

# LiteShift

*Employee Rostering Solution*

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# User Manual

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## Step 1: Installation / Deployment

- *For a list of required software, please see Page 8 of this report.*
- **Download** the LiteShift (.zip) archive from GitHub  
<https://github.com/toup162/liteshift>
- **Extract the LiteShift archive** into a convenient directory of your choice.
- **Open the LiteShift.jar** executable
- This is your first run of the program, the **First-Run Wizard** will run.
- The First-Run Wizard asks for some basic information about you, the Employer or Workplace Administrator.



- Navigate through the First-Run Wizard, inputting the information about yourself and your Workplace.

*continued on next page ...*

### First-Run Wizard continued ...

- You will eventually be prompted to edit your *Daily Availability*:

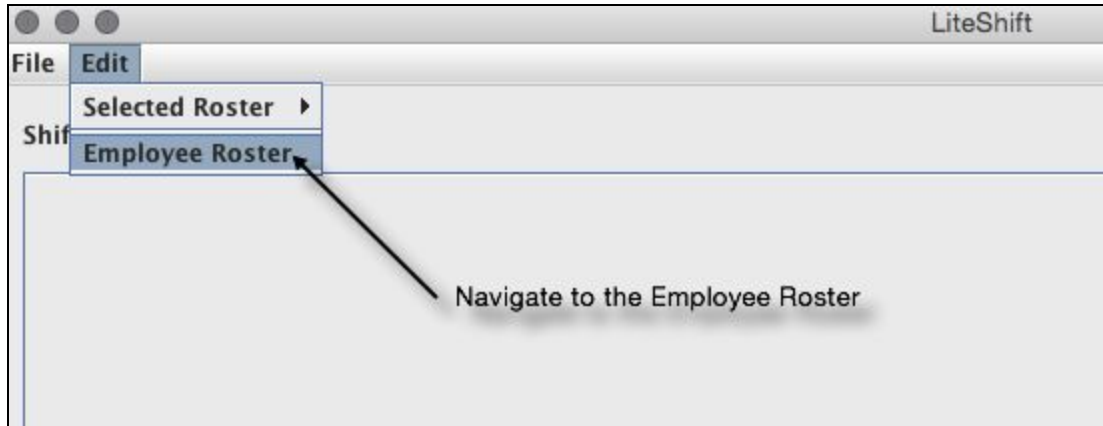
The screenshot shows a form titled "Daily Availability". It is divided into two main sections: "Soft Constraints" and "Hard Constraints". Each section contains a row of checkboxes for the days of the week: SUN, MON, TUE, WED, THU, FRI, and SAT. Each day has three checkboxes. In the "Soft Constraints" section, the first checkbox for Sunday is checked, and an arrow points to it with the label "Sunday Morning Shift". In the "Hard Constraints" section, the first checkbox for Wednesday is checked, and an arrow points to it with the label "Wednesday Afternoon Shift".

- Daily Availability:** Each Checkbox represents a particular shift in a day
  - For a given day ...
  - The **first checkbox** represents availability for a **Morning Shift**
  - The **second checkbox** represents availability for an **Afternoon Shift**
  - The **third checkbox** represents availability for an **Evening Shift**
- With availability, you have the notion of **Hard** and **Soft Constraints**
  - Hard Constraint:** This constraint *must* be met by the scheduling heuristic. If it cannot be met, the heuristic fails and we cannot solve the problem. In this context, checking the first Checkbox for Sunday in Hard Constraints represent that the employee *absolutely can* work on the Sunday Morning shift. If, for instance, the second Checkbox under Sunday in Hard Constraints is left *unchecked*, then the employee *absolutely cannot* work the Sunday Afternoon shift.
  - Soft Constraint:** This constraint does *not necessarily* need to be met by the scheduling heuristic, but *best-case scenario* the constraint is met. Similar to the Hard Constraints in that each checkbox corresponds to a particular shift. However, if, for instance, the first checkbox under Sunday in Soft Constraints is checked, then the employee would *prefer* to work the Sunday Morning Shift. If, for instance, the second checkbox under Sunday is left *unchecked* in Soft Constraints, then the employee *prefers not* to work the Sunday Afternoon shift. To reiterate: because the constraints are *soft*, they are not always met by the heuristic. **Soft Constraints are used with the notion of scoring a schedule. The heuristic strives to meet as many soft constraints as possible.**

- The Last step of the First-Run Wizard prompts you to input some information about your Workplace. When you are finished, click the **Finish** button.

## Step 2: Populate the Employee Roster

- Before you can begin creating a Schedule, you must first populate the **Employee Roster**. Navigate to *Edit > Employee Roster*



- A new (Employee Roster) window will appear. You will see yourself as the only Employee in the Roster, as well as the constraints that you set up. Add a new Employee by clicking the New Employee button.

A screenshot of the 'Employee Roster' window. The window is divided into two main sections: 'Selected Employee' on the left and 'Employee List' on the right. The 'Selected Employee' section shows details for 'Brian Cantrell', including 'Name: Brian Cantrell', 'Title: Manager', 'Absolute Min. Hours: 1', 'Min. Preferred Hours: 2', 'Absolute Max. Hours: 3', and 'Max. Preferred Hours: 4'. Below this section is a button labeled 'New Employee'. The 'Employee List' section shows a list with 'Brian Cantrell' at the top. An arrow points from the text 'Begin by creating a new Employee' to the 'New Employee' button.

- You will be met with the New Employee window. This form is *identical* to the form that you filled out for yourself. Input the New Employee's information and edit their availability (as described above) if needed.

- When you are finished inputting information for the new employee, click the Save button.
- A fully-populated employee roster will look like this:

The screenshot shows a window titled "Employee Roster". It is divided into two main sections. The left section, titled "Selected Employee", contains a form with the following fields: "Name: Kent Swartout", "Title: Crew", "Absolute Min. Hours: 4", "Min. Preferred Hours: 5", "Absolute Max. Hours: 29", and "Max. Preferred Hours: 15". Below this form are two buttons: "New Employee" and "Edit Selected". The right section, titled "Employee List", contains a scrollable list of employee names: Brian Cantrell, Tim Holden, Bill Patrowski, Jim Halpert, Benton Wallace, Abel Webber, Kyra Boatwright, Kent Swartout (highlighted), Efrain Haggerty, Camellia Sarmiento, Zandra Ruffner, and Elise Grimes.

- When you have finished adding Employees to the Roster, you may exit out of the Employee Roster Window.

### Step 3: Create a Schedule

- You must now select a date. You can do so by clicking the small \*Date Chooser Widget next to the *New Schedule* button. Select a week that you would like to create a Schedule for (by clicking any day that belongs to that week).

The screenshot shows a dialog box titled "New Schedule". It features a text input field, a small calendar icon (the \*Date Chooser Widget), and a "New Schedule" button. Below the input field is a calendar for April 2015. The calendar shows the following dates: 1 (Wed), 2 (Thu), 3 (Fri), 4 (Sat), 5 (Sun), 6 (Mon), 7 (Tue), 8 (Wed), 9 (Thu), 10 (Fri), 11 (Sat), 12 (Sun), 13 (Mon), 14 (Tue), 15 (Wed), 16 (Thu), 17 (Fri), 18 (Sat), 19 (Sun), 20 (Mon), 21 (Tue), 22 (Wed), 23 (Thu), 24 (Fri), 25 (Sat), 26 (Sun), 27 (Mon), 28 (Tue), 29 (Wed), 30 (Thu). The date 27 is highlighted in red. An arrow points from the text "\*Date Chooser Widget" to the calendar icon.

- When you have selected a week, click the *New Schedule* button.
- You will see that a table appears in the window. The first column will be populated with all of the Employees' names. Each Employee has their own row.

Shift Rosters by Week

Selected Week

04/19 - 04/25

| Employee           | Sunday | Monday | Tuesday |
|--------------------|--------|--------|---------|
| Brian Cantrell     |        |        |         |
| Tim Holden         |        |        |         |
| Bill Patrowski     |        |        |         |
| Jim Halpert        |        |        |         |
| Benton Wallace     |        |        |         |
| Abel Webber        |        |        |         |
| Kyra Boatwright    |        |        |         |
| Kent Swartout      |        |        |         |
| Efrain Haggerty    |        |        |         |
| Camellia Sarmiento |        |        |         |

- The final step in creating a schedule is to navigate to *Edit > Selected Roster > Roster Shifts*.

File Edit

Selected Roster

Employee Roster

04/19 - 04/25

Roster Shifts

Clear Roster

Close Roster

Roster the selected week with shifts

| Employee       | Sunday | Monday | Tuesday |
|----------------|--------|--------|---------|
| Brian Cantrell |        |        |         |
| Tim Holden     |        |        |         |
| Bill Patrowski |        |        |         |
| Jim Halpert    |        |        |         |
| Benton Wallace |        |        |         |

- If your workplace has less than 50 employees, schedule rostering should take less than a second. The output is a rostered schedule:

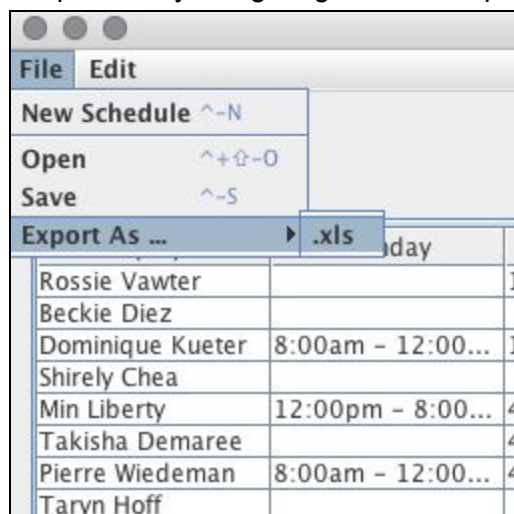


| Employee         | Sunday            | Monday            | Tuesday           | Wednesday |
|------------------|-------------------|-------------------|-------------------|-----------|
| Rossie Vawter    |                   | 12:00pm - 4:00... | 12:00pm - 4:00... | 8:00am -  |
| Beckie Diez      |                   |                   |                   |           |
| Dominique Kueter | 8:00am - 12:00... | 12:00pm - 4:00... | 4:00pm - 8:00pm   | 12:00pm   |
| Shirely Chea     |                   |                   |                   |           |
| Min Liberty      | 12:00pm - 8:00... | 4:00pm - 8:00pm   | 8:00am - 4:00pm   | 8:00am -  |
| Takisha Demaree  |                   | 4:00pm - 8:00pm   |                   |           |
| Pierre Wiedeman  | 8:00am - 12:00... | 4:00pm - 8:00pm   | 12:00pm - 8:00... | 12:00pm   |
| Taryn Hoff       |                   |                   |                   |           |

- **The window can be resized if the cells are too small to view an employee's hours**
- If needed, **Manual Edits** can be made by double-clicking on the cell that you wish to edit.

#### Step 4: Export a Schedule

- When you are happy with the Schedule, you will most likely want to **Export** the schedule to an XLS file so that it can be viewed in your favorite XLS parser. There are a variety of free XLS parsers/viewers available for download on the web. Mac OSX has a built in XLS viewer that can be used to view the exported file.
- Exporting a file is accomplished by navigating to *File > Export As ... > .xls*



| Employee         | Sunday            | Monday | Tuesday | Wednesday |
|------------------|-------------------|--------|---------|-----------|
| Rossie Vawter    |                   |        |         | 1         |
| Beckie Diez      |                   |        |         |           |
| Dominique Kueter | 8:00am - 12:00... |        |         | 1         |
| Shirely Chea     |                   |        |         |           |
| Min Liberty      | 12:00pm - 8:00... |        |         | 4         |
| Takisha Demaree  |                   |        |         | 4         |
| Pierre Wiedeman  | 8:00am - 12:00... |        |         | 4         |
| Taryn Hoff       |                   |        |         |           |

- To **View the exported .XLS file**, navigate to the "[LiteShift Installation Folder] > Exported" directory.
  - The .xls file will be in this directory, with a name corresponding to the week you chose to schedule for.
- The output of the Export will look considerably nicer than the LiteShift table view.



## Example XLS Output:

This example shows a weekly roster of 54 unique employees. Ten employees are scheduled per shift (as prescribed in the Workplace Settings) for a total of 210 shifts that needed to be filled (7 days per week, 3 shifts per day, 10 employees per shift). Some employees are scheduled to work a 'double' if their constraints allow for it. The employees' **constraints** in this example were generated randomly and the scheduling heuristic has attempted to create the best possible schedule for those random constraints.

| Employee           | Sunday 04/26     | Monday 04/27     | Tuesday 04/28    | Wednesday 04/29  | Thursday 04/30   | Friday 05/01     | Saturday 05/02   |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Brian Cantrell     | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Tim Holden         | 4:00pm - 8:00pm  | OFF              | 12:00pm - 8:00pm | OFF              | 12:00pm - 8:00pm | OFF              | 8:00am - 4:00pm  |
| Bill Patrowski     | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Jim Halpert        | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Benton Wallace     | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Abel Webber        | 8:00am - 12:00pm | 12:00pm - 4:00pm | 8:00am - 12:00pm | 8:00am - 4:00pm  | 8:00am - 12:00pm | 4:00pm - 8:00pm  | OFF              |
| Kyra Boatwright    | OFF              | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  | OFF              |
| Kent Swartout      | 4:00pm - 8:00pm  | 8:00am - 12:00pm | 12:00pm - 4:00pm | 8:00am - 12:00pm | 8:00am - 12:00pm | OFF              | 12:00pm - 8:00pm |
| Efrain Haggerty    | OFF              | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | OFF              |
| Carmelia Sarmiento | 12:00pm - 4:00pm | 8:00am - 12:00pm | OFF              | 4:00pm - 8:00pm  | 8:00am - 12:00pm | OFF              | 12:00pm - 4:00pm |
| Zandra Ruffner     | OFF              | OFF              | 12:00pm - 8:00pm | OFF              | 4:00pm - 8:00pm  | 8:00am - 4:00pm  | 4:00pm - 8:00pm  |
| Elvis Criner       | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Reed Aquirre       | OFF              | OFF              | 8:00am - 12:00pm | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 8:00am - 12:00pm | 8:00am - 4:00pm  |
| Bernice Oswald     | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| April Allende      | 8:00am - 12:00pm | OFF              | 8:00am - 12:00pm | 12:00pm - 8:00pm | 8:00am - 12:00pm | 12:00pm - 4:00pm | 8:00am - 12:00pm |
| Jarod Dollhoff     | 4:00pm - 8:00pm  | 8:00am - 12:00pm | 8:00am - 4:00pm  | 8:00am - 4:00pm  | 8:00am - 12:00pm | OFF              | OFF              |
| Chuck Halsell      | OFF              | OFF              | 8:00am - 12:00pm | OFF              | 8:00am - 12:00pm | 8:00am - 12:00pm | 12:00pm - 8:00pm |
| Veronica Guerrette | 12:00pm - 4:00pm | 8:00am - 4:00pm  | 8:00am - 4:00pm  | 8:00am - 4:00pm  | OFF              | OFF              | OFF              |
| Lisabeth Beard     | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Rossie Vawter      | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Beckie Diez        | 12:00pm - 8:00pm | 8:00am - 4:00pm  | 4:00pm - 8:00pm  | 12:00pm - 4:00pm | 8:00am - 12:00pm | OFF              | OFF              |
| Dominique Kueter   | 8:00am - 12:00pm | 12:00pm - 4:00pm | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 12:00pm - 4:00pm | 8:00am - 12:00pm | OFF              |
| Shirely Chea       | 12:00pm - 8:00pm | 8:00am - 4:00pm  | OFF              | 8:00am - 12:00pm | 8:00am - 4:00pm  | OFF              | OFF              |
| Min Liberty        | 12:00pm - 8:00pm | 4:00pm - 8:00pm  | 8:00am - 4:00pm  | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 8:00am - 4:00pm  | OFF              |
| Takisha Demaree    | OFF              | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  | 8:00am - 12:00pm |
| Pierre Wiedeman    | OFF              | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  |
| Taryn Hoff         | 8:00am - 4:00pm  | OFF              | OFF              | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 12:00pm - 8:00pm | 12:00pm - 4:00pm |
| Logan Shimizu      | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | 8:00am - 12:00pm |
| Abdul Heimer       | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Erwin Blasingame   | 8:00am - 12:00pm | 8:00am - 4:00pm  | 4:00pm - 8:00pm  | 8:00am - 12:00pm | 8:00am - 12:00pm | 8:00am - 4:00pm  | 8:00am - 4:00pm  |
| Elaina Rehn        | OFF              | 4:00pm - 8:00pm  | 12:00pm - 4:00pm | OFF              | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | OFF              |
| Carlotta Collis    | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Manual Postel      | 8:00am - 4:00pm  | OFF              | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | 8:00am - 4:00pm  | OFF              |
| Delphia Selvidge   | 8:00am - 4:00pm  | OFF              | OFF              | 12:00pm - 8:00pm | OFF              | 12:00pm - 4:00pm | 4:00pm - 8:00pm  |
| Torija Carver      | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | 8:00am - 12:00pm |
| Marcellus Kear     | 8:00am - 4:00pm  | 12:00pm - 8:00pm | 8:00am - 12:00pm | 8:00am - 4:00pm  | OFF              | OFF              | OFF              |
| Gertrudis Silas    | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  |
| Florencio Woolum   | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Vannesa Wurst      | OFF              | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 8:00am - 12:00pm |
| Charity Mitchell   | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | 8:00am - 12:00pm |
| Alfredo Lattea     | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | 4:00pm - 8:00pm  | 12:00pm - 8:00pm | OFF              | OFF              |
| Carter Kadlec      | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Frankie Ardrey     | OFF              | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | OFF              | 8:00am - 12:00pm |
| Karl Leven         | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Ludivina Amerson   | OFF              | OFF              | 12:00pm - 8:00pm | OFF              | OFF              | 12:00pm - 8:00pm | OFF              |
| Xiao Reiser        | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |
| Torie Maheu        | 4:00pm - 8:00pm  | 8:00am - 12:00pm | 4:00pm - 8:00pm  | 8:00am - 12:00pm | OFF              | 8:00am - 4:00pm  | 12:00pm - 8:00pm |
| Duncan Peliez      | 4:00pm - 8:00pm  | 8:00am - 4:00pm  | 8:00am - 12:00pm | 12:00pm - 8:00pm | 8:00am - 12:00pm | OFF              | OFF              |
| Vannesa Dursi      | OFF              | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | OFF              | OFF              |
| Tianna Mickelson   | 4:00pm - 8:00pm  | OFF              | OFF              | OFF              | OFF              | OFF              | 4:00pm - 8:00pm  |
| Mittie Portwood    | OFF              | 4:00pm - 8:00pm  | 4:00pm - 8:00pm  | OFF              | 12:00pm - 4:00pm | 4:00pm - 8:00pm  | 12:00pm - 8:00pm |
| Luetta Nutt        | 8:00am - 4:00pm  | 8:00am - 4:00pm  | 8:00am - 4:00pm  | 8:00am - 12:00pm | 12:00pm - 4:00pm | 12:00pm - 8:00pm | OFF              |
| Cris Tung          | 8:00am - 12:00pm | 12:00pm - 4:00pm | OFF              | 8:00am - 4:00pm  | 12:00pm - 4:00pm | 8:00am - 12:00pm | 12:00pm - 4:00pm |
| Shavonda Mesa      | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              | OFF              |

There are a number of implicit 'rules' that the heuristic follows to increase employee satisfaction. If in the Workplace Settings, the user inputs that ten Employees should work a given shift, then exactly ten employees will be scheduled per shift. An employee will never be scheduled to work a Morning shift AND a Night shift in the same day (Morning and Afternoon is okay. Afternoon and Night is okay).

This concludes the System Installation/Deployment/Usage instructions. If you would like provide feedback or have any questions about the usability of LiteShift, please contact a developer at:

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# Additional Information

## Third-Party Software used:

- NetBeans Java Libraries (Development)
  - **JCalendar** (Date Chooser Widget)
  - **Joda-Time** (Parsing Date information)
  - **jxl** (Exporting to XLS)
  - **biSlider** (Selecting a Time Range)
- GitHub (Source Control)
- ezVid (Screen Capturing for software demonstration)

## Development Environment Used:

- NetBeans 8.0.2 IDE

## Required OS/Software to run LiteShift:

- **(Windows XP / Windows 7 / Windows 8 / Mac OSX / Linux) Operating Systems**
- **Java Runtime Environment (JRE) 8.0+**
  - Available for all platforms at:  
<http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html>