

Operating Systems

Not Project 1 Introduction

**Another
Completely
Heuristic
Operating
System**

Speaker : Wei-Ting Lu

What is Nachos?

The history of UNIX.

In 1979, Version 7 Unix is not free anymore(Until 2002). The Berkeley professor Andrew Tanenbaum proposed Minix as an instructional operating system.

Nachos is an instructional operating systems and was developed at the University of Berkeley in 1992.

Numerous projects have been developed for teaching operating systems; among the published ones are Tunis [Holt 1983] and Minix [Tanenbaum 1987b, Aguirre et al. 1991].

Nachos is simpler than UNIX.

e.g. A complete UNIX-like file system would be too complicated for students to understand in only a few weeks

How to install?(Recommendation)

Install virtual machine software.

If your host OS is linux-like, installing VirtualBox is recommend.

https://www.virtualbox.org/wiki/Linux_Downloads

Download Desktop Ubuntu 14.04 LTS 32bit image.

You might get error on 64 bits version

<https://www.ubuntu-tw.org/modules/tinyd0/>

Installing Ubuntu 32bit as your guest OS.

After installation, you need start terminal and input the command showing on next slide page.

Please download the following file in the guest OS:

MIPS cross compiler for Nachos and Nachos 4.0

<http://cc.ee.ntu.edu.tw/~farn/courses/OS/OS2014/index.htm>

Commands in guest OS

Installing g++ and csh

```
sudo apt-get install g++  
sudo apt-get install csh
```

Untar packages

```
tar -zxvf nachos-4.0.tar  
tar -zxvf mips-x86.linux-xgcc.tar
```

Make

```
cd ~/nachos-4.0/code  
make
```

Re-compile after you fix the bugs

```
cd ~/nachos-4.0/code  
make clean(optional)  
make
```

Project 1 – Thread Management

cd userprog file and do the following command to run the test program

```
./nachos -e ../test/test1
```

```
nachos@nachos-VirtualBox:~/Nachos/nachos-4.0/code/userprog$ ./nachos -e ../test/test1
Total threads number is 1
Thread ../test/test1 is executing.
Print integer:9
Print integer:8
Print integer:7
Print integer:6
return value:0
No threads ready or runnable, and no pending interrupts.
Assuming the program completed.
Machine halting!

Ticks: total 200, idle 66, system 40, user 94
Disk I/O: reads 0, writes 0
Console I/O: reads 0, writes 0
Paging: faults 0
Network I/O: packets received 0, sent 0
nachos@nachos-VirtualBox:~/Nachos/nachos-4.0/code/userprog$ ./nachos -e ../test/test2
```

Project 1 – Thread Management

`./nachos -e ../test/test2`

```
nachos@nachos-VirtualBox:~/Nachos/nachos-4.0/code/userprog$ ./nachos -e ../test/test2
Total threads number is 1
Thread ../test/test2 is executing.
Print integer:20
Print integer:21
Print integer:22
Print integer:23
Print integer:24
Print integer:25
return value:0
No threads ready or runnable, and no pending interrupts.
Assuming the program completed.
```

Running two threads to see the result in the next slide page

`./nachos -e ../test/test1 -e ../test/test2`

```
nachos@nachos-VirtualBox:~/Nachos/nachos-4.0/code/userprog$ ./nachos -e ../test/test1 -e ../test/test2
```

```
Total threads number is 2
```

```
Thread ../test/test1 is executing.
```

```
Thread ../test/test2 is executing.
```

```
Print integer:9
```

```
Print integer:8
```

```
Print integer:7
```

```
Print integer:20
```

```
Print integer:21
```

```
Print integer:22
```

```
Print integer:23
```

```
Print integer:24
```

```
Print integer:6
```

```
Print integer:7
```

```
Print integer:8
```

```
Print integer:9
```

```
Print integer:10
```

```
Print integer:12
```

```
Print integer:13
```

```
Print integer:14
```

```
Print integer:15
```

```
Print integer:16
```

```
Print integer:16
```

```
Print integer:17
```

```
Print integer:18
```

```
Print integer:19
```

```
Print integer:20
```

```
Print integer:17
```

```
Print integer:18
```

```
Print integer:19
```

```
Print integer:20
```

```
Print integer:21
```

```
Print integer:21
```

```
Print integer:23
```

```
Print integer:24
```

```
Print integer:25
```

```
return value:0
```

```
Print integer:26
```

What is Project 1 going to do?

Trace the following files and find out why the result is wrong:

nachos-4.0/code/userprog/addrspace.h

nachos-4.0/code/userprog/addrspace.cc

nachos-4.0/code/userprog/userkernel.cc

nachos-4.0/code/userprog/translate.h

nachos-4.0/code/userprog/translate.cc

After you fix the bug, recompile Nachos and see if the result is correct.

Hand in report

Code

```
tar zcvf b99xxxxxx.tar.gz ./nachos-4.0
```

Report

1. Why the result is not congruent with expected?
2. Explain all the functions that you traced in the files(Slide page 7).
3. How you modified Nachos to make it support multiprogramming – important code segments.
4. Screenshot the final result.
5. Make your report as pdf file.

Mail your code and report to TA before the deadline:
argonmisir@gmail.com