OWN KERNEL: HOW TO START

TYPES

Type	Examples
monolithic	Linux, BSD
microkernel	Minix, Mach
hybrid	Windows?

WHAT YOU NEED (FOR X86)

- bootloader
- cross-toolchain
- some build system tool (eg. CMake + Ninja)

SIMPLE EXAMPLE

- everybody loves assembly ;)

```
.global start
start:
  hlt
```

```
ENTRY(start)
SECTIONS {
  . = 1M;
  .text : {
      KEEP(*(.text))
  }
}
```

MULTITASKING

Ability to run concurent processes

- cooperative
- preemptive

MULTITASKING

ON 1 CORE:

- time-sharing
- interrupt driven scheduler
- context switching

CONTEXT SWITCHING

Saving and restoring state of the CPU

```
PUSH_REGISTERS
STORE_STACK_POINTER

# Run scheduler to choose process to load

LOAD_NEW_STACK_POINTER
POP_REGISTERS

IRET
```

HOW CAN PROCESS PERFORM OPERATIONS IN THE KERNEL IF ACCESS IS FORBIDDEN?

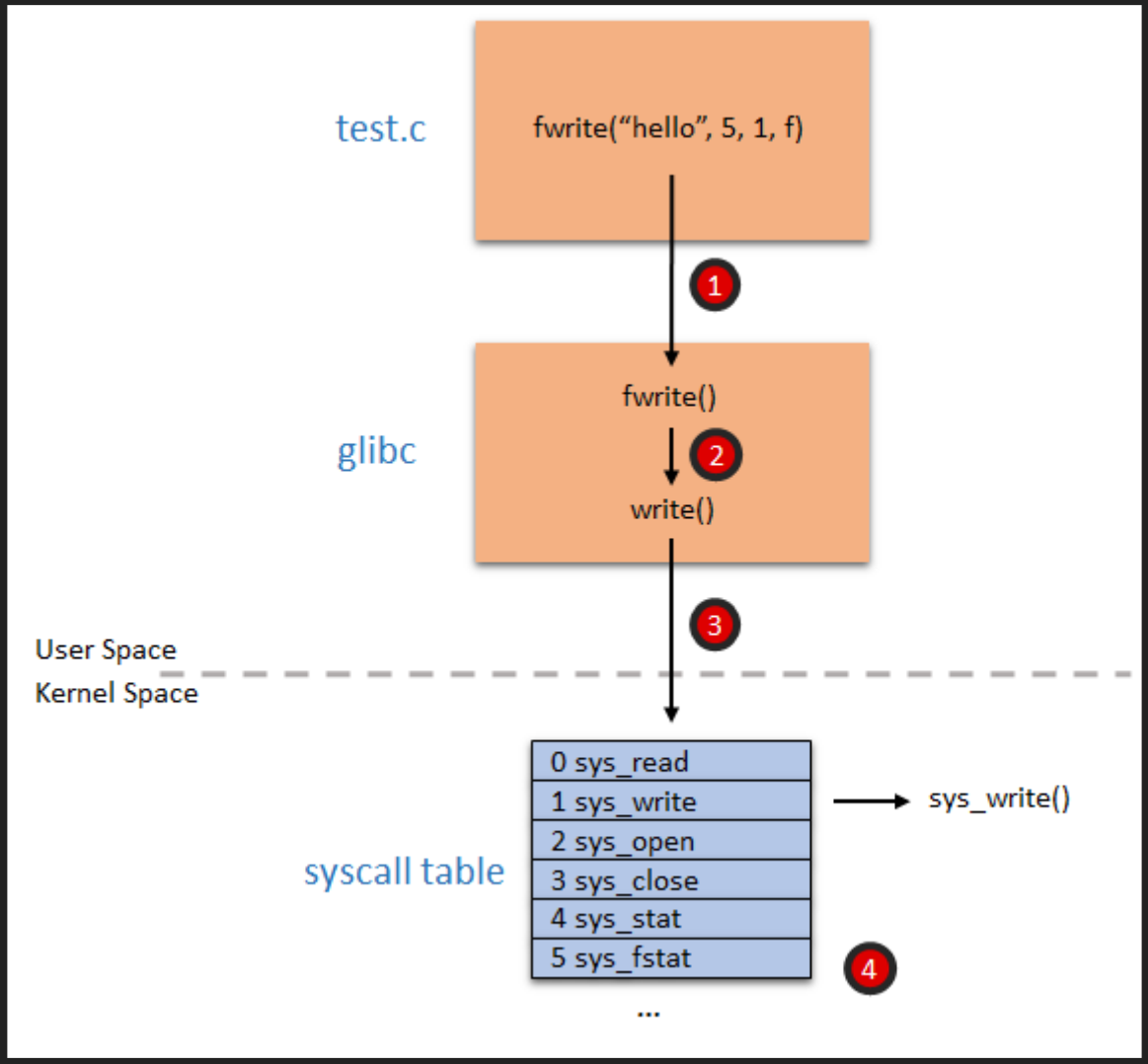
ANSWER: SYSTEM CALLS

On x86 Linux:

```
# write syscall
mov $1, %eax
mov $1, %ebx
mov $string, %ecx
mov $12, %edx
int $0x80

string:
.asciz "Hello World!"
```

WHAT HAPPENS?



NEXT STEPS

- filesystems
- IPC
- drivers

THANKS FOR YOUR ATTENTION! :)