# Operating Systems 2

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Programming Assignment 6

**Program Design**

* To create a system call, we first should assign a system call number to our new system call
* When the user inputs the name of the system call in xv6, the console reads the name of the function and find the relevant number which corresponds to the function
* A system call is executed in kernel mode as the program needs access low level functions The program generates a trap
* During a system call, the processor switches from user mode to kernel mode, then it completes the process and returns to user mode
* Traps are handled in trapasm.S
* The file makes a call trap(struct trapframe \*) in trap.c
* A system call can also take arguments to kernel mode or take return value back to user mode
* syscall.c stores an array of function pointers that return int
* There is a sys\_ prefix so that assembly instructions for each syscall are not written
* A particular syscall takes eax register value that we placed on usys.S with its corresponding syscall number and then calls sys\_ and puts the return value into eax register
* When a user function is passed with any parameters, they are stored in the user stack and are accessed using argint argstr and argptr given in syscall.c
* Pointers to the memory location are passed to avoid unnecessary overhead

**Important points to note:**

* To use pgtprint call, enter pgtprint in the console and press Enter
* The entire page table entry will be printed as per requirements mentioned in the assignment

Part 1: To add a new system call which prints the page table entires

* In syscall.h the following changes are made
  + #define SYS\_pgtprint 23 is added
* In syscall.c the following changes are made
  + extern int sys\_pgtprint(void); is added which is an external system call defined elsewhere
  + [SYS\_mydate] sys\_pgtprint is added inside static int (\*syscalls[])(void) [SYS\_pgtprint]
  + Inside sysproc.c a system call sys\_pgtprint() is added to print page table entires
  + Inside user.h a function which would be called by user to print date and time is added, int pgtprint() Inside usys.S , SYSCALL(mydate) is added, so that the user can now call this function to print the date and time Added \_mydate to the UPROGS definition in Makefile A file mydate.c has been created which contains the required procedure to print the correct date and time of the system in UTC and IST format