**Medical Staff Scheduling System**

**Final Design Assignment**

Mike Shamory

Yingjie Wang

Anqi Xu

Professor Steven Shaffer

CMPSC 431

November 17, 2017

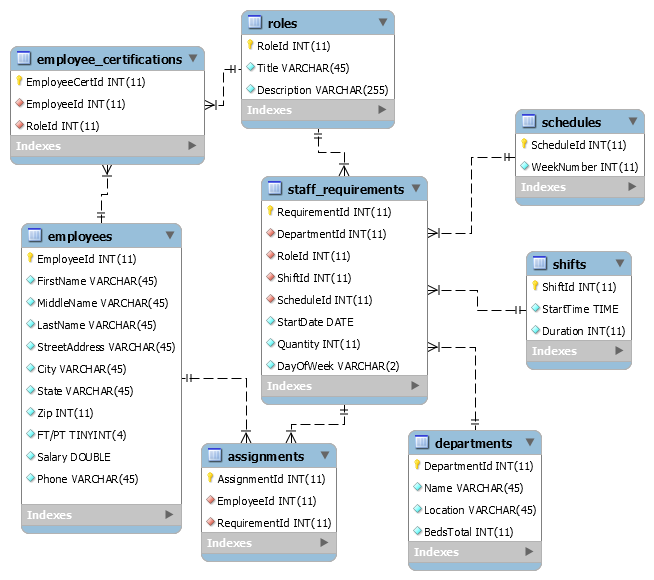
TO: Steven Shaffer, Administrator

FROM: Anqi Xu, Yingjie Wang, Mike Shamory Students from CMPSC431

DATE: November 13, 2017

SUBJECT: Optimizations of Database Queries

This is a proposal to optimize the overall efficiency of the medical staff scheduling system for the hospital. In this proposal, an analysis for time and space usage will be included for with and without using indexing for the specific select statements .

**Data model**

**Table Specifications**

This section includes detailed specifications of each table and its associated fields as referenced in the data model.

Assignments

A table containing employee-requirement pairs used to determine what employee(s) are assigned to a specific staff requirement and what assignments an individual employee has.

* AssignmentId: The primary key and a unique identifier to each employee-requirement pair
* EmployeeId: A foreign key that identifies a unique employee that is being assigned to a requirement
* RequirementId: A foreign key that identifies an individual requirement to which the employee is being assigned

Departments

A table containing information about the various departments that need staffing.

* DepartmentId: The unique identifier of a specific department
* Name: The name of the department (e.g. Maternity)
* Location: Where the department is physically located (e.g. 5th Floor)
* BedsTotal: The number of beds in the department for potential patients

Employee Certifications

A table containing information about which employees have received what certificate.

* EmployeeCertId: The unique identifier for each certificate assignment
* RoleId: The foreign key identifying the role the employee is certified for
* EmployeeId: The foreign key identifying the employee that was assigned the certificate

Roles

A table containing roles to which employees can be assigned.

* RoleId: The unique identifier for a particular role
* Name: The name of the role (e.g. Nurse)
* Description: A description of the role

Employees

A table containing information about employees.

* EmployeeId: The unique identifier for each employee
* FirstName: The employee’s given name
* MiddleName: The employee’s middle name (if applicable)
* LastName: The employee’s surname
* StreetAddress: The employee’s street address
* City: The city in which the employee lives
* State: The state or province in which the employee lives
* Zip: The postal code of the area in which the employee lives
* FT/PT: Whether or not the employee is a full-time employee
* Salary: The hourly (or approximate hourly) wage of the employee
* Phone: The employees contact number

Schedules

A table that identifies a single week of a period determined by a number of weeks.

* ScheduleId: A unique identifier for a specific schedule
* WeekNumber: The week number out of a given interval (e.g. week 2 of a 6 week period)

Shifts

A table of shifts that break up work into specific time intervals.

* ShiftId: The unique identifier of a particular shift
* StartTime: The time that a particular shift starts
* Duration: The number of hours in the shift

Staff Requirements

A table that contains information about the staffing requirements for a particular department on a shift for a given date.

* RequirementId: The unique identifier for a particular requirement
* DepartmentId: The foreign key representing a specific department
* RoleId: The foreign key representing what role needs to be filled
* ShiftId: The foreign key representing the specific shift that the requirements apply to
* ScheduleId: The foreign key representing the week of the current interval
* StartDate: The date that this specific requirement needs to be fulfilled
* Quantity: The number of employees matching this requirement’s criteria that need to be scheduled
* Dayoftheweek: Show the day of the week

**Select Statements**

The following select statements are examples of actual use cases of querying the data model.

1. Employee Schedule

This is a select statement gets the schedule for each employee over a one week interval. The information retrieved can be used to determine the date, day of week, shift, department, and role.

select employees.LastName, employees.FirstName, departments.Name, roles.Title, staff\_requirements.StartDate,staff\_requirements.DayofWeek, shifts.StartTime

from employees, assignments, staff\_requirements, shifts, departments, roles

where employees.EmployeeId = assignments.EmployeeId and

assignments.RequirementId = staff\_requirements.RequirementId and

staff\_requirements.ShiftId = shifts.ShiftId and

staff\_requirements.DepartmentId = departments.DepartmentId and

staff\_requirements.RoleId = roles.RoleId



(WITHOUT INDEX)

At the join of employees and assignment table. we have 16 pages at employee table and 70 different assignment pages. It gives us a total of O(1120).

At the next simple nested loop, we join the Staff\_requirement table and last table together at requirementid which is 70. It gives us a total of O(78400).

At the next simple nested loop, we join the shift table and last table together at shiftID which is 4. It gives us a total of O(313600).

At the next simple nested loop, we join the department table and last table together at departmentID which is 3. It gives us a total of O(940800).

At the next simple nested loop, we join the role table and last table together at roleID which is 3. It gives us a total of O(2822400).



(WITH INDEX)

Indices for the primary keys of staff requirements tables (RequirementId) would reduce the complexity for getting the row with a unique key .

At the join of employees and assignment table. we have 16 pages at employee table and 70 different assignment pages. It gives us a total of O(16\*70) = O(1120).

At the next simple nested loop, we join the Staff\_requirement table and last table together at requirementid which is 70. It gives us a total of O(1120log(70)).

At the next simple nested loop, we join the shift table and last table together at shiftID which is 4. It gives us a total of O(4480log(70)).

At the next simple nested loop, we join the department table and last table together at departmentID which is 3. It gives us a total of O(13440(log(70)).

At the next simple nested loop, we join the role table and last table together at roleID which is 3. It gives us a total of O(40320log(70)).

2. Department Needs

This select statement gets the schedule requirements for one week. The information retrieved can be used to determine the date, day of week, shift, and number of staff needed for each required role with certifications.

select sr.StartDate,sr.DayofWeek, s.StartTime, d.Name, r.Title, sr.Quantity

from staff\_requirements sr, departments d, roles r, shifts s, schedules sc

where sr.DepartmentId = d.DepartmentId and

sr.RoleId = r.RoleId and

sr.ScheduleId = sc.ScheduleId and

sr.ShiftId = s.ShiftId



(WITHOUT INDEX)

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(210).

At the next simple nested loop, we join the Role table and last table together at roleId which is 3. It gives us a total of O(630).

At the next simple nested loop, we join the schedules table and last table together at scheduleId which is 6. It gives us a total of O(3780).

At the next simple nested loop, we join the shift table and last table together at shiftId which is 4. It gives us a total of O(15120).



(WITH INDEX)

Indices for the primary keys of Staff\_requirement tables (departmentId) would reduce the complexity for getting the row with a unique key .

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(3log(70)).

At the next simple nested loop, we join the Role table and last table together at roleId which is 3. It gives us a total of O(9log(70)).

At the next simple nested loop, we join the schedules table and last table together at scheduleId which is 6. It gives us a total of O(54log(70)).

At the next simple nested loop, we join the shift table and last table together at shiftId which is 4. It gives us a total of O(216log(70)).

3. Department Schedule

This select statement gets the staff scheduled to a department for one week. The information retrieved can be used to determine the date, day of week, employee scheduled, and their phone number.

select d.Name, sr.StartDate,sr.DayofWeek, s.StartTime, e.LastName, e.FirstName, e.Phone

from departments d, staff\_requirements sr, assignments a, employees e, shifts s

where sr.DepartmentId = d.DepartmentId and

sr.ShiftId = s.ShiftId and

a.RequirementId = sr.RequirementId and

e.EmployeeId = a.EmployeeId



(WITHOUT INDEX)

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(210).

At the next simple nested loop, we join the Shift table and last table together at ShiftId which is 4. It gives us a total of O(840).

At the next simple nested loop, we join the Assignment table and last table together at requirementId which is 70. It gives us a total of O(58800).

At the next simple nested loop, we join the employee table and last table together at employeeId which is 16. It gives us a total of O(940800).



(WITH INDEX)

Indices for the primary keys of Assignment tables (RequirementId) would reduce the complexity for getting the row with a unique key .

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(210).

At the next simple nested loop, we join the Shift table and last table together at ShiftId which is 4. It gives us a total of O(840).

At the next simple nested loop, we join the Assignment table and last table together at RequirementId which is 70. It gives us a total of O(840log(70)).

At the next simple nested loop, we join the employee table and last table together at employeeId which is 16. It gives us a total of O(13440log(70)).

4. Cost by Date

This select statement allows the total cost of employee wages to be calculated for a given interval of dates. The results will be able to be ordered as a subtotal by departments and shifts.

select d.Name, sr.StartDate,sr.DayofWeek, s.StartTime, e.Salary \* s.Duration

from departments d, staff\_requirements sr, assignments a, employees e, shifts s

where sr.DepartmentId = d.DepartmentId and

a.RequirementId = sr.RequirementId and

e.EmployeeId = a.EmployeeId and

sr.ShiftId = s.ShiftId



(WITHOUT INDEX)

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(210).

At the next simple nested loop, we join the Shift table and last table together at ShiftId which is 4. It gives us a total of O(840).

At the next simple nested loop, we join the Assignment table and last table together at requirementId which is 70. It gives us a total of O(58800).

At the next simple nested loop, we join the employee table and last table together at employeeId which is 16. It gives us a total of O(940800).



(WITH INDEX)

Indices for the primary keys of Assignment tables (RequirementId) would reduce the complexity for getting the row with a unique key .

At the join of Staff\_requirement and Department table. we have 70 pages at Staff\_requirement table and 3 different Department pages. It gives us a total of O(210).

At the next simple nested loop, we join the Shift table and last table together at ShiftId which is 4. It gives us a total of O(840).

At the next simple nested loop, we join the Assignment table and last table together at RequirementId which is 70. It gives us a total of O(840log(70)).

At the next simple nested loop, we join the employee table and last table together at employeeId which is 16. It gives us a total of O(13440log(70)).

For statement four, we are using requirementId as index item again. For indexing, we have to check the availability for the indexed items first before we join two tables. In this situation, we have to check the availability of requirmentId.

**Conclusion**

In conclusion, this is our proposed data model along with the corresponding select statements for specific purpose. The Medical staff scheduling system allow the user to find the specific scheduled staff to the general department and retrieve the datas. When we are doing indexing, we have to check the availability for the indexed items first before we join two tables. By applying the indexing, we can see it improve our statements overall efficiency.

Query 1 Results:

**$sqlite3 database.sdb < main.sql**

Barajas|Keith|Emergency|Nurse|2017-11-16|TR|12:00:00  
Blackford|Jodi|Emergency|Surgeon|2017-11-16|TR|00:00:00  
Boyers|Christopher|Emergency|Doctor|2017-11-16|TR|12:00:00  
Cope|Michael|Surgery|Nurse|2017-11-16|TR|12:00:00  
Dawson|Kendra|Surgery|Surgeon|2017-11-16|TR|12:00:00  
Gordon|Robert|Surgery|Doctor|2017-11-16|TR|12:00:00  
Hebb|Karen|Surgery|Surgeon|2017-11-16|TR|00:00:00  
Huffman|Nola|Maternity|Doctor|2017-11-16|TR|18:00:00  
Kadlec|Karen|Maternity|Doctor|2017-11-16|TR|12:00:00  
Maynard|Henry|Maternity|Doctor|2017-11-16|TR|18:00:00  
Barajas|Keith|Emergency|Nurse|2017-11-17|FR|00:00:00  
Blackford|Jodi|Emergency|Surgeon|2017-11-17|FR|06:00:00  
Dawson|Kendra|Emergency|Doctor|2017-11-17|FR|06:00:00  
Hebb|Karen|Surgery|Nurse|2017-11-17|FR|12:00:00  
Kadlec|Karen|Surgery|Surgeon|2017-11-17|FR|18:00:00  
Maynard|Henry|Surgery|Doctor|2017-11-17|FR|06:00:00  
Nelson|Jared|Surgery|Surgeon|2017-11-17|FR|00:00:00  
Price|Rose|Surgery|Doctor|2017-11-17|FR|06:00:00  
Stringer|Christine|Maternity|Doctor|2017-11-17|FR|12:00:00  
Westra|Denise|Maternity|Doctor|2017-11-17|FR|18:00:00  
Dawson|Kendra|Emergency|Nurse|2017-11-18|SA|00:00:00  
Gordon|Robert|Surgery|Nurse|2017-11-18|SA|06:00:00  
Hebb|Karen|Surgery|Surgeon|2017-11-18|SA|12:00:00  
Huffman|Nola|Maternity|Doctor|2017-11-18|SA|18:00:00  
Kadlec|Karen|Maternity|Surgeon|2017-11-18|SA|12:00:00  
Maynard|Henry|Maternity|Nurse|2017-11-18|SA|06:00:00  
Nelson|Jared|Maternity|Doctor|2017-11-18|SA|00:00:00  
Cope|Michael|Emergency|Nurse|2017-11-19|SU|06:00:00  
Gordon|Robert|Emergency|Nurse|2017-11-19|SU|18:00:00  
Hebb|Karen|Emergency|Surgeon|2017-11-19|SU|12:00:00  
Huffman|Nola|Emergency|Doctor|2017-11-19|SU|18:00:00  
Nelson|Jared|Emergency|Doctor|2017-11-19|SU|12:00:00  
Reid|Deborah|Surgery|Surgeon|2017-11-19|SU|00:00:00  
Stringer|Christine|Surgery|Doctor|2017-11-19|SU|06:00:00  
Westra|Denise|Maternity|Surgeon|2017-11-19|SU|12:00:00  
Cope|Michael|Emergency|Nurse|2017-11-20|MO|00:00:00  
Dawson|Kendra|Emergency|Doctor|2017-11-20|MO|06:00:00  
Gordon|Robert|Emergency|Surgeon|2017-11-20|MO|12:00:00  
Hebb|Karen|Emergency|Doctor|2017-11-20|MO|18:00:00  
Huffman|Nola|Surgery|Nurse|2017-11-20|MO|06:00:00  
Kadlec|Karen|Surgery|Surgeon|2017-11-20|MO|12:00:00  
Maynard|Henry|Surgery|Doctor|2017-11-20|MO|18:00:00  
Nelson|Jared|Surgery|Doctor|2017-11-20|MO|12:00:00  
Paddock|Kimberly|Maternity|Nurse|2017-11-20|MO|12:00:00  
Price|Rose|Maternity|Doctor|2017-11-20|MO|18:00:00  
Reid|Deborah|Maternity|Doctor|2017-11-20|MO|06:00:00  
Stringer|Christine|Maternity|Doctor|2017-11-20|MO|12:00:00  
Barajas|Keith|Emergency|Nurse|2017-11-21|TU|18:00:00  
Blackford|Jodi|Emergency|Doctor|2017-11-21|TU|06:00:00  
Boyers|Christopher|Surgery|Nurse|2017-11-21|TU|12:00:00  
Cope|Michael|Surgery|Nurse|2017-11-21|TU|18:00:00  
Dawson|Kendra|Surgery|Surgeon|2017-11-21|TU|00:00:00  
Dawson|Kendra|Surgery|Surgeon|2017-11-21|TU|12:00:00  
Gordon|Robert|Maternity|Nurse|2017-11-21|TU|06:00:00  
Hebb|Karen|Maternity|Surgeon|2017-11-21|TU|12:00:00  
Huffman|Nola|Maternity|Doctor|2017-11-21|TU|18:00:00  
Kadlec|Karen|Maternity|Surgeon|2017-11-21|TU|12:00:00  
Maynard|Henry|Maternity|Surgeon|2017-11-21|TU|18:00:00  
Barajas|Keith|Emergency|Nurse|2017-11-22|WE|00:00:00  
Blackford|Jodi|Emergency|Nurse|2017-11-22|WE|06:00:00  
Dawson|Kendra|Emergency|Surgeon|2017-11-22|WE|12:00:00  
Gordon|Robert|Emergency|Surgeon|2017-11-22|WE|06:00:00  
Hebb|Karen|Emergency|Doctor|2017-11-22|WE|00:00:00  
Kadlec|Karen|Emergency|Doctor|2017-11-22|WE|18:00:00  
Maynard|Henry|Surgery|Nurse|2017-11-22|WE|12:00:00  
Nelson|Jared|Surgery|Surgeon|2017-11-22|WE|06:00:00  
Paddock|Kimberly|Surgery|Doctor|2017-11-22|WE|12:00:00  
Reid|Deborah|Maternity|Nurse|2017-11-22|WE|06:00:00  
Stringer|Christine|Maternity|Surgeon|2017-11-22|WE|18:00:00  
Westra|Denise|Maternity|Doctor|2017-11-22|WE|18:00:00

Query 2 Results:

**$sqlite3 database.sdb < main.sql**

2017-11-16|TR|12:00:00|Emergency|Nurse|1  
2017-11-16|TR|00:00:00|Emergency|Surgeon|1  
2017-11-16|TR|12:00:00|Emergency|Doctor|1  
2017-11-16|TR|12:00:00|Surgery|Nurse|1  
2017-11-16|TR|12:00:00|Surgery|Surgeon|2  
2017-11-16|TR|12:00:00|Surgery|Doctor|2  
2017-11-16|TR|00:00:00|Surgery|Surgeon|2  
2017-11-16|TR|18:00:00|Maternity|Doctor|1  
2017-11-16|TR|12:00:00|Maternity|Doctor|1  
2017-11-16|TR|18:00:00|Maternity|Doctor|1  
2017-11-17|FR|00:00:00|Emergency|Nurse|1  
2017-11-17|FR|06:00:00|Emergency|Surgeon|1  
2017-11-17|FR|06:00:00|Emergency|Doctor|1  
2017-11-17|FR|12:00:00|Surgery|Nurse|1  
2017-11-17|FR|18:00:00|Surgery|Surgeon|2  
2017-11-17|FR|06:00:00|Surgery|Doctor|1  
2017-11-17|FR|00:00:00|Surgery|Surgeon|1  
2017-11-17|FR|06:00:00|Surgery|Doctor|1  
2017-11-17|FR|12:00:00|Maternity|Doctor|2  
2017-11-17|FR|18:00:00|Maternity|Doctor|1  
2017-11-18|SA|00:00:00|Emergency|Nurse|1  
2017-11-18|SA|06:00:00|Surgery|Nurse|1  
2017-11-18|SA|12:00:00|Surgery|Surgeon|1  
2017-11-18|SA|18:00:00|Maternity|Doctor|1  
2017-11-18|SA|12:00:00|Maternity|Surgeon|2  
2017-11-18|SA|06:00:00|Maternity|Nurse|2  
2017-11-18|SA|00:00:00|Maternity|Doctor|2  
2017-11-19|SU|06:00:00|Emergency|Nurse|1  
2017-11-19|SU|18:00:00|Emergency|Nurse|1  
2017-11-19|SU|12:00:00|Emergency|Surgeon|2  
2017-11-19|SU|18:00:00|Emergency|Doctor|1  
2017-11-19|SU|12:00:00|Emergency|Doctor|2  
2017-11-19|SU|00:00:00|Surgery|Surgeon|1  
2017-11-19|SU|06:00:00|Surgery|Doctor|1  
2017-11-19|SU|12:00:00|Maternity|Surgeon|1  
2017-11-20|MO|00:00:00|Emergency|Nurse|1  
2017-11-20|MO|06:00:00|Emergency|Doctor|1  
2017-11-20|MO|12:00:00|Emergency|Surgeon|1  
2017-11-20|MO|18:00:00|Emergency|Doctor|1  
2017-11-20|MO|06:00:00|Surgery|Nurse|2  
2017-11-20|MO|12:00:00|Surgery|Surgeon|1  
2017-11-20|MO|18:00:00|Surgery|Doctor|2  
2017-11-20|MO|12:00:00|Surgery|Doctor|1  
2017-11-20|MO|12:00:00|Maternity|Nurse|2  
2017-11-20|MO|18:00:00|Maternity|Doctor|1  
2017-11-20|MO|06:00:00|Maternity|Doctor|2  
2017-11-20|MO|12:00:00|Maternity|Doctor|1  
2017-11-21|TU|18:00:00|Emergency|Nurse|1  
2017-11-21|TU|06:00:00|Emergency|Doctor|1  
2017-11-21|TU|12:00:00|Surgery|Nurse|1  
2017-11-21|TU|18:00:00|Surgery|Nurse|2  
2017-11-21|TU|00:00:00|Surgery|Surgeon|1  
2017-11-21|TU|12:00:00|Surgery|Surgeon|1  
2017-11-21|TU|06:00:00|Maternity|Nurse|2  
2017-11-21|TU|12:00:00|Maternity|Surgeon|1  
2017-11-21|TU|18:00:00|Maternity|Doctor|1  
2017-11-21|TU|12:00:00|Maternity|Surgeon|1  
2017-11-21|TU|18:00:00|Maternity|Surgeon|1  
2017-11-22|WE|00:00:00|Emergency|Nurse|1  
2017-11-22|WE|06:00:00|Emergency|Nurse|1  
2017-11-22|WE|12:00:00|Emergency|Surgeon|1  
2017-11-22|WE|06:00:00|Emergency|Surgeon|1  
2017-11-22|WE|00:00:00|Emergency|Doctor|1  
2017-11-22|WE|18:00:00|Emergency|Doctor|2  
2017-11-22|WE|12:00:00|Surgery|Nurse|1  
2017-11-22|WE|06:00:00|Surgery|Surgeon|1  
2017-11-22|WE|12:00:00|Surgery|Doctor|2  
2017-11-22|WE|06:00:00|Maternity|Nurse|1  
2017-11-22|WE|18:00:00|Maternity|Surgeon|1  
2017-11-22|WE|18:00:00|Maternity|Doctor|1

Query 3 Results:

**$sqlite3 database.sdb < main.sql**

Emergency|2017-11-16|TR|12:00:00|Barajas|Keith|319-447-9185  
Emergency|2017-11-16|TR|00:00:00|Blackford|Jodi|919-833-0135  
Emergency|2017-11-16|TR|12:00:00|Boyers|Christopher|304-674-0126  
Surgery|2017-11-16|TR|12:00:00|Cope|Michael|650-306-3426  
Surgery|2017-11-16|TR|12:00:00|Dawson|Kendra|517-767-6328  
Surgery|2017-11-16|TR|12:00:00|Gordon|Robert|415-390-8471  
Surgery|2017-11-16|TR|00:00:00|Hebb|Karen|617-570-2611  
Maternity|2017-11-16|TR|18:00:00|Huffman|Nola|323-796-8238  
Maternity|2017-11-16|TR|12:00:00|Kadlec|Karen|219-604-4539  
Maternity|2017-11-16|TR|18:00:00|Maynard|Henry|510-697-8950  
Emergency|2017-11-17|FR|00:00:00|Barajas|Keith|319-447-9185  
Emergency|2017-11-17|FR|06:00:00|Blackford|Jodi|919-833-0135  
Emergency|2017-11-17|FR|06:00:00|Dawson|Kendra|517-767-6328  
Surgery|2017-11-17|FR|12:00:00|Hebb|Karen|617-570-2611  
Surgery|2017-11-17|FR|18:00:00|Kadlec|Karen|219-604-4539  
Surgery|2017-11-17|FR|06:00:00|Maynard|Henry|510-697-8950  
Surgery|2017-11-17|FR|00:00:00|Nelson|Jared|405-275-4143  
Surgery|2017-11-17|FR|06:00:00|Price|Rose|941-284-3995  
Maternity|2017-11-17|FR|12:00:00|Stringer|Christine|605-653-0135  
Maternity|2017-11-17|FR|18:00:00|Westra|Denise|513-826-7940  
Emergency|2017-11-18|SA|00:00:00|Dawson|Kendra|517-767-6328  
Surgery|2017-11-18|SA|06:00:00|Gordon|Robert|415-390-8471  
Surgery|2017-11-18|SA|12:00:00|Hebb|Karen|617-570-2611  
Maternity|2017-11-18|SA|18:00:00|Huffman|Nola|323-796-8238  
Maternity|2017-11-18|SA|12:00:00|Kadlec|Karen|219-604-4539  
Maternity|2017-11-18|SA|06:00:00|Maynard|Henry|510-697-8950  
Maternity|2017-11-18|SA|00:00:00|Nelson|Jared|405-275-4143  
Emergency|2017-11-19|SU|06:00:00|Cope|Michael|650-306-3426  
Emergency|2017-11-19|SU|18:00:00|Gordon|Robert|415-390-8471  
Emergency|2017-11-19|SU|12:00:00|Hebb|Karen|617-570-2611  
Emergency|2017-11-19|SU|18:00:00|Huffman|Nola|323-796-8238  
Emergency|2017-11-19|SU|12:00:00|Nelson|Jared|405-275-4143  
Surgery|2017-11-19|SU|00:00:00|Reid|Deborah|260-242-7896  
Surgery|2017-11-19|SU|06:00:00|Stringer|Christine|605-653-0135  
Maternity|2017-11-19|SU|12:00:00|Westra|Denise|513-826-7940  
Emergency|2017-11-20|MO|00:00:00|Cope|Michael|650-306-3426  
Emergency|2017-11-20|MO|06:00:00|Dawson|Kendra|517-767-6328  
Emergency|2017-11-20|MO|12:00:00|Gordon|Robert|415-390-8471  
Emergency|2017-11-20|MO|18:00:00|Hebb|Karen|617-570-2611  
Surgery|2017-11-20|MO|06:00:00|Huffman|Nola|323-796-8238  
Surgery|2017-11-20|MO|12:00:00|Kadlec|Karen|219-604-4539  
Surgery|2017-11-20|MO|18:00:00|Maynard|Henry|510-697-8950  
Surgery|2017-11-20|MO|12:00:00|Nelson|Jared|405-275-4143  
Maternity|2017-11-20|MO|12:00:00|Paddock|Kimberly|781-843-4678  
Maternity|2017-11-20|MO|18:00:00|Price|Rose|941-284-3995  
Maternity|2017-11-20|MO|06:00:00|Reid|Deborah|260-242-7896  
Maternity|2017-11-20|MO|12:00:00|Stringer|Christine|605-653-0135  
Emergency|2017-11-21|TU|18:00:00|Barajas|Keith|319-447-9185  
Emergency|2017-11-21|TU|06:00:00|Blackford|Jodi|919-833-0135  
Surgery|2017-11-21|TU|12:00:00|Boyers|Christopher|304-674-0126  
Surgery|2017-11-21|TU|18:00:00|Cope|Michael|650-306-3426  
Surgery|2017-11-21|TU|00:00:00|Dawson|Kendra|517-767-6328  
Surgery|2017-11-21|TU|12:00:00|Dawson|Kendra|517-767-6328  
Maternity|2017-11-21|TU|06:00:00|Gordon|Robert|415-390-8471  
Maternity|2017-11-21|TU|12:00:00|Hebb|Karen|617-570-2611  
Maternity|2017-11-21|TU|18:00:00|Huffman|Nola|323-796-8238  
Maternity|2017-11-21|TU|12:00:00|Kadlec|Karen|219-604-4539  
Maternity|2017-11-21|TU|18:00:00|Maynard|Henry|510-697-8950  
Emergency|2017-11-22|WE|00:00:00|Barajas|Keith|319-447-9185  
Emergency|2017-11-22|WE|06:00:00|Blackford|Jodi|919-833-0135  
Emergency|2017-11-22|WE|12:00:00|Dawson|Kendra|517-767-6328  
Emergency|2017-11-22|WE|06:00:00|Gordon|Robert|415-390-8471  
Emergency|2017-11-22|WE|00:00:00|Hebb|Karen|617-570-2611  
Emergency|2017-11-22|WE|18:00:00|Kadlec|Karen|219-604-4539  
Surgery|2017-11-22|WE|12:00:00|Maynard|Henry|510-697-8950  
Surgery|2017-11-22|WE|06:00:00|Nelson|Jared|405-275-4143  
Surgery|2017-11-22|WE|12:00:00|Paddock|Kimberly|781-843-4678  
Maternity|2017-11-22|WE|06:00:00|Reid|Deborah|260-242-7896  
Maternity|2017-11-22|WE|18:00:00|Stringer|Christine|605-653-0135  
Maternity|2017-11-22|WE|18:00:00|Westra|Denise|513-826-7940

Query 4 Results:

**$sqlite3 database.sdb < main.sql**

Emergency|2017-11-16|TR|12:00:00|132.0  
Emergency|2017-11-16|TR|00:00:00|136.2  
Emergency|2017-11-16|TR|12:00:00|136.2  
Surgery|2017-11-16|TR|12:00:00|132.0  
Surgery|2017-11-16|TR|12:00:00|132.0  
Surgery|2017-11-16|TR|12:00:00|136.2  
Surgery|2017-11-16|TR|00:00:00|132.0  
Maternity|2017-11-16|TR|18:00:00|132.0  
Maternity|2017-11-16|TR|12:00:00|168.0  
Maternity|2017-11-16|TR|18:00:00|132.0  
Emergency|2017-11-17|FR|00:00:00|132.0  
Emergency|2017-11-17|FR|06:00:00|136.2  
Emergency|2017-11-17|FR|06:00:00|132.0  
Surgery|2017-11-17|FR|12:00:00|132.0  
Surgery|2017-11-17|FR|18:00:00|168.0  
Surgery|2017-11-17|FR|06:00:00|132.0  
Surgery|2017-11-17|FR|00:00:00|132.0  
Surgery|2017-11-17|FR|06:00:00|132.0  
Maternity|2017-11-17|FR|12:00:00|136.2  
Maternity|2017-11-17|FR|18:00:00|132.0  
Emergency|2017-11-18|SA|00:00:00|132.0  
Surgery|2017-11-18|SA|06:00:00|136.2  
Surgery|2017-11-18|SA|12:00:00|132.0  
Maternity|2017-11-18|SA|18:00:00|132.0  
Maternity|2017-11-18|SA|12:00:00|168.0  
Maternity|2017-11-18|SA|06:00:00|132.0  
Maternity|2017-11-18|SA|00:00:00|132.0  
Emergency|2017-11-19|SU|06:00:00|132.0  
Emergency|2017-11-19|SU|18:00:00|136.2  
Emergency|2017-11-19|SU|12:00:00|132.0  
Emergency|2017-11-19|SU|18:00:00|132.0  
Emergency|2017-11-19|SU|12:00:00|132.0  
Surgery|2017-11-19|SU|00:00:00|168.0  
Surgery|2017-11-19|SU|06:00:00|136.2  
Maternity|2017-11-19|SU|12:00:00|132.0  
Emergency|2017-11-20|MO|00:00:00|132.0  
Emergency|2017-11-20|MO|06:00:00|132.0  
Emergency|2017-11-20|MO|12:00:00|136.2  
Emergency|2017-11-20|MO|18:00:00|132.0  
Surgery|2017-11-20|MO|06:00:00|132.0  
Surgery|2017-11-20|MO|12:00:00|168.0  
Surgery|2017-11-20|MO|18:00:00|132.0  
Surgery|2017-11-20|MO|12:00:00|132.0  
Maternity|2017-11-20|MO|12:00:00|132.0  
Maternity|2017-11-20|MO|18:00:00|132.0  
Maternity|2017-11-20|MO|06:00:00|168.0  
Maternity|2017-11-20|MO|12:00:00|136.2  
Emergency|2017-11-21|TU|18:00:00|132.0  
Emergency|2017-11-21|TU|06:00:00|136.2  
Surgery|2017-11-21|TU|12:00:00|136.2  
Surgery|2017-11-21|TU|18:00:00|132.0  
Surgery|2017-11-21|TU|00:00:00|132.0  
Surgery|2017-11-21|TU|12:00:00|132.0  
Maternity|2017-11-21|TU|06:00:00|136.2  
Maternity|2017-11-21|TU|12:00:00|132.0  
Maternity|2017-11-21|TU|18:00:00|132.0  
Maternity|2017-11-21|TU|12:00:00|168.0  
Maternity|2017-11-21|TU|18:00:00|132.0  
Emergency|2017-11-22|WE|00:00:00|132.0  
Emergency|2017-11-22|WE|06:00:00|136.2  
Emergency|2017-11-22|WE|12:00:00|132.0  
Emergency|2017-11-22|WE|06:00:00|136.2  
Emergency|2017-11-22|WE|00:00:00|132.0  
Emergency|2017-11-22|WE|18:00:00|168.0  
Surgery|2017-11-22|WE|12:00:00|132.0  
Surgery|2017-11-22|WE|06:00:00|132.0  
Surgery|2017-11-22|WE|12:00:00|132.0  
Maternity|2017-11-22|WE|06:00:00|168.0  
Maternity|2017-11-22|WE|18:00:00|136.2  
Maternity|2017-11-22|WE|18:00:00|132.0