

# Job Scheduler Documentation

Many kinds of service-oriented companies perform “jobs” for their customers. Examples of such jobs include: installing a fence, mowing a lawn, repairing a car, or painting a house. Typically, customers call a company to schedule a service appointment, and the company schedules a customer’s job at the earliest available time, whenever that might be.

Job Scheduler is a program that can be used by a company to schedule customer appointments. Scheduling customer appointments is more complicated than it might at first seem. Jobs have different sizes. Weekends and holidays must be taken into account. Work crews need to eat lunch. Scheduling a job on the same day the customer calls may not work because there is insufficient time to prepare for it. All of these factors must be considered when scheduling customer appointments. Using Job Scheduler, a new job can be scheduled by simply specifying its name and size (measured in hours). Job Scheduler finds the first available time for the job, taking into account all of the details that must be considered in finding an appropriate time.

## Running Job Scheduler

Running Job Scheduler is easy. All input is provided as command-line arguments. The command-line syntax is as follows:

```
java -cp . JobScheduler <job-name> <job-duration> <job-name> <job-duration> ...
```

The user provides a list of jobs to be scheduled. Each job is specified as a pair of command-line arguments, including the job’s name and duration. A job’s name may be any non-empty string. A job’s duration is the number of hours it will take to complete the job, and must be an integer value in the range 1-8, inclusive. Zero or more jobs may be provided on the command-line, each specified by a name/duration pair.

Job Scheduler takes the jobs on the command-line and adds them to the schedule in the order they were listed by the user. The output is a schedule that shows the date and time at which each job will be started and finished. Example output is shown below (this was generated on 7/26/2006):

```
$ java -cp . JobScheduler Jones 8 Anderson 4 Fitzpatrick 5 Wilson 1 Franklin 6
```

```
Schedule:
```

```
Daily Schedule: 07/27/06
```

```
Job: [Jones, 8, 07/27/06 08:00 AM, 07/27/06 05:00 PM]
```

```
Daily Schedule: 07/28/06
```

```
Job: [Anderson, 4, 07/28/06 08:00 AM, 07/28/06 01:00 PM]
```

```
Job: [Wilson, 1, 07/28/06 01:00 PM, 07/28/06 02:00 PM]
```

```
Daily Schedule: 07/31/06
```

```
Job: [Fitzpatrick, 5, 07/31/06 08:00 AM, 07/31/06 02:00 PM]
```

Daily Schedule: 08/01/06

Job: [Franklin, 6, 08/01/06 08:00 AM, 08/01/06 03:00 PM]

## **Scheduling Algorithm**

Job Scheduler starts with an empty schedule. Each job is scheduled to start at the earliest available time that satisfies the following constraints:

- When a customer calls to schedule an appointment, the job will be scheduled to start no earlier than the following day (i.e., jobs are never started on the same day the customer calls)
- Jobs are always started and finished on the same day.
- Company employees work from 8am – 5pm, with a one hour lunch break at noon.
- Jobs are not scheduled on weekends or holidays. Holidays include: New Year's Day, Memorial Day, Independence Day, Pioneer Day, Labor Day, Thanksgiving, and Christmas.