

# RosterBot

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RosterBot is a tool for automatically generating duty rosters for teams. Operating on Constraint Programming, the software narrows the pool of schedules based on the specified restrictions, then iterates through them to find an optimal selection.

Built in Clojure, RosterBot is released under the GPL3. The following libraries are used by RosterBot:

**aengenberg/loco** Constraint Programming

**yogthos/clj-pdf** PDF generation

**SparkFund/google-apps-clj** Google Calendar sync

**clj-time** Date/time library

## 1 TODO Core Logic

### 1.1 TODO Base Constraint Model

Constraint programming operates on a model of bounded variables which are reduced and restricted until a solution is found that meets all constraints. Constraints are defined in terms of variables.

#### 1.1.1 TODO Model timespan with each day's shifts

The most flexible option seems to be generating **employee-day** variables, by iterating through the date range, then iterating through the employee list. I'll map each assignment-state to a number:

**Requested time off** -2

**Assigned elsewhere** -1

**Unassigned** 0

**Shifts** 1-N

#### 1.1.2 TODO Model shift definitions and restrictions

Shift restrictions will be added as constraints as the **employee-day** variables are generated. Shifts will have schedule options as follows:

- Every **X** days
- Specified days-of-week every **X** weeks
- Specified days-of-month every **X** months

Shift exceptions can be specified as dates and date ranges, causing the modified shift to not be generated for those dates.

1.1.3 TODO Constrain employees by other obligations and personal requests

1.1.4 TODO Model balanced shift distribution

## 2 TODO Data I/O

2.1 TODO Store Definitions Locally

2.2 TODO Sync Employee Availability

2.3 TODO Sync Produced Roster

## 3 TODO Graphical User Interface

3.1 TODO Shift Definition Screen

3.2 TODO Employee Definition Screen

3.2.1 TODO Employee Availability Screen

3.3 TODO Generated Roster View

3.3.1 TODO Enable Roster Modification