# FIT1047 Tutorial 6

## Topics

- Operating Systems
- Processes

## Instructions

The tasks are supposed to be done in groups of two or three students.

For some of the questions, you may have to refer to the free online textbook at `http://www.ostep.org/`, or do some internet research.

## Task 1: Processes

1. What is the difference between a *process* and a *program*?
2. A *context switch* happens when execution switches between a process and the operating system (e.g. to handle an interrupt). What does a context switch have to do?
3. Explain the different *states* that a process can be in.

## Task 2: Protection

An important concept in Operating Systems is *Protection*, meaning that one malicious or buggy process cannot bring another process or even the entire system down.

1. Explain the difference between *user mode* and *kernel mode*
2. Why are *system calls* necessary when application programs run in user mode?
3. Find a list of system calls in the Linux operating system. How many are there? Which system call numbers would you have to use to get the current time, open a file, create a new directory, and exit the process?

## Task 3: Examining running processes

Explore the processes currently running on your computer. On Windows, start the *Task Manager*. On Mac OS, start the *Activity Monitor*. On many Linux systems, you can run a program called *System Monitor*, or run the *top* command line tool.

1. How many processes are currently running?
2. How many processors (or cores) does your computer have?
3. Find out how much of the processor(s) is currently in use, and by which process. Try a few things (e.g. playing a video in a web browser) to see how CPU usage goes up and down.
4. Can you find out how much time is spent in user mode vs. kernel mode?