Reminders

- Project 4 due tomorrow, 4:00pm
- Review lecture tomorrow
- Today:
  - Project 4 questions
  - Some practice for the exam
  - Evaluations
  - HW5 + Project 3 + all old stuff back
    - HW5 average: 70/80
    - Project 3 average: 44.8/50

Project 4 questions

- General?
- Filename length?
- File size?
- File length?

Review: file systems

- Two improvements BSD Fast File System implemented?
- Name one disadvantage of RAID 0
- Name the type of system and workload that LFS was based on
- Max UNIX file size for 1K blocks?
- The sequence of actions that occurs when a user executes the following, in terms of inodes and directory entries:

```
touch file && ln file file2 && rm file && rm file2
```


Review: file systems

- Two improvements BSD Fast File System implemented?
  - Cylinder groups, blocksize 1->4K, disk params
- Name one disadvantage of RAID 0
  - No redundancy –data loss possible
- Name the type of system and workload that LFS was based on
  - Frequent writes with lots of small files
- Max UNIX file size for 1K blocks?
  - (10+256+256^2+256^3)*1K = around 16 GB
  - But what about file handles?
- The sequence of actions that occurs when a user executes the following, in terms of inodes and directory entries: `touch file && ln file file2 && rm file && rm file2`
  - …

Review: virtual memory

- Segmentation doesn't have this problem of wasted space.
- How does copy-on-write work? What is it used for?
- What is Belady's anomaly?
- Number of references the first load will produce on x86 on powerup.

Review: virtual memory

- Segmentation doesn't have this problem of wasted space.
  - Internal fragmentation
- How does copy-on-write work? What is it used for?
  - …
- What is Belady's anomaly?
  - Bad property of FIFO – fault rate can increase with more allocated frames
- Number of references the first load will produce on x86 on powerup.
  - Two-level PT: 3

Review: Networks + Security

- What does the network stack look like?
- Name a few functions provided by TCP
- What is RPC good for?
- What is the difference between authentication and authorization?
- How can you detect someone stole your password?
- Why does Windows require ctrl+alt+del before you type your username/password?

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Review: Networks + Security

- What does the network stack look like?
- Name a few functions provided by TCP
  - Reliability, flow control, congestion control
- What is RPC good for?
- What is the difference between authentication and authorization?
  - Authentication = identify users/programs
  - Authorization = track user's read/write access to different objects
- How can you detect someone stole your password?
  - Last login time, etc.
- Why does Windows require ctrl+alt+del before you type your username/password?
  - Protect again login spoofers

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Last slide

- Good luck on the exam!
- Congratulations on making it through a tough class J

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