CS 219

Lecture 21

\# ~~Scheduler~~ Scheduling

Scheduling mechanism

Scheduling events

Scheduling policy

process

Kernel thread
↳ a Kernel functionality scheduling entity.

eg. ps - aux

[Kswapd]

[Kmigration d]

Q. When can the scheduler be invoked?

- Whenever the OS is executing!

- interrupts

  implicit ~ timer, page fault handler (exception)

  explicit ~ blocking calls, yield, sleep, exit, ...
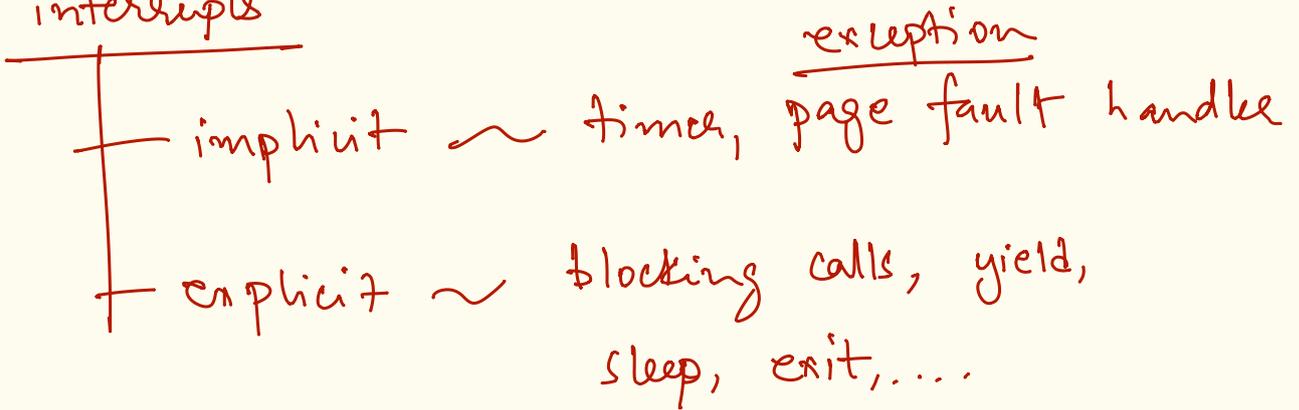
Q: context save & restore is THE primitive for scheduling.

~ what is context?

~ user context : state of all registers on the CPU on process s/w to kernel mode.

☑ XV6 : trap frame usage for context save & restore | per process

P_1

P_2

yield();

user

Kernel

save process context on trap frame

Kernel object

Kernel execution (process context) & some point invoke scheduler

yield: syscall execution

Scheduler

saves & restores

Kernel context → state of CPU regs. and PC when kernel thread of process is switched out & switche into.

XV6

⊛ sched ⤳ swtch (old context, new context)

xv6

P_1

P_2

save

restore of
user context

user
context
process
context.

Kernel-
execution

per-cpu
scheduler kernel
thread

Kstack
of
scheduler

Kernel stack
of P_2

Kernel stack
of P_1

Sched ()

switch

switch

save cpu regs.
content
of kernel.

XV6   struct proc
context. ← Kernel
context