresponding to a given virtual address.

SYNOPSIS

```
#include "types.h"
#include "user.h"

uint myV2p(uint va, int mode); // mode = '0':read, '1':write
```

DESCRIPTION

myV2p() takes a virtual address as an input and returns the corresponding physical address allocated to it. To do so, the 10 most significant bits of the virtual address are used to index into the page directory (level 1) of the calling process and the address of the page table in the entry is retrieved. Next, the following 10 bits are used as an index into this page table (level 2) and the physical frame number (PPN) is retrieved. This PPN is then concatenated with the page offset (12 least significant bits of the virtual address) to compute the required physical address, which is then returned to the calling program. At each page table lookup, the flag bits are also checked to verify appropriate access (specified by the mode of operation) and valid pages.

RETURN VALUE

physical address (uint) on success; -1 on failure.

ERROR HANDLING

The return value of the myV2p() system call can be checked to detect errors. If the returned value is -1, an error has occurred. Following are the possible reasons for the error:

(1) The entered virtual address is not a valid 32-bit number.
(2) The entered mode of operation is invalid.
(3) The page corresponding to the given virtual address is invalid (not present).
(4) The page corresponding to the given virtual address is a supervisor page (cannot be accessed in user mode).
(5) The page corresponding to the given virtual address does not have write permission (only if mode of operation is '1') — all user pages are readable.

EXAMPLE

A call to myV2p() with a VA in user space (eg. $1000) will return a corresponding PA(eg. $ee2b2000). Trying to get the PA of a supervisor page (eg. VA = $80000000) will throw an error.