CECS 277 – Lecture 17 – Threads

A multi-threaded program is one that is written so that different parts of the program can be run concurrently. This is done to better utilize the CPU to minimize idle time, allow the computer to multitask, and now with multi-core processors, a task can be divided up so that it can be processed on multiple processors.

There are two different ways of creating a new thread:

1. Extend the Thread class to make a new thread.
2. Implement the Runnable interface.

Both of these methods will have the same effect.

Example: Extending the Thread class.

```
public class ThreadA extends Thread {
     public ThreadA(){
          super("A");
          System.out.println("Thread A");
          start();
     }
     public void run(){
          try{
               for(int i=0;i<5;i++){
                    System.out.println("A: "+i);
                    Thread.sleep(1000);
               }
          }catch(InterruptedException e){
               System.out.println("A Interrupted");
          }
          System.out.println("Thread A exiting");
     }
}
public class ThreadMain{
     public static void main(String [] args){
          ThreadA a = new ThreadA();
          try{
               for(int i=0;i<5;i++){
                    System.out.println("Main: "+i);
                    Thread.sleep(1000);
               }
          }catch(InterruptedException e){
               System.out.println("Main Interrupted");
          }
          System.out.println("Main exiting");
     }
}
```

Example: Implement the Runnable interface.

```
public class ThreadA implements Runnable {
     private Thread t;
     public ThreadA(){
          t = new Thread(this, "A");
          System.out.println("Thread A");
          t.start();
     }
     public void run(){
          try{
               for(int i=0;i<5;i++){
                    System.out.println("A: "+i);
                    Thread.sleep(1000);
               }
          }catch(InterruptedException e){
               System.out.println("A Interrupted");
          }
          System.out.println("Thread A exiting");
     }
}
public class ThreadMain{
     public static void main(String [] args){
          ThreadA a = new ThreadA();
          try{
               for(int i=0;i<5;i++){
                    System.out.println("Main: "+i);
                    Thread.sleep(1000);
               }
          }catch(InterruptedException e){
               System.out.println("Main Interrupted");
          }
          System.out.println("Main exiting");
     }
}
/*   Thread A
     A: 0
     Main: 0
     A: 1
     Main: 1
     A: 2
     Main: 2
     A: 3
     Main: 3
     A: 4
     Main: 4
     Thread A exiting
     Main exiting */
```