

Learn how an OS works

- OS are essential to everything we do with computers

Get an inside view

- Look at design & implementation

Learn by doing

- You'll code a substantial part of an actual OS

Check website regularly

- <http://courses.cs.vt.edu/~cs3204/spring2008/wmcquain>

Use CS Forum for projects first

Second - send project-related email to

- cs3204-staff@cs.vt.edu

TAs:

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Willingness to master an intellectually challenging subject

Knowledge of computer organization (CS/ECE 2504)

- Addressing, Registers, Basic Assembly Language, Memory Organization

Knowledge of algorithms & data structures (CS 2604)

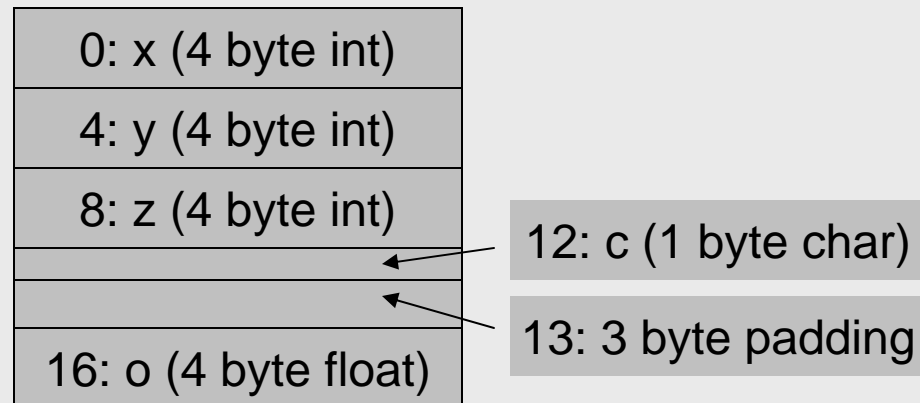
- Solid knowledge of linked lists, hash tables, etc.

A solid knowledge of C++

Willingness to develop a solid knowledge of C

```
#define offsetof(TYPE, MEMBER) \
    ((size_t) &((TYPE *) 0)->MEMBER)
```

```
struct point {
    int x;
    int y;
    int z;
    char c;
    float o;
};
```



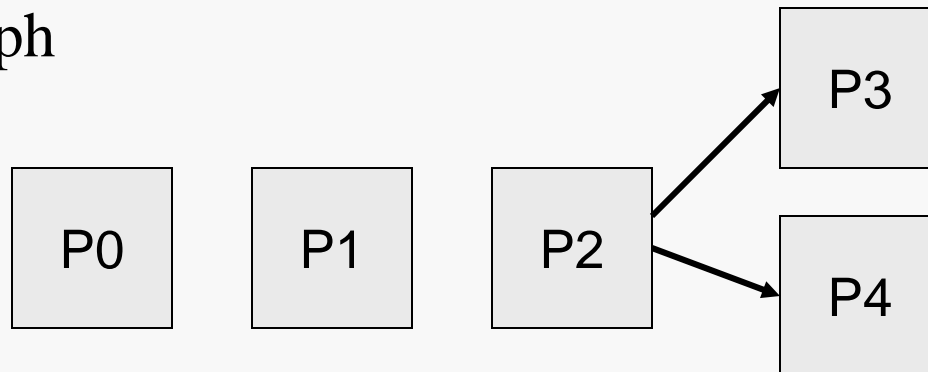
Q.: What is `offsetof(struct point, y)`?
`offsetof(struct point, o)`?

5 Projects: 0, 1, 2, 3, and 4.

Project 0 is warm-up

Projects 1-4 will use the Pintos operating system developed at Stanford.

Project dependency graph



Projects are different in five ways

The Pintos projects are hard (*)

Expect a stimulating challenge

About 2,500 lines of code (over the entire semester) to write

We will help:

- Provide tools, answer questions
- Although Pintos is a true OS, we run it in a simulator (Bochs or Qemu) → reproducibility! (well, almost...)

Ask lots of questions!

We've hired a few students and interns recently from Tech. During the interview process, and during conversations with faculty and students, it became apparent that CS3204 Operating systems, and specially the project oriented version had a great impact in our interest in a candidate.

We consistently could distinguish between systems oriented students/graduates applying for internships or full time positions based on how they described their experiences in that class. We also believe that they learnt a lot through this course, giving them a distinct edge over candidates from some of the other schools we recruit from, ranging from scheduling primitives and memory management to file system basics and IPC. We've noticed certain schools (the CS program at Brown for instance), has similar undergraduate classes focused on systems that we like and support. (...)

we would really like to see more of this trend in a systems focus in the undergraduate program, and encourage it in any way we can.

The projects are group projects

Working in a group more closely resembles what you do outside of academia

- Can design together, code together
- Learn group collaboration tools (CVS version control system)

Group members must contribute equally

3 People per group, this semester groups can be formed across sections.

- All project-related policies are identical.

Read before you code

We can't build an OS from scratch in a semester

- Start with very primitive baseline code

You must read a substantial amount of (well-written, well-documented) code before starting the projects

- All of Pintos is about 7,000 lines
- Must intimately understand probably 500-1000 lines, will be introduced gradually
- Welcome to read all nitty-gritty details

Only 50% of your grade comes from test cases

- All test cases are public

Other 50% is given for design & documentation

- Will grade both design and code quality
- Requires design documents
 - For P1 & P2, create these individually
 - For P3 & P4, one document per group suffices.
- Explain your design rationale
 - Better designs will yield generally more credit
 - Flawed design will incur deductions
 - Bugs that become apparent from your description will lead to deduction
- Create maintainable code, of “peer review” quality
- No credit for descriptions of unimplemented designs

We use C, not C++

Note: C is a subset of C++

Don't have virtual methods, don't have templates, don't have rtti

Still use object-orientation, still use encapsulation

Most OS are written in C, not C++.