CSCI 4131 – Internet Programming
Homework Assignment 6 (Version 2, Updated 4/2)

Due Friday, April 12th at 3pm

Late Submissions (with Penalty) accepted until Saturday, April 13th at 6pm

Description

Assignment 5 provided an introduction to web-development using Node.js. This assignment will build upon the what you have developed with assignment 5. The objective of this assignment is to develop a basic website using Express. Express is an application framework that simplifies the development of node.js server-side applications, and it is the most widely used application framework for doing so. Typical features of Express are:

- routing: a way to map URLs and http verbs to code paths
- easy methods for parsing http requests and building http responses:

*The following are **some of the resources** you should use to familiarize yourself with Express:*

- Essential
  - Installing Express
  - Hello world example of Express
  - Basic routing in Express
  - Serving static files in Express
- Additional Referenced
  - Express website
  - Books and blogs
  - FAQ
  - Routing in Express
  - API Reference
  - Building a Website with Node.js and Express.js (Video tutorial)

This assignment will also introduce you to SQL and the MySQL database.

The following are resources you should review to get familiar with SQL, MYSQL and MYSQL/Node.js

- https://www.w3schools.com/sql/
- https://www.w3schools.com/sql/sql_ref_mysql.asp
- https://www.w3schools.com/nodejs/nodejs_mysql.asp
- SQL/MYSQL: Chapter 13 Sebesta

Preparation and Provided Files

I. The first step will be to get Node.js and MySQL running on CSE lab machines. This can be accomplished as follows:

1. Log into a CSE lab machine.
2. Most of the CSE lab machines run version 8.11.4 of Node.js
3. Open the terminal and type the following command to add the Node.js module:
   ```
   module add soft/nodejs
   ```
4. The next step is to check the availability of Node.js. Type the following command to check the version of Node.js on the machine:
   ```
   node -v
   ```
5. This will display the current installed version.
6. To use the MYSQL database, you will need a database user id and password. Your MYSQL database user id and numeric password can be found on the class Moodle site. The user name and password are separated by a space.
7. At the terminal, type the following command to add MySQL module:
   ```
   module add soft/mysql
   ```
8. At the terminal, type the following command to login to MySQL and check whether its active:
   ```
   mysql -u your_database_user -hcse-curly.cse.umn.edu -P3306 -p your_database_user
   ```
   You will find your database id and NUMERIC database password on Moodle with your grades in the feedback section of the column named: **UserID_Password**

   Replace your_database_user with the database id provided to you before hitting enter. your_database_user will be in the format: C4131S19GXXX

   When prompted for password, enter the NUMERIC password provided to you.
9. After successful login, you should see **mysql>** prompt.

II. The second step is to create a Node.js (Express) project for this assignment. This can be accomplished as follows:

1. Open the terminal on a CSE lab machine.
2. Create a directory named <x500id_hw05> by typing the following command:
   ```
   mkdir yourx500id_hw06
   ```
3. Go inside the directory by typing the following command:
   ```
   cd  yourx500id_hw06
   ```
4. Having a file named *package.json* in Node.js project makes it easy to manage module dependencies and makes the build process easier. To create *package.json* file, type the following command: `npm init`

5. The *npm init* command will prompt you to enter the information. Use the following guidelines to enter the information (The things that you need to enter are in **bold** font. Some fields can be left blank.):

```
name: (yourx500id_hw08) yourx500id_hw06

version: (1.0.0) <Leave blank>

description: Assignment 6

entry point: (index.js) <Leave blank> (You will create an index.js file
for your use)

test command: <Leave blank>

git repository: <Leave blank>

keywords: <Leave blank>

author: yourx500id

license: (ISC) <Leave blank>
```

6. After filling in the above information, you will be prompted to answer the question: "`Is this ok? (yes)`". Type **yes** and hit enter.

7. Listing all the available files in the directory should display the following:

```
-rw-------  1 madis180 CSEL-student  219 Mar 27 13:37 package.json
```

8. Install Express by typing the following command:
   `npm install --save express`

9. You can use any npm module that you deem fit for this assignment. The npm modules that will be useful for this assignment and should be installed are:

   - mysql (*`npm install --save mysql`*)
   - body-parser (*`npm install --save body-parser`*)
   - express-session (*`npm install --save express-session`*)

10. You are free to decide your own project structure for this assignment.

NOTE: We have provided a sample file for server (sample_index.js) which can be used for reference.

III. Database setup:

1. The following files have been provided to you for this assignment:
   - create_accounts_table.js
   - insert_into_accounts_table.js
   - create_events_table.js

2. Download these files and move them to **`yourx500id_hw06`** directory.
3. Edit each of the files to include your database id and numeric password, which you can find on Moodle in your grades in the comments portion of column named: **UserID_Password**
4. Set the permissions on the files to rwxr-xr-x (e.g., **`chmod 755 filename`**)
5. At the terminal, type the following command to create the MySQL table: tbl_accounts

   ```
   node create_accounts_table.js
   ```

   This table will be used to store your encrypted login credentials.

6. At the terminal, type the following command to insert values for acc_name, acc_login, acc_password into tbl_accounts table:

   ```
   node insert_into_accounts_table.js
   ```

   You will use the values chosen for acc_login and acc_passowrd to login to the website. Keep the values in a safe place and do not share them with anyone

7. At the terminal, type the following command to create the MySQL table: tbl_events

   ```
   node create_events_table.js
   ```

   This table will be used to store the details of the events.

At this point you are ready to start the website development.

3 Functionality

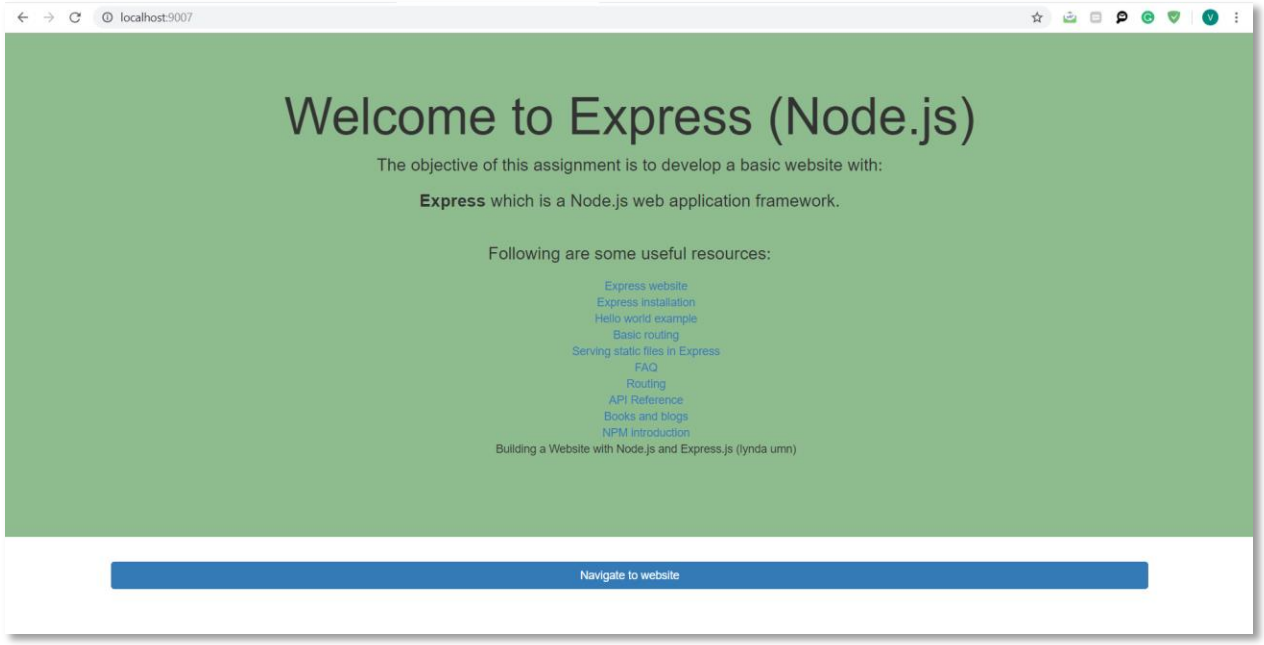
Your website will have 5 pages:

- A **Welcome** Page (provided)
- A **Login** page
- An **Schedule** page
- An **Add Schedule Events** page
- A **Stock** page

The *Schedule* , *Add Schedule Events* , *Stock* pages will have a navigation bar with logout button.
NOTE: For this assignment you will need to develop the entire website including frontend (HTML pages, CSS, Javascript) and backend (Express server).

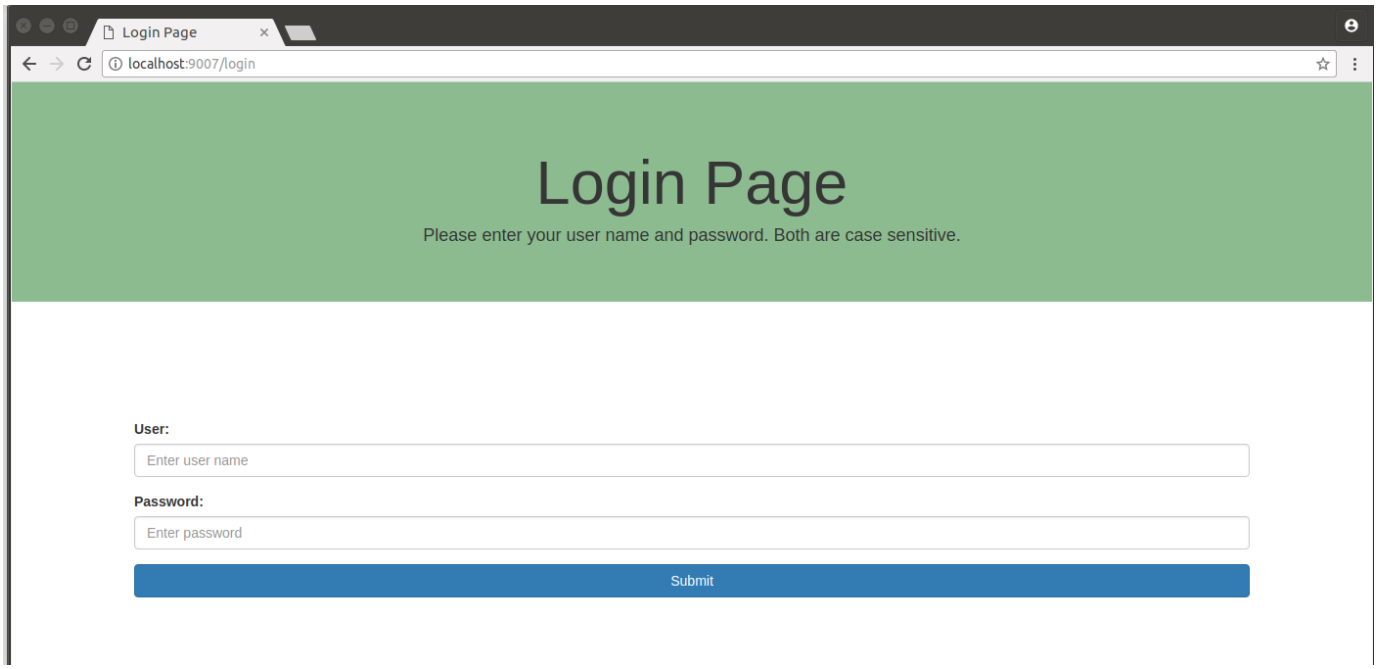
Pages 5 through 8 below specify the functionality provided, and the functionality you must develop.

Welcome Page



- The Welcome page is already provided to you and is displayed when the default route "/" is called.
- When you click on the Navigate to website button, the /login route on the Express (Node.js) will be called. You need to develop all the remaining functionality,

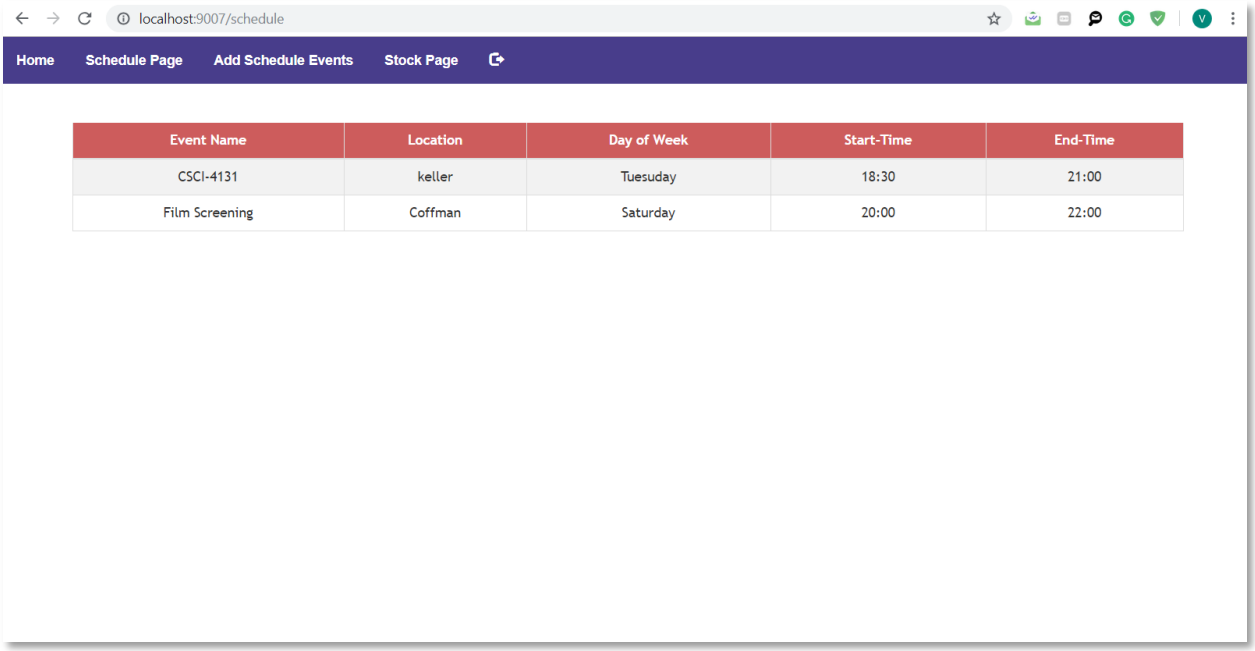
Login page



- The Login page should have a form with two fields: "User", and "Password"

- Both these fields are mandatory (required).
- When the submit button is clicked, the values entered for "User" and "Password" should be sent to the server for validation before allowing further access to website.
- The server will validate the values obtained from the form against the *acc_login*, and *acc_password* fields stored in *tbl_accounts*. Passwords are stored in the MySQL database in a SHA256 hashed format in *tbl_accounts*. The Server should hash the password string it obtains from the form using the SHA256 hash algorithm and compare it to the SHA256 hashed password stored in the database table *tbl_accounts*. (*Hint: you can use crypto module to create the SHA256 hash*. An example indicating how to use the SHA256 hashing algorithm can be found in the file we gave you to insert login information into the database named: **insert_into_accounts_table.js)**
- Upon successful validation, server should
  - Create a user session (*Hint: you can use express-session module*).
  - Send a response back to client indicating successful validation.
- If the validation fails, server should:
  - Send a response back to client indicating validation failure.
- If successful response is received from server, user should be routed to "Events" page, otherwise an appropriate error message should be displayed to the user (Check screenshots towards the end of this assignment)

Schedule page

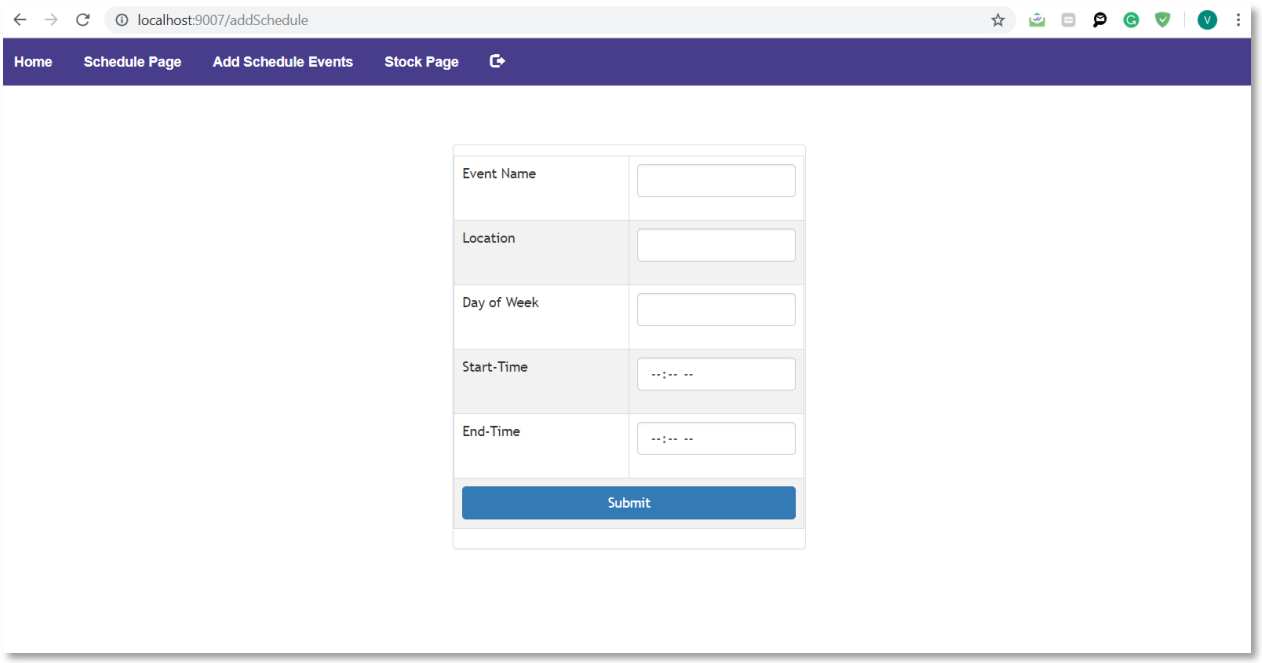


- If a user tries to access this page without a valid login, the user should be routed to "**Login**" page.
- The page should have a navigation bar with logout button.
- The table in this page should be dynamically populated.
- To achieve this, the server should provide a GET API which returns the list of events.

This API will be very similar to the one developed in assignment 5. It will get the list of events by querying the table: *tbl_events*.

- The client will call this API and populate the table using the data received from the server.

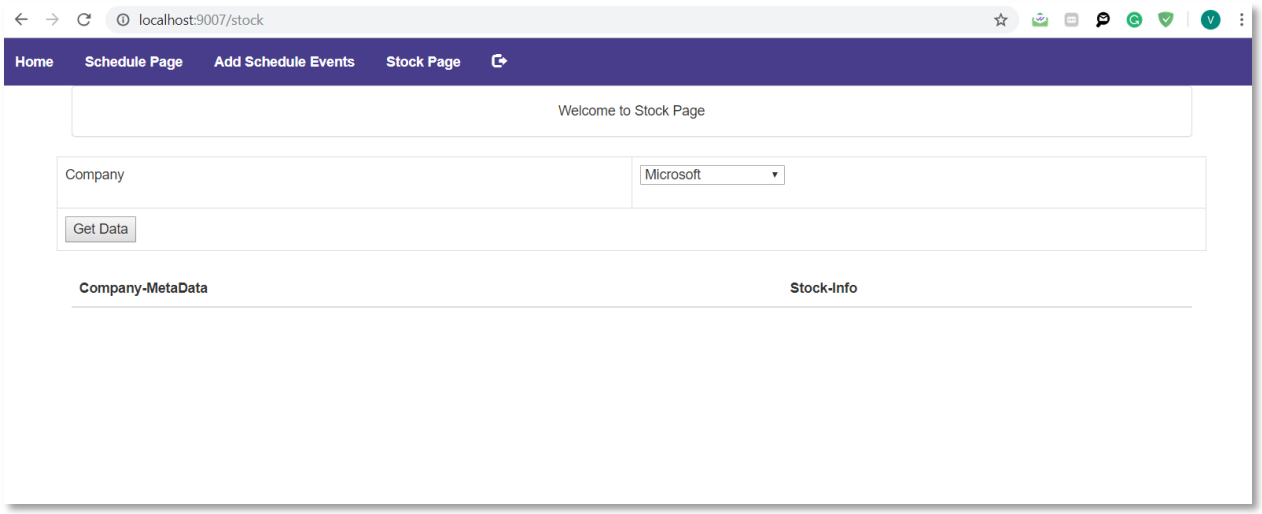
Add Schedule Events page



- You can use the form developed in the earlier assignments for the 'Add Schedule events' page.
- If this page is accessed without a valid login, the user should be routed to "**Login**" page.
- The page should have a navigation bar with logout button.
- Upon clicking submit, the form data should be posted to the server.
- The server should insert the received data into the following table: *tbl_events* (*Hint: you can use mysql module*)
- The mapping between form fields and table columns is:
    - Event Name: **event_name**
    - Location: **event_location**
    - Day of Week: **event_day**
    - Start-Time: **evemt_start_time**
    - End-Time: **event_end_time**

- Upon successful insertion, server should return a re-direct response the browser to display the "Schedule" page.

Stock page



You can use the 'Stock' page developed in the earlier assignments.

- If this page is accessed without a valid login, the user should be routed to "**Login**" page.
- The page should have a navigation bar with logout button.

Logout button

Upon clicking the logout button on the menu-bar (pictured below) , the session should be destroyed and the server should send a re-direct message to the browser to display the **Login** page.

Submission Instructions

PLEASE ENSURE TO TEST YOUR CODE ON CSE LAB MACHINES.

You will need to submit all the files used to develop the website. This includes all the HTML, CSS, JavaScript, package.json, index.js and any other files.

Towards this end, make a copy of your working directory: `yourx500id_hw06`. Rename the copied folder as **yourx500id_express**.

Create a README file inside yourx500id_express directory. This README file should include: Your x500id, acc_login, and acc_password values from insert_into_accounts_table.js file. Finally, compress (e.g., tar or zip) the **yourx500id_express** directory and submit it **via Moodle.**

We will use the acc_login and acc_password values to login to your website. Ensure that these values are correct and can be used to access your website.

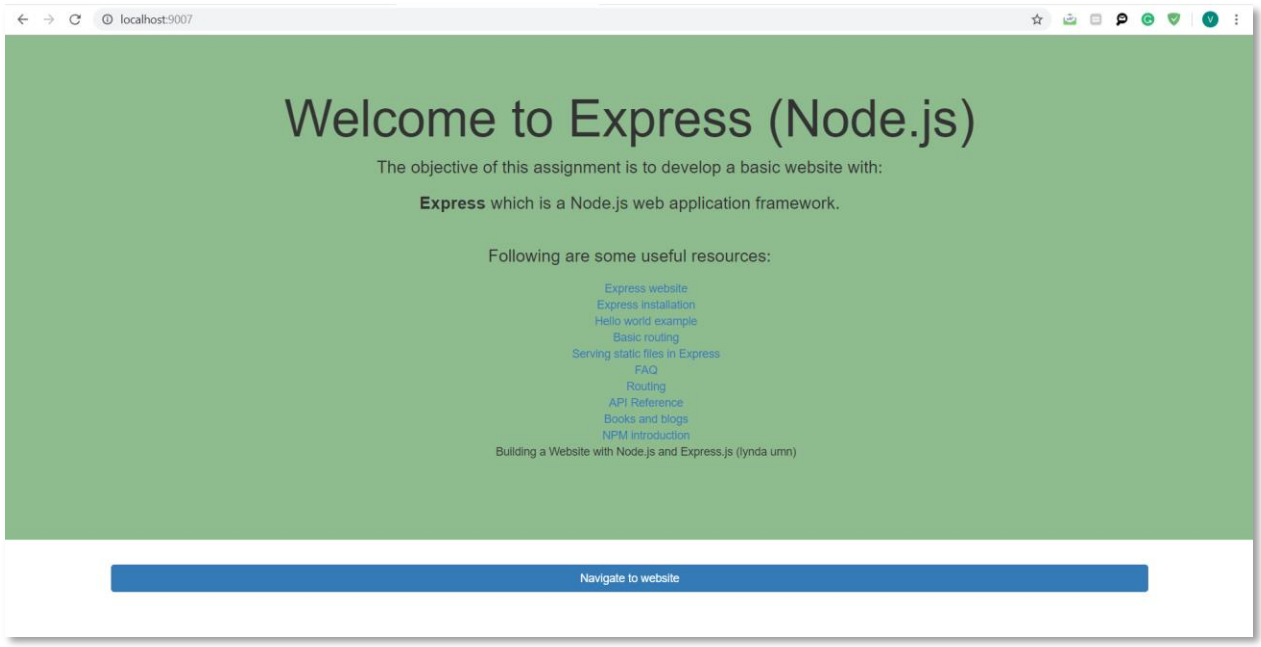
Evaluation

Your submission will be graded out of 100 points on the following items:

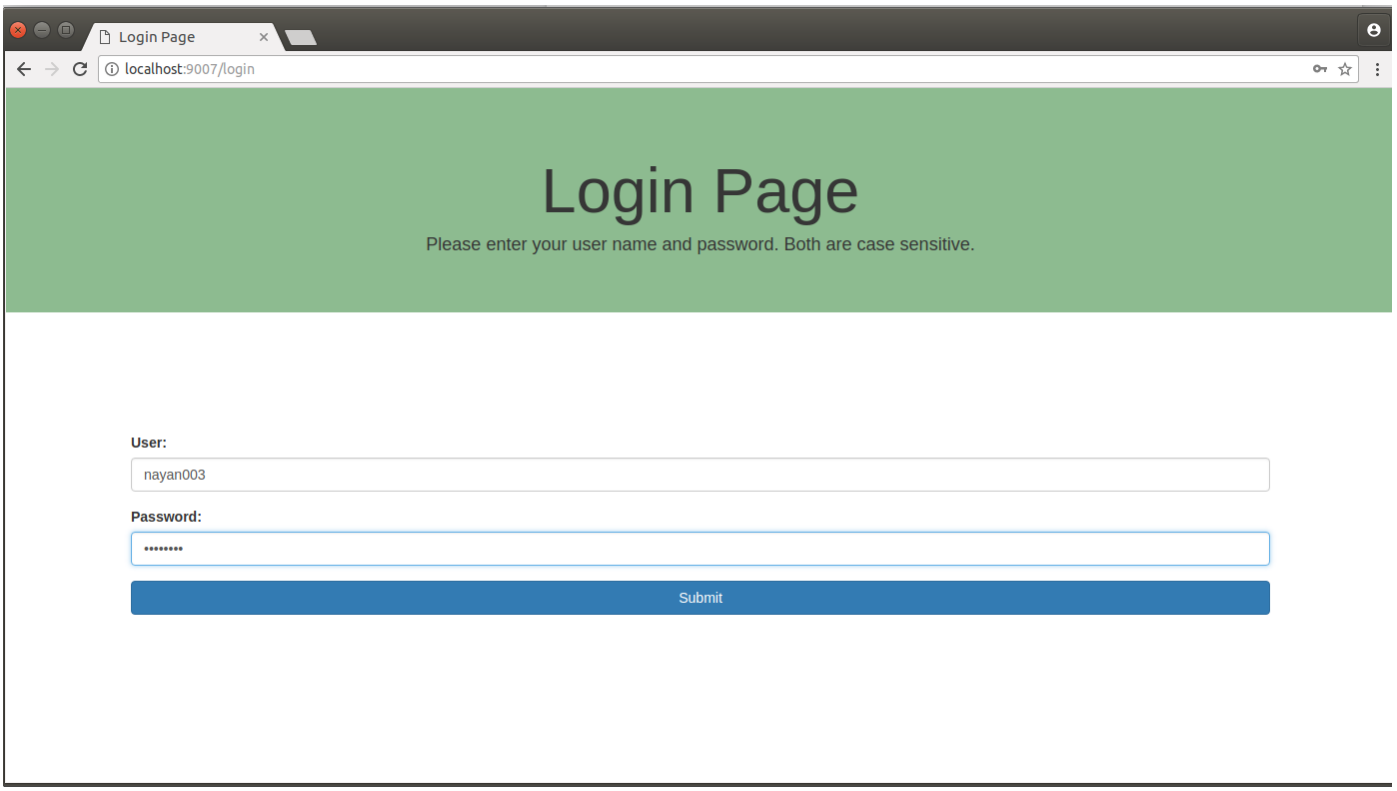
- Submission instructions are met. **(5 points)**
- The "Schedule" and "Add Schedule Event" and “Stock” pages of your website redirect the user to "Login" page automatically before authentication. **(10 points)**
- The "Login" page shows the form elements and submit button. **(5 points)**
- After successful login validation by the server, the "Login" page redirects the user to "Schedule" page. **(10 points)**
- If server login validation fails, an error message is displayed on "Login" page and the browser displays the login page and error message. **(10 points)**
- After successful login, the "Schedule" page displays correctly and has operational navigation bar. **(5 points)**
- The "Schedule" page gets the list of schedule events from server (which the server gets from the database). These events are dynamically added to the table displayed in the user’s browser. **(20 points)**
- The user can add a new event to the database using the form present in "Add Schedule Event" page. **(15 points)**
- After The "Add Schedule Event" page displays and has an operational navigation bar. **(5 points)**
- When a new event is added using the “Add Schedule Events” page, the event data is stored in the MySQL database. Then the user is redirected to "Schedule" page, and the user’s events are correctly displayed. **(5 points)**
- The "Stock" page displays and has an operational navigation bar. **(5 points)**
- The logout functionality works correctly. **(5 points)**

Additional Screenshots (See the following pages for examples)

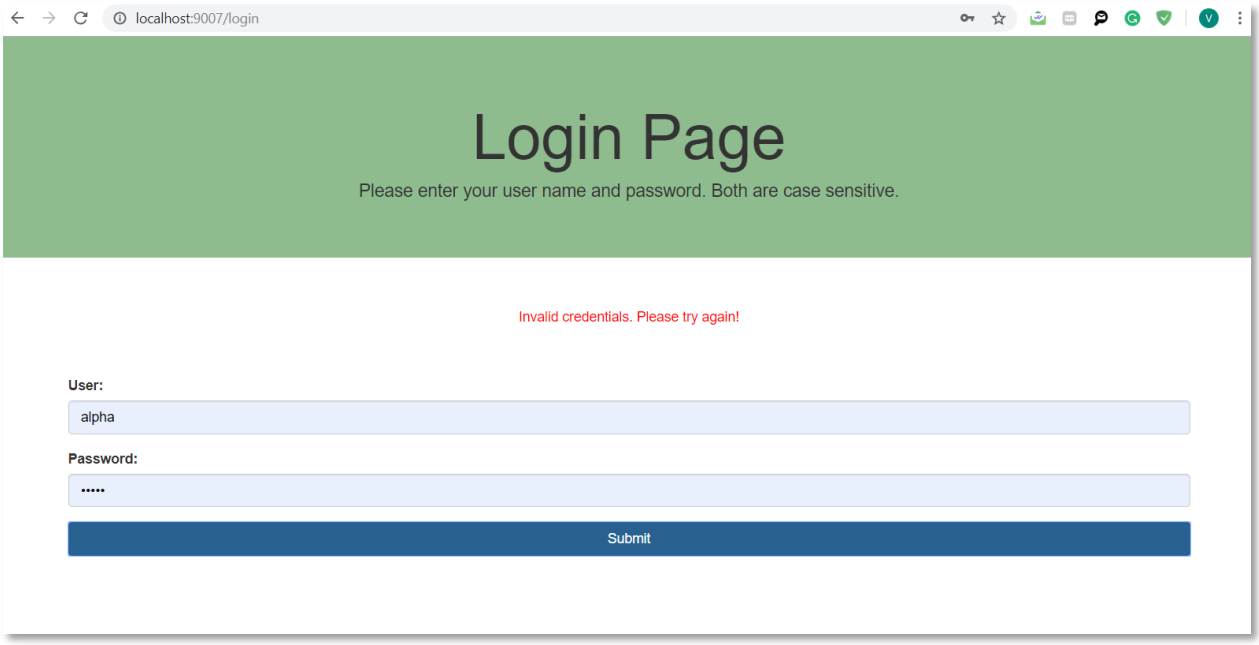
Welcome Page



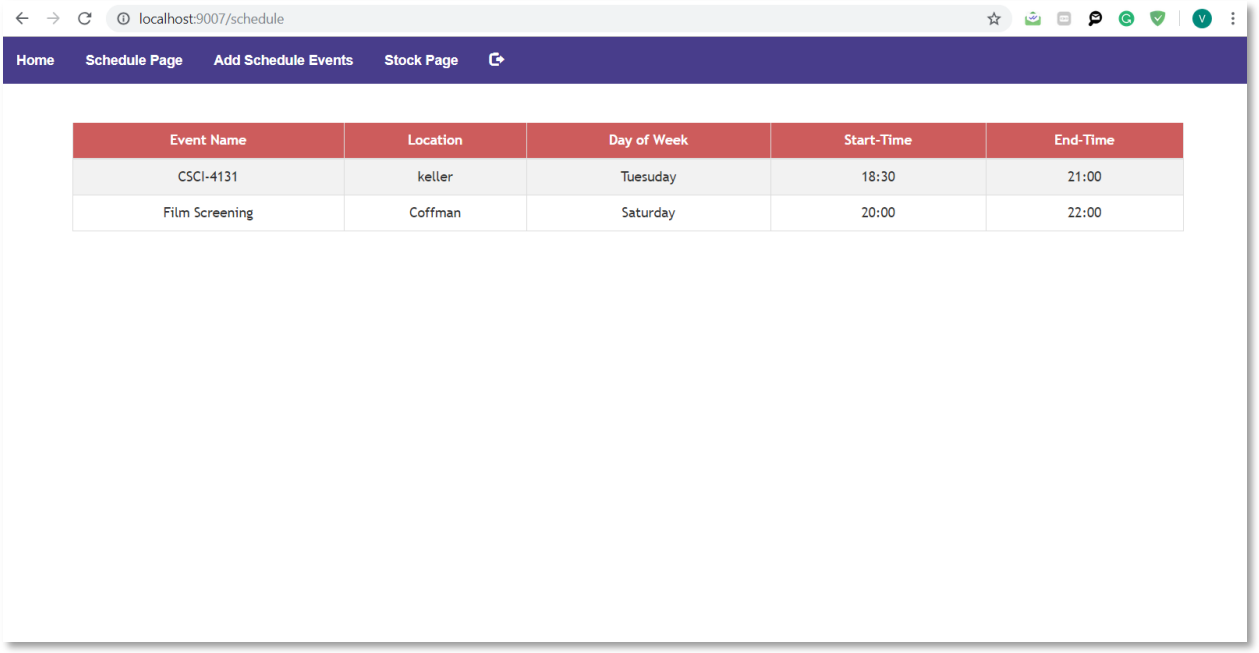
Login Page



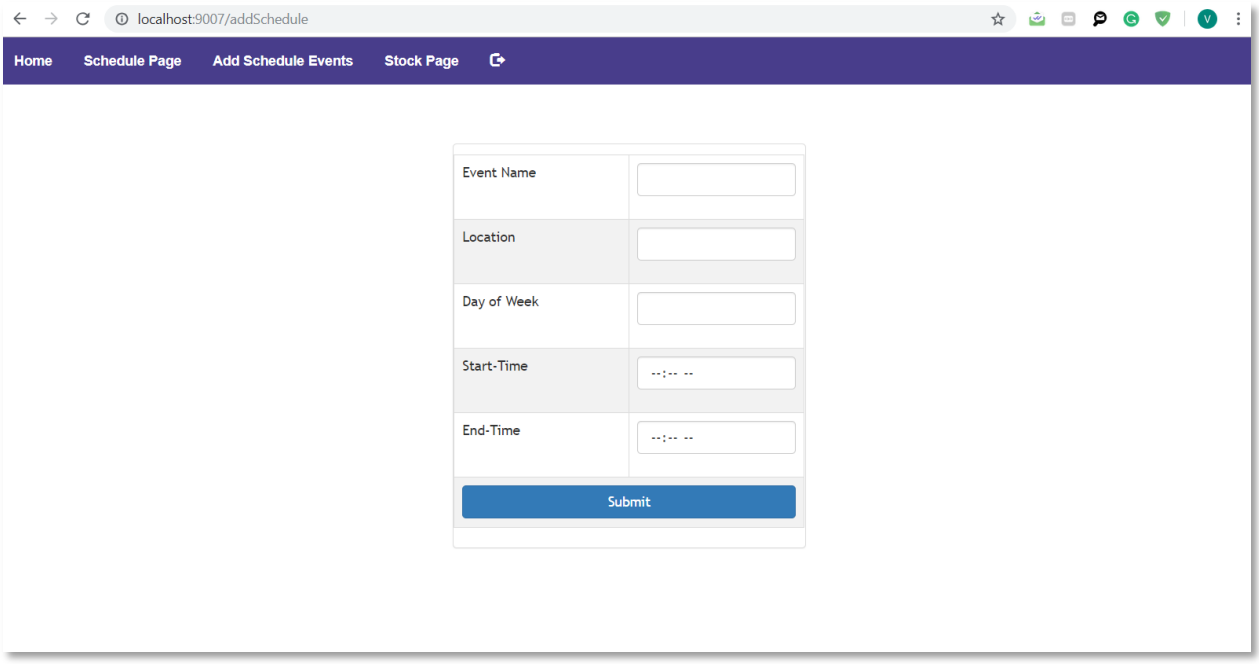
Invalid Login



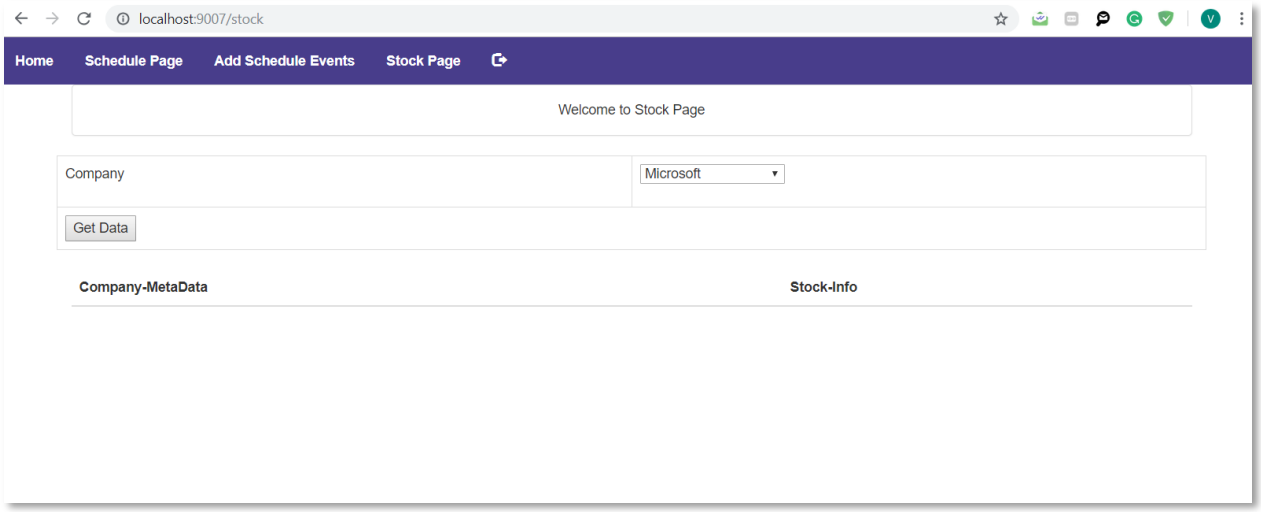
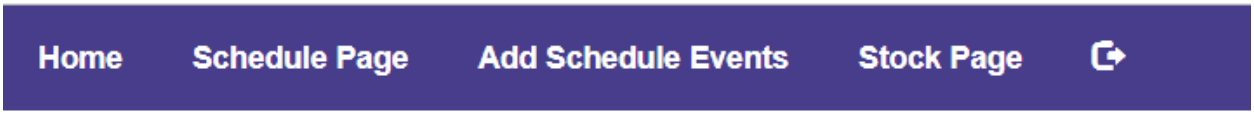
Schedule Page



Add Schedule Events page



Stock page



Navigation bar