

University Management System

SCS1203 - Take Home Project

Group No. 49

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Introduction

The “University Management System” is a software system that helps to improve student service, increase sharing of information and provide facilities for teachers. It can handle all the details about a student, and all other users and functionalities involved with managing of the university system. The details include course offerings, student enrollment for course sections, evaluating students course grade, assign professors accordingly etc.

Background

The university management system needs to be accessed by five kinds of users as assessed by the team. Namely, students, professors, librarians, company session managers, and system administrators.

The system should provide separate user interfaces depending on the user logged in, to cater their needs.

Also, to be accessible to any user of the system no matter where he is, the system should be available through the internet, by means of a web application.

Technologies

- The data gathered in the system are stored in a MySQL database
- The database definitions for the database are created with PHP using the Laravel Artisan framework
- The web application’s backend is designed with PHP using CodeIgniter framework
- Front end for the application is designed with HTML, CSS, and javascript

Design

Use Cases

The use cases are for the 5 user roles

1. Administrator
2. Professor
3. Student
4. Librarian
5. Company Session Manager

Administrator

- Create user accounts with user types
- Add departments to the system
- View departments details
- Delete the non-existing departments
- Add, view the details, remove courses for departments
- Set the current semester (choose for 2 semesters)
- Add section for the courses
- Start a section and cancel it
- Set the department heads (order by the seniority)
- Create a company session
- Remove professor , student and employee from the system

Professor

- Login to the system
- Assign grades to the students
- Select the courses that he teach and the textbook used
- Select the sections he teaches
- Add lab sessions for a section and assign graduate student who conduct it
- Can change the book used for a course
- Remove sections taken by professor

Student

- Login to the system
- Enroll for the sections
- View books which they borrow from the library
- Can enroll in company sessions

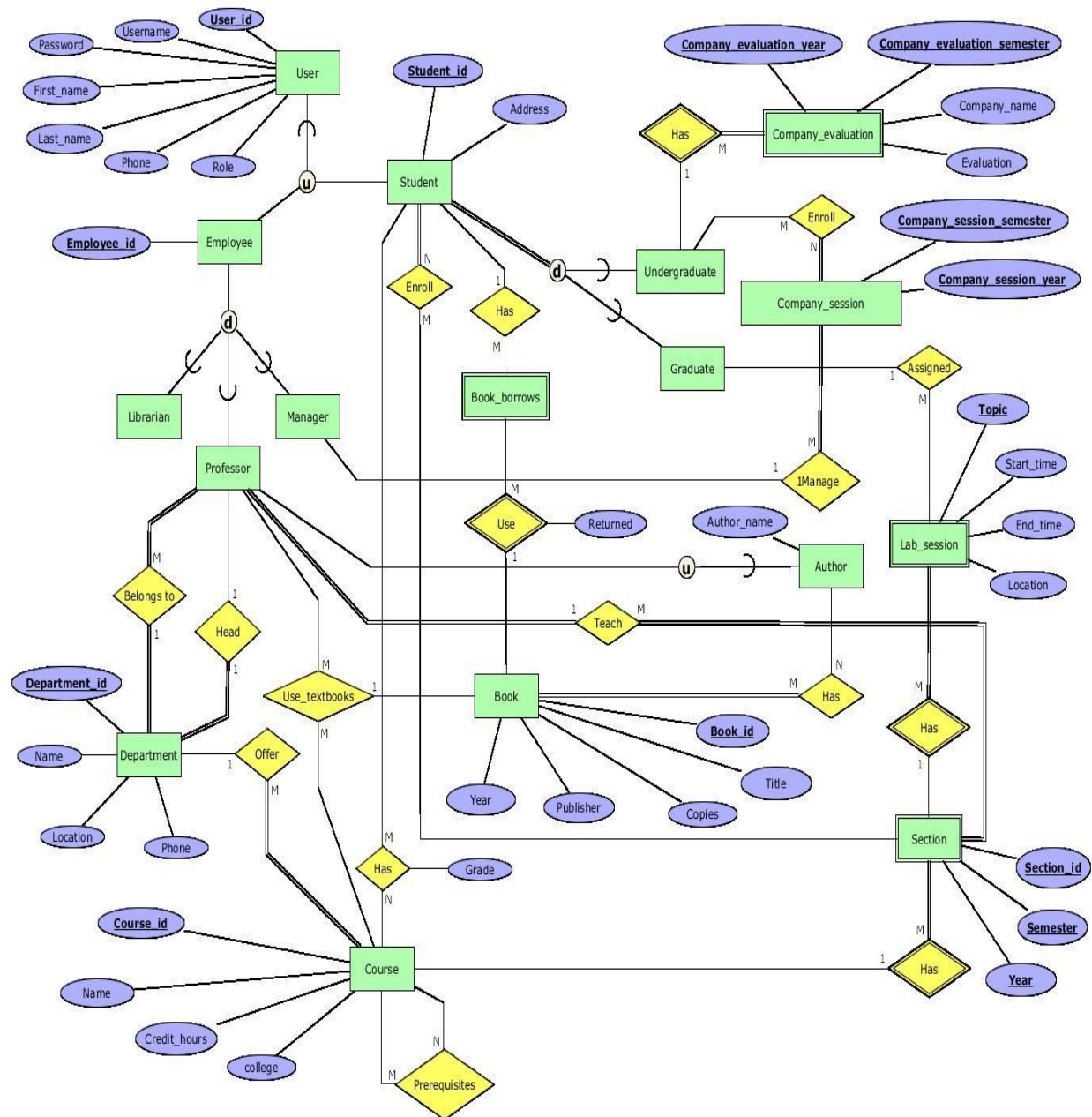
Librarian

- Login to the system
- Add description on books to the system and relevant author for each book
- Keep Record of each students borrowing and lending

Company Session Manager

- Login to the system
- Add company evaluation reports to the students enrolled in company sessions

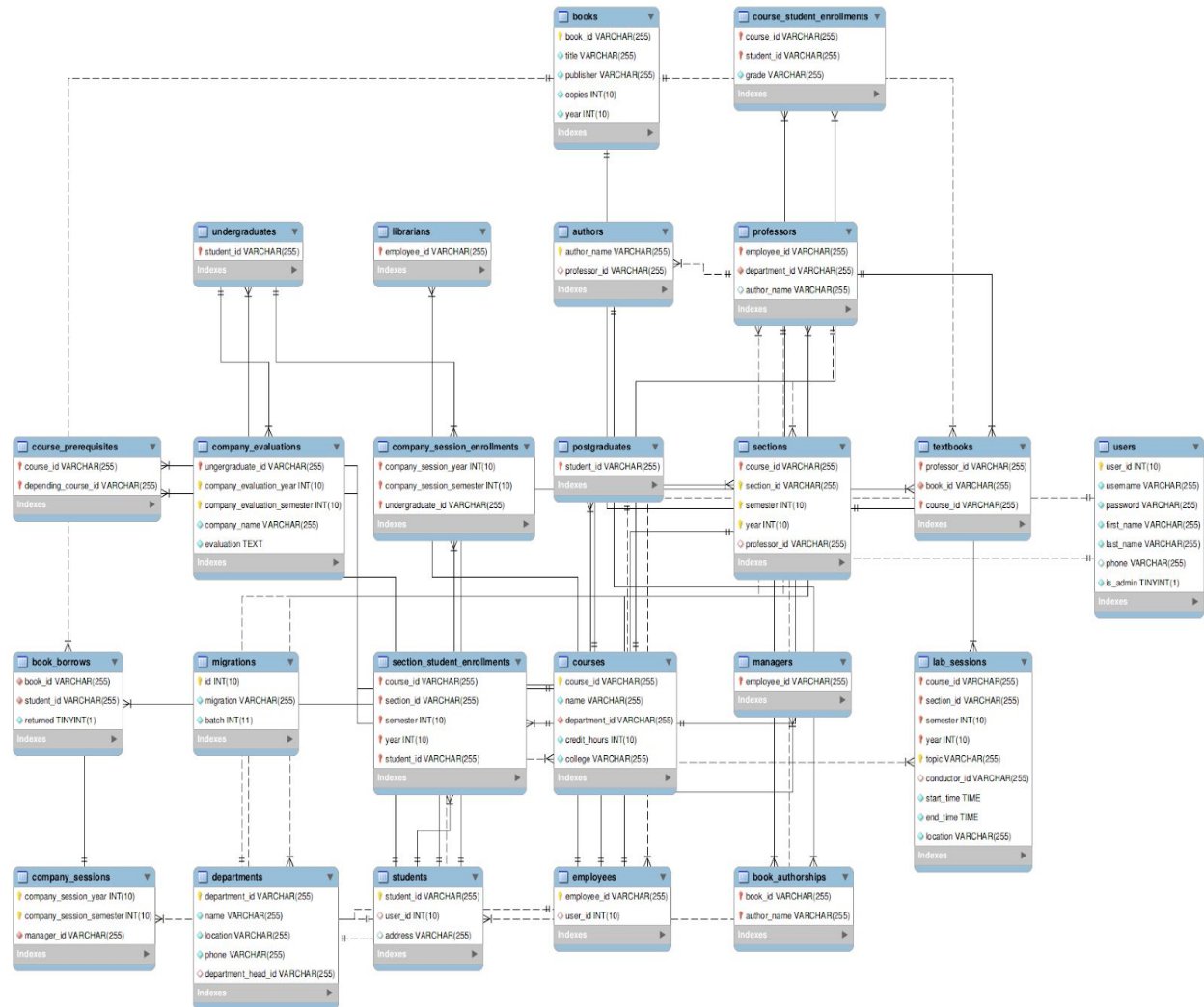
Entity Relationship Diagram



Assumptions:

- Year refers to the study year of a student (such as year 1, year 2)
- Company session evaluation entity is kept separately because the evaluation data has to be maintained even if the company session is removed.

Database Schema

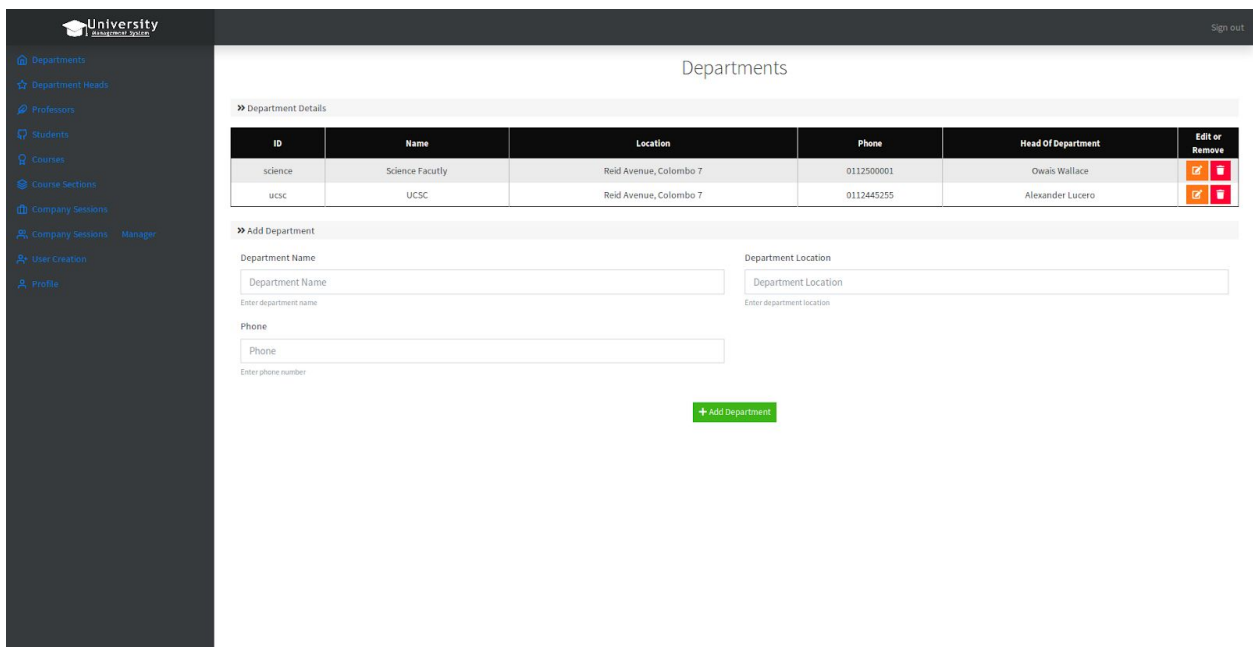


Implementation

User Interfaces

The following shows the steps taken by an administrator to login to the system, view the current departments, create a new department record, edit an existing department record, and delete a department.





University

Departments

Department Heads

Professors

Students

Courses

Course Sections

Company Sessions

Company Sessions





User Creation

Profile

Sign out

Departments

Department Details

ID	Name	Location	Phone	Head Of Department	Edit or Remove
science	Science Facutly	Reid Avenue, Colombo 7	0112500001	Owais Wallace	 
ucsc	UCSC	Reid Avenue, Colombo 7	0112445255	Alexander Lucero	 

Add Department

Department Name

Management Faculty

Enter department name

Department Location

Koswatta, Nugegoda

Enter department location

Phone

0112704456

Enter phone number

Add Department

University

Departments

Department Heads

Professors

Students

Courses

Course Sections

Company Sessions

Company Sessions







User Creation

Profile

Sign out

Departments

Department Details

ID	Name	Location	Phone	Head Of Department	Edit or Remove
management-faculty-34	Management Faculty	Koswatta, Nugegoda	0112704456		 
science	Science Facutly	Reid Avenue, Colombo 7	0112500001	Owais Wallace	 
ucsc	UCSC	Reid Avenue, Colombo 7	0112445255	Alexander Lucero	 

Add Department

Department Name

Department Name

Enter department name

Department Location

Department Location

Enter department location

Phone

Phone

Enter phone number

Add Department

University

Departments

Department Heads

Professors

Students

Courses

Course Sections

Company Sessions

Company Sessions

User Creation

Profile

Sign out

Departments

» Edit Department Details

Department ID

UCSC

Department Name

UCSC

Enter department name

Department Location

Reid Avenue, Colombo 7

Enter department location

Phone

0112445255

Enter phone number

Head of Department

Alexander Lucero

Back

Edit Department

Name
Alexander Lucero

University

Departments

Department Heads

Professors

Students

Courses

Course Sections

Company Sessions

Company Sessions

User Creation

Profile

Sign out

Departments

» Department Details

ID	Name	Location	Phone	Head Of Department	Edit or Remove
management-faculty-34	Management Faculty	Koswatta, Nugegoda	0112704456		<div></div>
science	Science Faculty	Reid Avenue, Colombo 7	0112500001	Owais Wallace	<div></div>
ucsc	UCSC	UCSC Building Complex, 35 Reid Ave, Colombo 00700	0112445255	Alexander Lucero	<div></div>

» Add Department

Department Name

Department Name

Enter department name

Department Location

Department Location

Enter department location


Phone

Phone

Enter phone number

Add Department

9



Departments

Department Heads

Professors

Students

Courses

Course Sections

Company Sessions

Company Sessions Manager





User creation

Profile

Sign out

Departments

» Department Details

ID	Name	Location	Phone	Head Of Department	Edit or Remove
science	Science Faculty	Reid Avenue, Colombo 7	0112500001	Owais Wallace	 
ucsc	UCSC	UCSC Building Complex, 35 Reid Ave, Colombo 00700	0112445255	Alexander Lucero	 

» Add Department

Department Name

Enter department name

Department Location


Enter department location

Phone

Enter phone number

+ Add Department

The following screenshots show the UI provided for a professor to manage his course sections, to create lab sessions, and to assign a textbook for a course section.



Overview

Course Sections

Lab Sessions

Text Books

Lab Sessions Conductors

Profile

Sign out

Course Sections

Search

Unassigned Course Section



	Department	Name	Semester	Year	C. Hours	Section No
<input type="checkbox"/>	UCSC	Database	1	1	50	scs1203
<input type="checkbox"/>	UCSC	Programming	1	2	80	scs1202

Course Section

Choose Course Section

+ Add To My Sections

My Course Section

Department	Name	Semester	Year	C. Hours	Section No	Action
UCSC	DSA	1	1	100	scs1201	
UCSC	DSA	2	1	100	scs1301	

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- Overview
- Books
- Authors
- Borrow & Return Books
- Profile

Sign out

Authors

Authors

Author Name	Is a professor	Action
Charles E. Leiserson	No	
Clifford Stein	No	
Ronald L. Rivest	No	
Thomas H. Cormen	No	

Add Authors

Author Name

Enter Author Name

Professor Link

None

Professor Name

UCSC

Department

UCSC

Name

Alexander Lucero

Department

Science Faculty

Name

Owais Wallace

- Overview
- Books
- Authors
- Borrow & Return Books
- Profile

Sign out

Books

Books Basic Details

Title	Publisher	ISBN	Authors	No. Of Copies	Available	Action
Introduction to Algorithms	MIT Publications	9780262531962	Charles E. Leiserson, Clifford Stein, Ronald L. Rivest, Thomas H. Cormen	10	10	

Add Books

Map Authors to Books

Book Title

Enter book title

Publisher

Book Publisher

Book

Introduction to Algorithms

Author

Charles E. Leiserson

ISBN No.

Book ISBN No.

Publish Year

Published year

Number Of Copies

Copies Count

Enter copies count.

Enter published year.

The following shows the UI provided for any user to manage their user profile.

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- Overview
- Course Sections
- Lab Sections
- Text Books
- Lab Session Conductors
- Profile

Sign out

Profile

Basic Details

Username	:	professor
First Name	:	Alexander
Last Name	:	Lucero
Contact No	:	0712365498

Update Basic Details

First Name

Alexander

Enter your first name.

Last Name

Lucero

Enter your last name.

Contact Number

0712365498

Enter your contact number.

Update Profile

Change Password

New Password

Enter New Password

Enter your new password.

Confirm Password

Confirm Your Password

The following shows the overview page provided for an undergraduate.
(Data not populated through DB)

- Overview
- Enroll for Course
- Company Sessions
- Library
- Grades
- Profile

Sign out

Overview

Courses

Finished

- Name
 - Department :
 - Creadit Hours :
 - College :
 - Prerequisites : wec , fvef , fvqfvv

Now

- Name
 - Department :
 - Creadit Hours :
 - College :
 - Prerequisites : wec , fvef , fvqfvv

Library

- Book Name
- Borrowed Date :
- Return Date :

Company Sessions

Finished

- Year
- Semester
- Company

Now

- Year
- Semester
- Company

Grades

Course Greads.

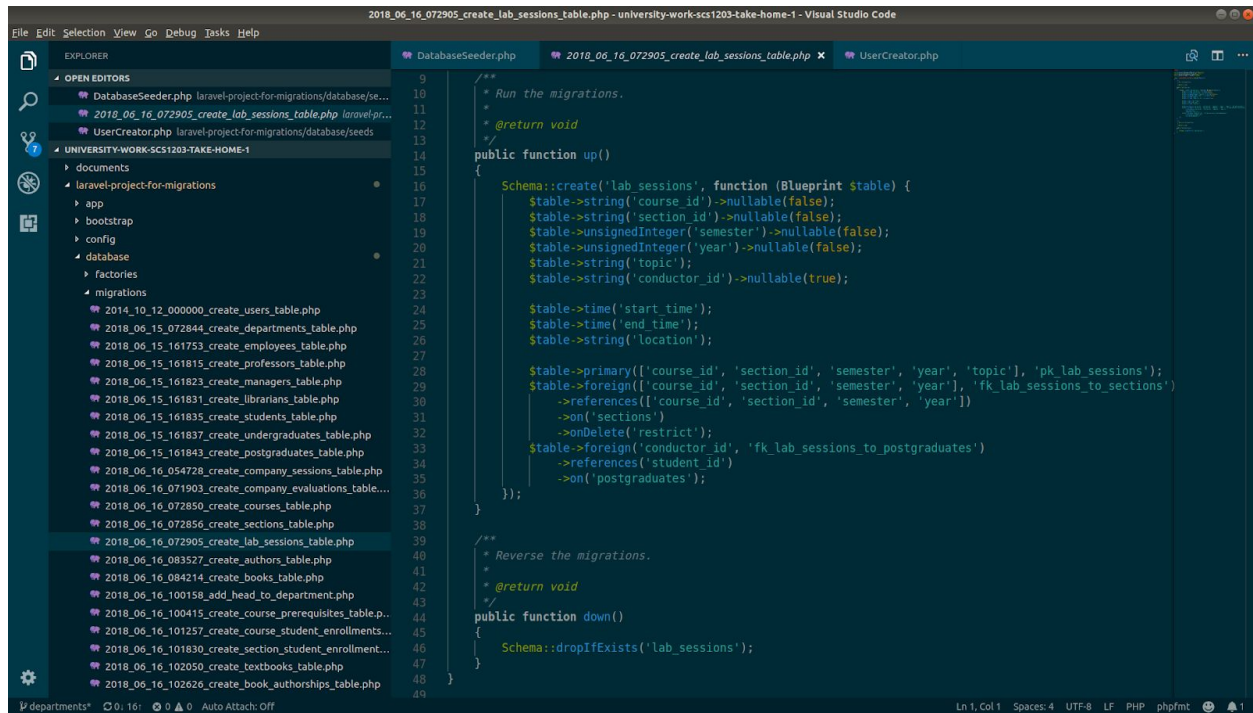
- Course Name
 - Year
 - Semester
 - Grade : wow

Company Session Evaluations

- Company Name
 - Year
 - Semester
 - Evaluation : wow

Database Schema Creation Scripts

A Table creation script. (Lab sessions table)



The screenshot shows a Visual Studio Code editor with a file explorer on the left and a code editor on the right. The file explorer shows a project structure with a 'migrations' folder. The code editor displays a PHP file named '2018_06_16_072905_create_lab_sessions_table.php'. The script defines a 'up()' function to create the 'lab_sessions' table with columns: 'course_id', 'section_id', 'semester', 'year', 'topic', and 'conductor_id'. It also defines a 'down()' function to drop the table if it exists. The script includes comments for running and reversing migrations.

```
2018_06_16_072905_create_lab_sessions_table.php - university-work-scs1203-take-home-1 - Visual Studio Code
File Edit Selection View Go Debug Tasks Help

EXPLORER
  OPEN EDITORS
    DatabaseSeeder.php laravel-project-for-migrations/database/se...
    2018_06_16_072905_create_lab_sessions_table.php laravel-pr...
    UserCreator.php laravel-project-for-migrations/database/seeds
  UNIVERSITY-WORK-SCS1203-TAKE-HOME-1
    documents
    laravel-project-for-migrations
      app
      bootstrap
      config
      database
        factories
        migrations
          2014_10_12_000000_create_users_table.php
          2018_06_15_072844_create_departments_table.php
          2018_06_15_161753_create_employees_table.php
          2018_06_15_161815_create_professors_table.php
          2018_06_15_161823_create_managers_table.php
          2018_06_15_161831_create_librarians_table.php
          2018_06_15_161835_create_students_table.php
          2018_06_15_161837_create_undergraduates_table.php
          2018_06_15_161843_create_postgraduates_table.php
          2018_06_16_054728_create_company_sessions_table.php
          2018_06_16_071903_create_company_evaluations_table...
          2018_06_16_072850_create_courses_table.php
          2018_06_16_072856_create_sections_table.php
          2018_06_16_072905_create_lab_sessions_table.php
          2018_06_16_083527_create_authors_table.php
          2018_06_16_084214_create_books_table.php
          2018_06_16_100158_add_head_to_department.php
          2018_06_16_100415_create_course_prerequisites_table.p...
          2018_06_16_101257_create_course_student_enrollments...
          2018_06_16_101830_create_section_student_enrollment...
          2018_06_16_102050_create_textbooks_table.php
          2018_06_16_102626_create_book_authorships_table.php

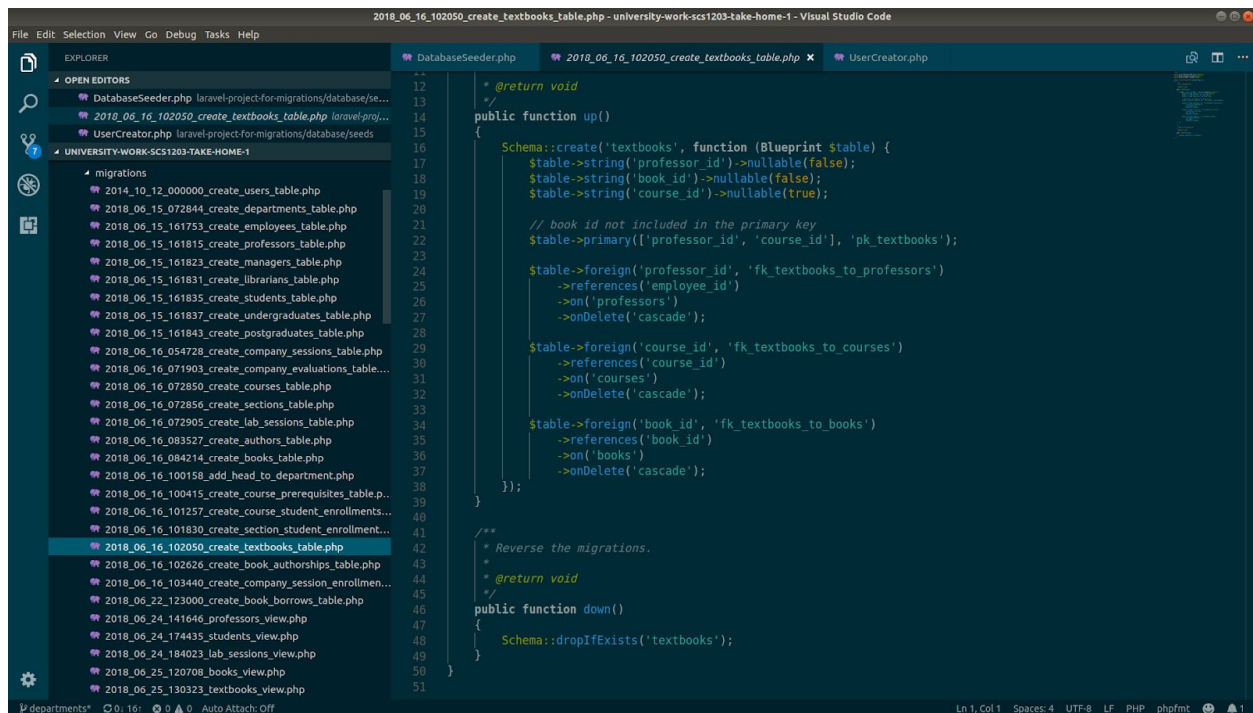
2018_06_16_072905_create_lab_sessions_table.php
  /**
   * Run the migrations.
   *
   * @return void
   */
  public function up()
  {
    Schema::create('lab_sessions', function (Blueprint $table) {
      $table->string('course_id')->nullable(false);
      $table->string('section_id')->nullable(false);
      $table->unsignedInteger('semester')->nullable(false);
      $table->unsignedInteger('year')->nullable(false);
      $table->string('topic');
      $table->string('conductor_id')->nullable(true);

      $table->time('start_time');
      $table->time('end_time');
      $table->string('location');

      $table->primary(['course_id', 'section_id', 'semester', 'year', 'topic', 'pk_lab_sessions']);
      $table->foreign(['course_id', 'section_id', 'semester', 'year'], 'fk_lab_sessions_to_sections')
        ->references(['course_id', 'section_id', 'semester', 'year'])
        ->on('sections')
        ->onDelete('restrict');
      $table->foreign('conductor_id', 'fk_lab_sessions_to_postgraduates')
        ->references('student_id')
        ->on('postgraduates');
    });
  }

  /**
   * Reverse the migrations.
   *
   * @return void
   */
  public function down()
  {
    Schema::dropIfExists('lab_sessions');
  }
}
```

(Textbooks table)



The screenshot shows a Visual Studio Code editor with a file explorer on the left and a code editor on the right. The file explorer shows a project structure with a 'migrations' folder. The code editor displays a PHP file named '2018_06_16_102050_create_textbooks_table.php'. The script defines a 'up()' function to create the 'textbooks' table with columns: 'professor_id', 'book_id', and 'course_id'. It also defines a 'down()' function to drop the table if it exists. The script includes comments for running and reversing migrations.

```
2018_06_16_102050_create_textbooks_table.php - university-work-scs1203-take-home-1 - Visual Studio Code
File Edit Selection View Go Debug Tasks Help

EXPLORER
  OPEN EDITORS
    DatabaseSeeder.php laravel-project-for-migrations/database/se...
    2018_06_16_102050_create_textbooks_table.php laravel-proj...
    UserCreator.php laravel-project-for-migrations/database/seeds
  UNIVERSITY-WORK-SCS1203-TAKE-HOME-1
    migrations
      2014_10_12_000000_create_users_table.php
      2018_06_15_072844_create_departments_table.php
      2018_06_15_161753_create_employees_table.php
      2018_06_15_161815_create_professors_table.php
      2018_06_15_161823_create_managers_table.php
      2018_06_15_161831_create_librarians_table.php
      2018_06_15_161835_create_students table.php
      2018_06_15_161837_create_undergraduates table.php
      2018_06_15_161843_create_postgraduates table.php
      2018_06_16_054728_create_company_sessions table.php
      2018_06_16_071903_create_company_evaluations table...
      2018_06_16_072850_create_courses table.php
      2018_06_16_072856_create_sections table.php
      2018_06_16_072905_create_lab_sessions table.php
      2018_06_16_083527_create_authors table.php
      2018_06_16_084214_create_books table.php
      2018_06_16_100158_add_head_to_department.php
      2018_06_16_100415_create_course_prerequisites table.p...
      2018_06_16_101257_create_course_student_enrollments...
      2018_06_16_101830_create_section_student_enrollment...
      2018_06_16_102050_create_textbooks table.php
      2018_06_16_102626_create_book_authorships table.php
      2018_06_16_103440_create_company_session_enrollmen...
      2018_06_22_123000_create_book_borrows table.php
      2018_06_24_141646_professors_view.php
      2018_06_24_174435_students_view.php
      2018_06_24_184023_lab_sessions_view.php
      2018_06_25_120708_books_view.php
      2018_06_25_130323_textbooks_view.php

2018_06_16_102050_create_textbooks_table.php
  /**
   * @return void
   */
  public function up()
  {
    Schema::create('textbooks', function (Blueprint $table) {
      $table->string('professor_id')->nullable(false);
      $table->string('book_id')->nullable(false);
      $table->string('course_id')->nullable(true);

      // book id not included in the primary key
      $table->primary(['professor_id', 'course_id'], 'pk_textbooks');

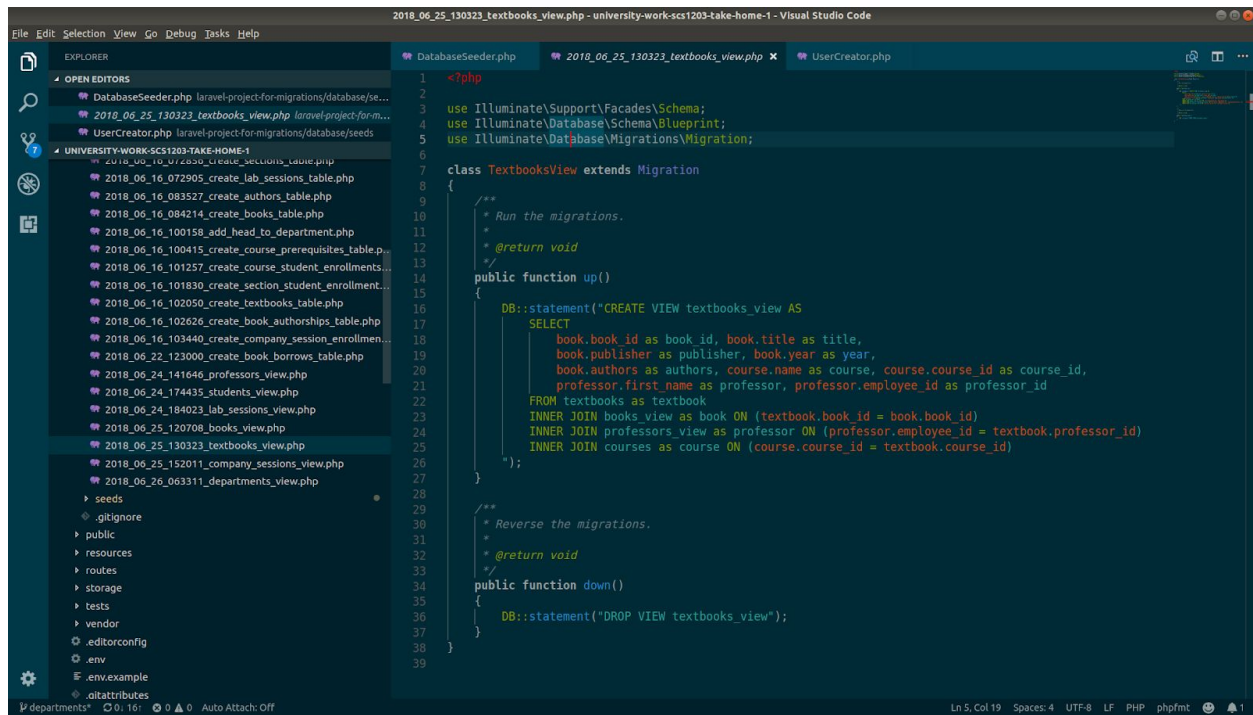
      $table->foreign('professor_id', 'fk_textbooks_to_professors')
        ->references('employee_id')
        ->on('professors')
        ->onDelete('cascade');

      $table->foreign('course_id', 'fk_textbooks_to_courses')
        ->references('course_id')
        ->on('courses')
        ->onDelete('cascade');

      $table->foreign('book_id', 'fk_textbooks_to_books')
        ->references('book_id')
        ->on('books')
        ->onDelete('cascade');
    });
  }

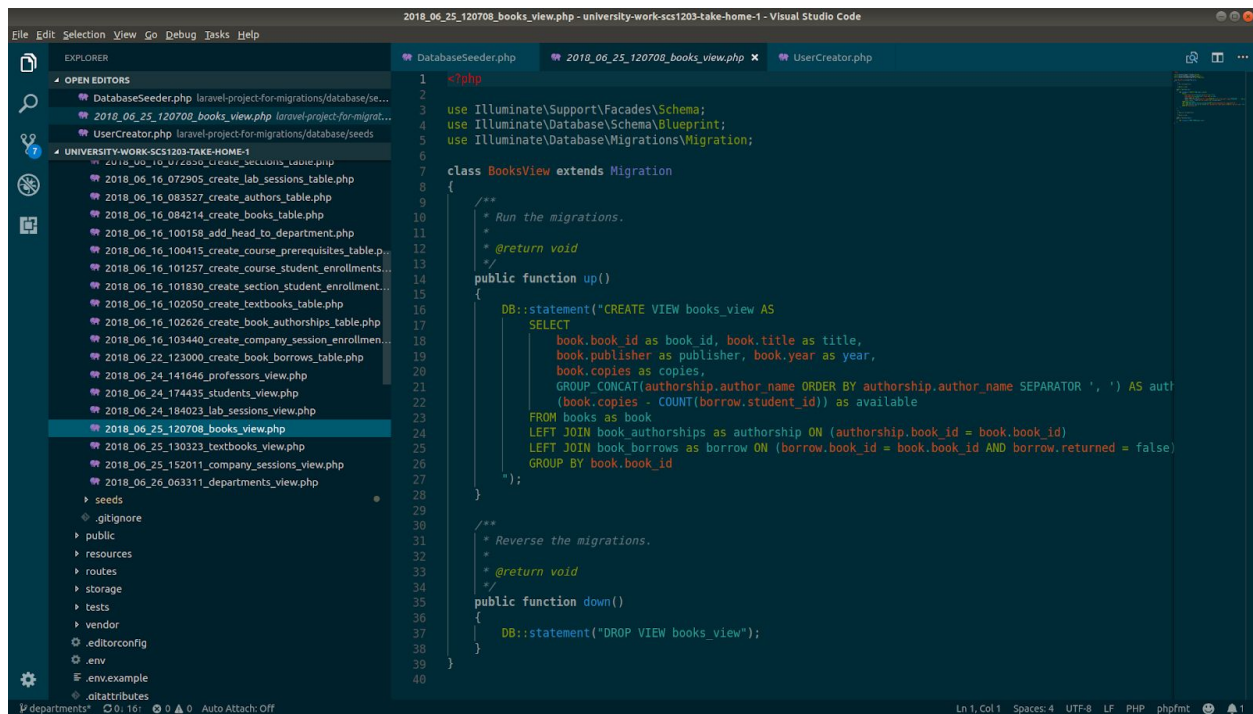
  /**
   * Reverse the migrations.
   *
   * @return void
   */
  public function down()
  {
    Schema::dropIfExists('textbooks');
  }
}
```


A view creation script (views are used in the system in order to gather data for displaying, and the updates to records are done on the actual tables)



The screenshot shows the Visual Studio Code editor with the Explorer sidebar on the left. The Explorer sidebar shows a project structure with folders like 'seeds', 'public', 'resources', 'routes', 'storage', 'tests', 'vendor', and 'env'. The 'OPEN EDITORS' list shows several files, including 'DatabaseSeeder.php', '2018_06_25_130323_textbooks_view.php', and 'UserCreator.php'. The main editor window displays the content of '2018_06_25_130323_textbooks_view.php'. The code is a PHP migration script for creating a view named 'textbooks_view'. It uses the Laravel migration framework, including the 'use Illuminate\Support\Facades\Schema;' and 'use Illuminate\Database\Schema\Blueprint;' statements. The 'up()' method contains a SQL statement to create the view, selecting columns from 'books', 'authors', 'courses', and 'professors' tables. The 'down()' method contains a SQL statement to drop the view. The status bar at the bottom indicates the file is at line 5, column 19, with 4 spaces, UTF-8 encoding, and LF line endings.

```
1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class TextbooksView extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         DB::statement("CREATE VIEW textbooks_view AS
17         SELECT
18             book.book_id as book_id, book.title as title,
19             book.publisher as publisher, book.year as year,
20             book.authors as authors, course.name as course, course.course_id as course_id,
21             professor.first_name as professor, professor.employee_id as professor_id
22         FROM textbooks as textbook
23         INNER JOIN books view as book ON (textbook.book_id = book.book_id)
24         INNER JOIN professors view as professor ON (professor.employee_id = textbook.professor_id)
25         INNER JOIN courses as course ON (course.course_id = textbook.course_id)
26         ");
27     }
28
29     /**
30      * Reverse the migrations.
31      *
32      * @return void
33      */
34     public function down()
35     {
36         DB::statement("DROP VIEW textbooks_view");
37     }
38 }
39
```



The screenshot shows the Visual Studio Code editor with the Explorer sidebar on the left. The Explorer sidebar shows a project structure with folders like 'seeds', 'public', 'resources', 'routes', 'storage', 'tests', 'vendor', and 'env'. The 'OPEN EDITORS' list shows several files, including 'DatabaseSeeder.php', '2018_06_25_120708_books_view.php', and 'UserCreator.php'. The main editor window displays the content of '2018_06_25_120708_books_view.php'. The code is a PHP migration script for creating a view named 'books_view'. It uses the Laravel migration framework, including the 'use Illuminate\Support\Facades\Schema;' and 'use Illuminate\Database\Schema\Blueprint;' statements. The 'up()' method contains a SQL statement to create the view, selecting columns from 'books', 'authorships', and 'borrow' tables. The 'down()' method contains a SQL statement to drop the view. The status bar at the bottom indicates the file is at line 1, column 1, with 4 spaces, UTF-8 encoding, and LF line endings.

```
1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class BooksView extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         DB::statement("CREATE VIEW books_view AS
17         SELECT
18             book.book_id as book_id, book.title as title,
19             book.publisher as publisher, book.year as year,
20             book.copies as copies,
21             GROUP_CONCAT(authorship.author_name ORDER BY authorship.author_name SEPARATOR ', ') AS author
22             (book.copies - COUNT(borrow.student_id)) as available
23         FROM books as book
24         LEFT JOIN book authorships as authorship ON (authorship.book_id = book.book_id)
25         LEFT JOIN book borrows as borrow ON (borrow.book_id = book.book_id AND borrow.returned = false)
26         GROUP BY book.book_id
27         ");
28     }
29
30     /**
31      * Reverse the migrations.
32      *
33      * @return void
34      */
35     public function down()
36     {
37         DB::statement("DROP VIEW books_view");
38     }
39 }
40
```


Conclusion

The complete project is hosted on github under the url
github.com/pasinducw/university-work-scs1203-take-home-1

Thank you.

