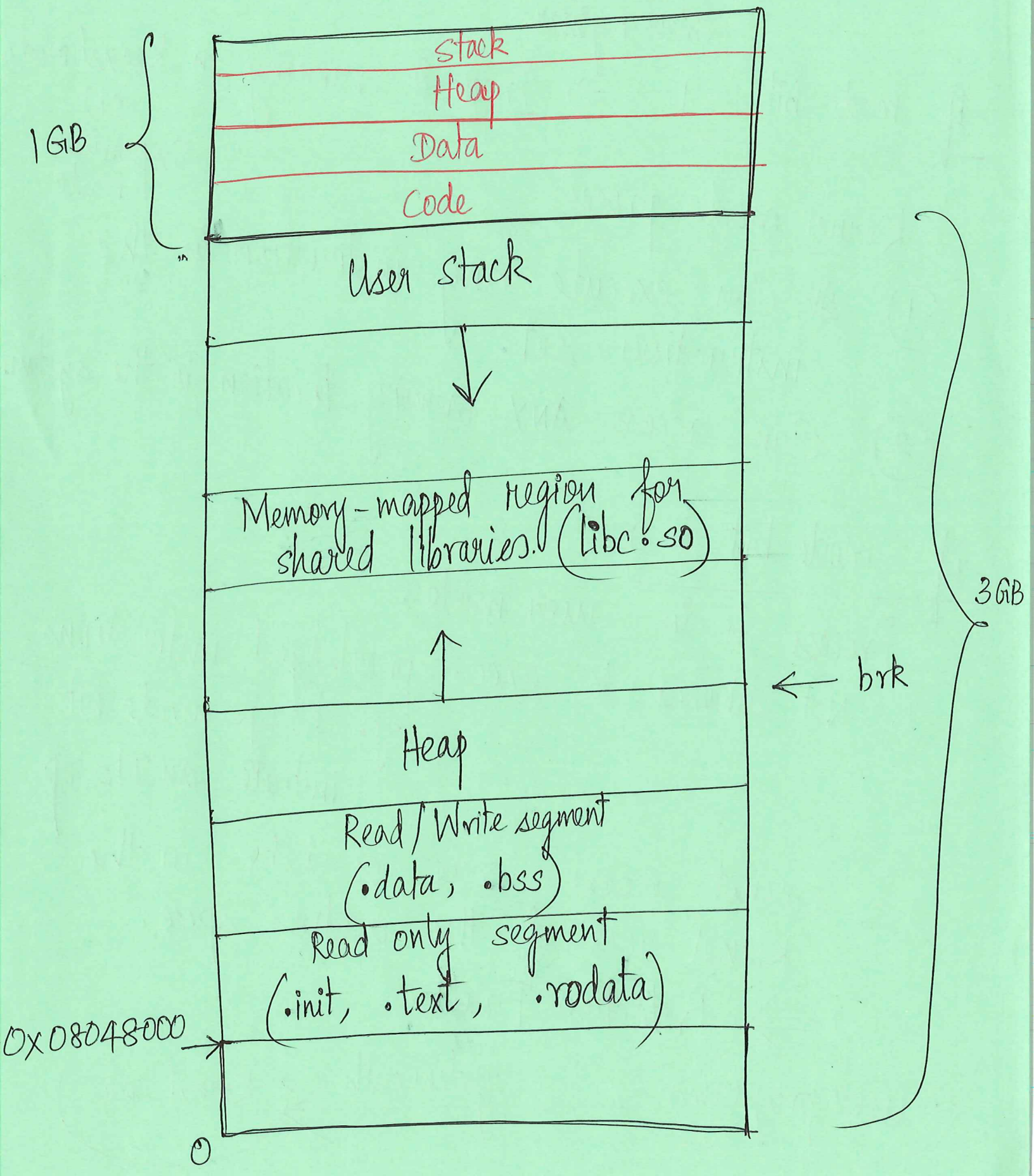
User mode and Kernel Mode ①



Mode bit (2)

control register.

if mode bit = 1 ⇒ Process is running in Kernel mode. (or) Supervisor mode.

Kernel mode process

(1) Can execute any instruction in the instruction set.

(2) Can access ANY memory location in the system.

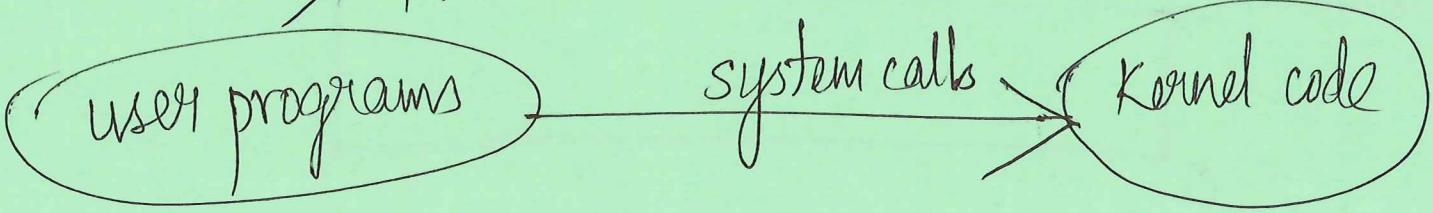
if mode bit = 0.

Process is in user mode.

1. Not allowed to exec. previledged instructions.
   eg. change mode bit
   initiate an I/o op.

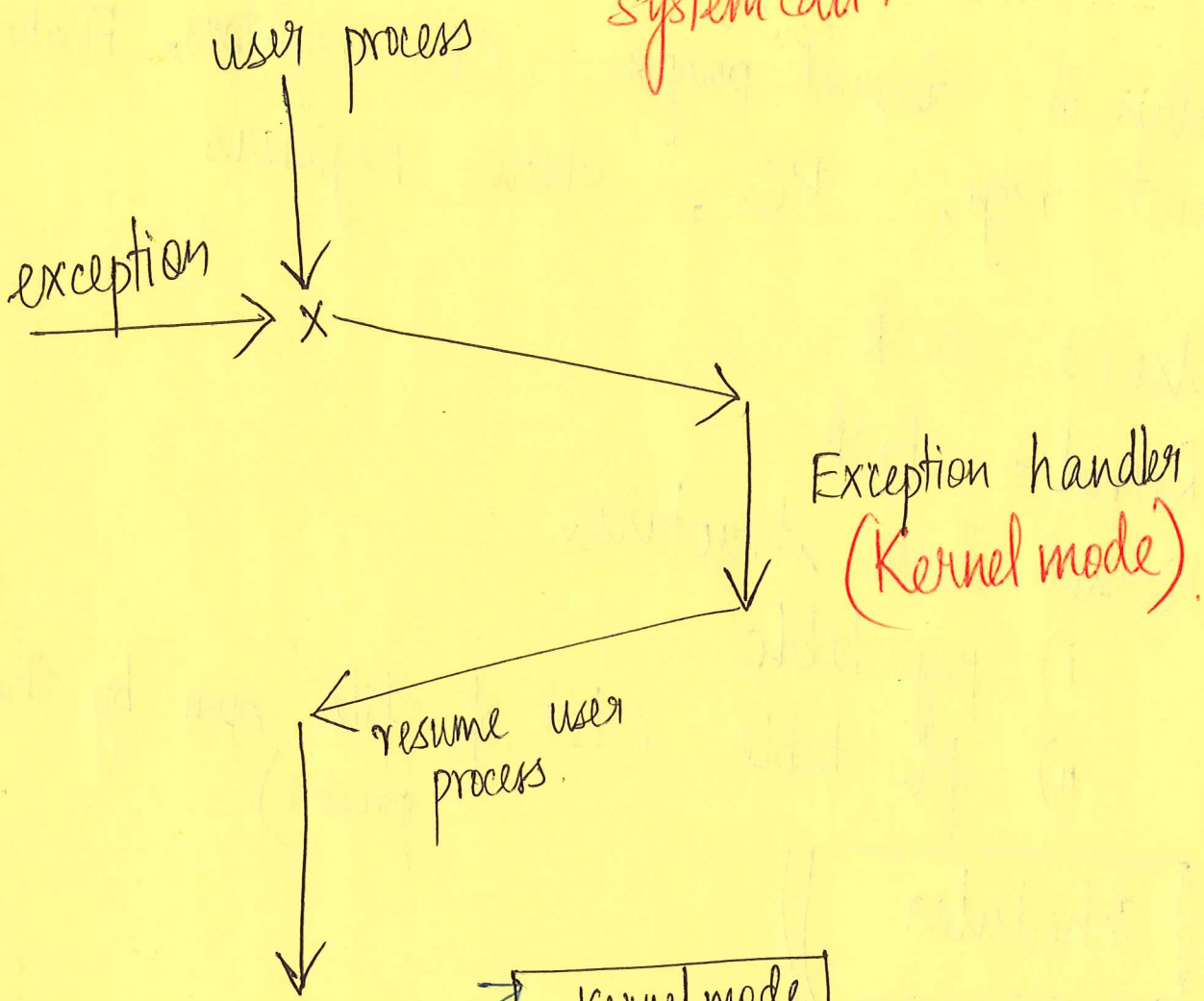
2. Cannot access code or data in the Kernel area of the address space.

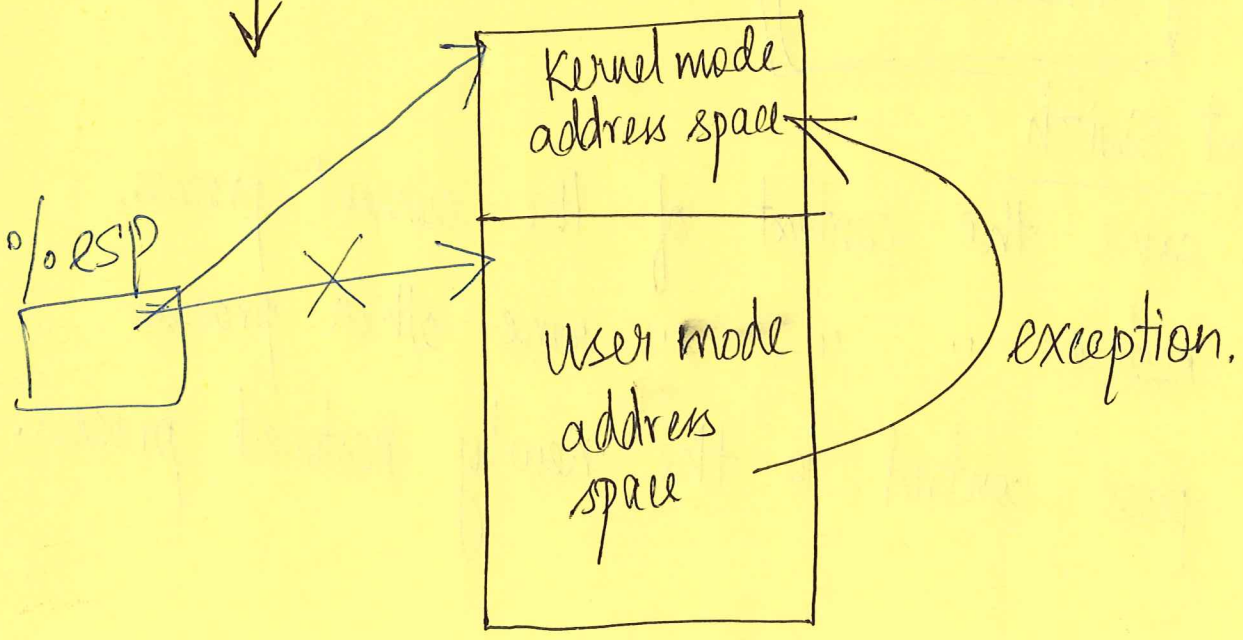
⇒ Protection Fault.



user mode → kernel mode

interrupt
fault
system call.





Context Switches

Kernel maintains a context for each process.

Context

1. Values in General purpose CPU registers, Floating point regs, PC, status registers
2. User's stack
3. Kernel's stack
4. Kernel data structures
   i) page table
   ii) file table (list of files open by the process)

Scheduler

Context Switch

1. save the context of the current process.
2. restore " " " some other process
3. pass control to the newly restored process.

Flow of control in context switch (5)