As discussed, below are three assignments we would like you to complete.  You are welcome to use whatever non-living resources are available to you (no other human help).

Please submit the completed work to [cindy@matrixmarketing.co.za](mailto:cindy@matrixmarketing.co.za) and [wn@pwnconsulting.com](mailto:wn@pwnconsulting.com) when done.

**Challenge 1:**

Background: As lead developer for a company, you are tasked to develop a login portal for a new production system that is in development.  Your sole focus at the moment is to create a login portal that asks the user for a username and password then authenticates them against a backend database.  The code you are to deliver will be deployed in to production, and will be used by ten thousand users daily.  The functional requirements are:

1. The login form must accept a username and password from the user

2. When the user submits the data, the system must authenticate the user

3. If the authentication is successful, show a Welcome page.

4. If the authentication failed, show a failure message and do not grant access to the system.

Assumptions:

1. You do not need to build account management functions to CRUD users.  Pre-seed your backend with some accounts for testing.

2. You must use Java

3. You must use PostgreSQL as the database backend where the user data is stored

4. The login form must be an HTML based web form

5. The system must be accessible via a web browser (it is fine if you provide instructions to bootstrap it locally - does not need to be accessible via the internet)

6. This code should be production ready

**Challenge 2:**

Using any language of your chose, write code that will validate an email address. So input is an email address, output is VALID or INVALID.  It can be a console app - does not matter.

**Challenge 3**

You have a database table called *schedule* as per below:

Year    Week    Hours

2021    48       8

2021    49       12

2021    50       6

You must write either code or SQL to shift these entries by x weeks. So if we ask it to be shifted by 5 weeks it should become:

Year    Week    Hours

2022    1       8

2022    2       12

2022    3       6

It must support arbitrary weeks to shift by. The final effect of your code must be to update the rows in the table.

We just need to see the code or SQL. Assume the table exists. No need to show connection logic.