

## CS520 Web Programming

### Task Scheduling

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## Scheduled Tasks

- ◆ Daily or weekly email digest
- ◆ Offline processing
  - Index optimization
  - Topic clustering
- ◆ Service reminders
- ◆ ...

## Java Timer and TimerTask

```
public class TimerTest {  
    public static void main( String args[] )  
    {  
        new Timer().schedule( new ScheduledTask(), 5000, 2000 );  
        System.out.println( "task scheduled" );  
    }  
}  
  
class ScheduledTask extends TimerTask {  
    public void run() { System.out.println( "hello" ); }  
}
```

## TimerTask Scheduling

- ◆ Execute Once
  - schedule(TimerTask task, Date time)
  - schedule(TimerTask task, long delay)
- ◆ Execute periodically
  - schedule(TimerTask task, Date firstTime, long period)
  - schedule(TimerTask task, long delay, long period)

## Spring Support for TimerTask

```
<bean id="someScheduledTask"  
class="org.springframework.scheduling.timer.ScheduledTimerTask">  
    <property name="timerTask">  
        <ref bean="someTimerTask"/>  
    </property>  
    <property name="delay">  
        <value>3600000</value>  
    </property>  
    <property name="period">  
        <value>86400000</value>  
    </property>  
</bean>
```

## Quartz

- ◆ <http://www.opensymphony.com/quartz/>
- ◆ Triggers
  - Simple triggers
  - Cron triggers
- ◆ Jobs
  - Execution
  - Persistence
- ◆ ... and more

## Cron Expression

- ◆ Seven field separated by space
  1. Seconds (0-59)
  2. Minutes (0-59)
  3. Hours (0-23)
  4. Day of month (1-31)
  5. Month (1-12 or JAN-DEC)
  6. Day of week (1-7 or MON-SUN)
  7. Year (1970-2099) *[optional]*

## Cron Field Values

- ◆ Single value, e.g. 12
- ◆ Set of values, e.g. 0,15,30,45
- ◆ Range, e.g. 1-12
- ◆ \*
- ◆ Day of month and day of week are mutually exclusive, so one of them should be ?

## Cron Expression Examples

```
0 0 10,14,16 * * ?  
0 0,15,30,45 * 1-10 * ?  
30 0 0 1 1 ? 2012  
0 0 8-5 ? * MON-FRI
```

## Spring Support for Quartz

- ◆ Job
  - QuartzJobBean
  - Single method invocation
- ◆ Trigger
  - Simple trigger using *start time* and *repeat interval* (optional)
  - Cron trigger using *cron expression*
- ◆ Schedule
  - SchedulerFactoryBean

## Evelyn Example

- ◆ CheckUsersJob
- ◆ IndexOptimizationJob