

**Week #15: File systems and Security**  
**Exam Review Question**  
**CS 241: Fall 2013**

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*These questions are provided to you to help you study material covered in CS 241 that may appear on the final exam. These exact questions may or may not appear on the final exam, but the topics they cover will almost certainly be on the final exam.*

1. What is the maximum size of a file that can be stored in an i-node based file system where the size of each disk block is 8 KB, the size of a disk pointer is 4 B, and each i-node contains 5 direct entries, 3 single-indirect entries, 2 double-indirect entries, and 1 triple-indirect entry?
2. If the size of a disk pointer doubles, how does this affect the maximum size of the file on a system where each i-node contains 10 direct entries, 1 single-, 1 double-, and 1 triple-indirect entry?
  - a. Does the maximum size grow by a factor of 2x (eg: doubles)?
  - b. Does the maximum file size shrink by a factor of 0.5x (eg: the new maximum file size is half of the old size)?
  - c. What is the new maximum file size as a factor to the old maximum file size?
3. Name three things that are included in an i-node entry and one thing that is not contained in an i-node entry.
4. A file has the permissions "755". Explain in English terms what "755" signifies.
5. You have built a brand-new fancy hash table to store all the knowledge you have learned from CS 241. However, you still need to find a hash function to use to hash data into your hash table. Explain why a SHA-256 hash function may not be an ideal hash function for this purpose.
6. You built a database that stored user passwords using a hash. However, you found that some users have the same hashed password. What does this mean? How can you prevent this from happening?