Thread and Multithreading

CS 35L Fall 17 Section 7

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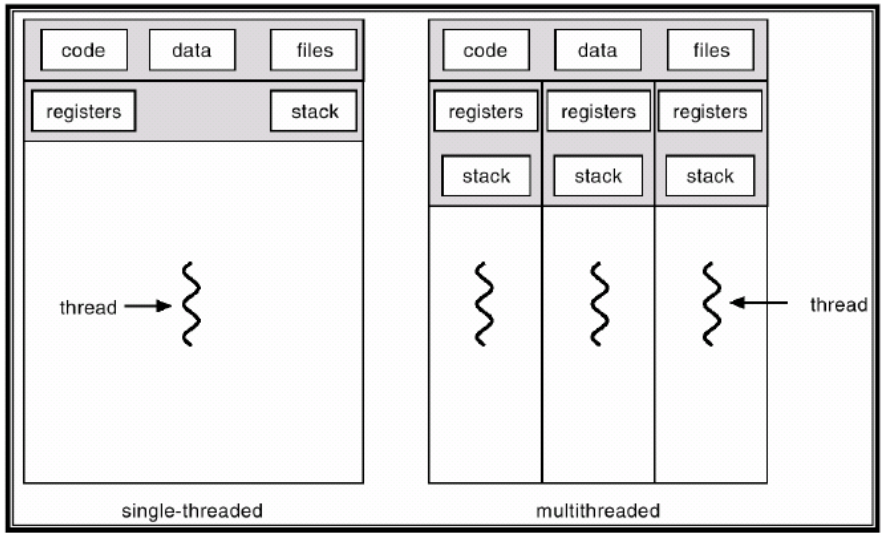
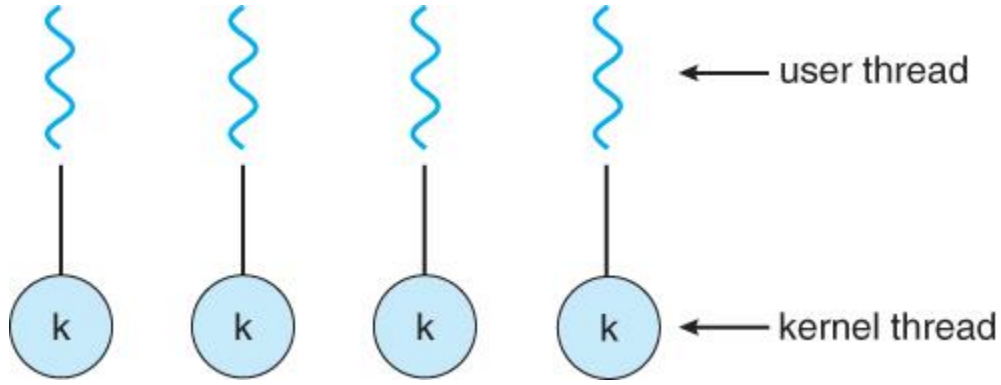
Motivation

- Multiple tasks in application can be implemented by separate threads
  - E.g. Fetch data, update display, etc.
- Process creation is heavy-weight while thread is light-weight
- Simplify The code, increase efficiency
- Benefits:
  - Responsiveness
  - Resource Sharing
  - Economy
  - Scalability



User Threads and Kernel Threads

- User thread management done by user-level threads library
- Kernel threads are supported by the kernel
- Mapping user level threads to kernel threads
  - Many-to-One, One-to-One, Many-to-many, Two-level …



Thread Libraries

- Thread library provides programmer with API for creating and managing threads

- Pthreads: A POSIX standard API for thread creation and synchronization
- This API specifies behavior of the thread library, implementation is up to development of the library
- Common in UNIX operating systems

Pthread Example

- pthread_create
  - http://man7.org/linux/man-pages/man3/pthread_create.3.html
- pthread_attr_init
  - http://man7.org/linux/man-pages/man3/pthread_attr_init.3.html
- pthread_exit
  - http://man7.org/linux/man-pages/man3/pthread_exit.3.html
- Pthread_join
  - http://man7.org/linux/man-pages/man3/pthread_join.3.html