# UNI CS 3430

**Operating Systems** **Suggested Exercise #5**

**Note:** The point of the exercises is to help you reflect on and better understand the course material for the test. This material and types of questions will probably show up on the exams. We will go over answers to the questions before the exam. Covers Projects 2-3 and Sessions 23 and 24.

**Vocabulary to know [Projects 2 and 3]:** Difference between module and kernel executable, kthread, mutex, /proc file system, what these commands do: ‘make menuconfig’, ‘make oldconfig’, ‘make’, ‘lsmod’, ‘insmod’, ‘rmmod’.

**Vocabulary to know [Session 23]:** File, file header, 4 file system components (disk management, naming, protection, reliability), 3 ways to access a file (sequential, random, content-based), file usage patterns (e.g. most references are to small files, but large files use most of the disk space and account for most of the bytes transferred), disk allocation policies (contiguous, linked-list, segment-based, indexed, multilevel indexed, hashed).

**Vocabulary to know [Session 24]:** i-node, directory, name collisions, absolute path name, different ways to organize a name space (flat, hierarchical, relational, contextual, content-based).

**Questions and Short Answers: Projects 2 and 3 (Kernel Projects)**

1. What are the basic steps to configure, compile, and install a new kernel
2. When are the read and write module functions triggered?
3. What does a kthread function do and where does it run? (Hint: it runs in its own function.)
4. What kind of variables do we need to protect with a mutex?

**Questions and Short Answers: File Sysems:**

1. [Session 24] For a hierarchical name space, what are the steps to resolve the path /pets/cat.jpg?
2. [Session 24] How many disk I/Os do we need to resolve the path (without caching)?
3. [Sessions 23 and 24] Answer one of the following questions
	1. If you can have infinite number of CPUs (computation time is zero) on a machine, how would you design your file system?
	2. If you can have infinite memory size on your machine, how would you design your file system?
	3. If you can have infinite disk storage on your machine, how would you design your file system?
	4. If you can have infinite network bandwidth on your machine, how would you design your file system?
4. [Sessions 23 and 24] Answer one of the following questions
	1. How would you design a file system to store only large files?
	2. How would you design a file system to store only small files?
	3. If you have as much memory capacity as the disk capacity, how would you design your file system?