cs 140 project 1: threads

9 January 2015

git

The basics:

```
git clone
git add
git commit
git branch
git merge
git stash
git pull
git push
git rebase
```

Some guidelines & ideas:

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Read or skim Pro Git[1] for fuller advice.

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- Commit often. Use `git bisect` to find regression bugs.

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Synchronization primitives In `threads/synch.h`

- Semaphores
- Locks
- Condition variables

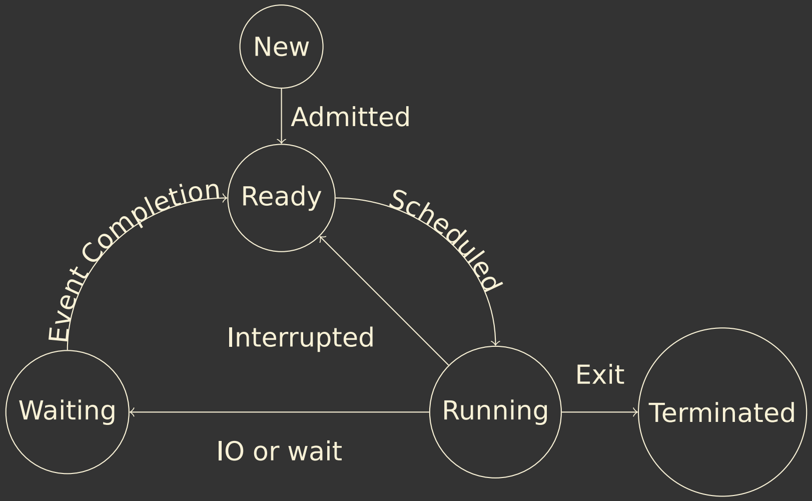
Thread basics

```
struct thread
  {
    tid_t tid;
    enum thread_status status;
    char name[16];
    uint8_t *stack;
    int priority;
    struct list_elem allelem;
    struct list_elem elem;

#ifdef USERPROG
    uint32_t *pagedir;
#endif

    unsigned magic;
  };
```

Thread basics



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- What to do with a `struct thread` if you don’t want to touch it again until after time passes?

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- When lowering thread’s priority, it should yield if another thread has higher priority.
- When a higher priority thread wakes up from alarm clock or a lock, it should preëmpt the current thread.

Priority inversion

If the lowest priority thread holds a lock that a high priority thread wants, the high priority thread blocks until *every other* thread finishes running.

Solution: **priority donation**. Things to consider:

- To how many threads can a donor donate its priority? From how many threads may a donee receive priority?
- What happens when a priority recipient donates to another thread?

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- Global Boolean variable `thread_mlfqs` indicates which mode to use.

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- Read the design document template *first* and work on it as you write code and debug.
- Design your solution, data structures, and synchronization scheme *before* writing code.