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

```java
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

```xml
<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/
- Very flexible job scheduling
  - Cron expression
  - Various ways to control repetition
- Job 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 *delay* and *period*
    - Cron trigger using *cron expression*
- Schedule
    - SchedulerFactoryBean

Evelyn Example

- CheckUsersJob
- IndexOptimizationJob