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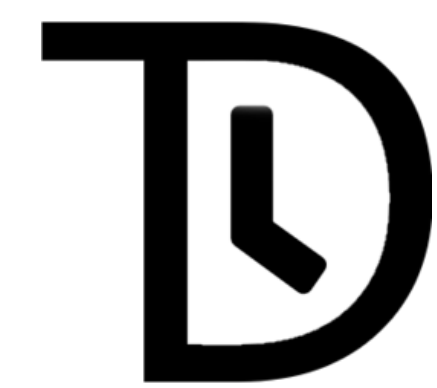


CodeIgniter



School of Computing & Information Sciences

Spring 2019 Senior Design Project



Patrol Shift Bid Scheduler

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Problem

Scheduling at police stations is a very manual, and tedious process, requiring significant oversight from the officers in charge of it.

An online replacement for the current system would greatly simplify things for the officers tasked with scheduling, being more efficient and less wasteful in the process.

Current System

Scheduling at many police departments is currently done manually using tools such as: spreadsheets, paper, pencil, binders, whiteboard, etc.

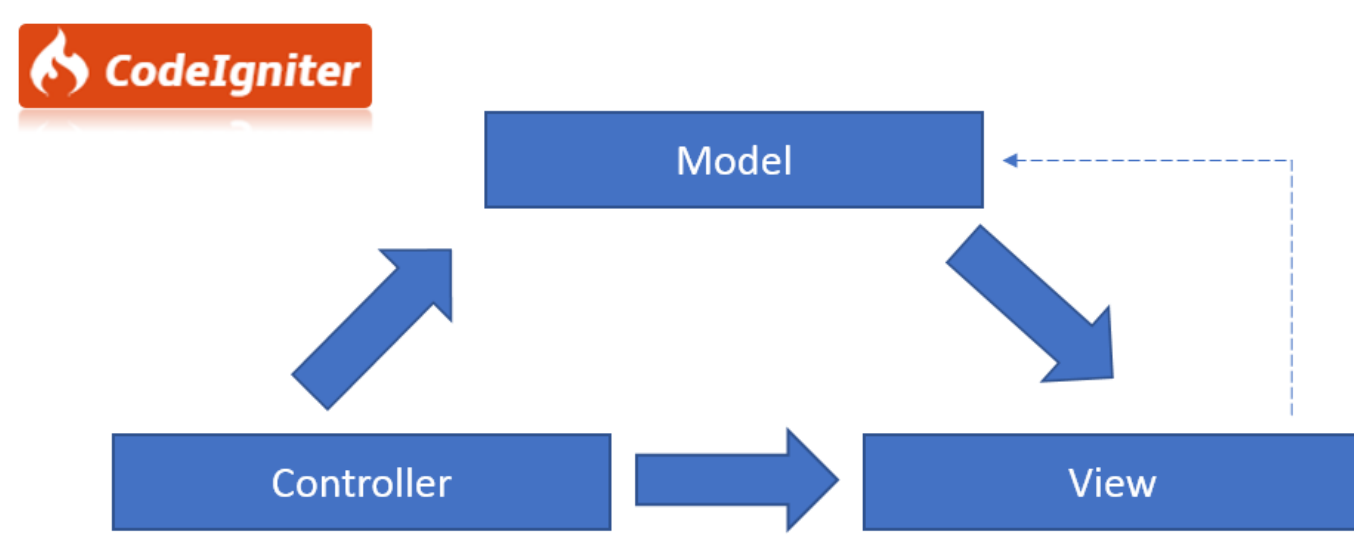
- Patrol officers are asked to bid for their time slots based on seniority. They fill out forms for this purpose.
- Once collected, the bids are compiled into a schedule using spreadsheets, to ensure minimum staffing requirements are met.
- Vacation/sick days are tracked separately using whiteboards.

The tedium involved in this process warrants a more automated solution.

Requirements

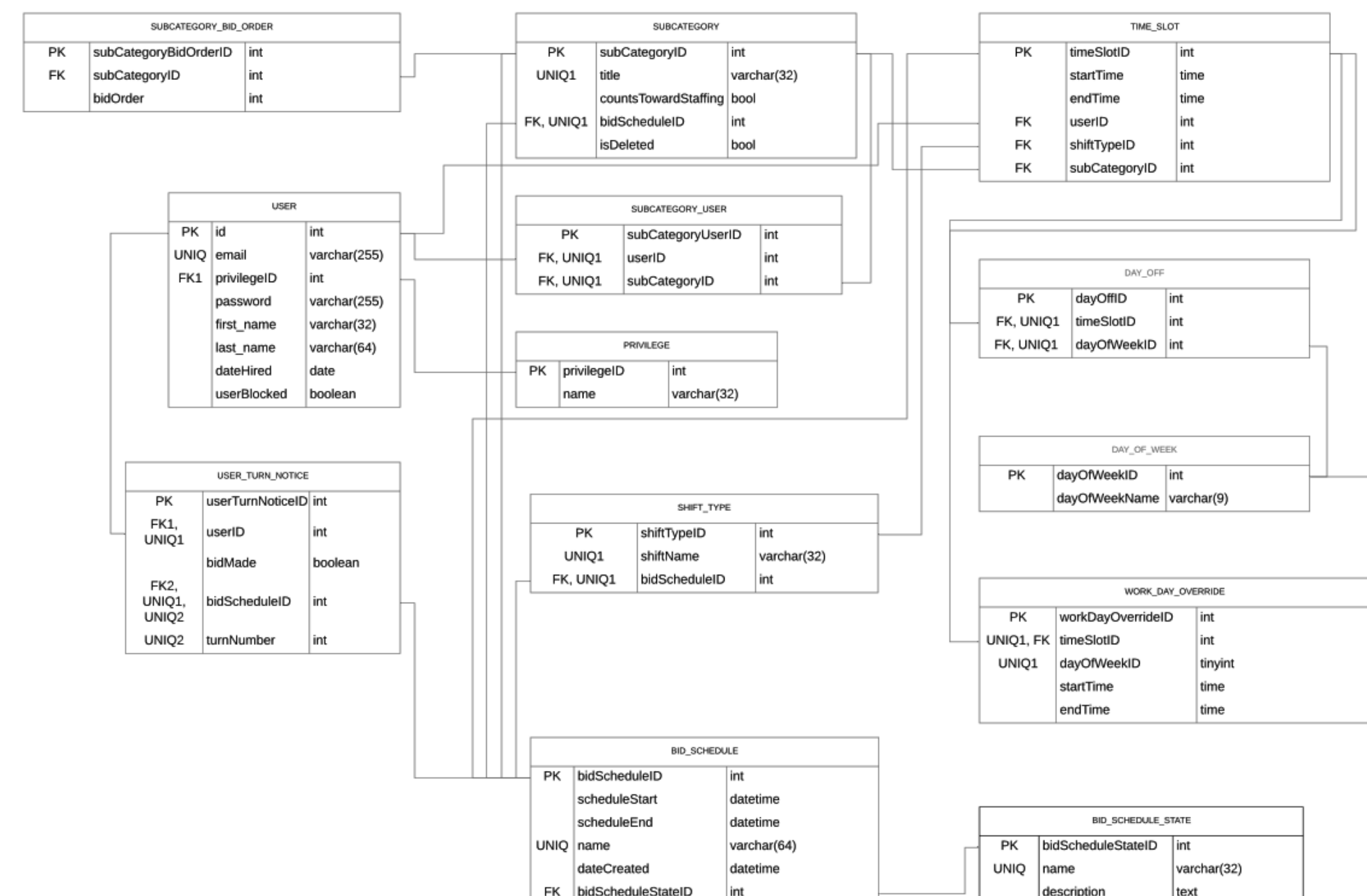
- Web-based system.
- Software technology requirements
 - WAMP server running PHP 5.6.X was necessary to stay consistent with preexisting servers used by the department.
- Feature requirements
 - Audit table for root user.
 - Patrol schedule overview:
 - For an entire week
 - For a given day
 - User authentication system
 - System for managing access and rights for four tiers of users: root, admin, supervisor, and user.

Class & System Design

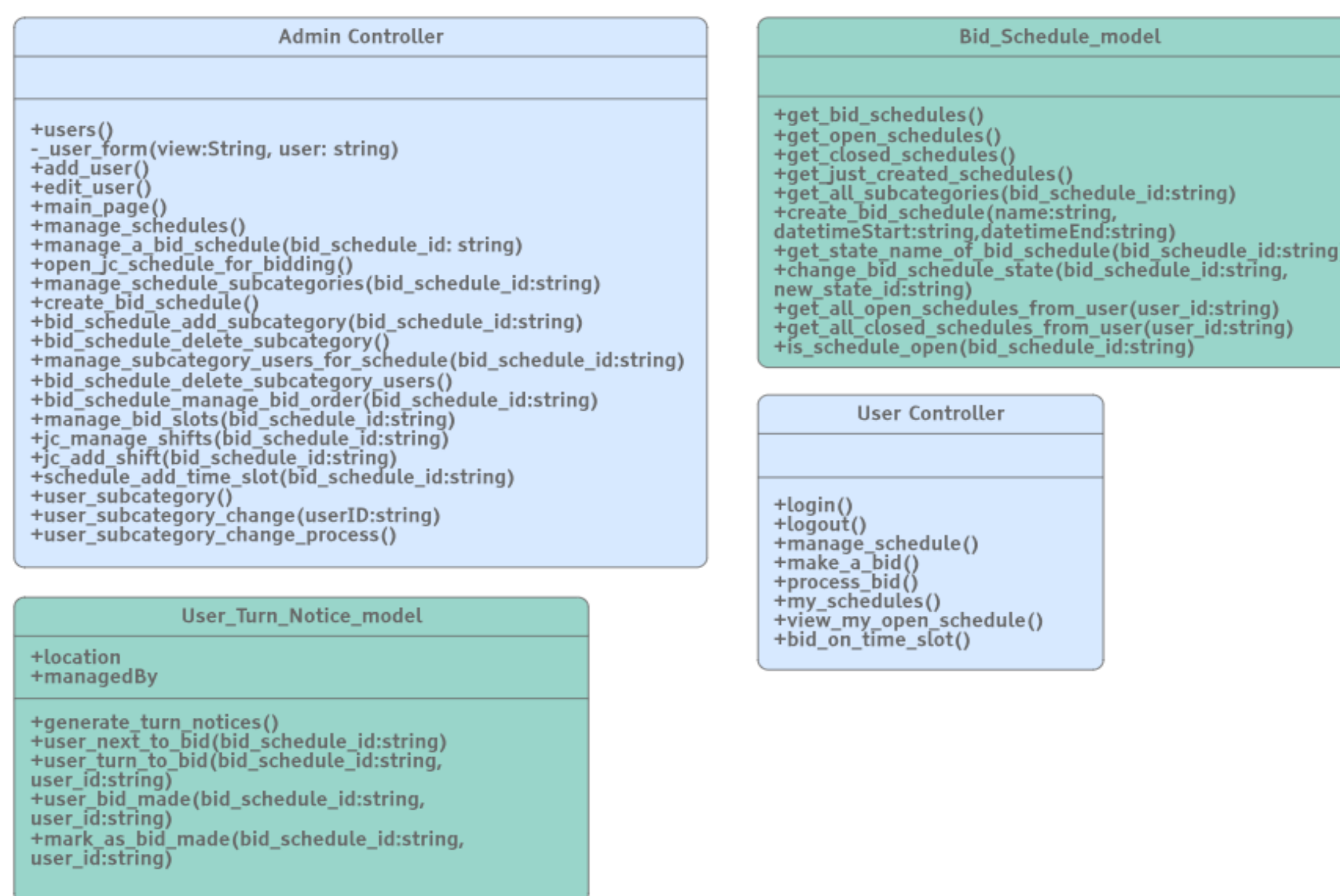


Uses the Model-View-Controller architectural pattern through the use of the lightweight php framework, CodeIgniter.

Minimal Database Schema



Minimal Class Diagram



Implementation

Given the MySQL and PHP version constraints, the CodeIgniter framework was selected for its compatibility. Many of its features were used extensively in the scheduler's design:

- Query builder helper avoid writing raw SQL queries whenever possible.
 - Database migrations, as changes to the schema are an inevitability.
 - Other various facilities; namely, form validation and email-sending
 - Use of helper classes provided by CodeIgniter provides protection from vulnerabilities like SQL injection and XSS attacks.
- For the frontend, Bootstrap 4 was used for its familiarity.

Screenshots

Summary

Create Bid Slots

Manage Bid Slots

Sergeant
Shift: A

Slot ID: #73 [delete](#) [update](#)
Start Time: 08:00:00
End Time: 08:00:00
Days off: Sunday, Monday

Shift: B

Slot ID: #74 [delete](#) [update](#)
Start Time: 08:00:00
End Time: 16:00:00
Days off: Thursday, Friday

Slot ID: #77 [delete](#) [update](#)
Start Time: 09:00:00
End Time: 17:00:00
Days off: Wednesday, Thursday

Shift: C

Patrol Officer
Shift: A

Slot ID: #75 [delete](#) [update](#)
Start Time: 00:00:00
End Time: 08:00:00
Days off: Monday, Tuesday

Slot ID: #76 [delete](#) [update](#)
Start Time: 01:00:00
End Time: 09:00:00
Days off: Wednesday, Thursday

Admin's bid process overview

Manage Open Schedule

Schedule Name: Schedule Name

Status: Open

Users bidded: 0/9

Users left: 9

[Close Bidding](#)

First	Last	Hire date	Subcat	Status	Time Slot
Jorge	Paez	2002-03-27	Sergeant	Bid Made	#76 bid for user
Gary	Spence	2005-05-18	Sergeant	Bid Made	#77 bid for user
Christian	Rosado	2018-11-16	Sergeant	In queue	Unassigned bid for user
Ana	Ogando	2012-10-15	CSI	In queue	Unassigned bid for user
Courtney	Wilcox	2014-11-07	CSI	In queue	Unassigned bid for user
Alexander	Caledron	2017-11-21	CSI	In queue	Unassigned bid for user
Carlos	Villanueva	2001-04-12	K-9	In queue	Unassigned bid for user
Brienna	Brown	2019-01-08	K-9	In queue	Unassigned bid for user
Troy	Cotto	2019-01-08	K-9	In queue	Unassigned bid for user

User Making a bid

Make a bid

Shift: A

Start time: 12:00:00
End time: 20:00:00

Days off: Tuesday, Wednesday

[Slot taken](#)

Shift: B

Start time: 19:24:00
End time: 19:25:00

Days off: Wednesday, Thursday

[Choose this slot](#)

Shift: C

The following features were implemented:

- Users are automatically notified by email when it is their turn to bid.
- Users can make bids online.
- Admins can monitor the bidding process.
- Privileged administrators can create and set up new schedules or modifying existing closed schedules.

Acknowledgement

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