Operating System
Nachos Term Project

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Outline

- Introduction to Nachos
  - http://www.cs.berkeley.edu/~kubitron/courses/cs162-F05/Nachos/nachos.ppt
- Install Nachos 4.0
- Install Nachos 5.0j
- Nachos Term Project

What is Nachos

- An instructional operating system
- Includes many facets of a real OS:
  - Threads
  - Interrupts
  - Virtual Memory
  - I/O driven by interrupts
- You can (and will) modify and extend it

What else is Nachos?

- Nachos also contains some hardware simulation.
  - MIPS processor
    - Can handle MIPS code in standard COFF, except for floating point instructions
    - You can (and will) write code in C, compile it to MIPS and run it on Nachos.
  - Console
  - Network interface
  - Timer

Why Nachos?

- What better way to learn how an OS works than by building one?
- Much easier and more reasonable to build a simulated one in Java
- Skeleton code allows us to work on, replace, or upgrade one piece at a time.

History of Nachos

- Originally created here at Berkeley in 1992 in C++
- By Wayne A. Christopher, Steven J. Procter, and Thomas E. Anderson
- Used at many universities
- Rewritten in Java by Daniel Hettena
  - Now simpler, easier to grade, type-safe, portable, and more students now know Java.

Install Nachos

- Nachos itself
- Cross Compiler
  - Runs on one architecture but compiles to another architecture

Nachos Term Project

- 1.Implement system call “Sleep”
- 2.Implement Shortest-Job-First scheduling

System Call “Sleep”

- 請實作Sleep(int x)這個system call，把呼叫這個system call的thread block住，並且在x次的timer interrupts以後才又回到READY的狀態。

Hint

- Nachos 4.0
  - a. 修改exception.cc, syscall.h, start.s
  - b. 呼叫alarm.cc的WaitUntil(int x)來處理Sleep(int x)這個system call
- Nachos 5.0j
  - a. 修改UserProcess.java, syscall.h, start.s
  - b. 呼叫alarm.java的WaitUntil(int x)來處理Sleep(int x)這個system call

SJF Scheduling

- a. Nachos 內定的 scheduling algorithm 是 Round-Robin，請設計SJF scheduling加入 Nachos。
- b. 請自行設計test case來證明你的project是對的，針對RR scheduling和SJF scheduling都要能work，放到nachos下面去run的thread，個數至少3個。

Demo

- 6月27日AM 9:00資工系電腦教室
- 把你寫好的nachos source code 與報告(.doc)壓縮成“學號.tar.gz”，Email to : sino@networklab.csie.ncu.edu.tw
- 郵件主旨請定為
  - OS Nachos project report, 學號: 姓名
  - 以避免被當成垃圾信
- 報告內容
  - Nachos介紹、安裝環境、安裝過程、執行結果證明、主要程式說明、遭遇困難與解決方法...等。