



PHP SLIM FRAMEWORK WEB SECURE TELEMETRY APP

Demonstration of the Application



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PHP Slim Framework Web Secure Telemetry App

Key Features

Registration and User Data

Users register to use the app. User data is encrypted and stored in the SQL MariaDB database using Bcrypt to encrypt the user data. Passwords are not encrypted, but rather, Bcrypt is used to hash the passwords before they are stored in the database.

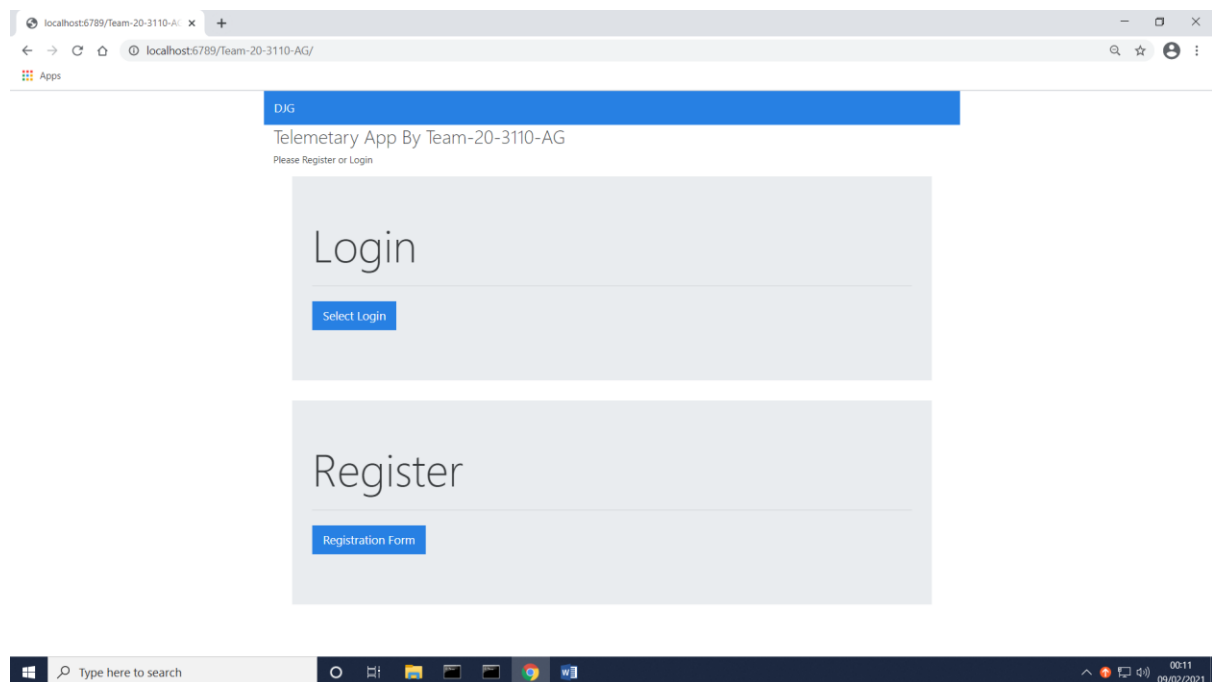
Telemetry Features

The user can then generate configuration data automatically or manually using a keypad. This data is then sent over internet and stored as text messages on the EEM2M Server. The messages are stored in XML format and the data is in the messages encrypted for security. Later, the messages can be downloaded and displayed as scrolling messages in a table. The app uses sessions to enforce security. Once the session has ended the user cannot return to pages they have previously loaded.

Demonstrating the Application

Login and Registration Process

Initial screen offers the option to Login or Register



After selecting to register the user will be required to fill in the registration form

localhost:6789/Team-20-3110-AG/registrationform

DIG

Please enter registration details

Mobile Phone No.
441234567890

Username
username

Password
password

Submit

The form fields each contain a placeholder hinting to the user the expected value of the input field, this placeholder data is not used for registration. Once the fields are completed and the user clicks on submit the data is processed. The data from the form is validated by the application, and if there are any errors then flash messages will appear advising on the correct format of the data required for the specified field.

localhost:6789/Team-20-3110-AG/processregistration

DIG

Please enter registration details

Please ensure all fields are filled

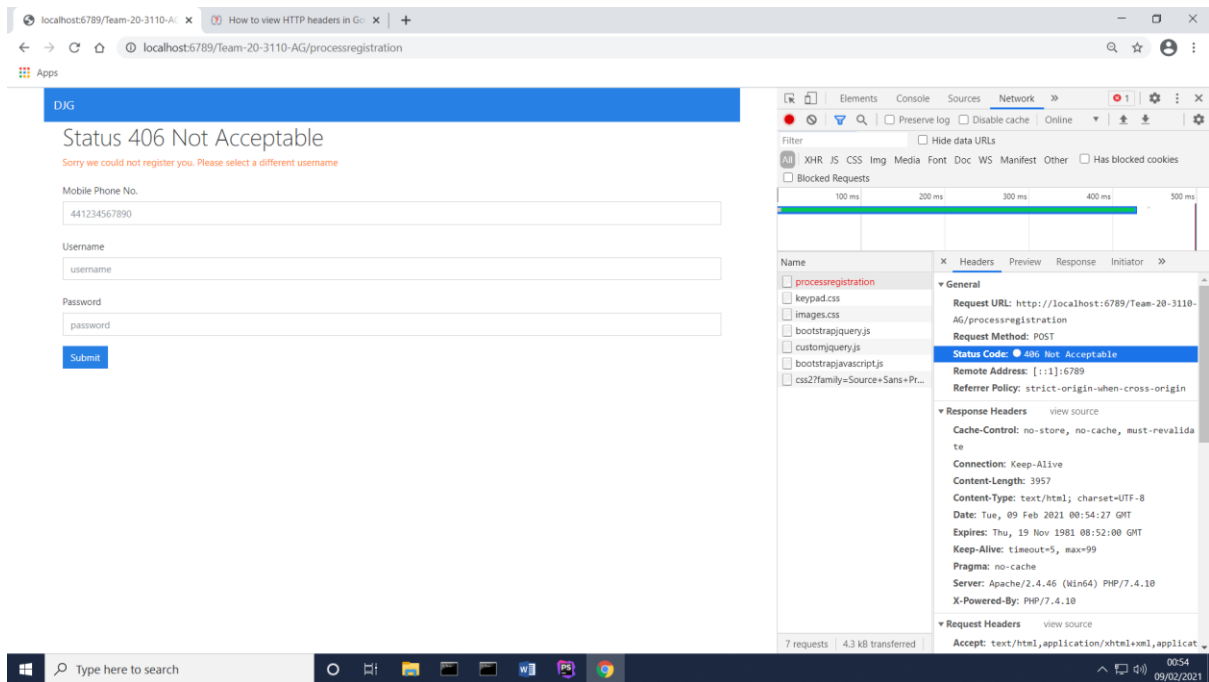
Mobile Phone No.
441234567890
Mobile number must be between 8 and 15 digits

Username
username
Username must be between 6 and 15 characters

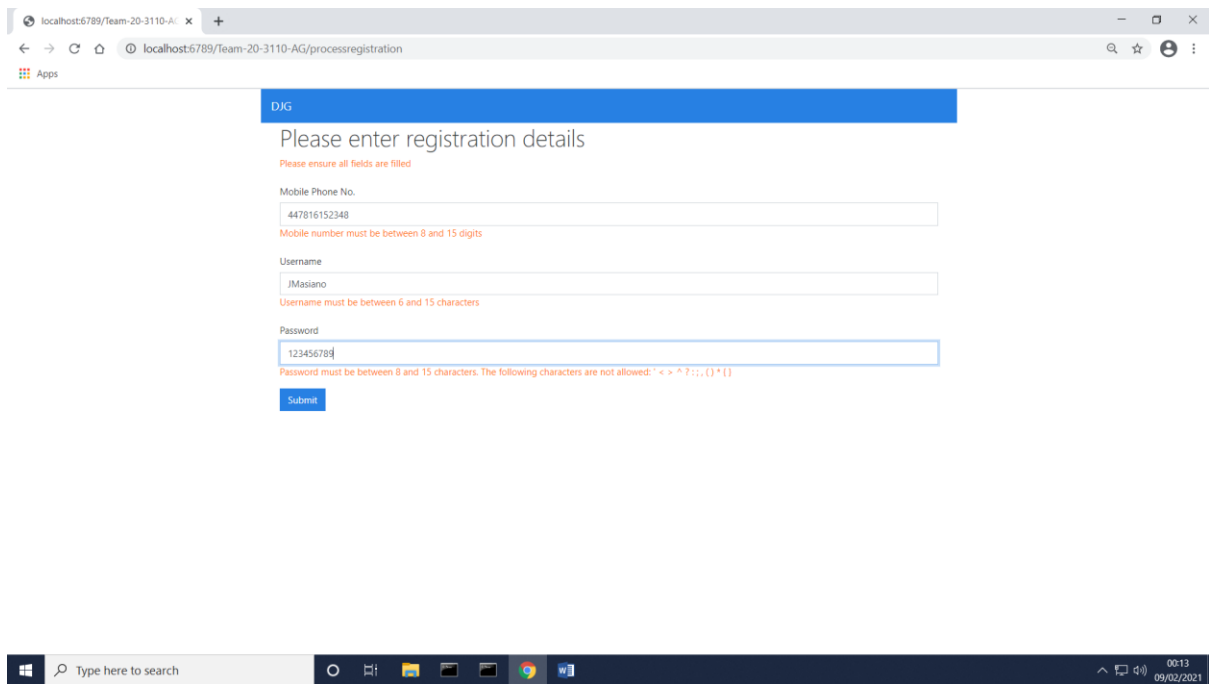
Password
password
Password must be between 8 and 15 characters. The following characters are not allowed: "<" ">" "^" "?" ":" ";" "()" "*" "[" "]"

Submit

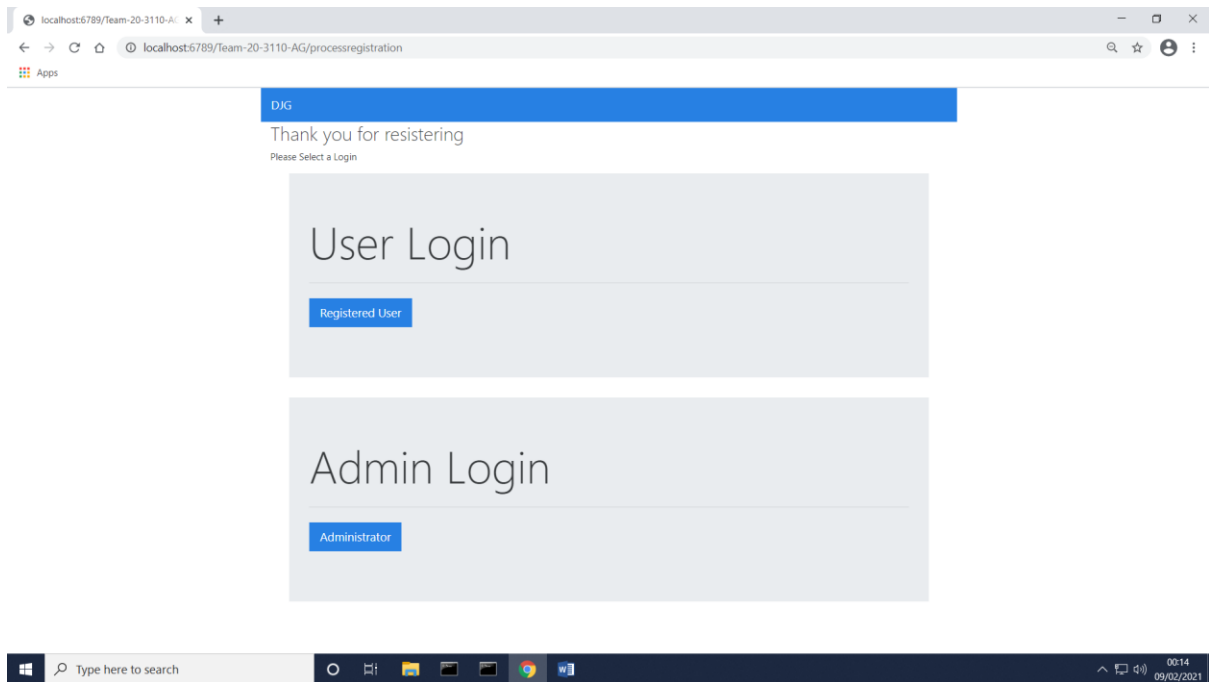
To ensure usernames are unique, an existing username cannot be used again for registration. A Message and correct HTTP status code will be displayed on the screen to update the user and let them know registering using existing username is not permitted. In the browser developer tools view, the request can be seen in red and status of the request in the header is a 406 Not Acceptable.



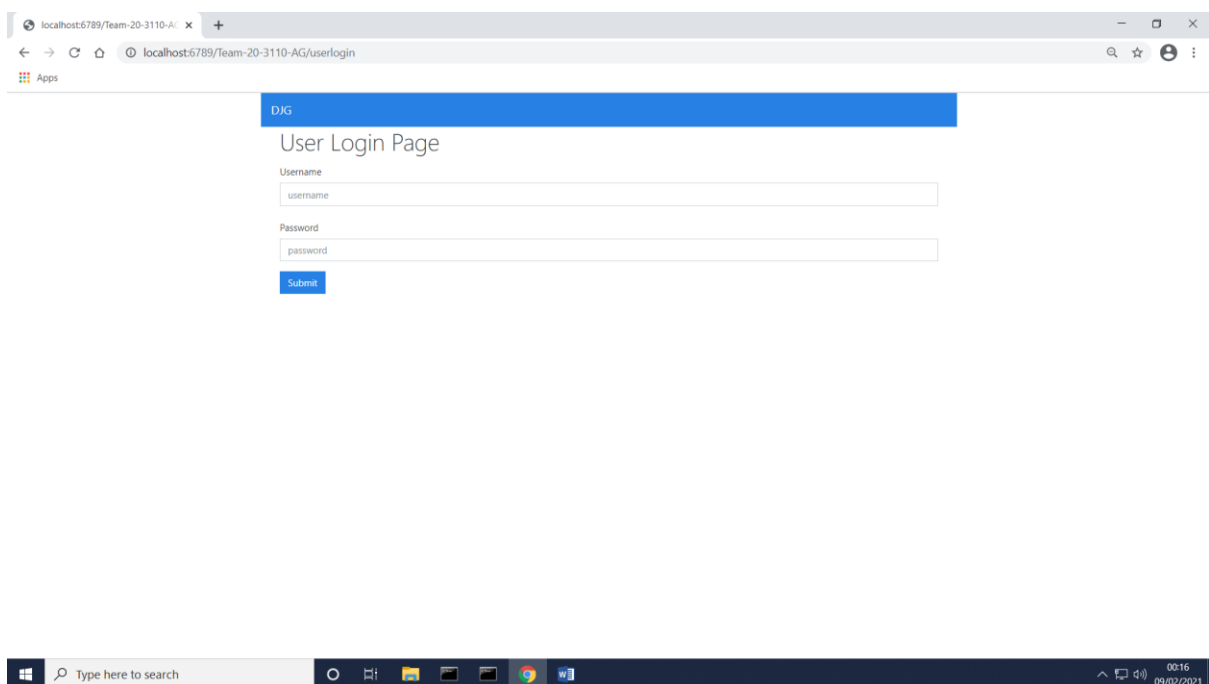
Here is an example of the form filled in using sample information.



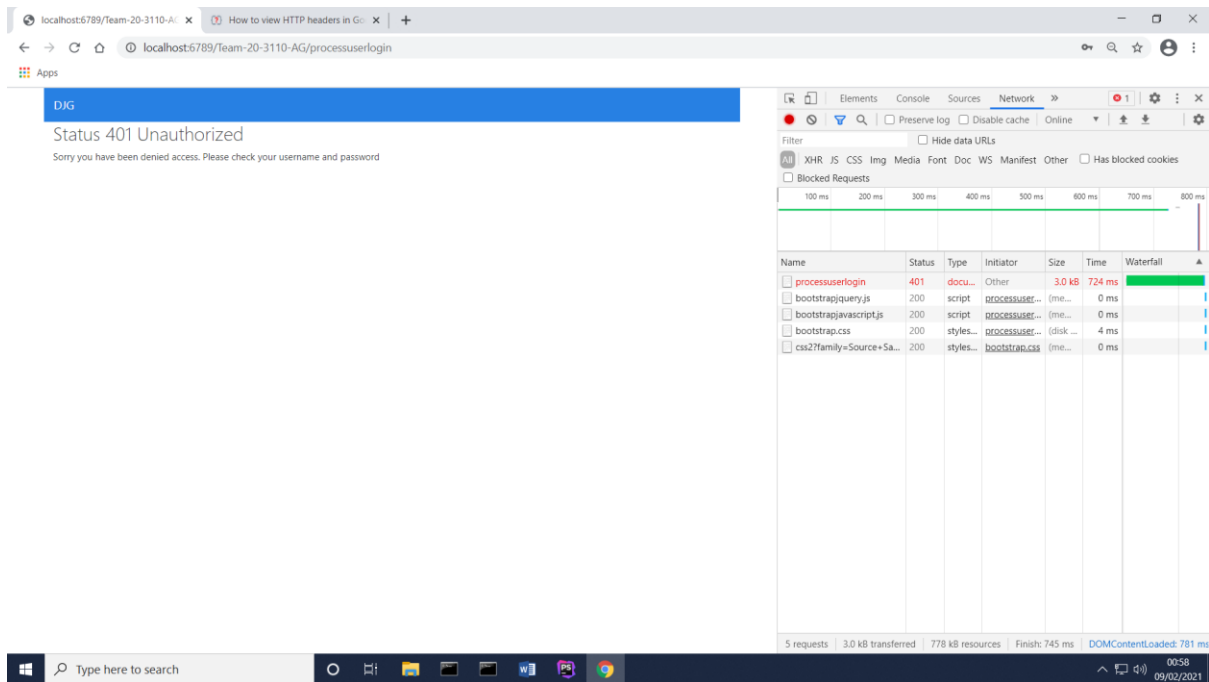
After successfully registering the user is redirected to the login screen, where they are able to log in to their account.



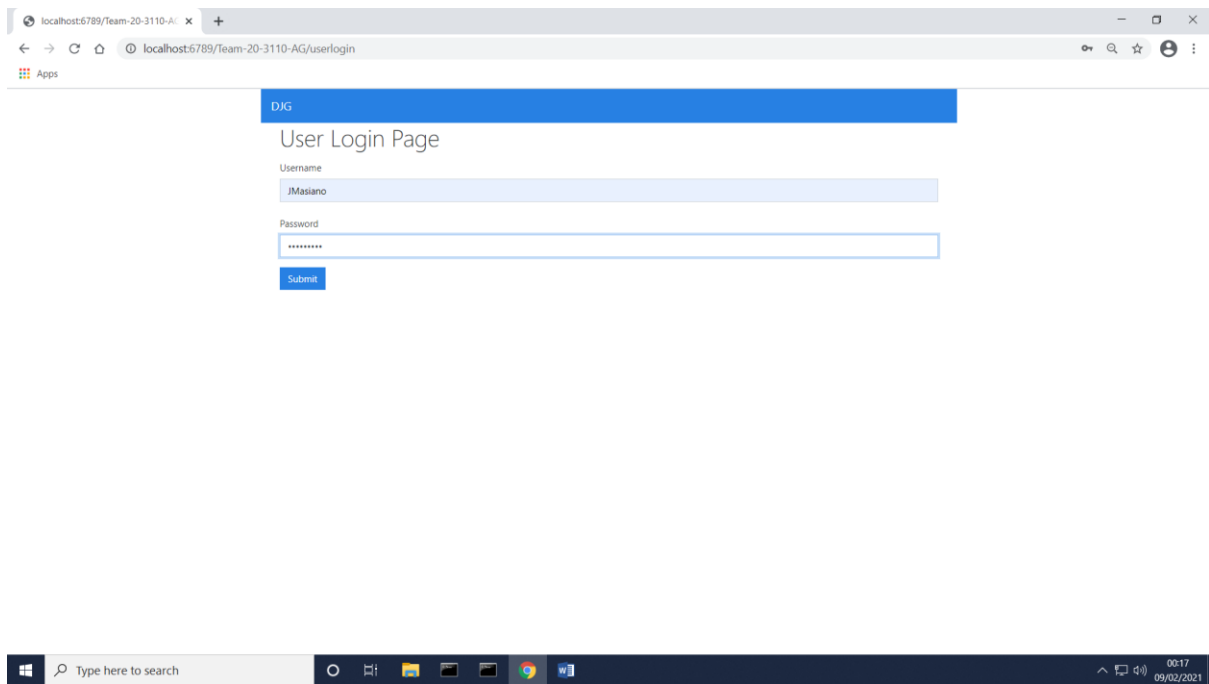
To log in as a User, rather than Admin, the user can click the “Registered User” button to navigate to User Login



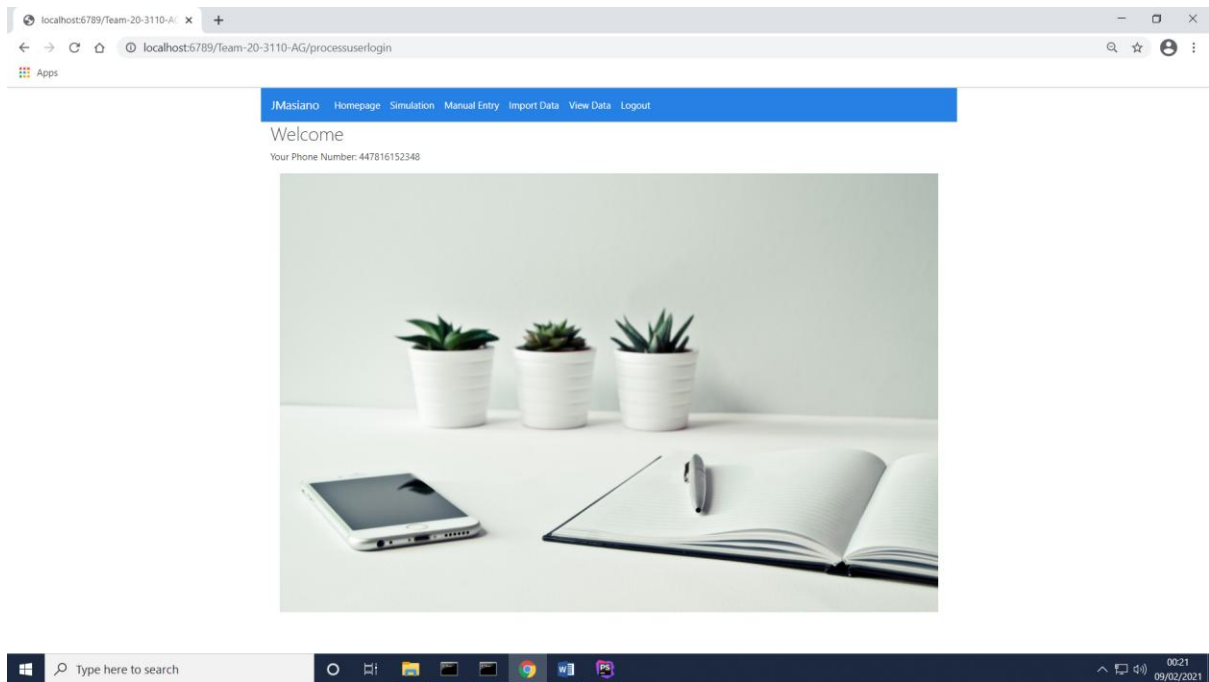
If the User enters incorrect login details, then they are presented with message and correct status code, stating access has been denied and advising on corrective actions. In the browser developer tools view, the request can be seen in red and status of the request in the header is a 401 Unauthorised.



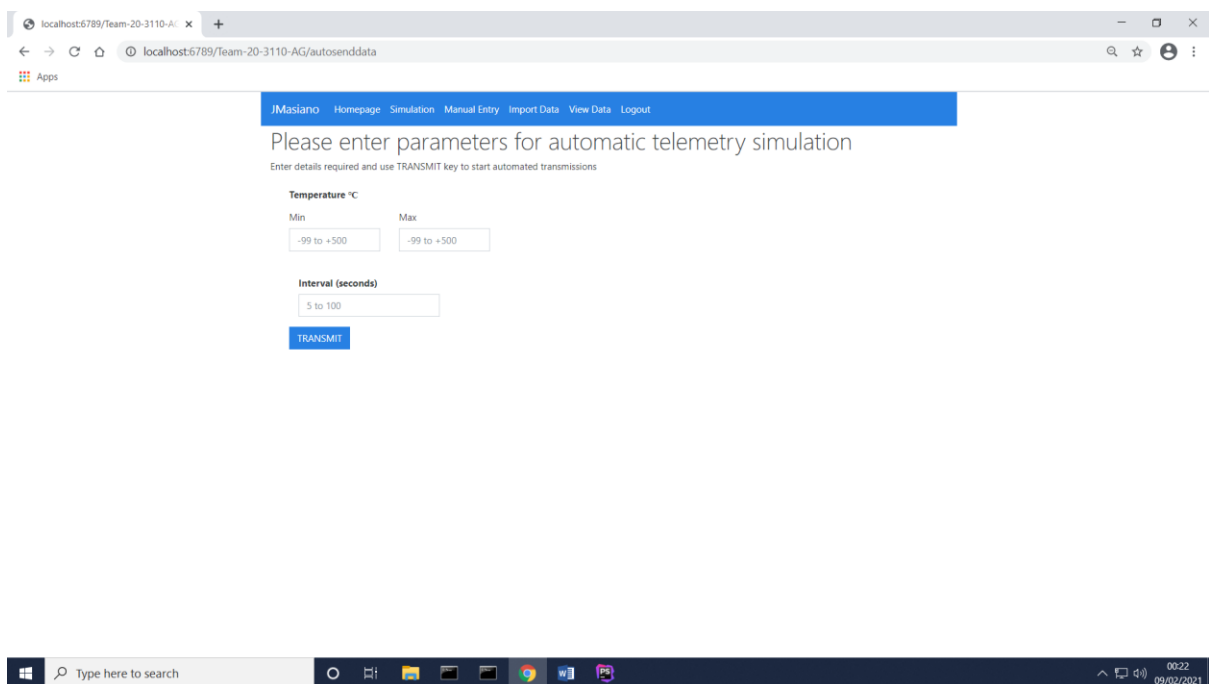
Here is an example of how the form looks when login information is entered into the form.



After successfully logging in to the application the user is redirected to their Homepage which is customised with the user's person session data. Present in the navigation bar (header) will be the username, while the page content will contain the users phone number.

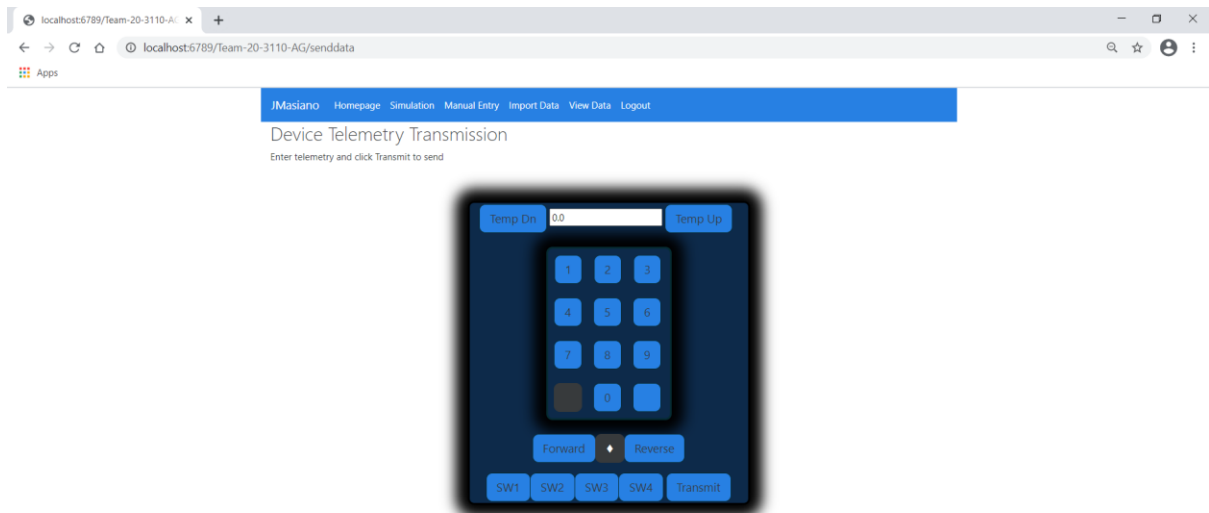


The user is able to navigate to the Simulation page via the navigation bar “Simulation link”. The navigation page will display input fields that can be filled to set the range for the data that will be generated randomly automatically.

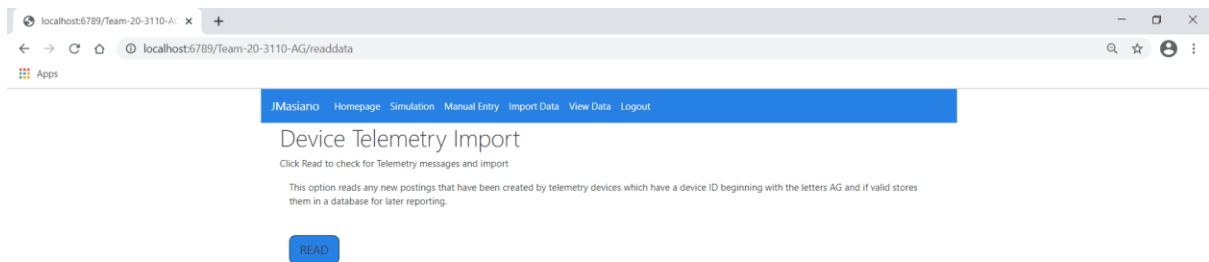


The User is also able to navigate to the manual entry page and enter data manually via the “Manual Entry” link in the navigation bar.

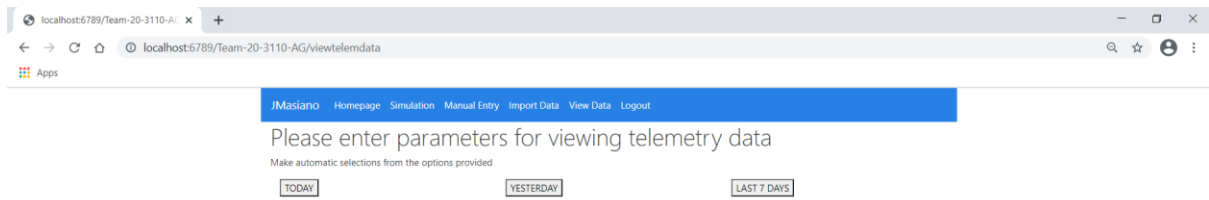
The Manual Entry page displays a data Key pad with toggle switches and temperature settings that can be set before the Transmit key is used to transmit the data to the EEM2M Server, where it is stored in XML format, and data encrypted using Bcrypt. The messages can be retrieved later.



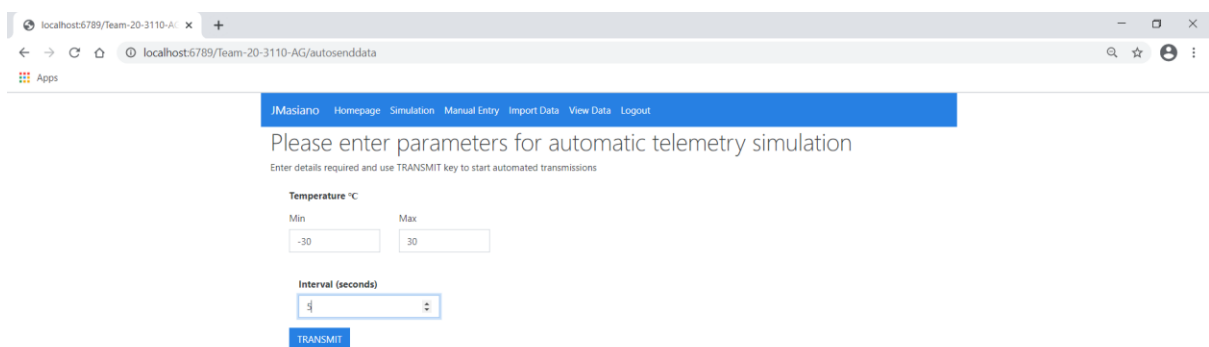
In order to retrieve messages stored on the EEM2M Server The user can click on “Import Data” link where they are presented with the option to read (import) data from the server. In order for the data to be presented in a readable format, the data is extracted from the messages and then decrypted.



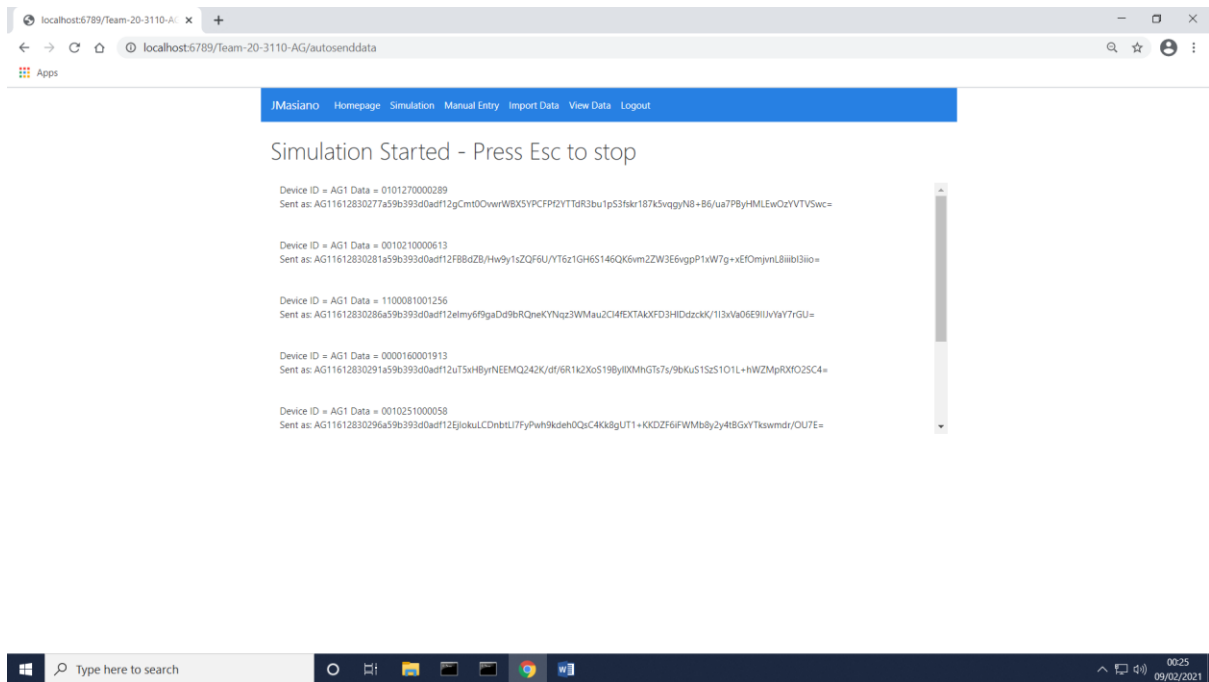
The user can navigate to the “View Data” page view the navigation bar, where they are presented with the option to view today’s messages, yesterday’s messages or messages from the last 7 days.



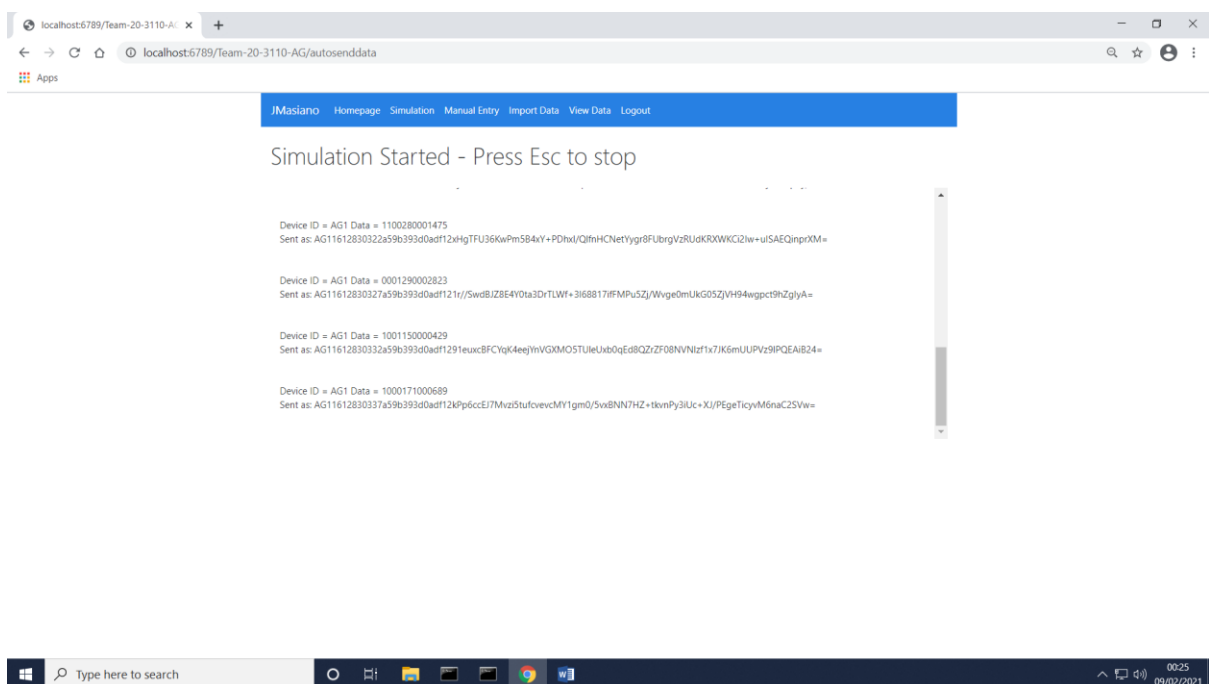
Here is an example of the range the data can be set to for automatically generated and transmitted data.



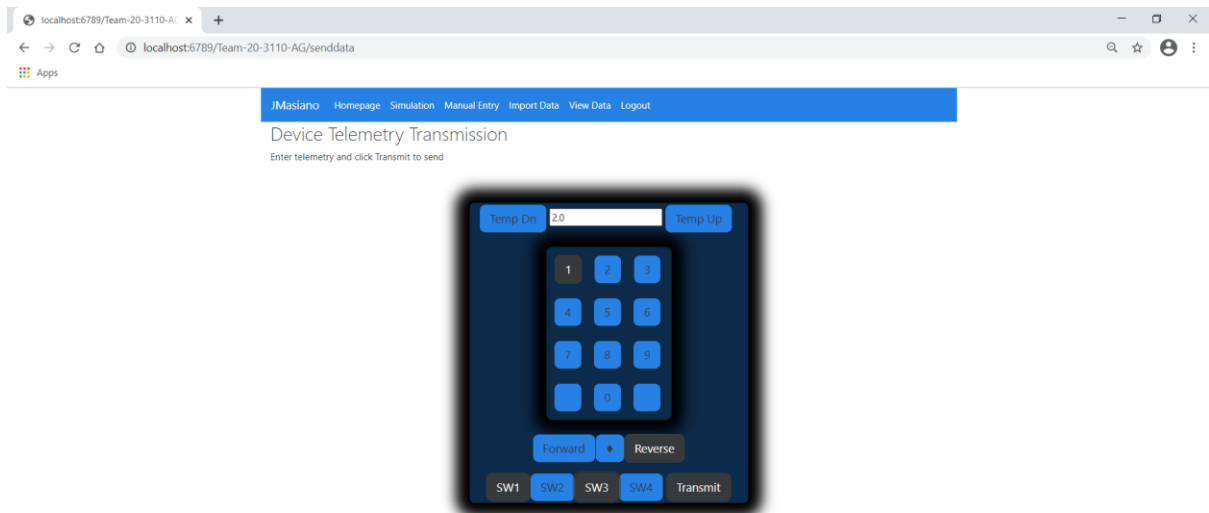
After the user clicks the “Transmit” button The view changes and each line of auto generated data transmitted can be viewed in a list.



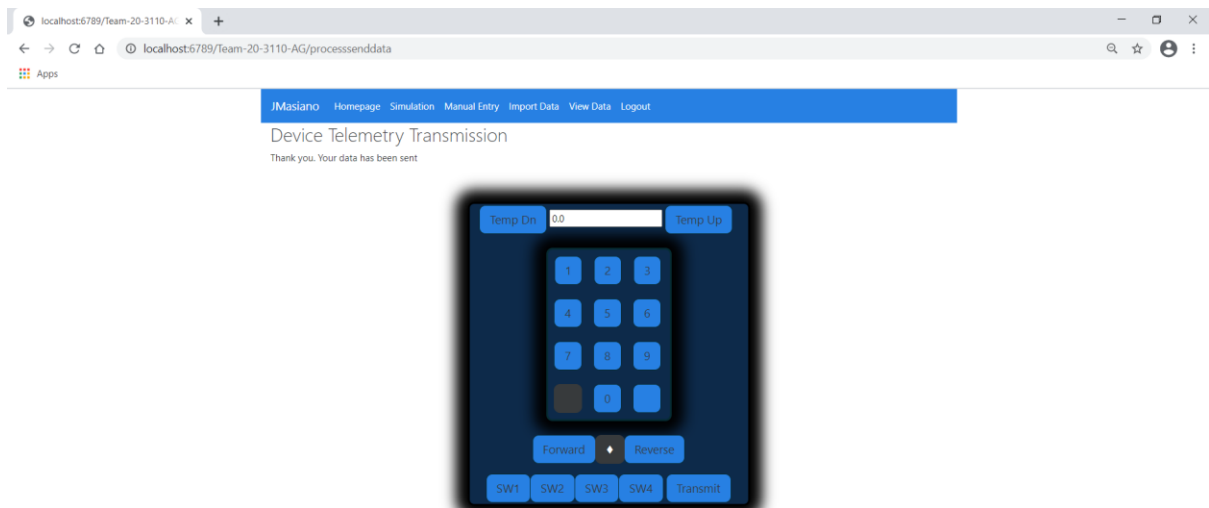
Due to limited view area of the screen, a scroll bar feature will allow the user to view earlier entries and newer entries added to the list.



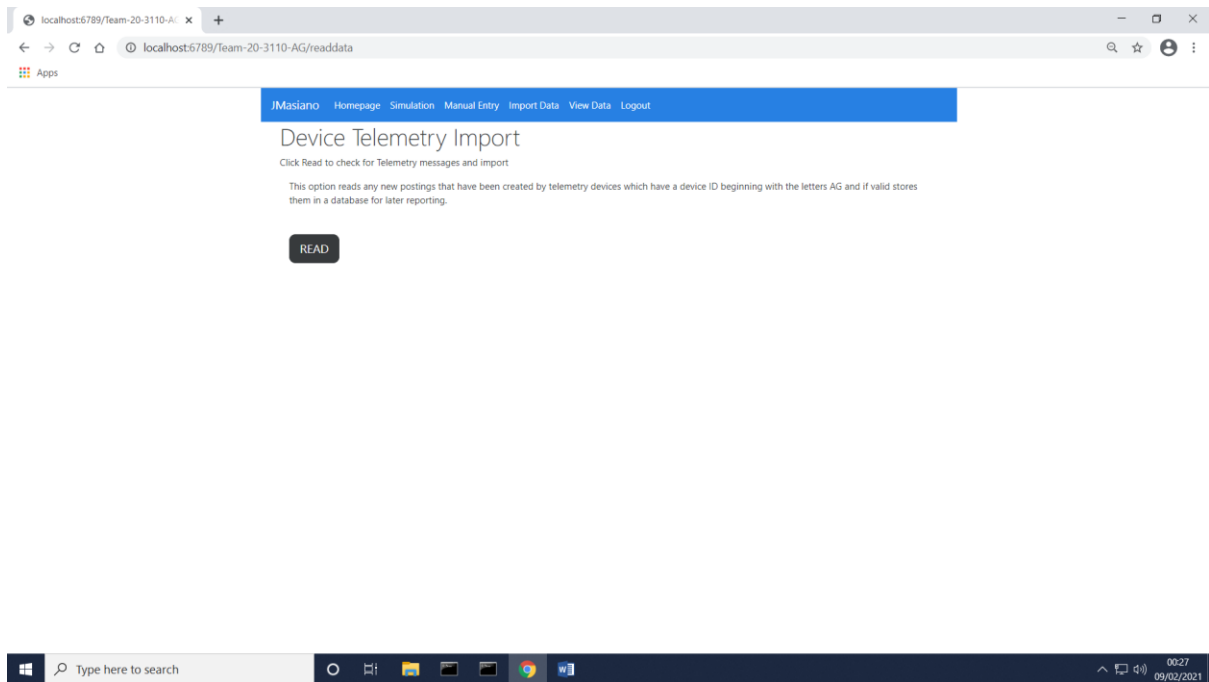
As mentioned earlier the user can transmit manually. In this example the user has set specific key pad switches and updated the temperature using the Temp Up and Temp Dn keys.



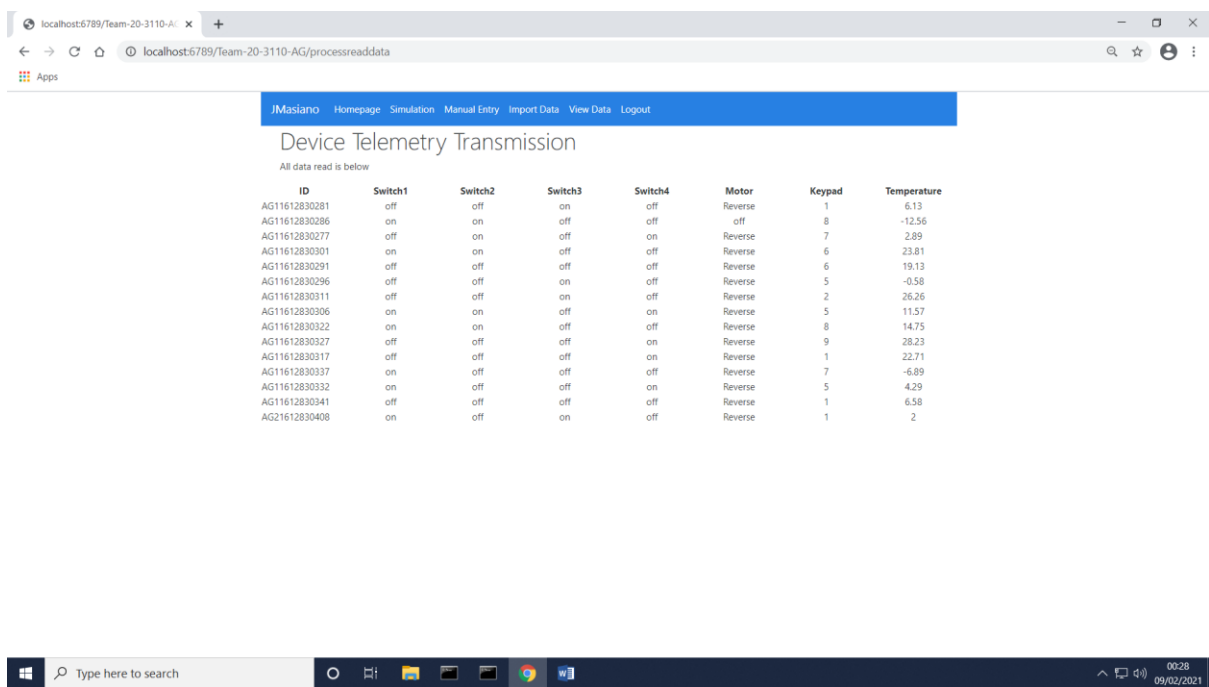
Once the data is transmitted a message confirming manual transmission is presented to the user.



In order to import data the user can click READ button using the Import Data page.



Data read from the server, that was previously transmitted and stored, is displayed in a table.



The user can navigate to the View Data page via the navigation menus “View Data” link and click the “Today” button to view today’s data or click the “Yesterday” to view yesterday’s data.

ID	Switch1	Switch2	Switch3	Switch4	Motor	Keypad	Temperature
AG11612830281	off	off	on	off	Reverse	1	6.13
AG11612830286	on	on	off	off	off	8	-12.56
AG11612830277	off	on	off	on	Reverse	7	2.89
AG11612830301	on	on	off	off	Reverse	6	23.81
AG11612830291	off	off	off	off	Reverse	6	19.13
AG11612830296	off	off	on	off	Reverse	5	-0.58
AG11612830311	off	off	on	off	Reverse	2	26.26
AG11612830306	on	on	off	on	Reverse	5	11.57
AG11612830322	on	on	off	off	Reverse	8	14.75
AG11612830327	off	off	off	on	Reverse	9	28.23
AG11612830317	off	off	off	on	Reverse	1	22.71
AG11612830337	on	off	off	off	Reverse	7	-6.89
AG11612830332	on	off	off	on	Reverse	5	4.29
AG11612830341	off	off	off	off	Reverse	1	6.58
AG21612830408	on	off	on	off	Reverse	1	2



Message displayed if no entries available

Device Telemetry Transmission							
There were no relevant telemetry messages for this period.							



Click Last 7 Days

The screenshot shows a web browser window with the URL `localhost:6789/Team-20-3110-AG/processviewdata`. The application has a blue header bar with the username `JMasiano` and navigation links: `Homepage`, `Simulation`, `Manual Entry`, `Import Data`, `View Data`, and `Logout`. The main content area is titled `Device Telemetry Transmission` with the subtitle `All data read is below`. Below this is a table of telemetry data.

ID	Switch1	Switch2	Switch3	Switch4	Motor	Keypad	Temperature
AG11612830281	off	off	on	off	Reverse	1	6.13
AG11612830286	on	on	off	off	off	8	-12.56
AG11612830277	off	on	off	on	Reverse	7	2.89
AG11612830301	on	on	off	off	Reverse	6	23.81
AG11612830291	off	off	off	off	Reverse	6	19.13
AG11612830296	off	off	on	off	Reverse	5	-0.58
AG11612830311	off	off	on	off	Reverse	2	26.26
AG11612830306	on	on	off	on	Reverse	5	11.57
AG11612830322	on	on	off	off	Reverse	8	14.75
AG11612830327	off	off	off	on	Reverse	9	28.23
AG11612830317	off	off	off	on	Reverse	1	22.71
AG11612830337	on	off	off	off	Reverse	7	-6.89
AG11612830332	on	off	off	on	Reverse	5	4.29
AG11612830341	off	off	off	off	Reverse	1	6.58
AG21612830408	on	off	on	off	Reverse	1	2

The Windows taskbar at the bottom shows the search bar, task view button, and several open applications. The system clock indicates 00:31 on 09/02/2021.

Note: session data persistence throughout until logout clicked.

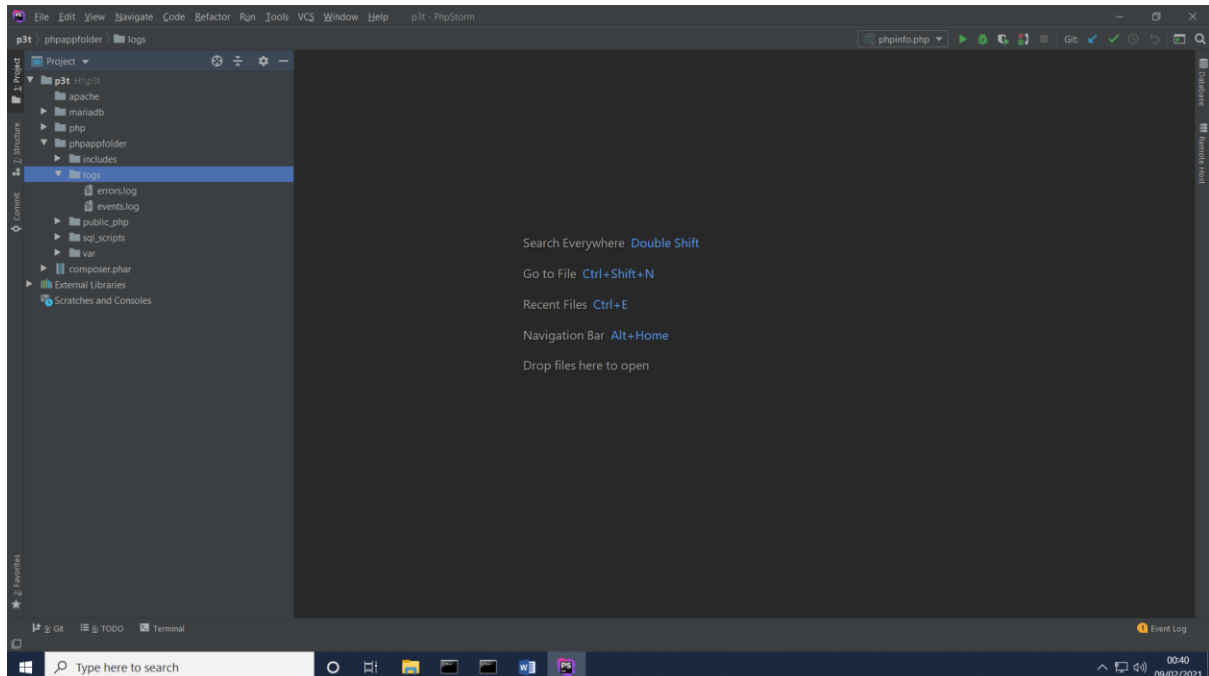
Clicking logout returns to

The screenshot shows a web browser window with the URL `localhost:6789/Team-20-3110-AG/selectlogin`. The application has a blue header bar with the username `DJG`. The main content area is titled `Welcome` with the subtitle `Please Select a Login`. Below this are two large, light gray rectangular boxes. The first box is titled `User Login` and contains a blue button labeled `Registered User`. The second box is titled `Admin Login` and contains a blue button labeled `Administrator`. The Windows taskbar at the bottom is identical to the previous screenshot, showing the search bar, task view button, and several open applications. The system clock indicates 00:33 on 09/02/2021.

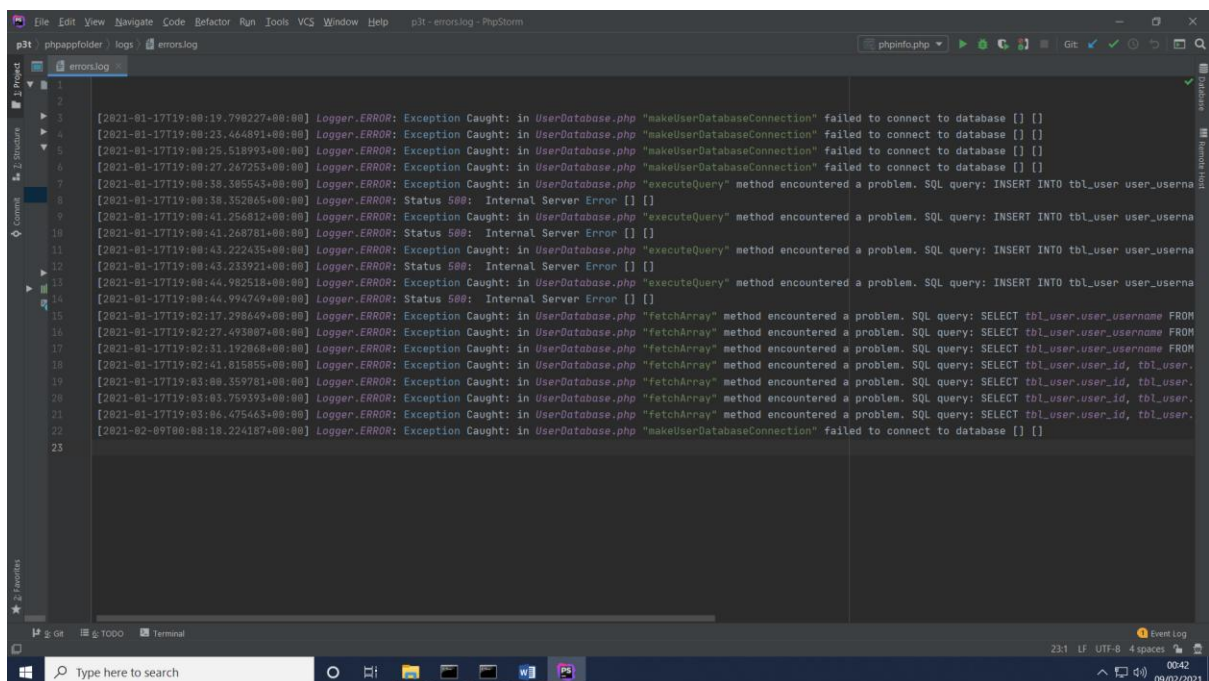
Navigating back will only return you to the same page as you are not logged in.

Logs for Error and Event Logging

Logging can be a useful aid in helping with security and debugging, and logs can be referenced later. In the case of a security breach, we can use logging to show who logged in at the time of the breach, for example, if someone was making multiple login attempts at the time. We can also log important events, so that later we can see what was happening during or leading up to a failure.



Previously Simulated Errors



Navigation Logs


```

23 [2021-01-22T18:54:48.944727+00:00] Logger.NOTICE: User 5: Navigated to Simulation Page [] []
24 [2021-01-22T18:54:52.384126+00:00] Logger.NOTICE: User 5: Navigated to Select Login Page [] []
25 [2021-01-22T18:54:52.329347+00:00] Logger.NOTICE: User 5: Logged Out [] []
26 [2021-02-09T08:13:57.797728+00:00] Logger.NOTICE: New User: Registered Successfully [] []
27 [2021-02-09T08:17:29.656324+00:00] Logger.NOTICE: User 12: Successfully Authenticated and Logged in [] []
28 [2021-02-09T08:18:36.331695+00:00] Logger.NOTICE: User 12: Navigated to Simulation Page [] []
29 [2021-02-09T08:28:19.946562+00:00] Logger.NOTICE: User 12: Navigated to Simulation Page [] []
30 [2021-02-09T08:28:28.485289+00:00] Logger.NOTICE: User 12: Navigated to Homepage [] []
31 [2021-02-09T08:28:32.287851+00:00] Logger.NOTICE: User 12: Navigated to Simulation Page [] []
32 [2021-02-09T08:28:33.614526+00:00] Logger.NOTICE: User 12: Navigated to Device Manual Entry Page [] []
33 [2021-02-09T08:28:34.724752+00:00] Logger.NOTICE: User 12: Navigated to Import Data Page [] []
34 [2021-02-09T08:28:35.987285+00:00] Logger.NOTICE: User 12: Navigated to Select Login Page [] []
35 [2021-02-09T08:28:36.885337+00:00] Logger.NOTICE: User 12: Logged Out [] []
36 [2021-02-09T08:28:41.857353+00:00] Logger.NOTICE: User 12: Successfully Authenticated and Logged in [] []
37 [2021-02-09T08:21:09.551127+00:00] Logger.NOTICE: User 12: Successfully Authenticated and Logged in [] []
38 [2021-02-09T08:21:41.174437+00:00] Logger.NOTICE: User 12: Navigated to Simulation Page [] []
39 [2021-02-09T08:22:21.249829+00:00] Logger.NOTICE: User 12: Navigated to Device Manual Entry Page [] []
40 [2021-02-09T08:22:42.259260+00:00] Logger.NOTICE: User 12: Navigated to Import Data Page [] []
41 [2021-02-09T08:23:26.424569+00:00] Logger.NOTICE: User 12: Navigated to Simulation Page [] []
42 [2021-02-09T08:25:43.784467+00:00] Logger.NOTICE: User 12: Navigated to Device Manual Entry Page [] []
43 [2021-02-09T08:27:22.682931+00:00] Logger.NOTICE: User 12: Navigated to Import Data Page [] []
44 [2021-02-09T08:33:07.536657+00:00] Logger.NOTICE: User 12: Navigated to Select Login Page [] []
45 [2021-02-09T08:33:07.569884+00:00] Logger.NOTICE: User 12: Logged Out [] []
46 [2021-02-09T08:37:27.625418+00:00] Logger.NOTICE: User 12: Successfully Authenticated and Logged in [] []
47 [2021-02-09T08:38:35.482818+00:00] Logger.NOTICE: User 12: Successfully Authenticated and Logged in [] []
48 [2021-02-09T08:38:48.495245+00:00] Logger.NOTICE: User 12: Navigated to Select Login Page [] []
49 [2021-02-09T08:38:48.495684+00:00] Logger.NOTICE: User 12: Logged Out [] []
50 [2021-02-09T08:58:14.161336+00:00] Logger.NOTICE: User 12: Failed Authentication and Login [] []
51

```

Appropriate HTML Status header code applied for change of status

The browser window shows a status 307 Temporary Redirect. The page content indicates the area is under maintenance. The Network tab is open, showing a GET request to `http://localhost:6789/Team-20-3110-AG/adminlogin`. The response status is 307 Temporary Redirect. The response headers include `Cache-Control: no-store, no-cache, must-revalidate`, `Connection: Keep-Alive`, `Content-Length: 2595`, `Content-Type: text/html; charset=UTF-8`, `Date: Tue, 09 Feb 2021 08:47:37 GMT`, `Expires: Thu, 19 Nov 1981 08:52:00 GMT`, `Keep-Alive: timeout=5, max=100`, `Pragma: no-cache`, `Server: Apache/2.4.46 (Win64) PHP/7.4.10`, and `X-Powered-By: PHP/7.4.10`.