CPSC 471: Computer Communications

A Quick Java Threads Tutorial

What is a thread?

- Used in Java to enable multitasking
- Usually spawned by a main program
  - Run in parallel to the main thread
  - Run in parallel to each other

Java Thread Class

- http://docs.oracle.com/javase/7/docs/api/java/lang/Thread.html

- Some important functions:
  - void run()
    - Contains the code the thread will run
  - void start()
    - Causes the thread to begin execution
      - Java VM calls the thread's run() function
  - void join()
    - Waits for the thread to die **(Blocking function)**

How to use threads

- Create a class which either
  - is a subclass of Thread and implements run()
    - instantiate this class to start the thread
  - implements the Runnable interface with a run() method
    - pass an instance of this class to the Thread constructor
- I'll show an example of a class which is a subclass of Thread

Thread Example

```java
import java.lang.*;
import java.io.*;

class threadexample {

        public static void main(String args[]) {
                System.out.println("Starting main()");

                myThread first = new myThread("Hello");
                myThread second = new myThread("Bonjour");
                myThread third = new myThread("Aloha");

                first.start();
                second.start();
                third.start();

                System.out.println("main() finished");
        }
}
```

Thread Example continued

```java
class myThread extends Thread {

        private String message;

        public myThread( String msg ) {
                message = msg;
        }

        public void run() {
                while( true ) {
                        System.out.println(message);
                        try {

                                Thread.sleep((long)(Math.random()*2000));
                        } catch( Exception e ) {} // Nothing should go wrong
                }
        }
}
```

Common Mistakes

- Forgetting to call start()
- Calling run() instead of start()

- How can I tell a thread that is blocking to finish?
  - accept()
  - read()