國立陽明交通大學
NATIONAL YANG MING CHIAO TUNG UNIVERSITY

Institute of Artificial Intelligence Innovation
Department of Computer Science

Operating System

Homework 03: CPU Scheduling (part1)

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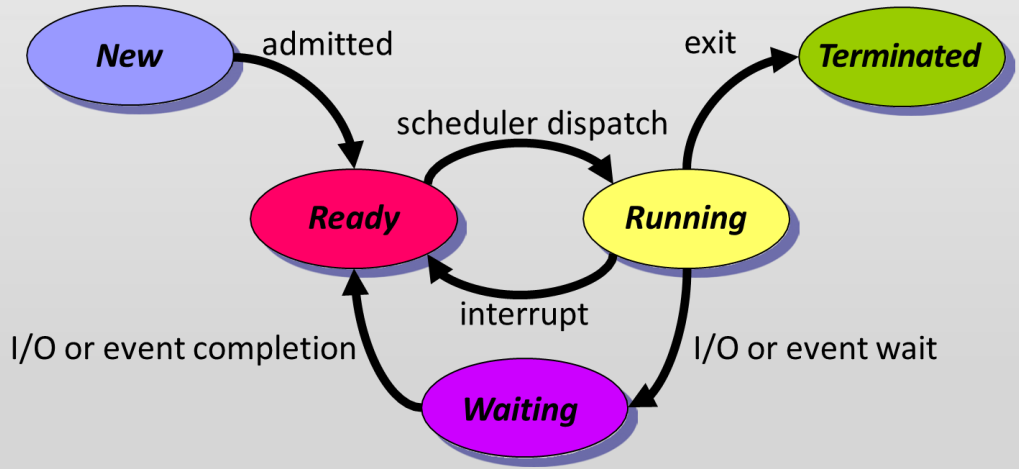
Wed. 10:10 - 12:00 EC115 +
Fri. 11:10 – 12:00 Online

Goal

1. The default CPU scheduling algorithm of Nachos is a simple round-robin scheduler for every 100 ticks.
2. To get familiar with Nachos scheduling strategy.



Trace Code

- Explain the purposes and details of the following 6 code paths to understand how nachos manages the lifecycle of a process (or thread) as described in the Diagram of Process State.

1. New -> Ready

   Kernel::ExecAll -> Kernel::Exec -> Thread::Fork -> Thread::StackAllocate -> Scheduler::ReadyToRun

2. Running -> Ready

   Machine::Run -> Interrupt::OneTick -> Thread::Yield -> Scheduler::Find NextToRun -> Scheduler::ReadyToRun -> Scheduler::Run

3. Running -> Waiting
4. Waiting -> Ready
5. Running -> Terminated
6. Ready -> Running

Trace Code (cont'd)

- Explain the purposes and details of the following 6 code paths to understand how nachos manages the lifecycle of a process (or thread) as described in the Diagram of Process State.
  1. New -> Ready
  2. Running -> Ready
  3. Running -> Waiting

     SynchConsoleOutput::PutChar -> Semaphore::P -> List<T>::Append ->
     Thread::Sleep -> Scheduler::FindNextToRun -> Scheduler::Run
  4. Waiting -> Ready

     Semaphore::V -> Scheduler::ReadyToRun
  5. Running -> Terminated

     ExceptionHandler(ExceptionType) case SC_Exit -> Thread::Finish() ->
     Thread::Sleep -> Scheduler::FindNextToRun -> Scheduler::Run
  6. Ready -> Running

Trace Code

- Explain the purposes and details of the following 6 code paths to understand how nachos manages the lifecycle of a process (or thread) as described in the Diagram of Process State.
  1. New -> Ready
  2. Running -> Ready
  3. Running -> Waiting
  4. Waiting -> Ready
  5. Running -> Terminated
  6. Ready -> Running

     Scheduler::FindNextToRun -> Scheduler::Run -> SWITCH(Thread*, Thread*) -> (depends on the previous process state, e.g., [New,Running,Waiting]→Ready) -> for loop in Machine::Run()

Report Format

- Please follow the word file to form your report for HW03
- Format guide
  - Content format: 12pt front,~~16pt row height~~, and align to the left.
  - Caption format: 18pt and Bold font.
  - ~~Font format: Times New Roman, 標楷體~~
  - ~~Figure: center with single line row height.~~
  - Upload pdf file with the filename:
    - OS_HW03_GROUP_XX.pdf (change XX to your Group Number)

Grading

- Trace – 98%
  - 1-5 Each path – 16%
  - 6 – 18%
- Report Format – 2%
- Deadline: 11/24 23:59
- Late submission:
  - 3 days: 90%, 1 week: 80%
  - 2 weeks: 70%, 3 weeks: 60%
  - Further, will not be accepted

Reminder

- 0 will given to cheaters. Do not copy & paste!
  - TA will check your repository
- Feel free to ask TA questions
  - The TA has created a channel named '作業討論'. If you have any questions about the homework, please ask and discuss them in the channel. The records in the channel may help classmates who have similar issues.
  - The TA will not help you debug your code.
- Late submission:
  - 3 days: 90%, 1 week: 80%
  - 2 weeks: 70%, 3 weeks: 60%
  - Further, will not be accepted

Q & A

Thank you for your attention