

**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**AGILE PROJECT MANAGEMENT SYSTEM**

**TureON**  
**Turing Machine Visualization**

**Design Document**

Submitted to  
**Dr. Bijoy A. Jose**

Prepared by  
**Omal S**                           **Noble Austine**  
(80521015)                       ( 80521014 )

**Integrated MSc Computer Science**  
**4<sup>th</sup> Semester , 2<sup>nd</sup> year**  
**2021 - 2026 Batch**

**23<sup>rd</sup> February, 2023**

# Table of Contents

<b>1. UI UX SCREEN DESIGN AND WORKFLOW</b>	<b>1</b>
<b>2. API REQUIREMENT</b>	<b>11</b>
<b>3. USER STORY</b>	<b>12</b>
<b>4. ER DIAGRAM AND DATABASE DESIGN</b>	<b>14</b>
<b>5. SOFTWARE ARCHITECTURE DIAGRAM</b>	<b>15</b>

# 1. UI UX Design and Workflow

This section provides the overall workflow of the project through explaining in detail the entire user interface and user interaction. Presentation of UI UX design is used to explain and support the work flow.

- Login and Sign Up Page:

The work flow of the project begins from the login and sign up page. The users are first introduced to the face page to the website with welcoming details and from there they are provided with options logging into account, creating new account and getting new password. Through the sign up and login page the user moves through the process of creating an account if not already done and then logging into the website. It also provides a facility to generate new passwords in case old ones are forgotten. The end goal of the workflow is to take the user to the home page.

- Logging into your account:

The login page is provided with two input handles where the user can enter their username and password to login to their account, by clicking on the enter button by providing with their correct username and password the user will be guided to the home page. If invalid credentials are given the login page will display “invalid credentials” and will not provide access until the user enters the correct credentials. The user can press the cancel button to exit the login page.

- Creating a new account:

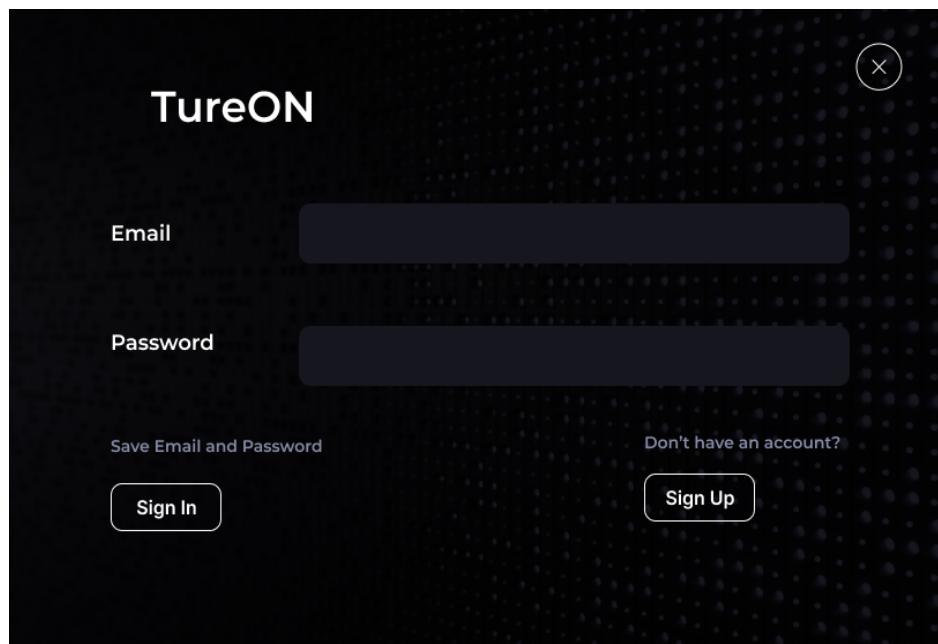
The facility termed “create a new account” is provided in this page is for the user to create an account if he already doesn't have one by clicking the create new account option, here the user will be guided to a sign up page where he can create a new account.

The sign up page provides four input handles which are username, email id, password and confirm password. An account will be created for the user and he will be

directed to the login page by clicking the enter button. Here a cross verification on his password and confirm password along with cross checking on if the username and password meet the required details is done before creating an account. Both the password and username should be at least six characters long with a compulsory inclusion of at least one upper case alphabet , number and a special character.

- Getting new password:

Facility is provided in the login page for “forget password”, the forgot password path helps the user in case he forgot his password by providing the option to create a new password. Clicking the option take the user into a page where is provided with a place to enter his email id and if the mail id is present in the database a six digit code is send to the mail id with 5 min of expiry time if the user can enter the correct code then he will be directed to a page where he can create a new password and successful message will be displayed when the process is successfully completed.



## TureOn: Turing machine Visualization

**TureON**

Overview   Visualization   Contacts   About   Sign in

# Turing Machine Visualization

**Get Started**

**Build**

Help to build different Turing Machines as per the requirement and run on the string either input by the user.

[Get Started →](#)

**Login**

Each user have their own persona dashboard were they can save and run the projects build by them as well as the projects saved public by the others.

[Create Account →](#)

**Manage**

Each projects which the user build can be managed by the user as either the files can be public or private, which provide accessibility for others.

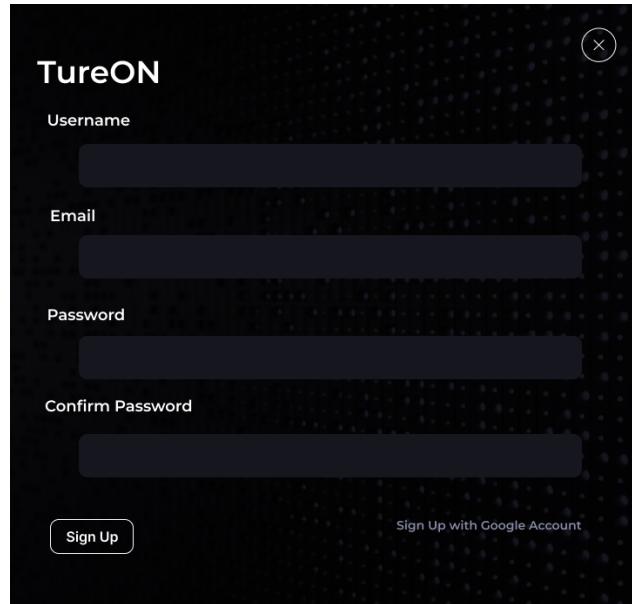
[Privacy](#)

The Turing Machine Visualization project is a web application project named as "TureON" which is designed to help individuals understand the inner workings of a Turing machine. It visualizes the concept of Theory of Computation through Turing machines. We plan to implement a website so that users can create an account after which a platform will be provided for them where they can create, save and update their own Turing machines for various problems.

As the website provides a facility to save your projects you can refresh your memory just before the exam or if in case you forgot the logic behind the Turing machine.

Contacts:

nobleastine2002@gmail.com  
omammu311@gmail.com



- Home Page :

The entire workflow of the project is centered at the home page after entering through the single channel that is the login page all different parts of the website are accessed through the home page. It provides the user with all the navigation facilities and can take the user to pages which provide different functionalities like the project build page, my projects page, favorites page and profile page. The entire workflow is to help the user to navigate through and explore the entire website and its functionalities.

- Searching a person or a machine:

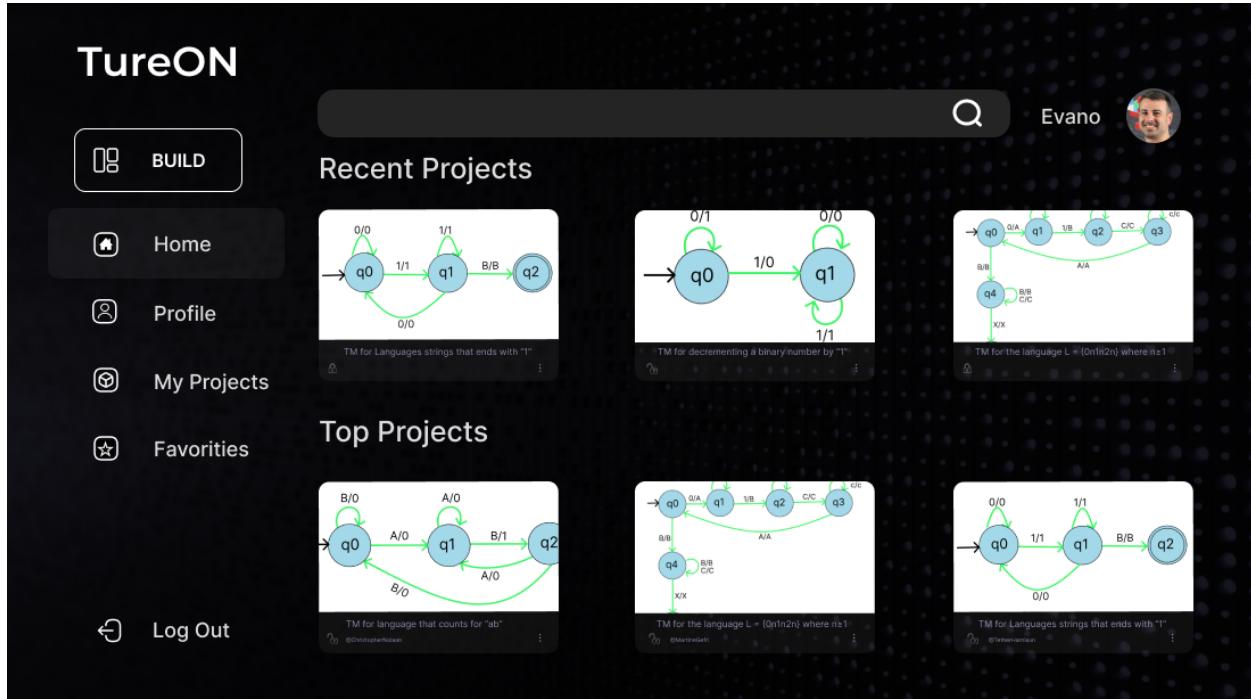
Users can search for different Turing machines for various purposes and creators by entering the problem and username of the creator respectively. It helps the user to visit pages of different creators and also helps to find Turing machines to solve different issues which they can run with different inputs.

- Navigate to build project page:

The user is guided into the build page by a button in the dashboard from the home page it opens into a screen with a default project to help the user start building his project.

## TureOn: Turing machine Visualization

- Access profile page:  
The user is guided to the project page where he can view and alter his details. This facilitates updating profile photo, about etc. A button present in the dashboard allows this.
- Accessing created projects and favorite projects :  
The accessing of all the created and liked projects can be done through two buttons provided in the dashboard through this page from where the user can run or continue building project accordingly
- Recent projects and top machines:  
This feature present as two panels help users to start working immediately on their recent projects and also provide them with access to the top most liked projects which they can try.



- Build Project Page:  
The primary objective of the website is to get users to the project build page the workflow from the home page using the build

button or recent projects take the users to this page, where they can build different projects. This also along with all other following pages provide a navigation bar for users to jump around various frames.

- Navigation to different pages:

Allow the user to navigate through all the different pages like home page, my projects page, favorites page and profile page

- Creating a project and Saving a project:

The user is provided with a toolbar to insert states and transactions as and when they do it corresponding changes will take place in the matrix representation of the project. Users also can alter various specifications of each state and transactions through different facilities in the turing machine part like changing name, color, size of the states and so on. After which the user can save the project which also provides the two kinds of access modes that are private and public. The private files can only be accessed by the user whereas the public file can also be accessed by others that is others can run the project

- Running a project:

The user after creating the project can run the machine for various inputs by entering the inputs to the tape. The machine will read each input and clearly depict the transitions from one state to another so that we can clearly grasp the logic going behind the turing machine. After running the project the user can also clear the input screen and continue.

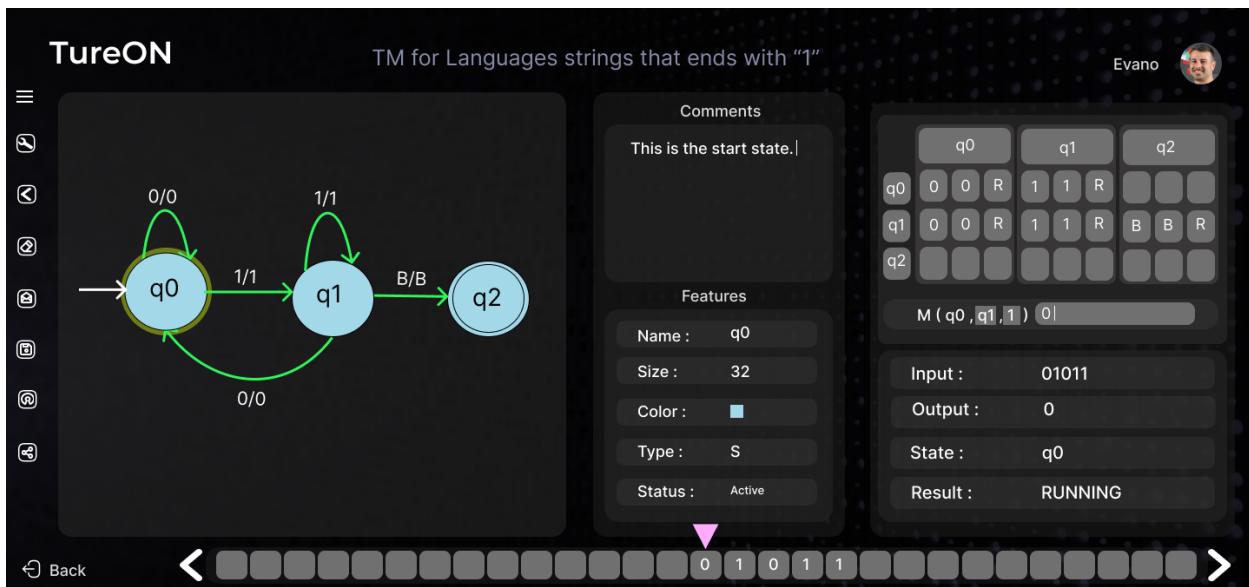
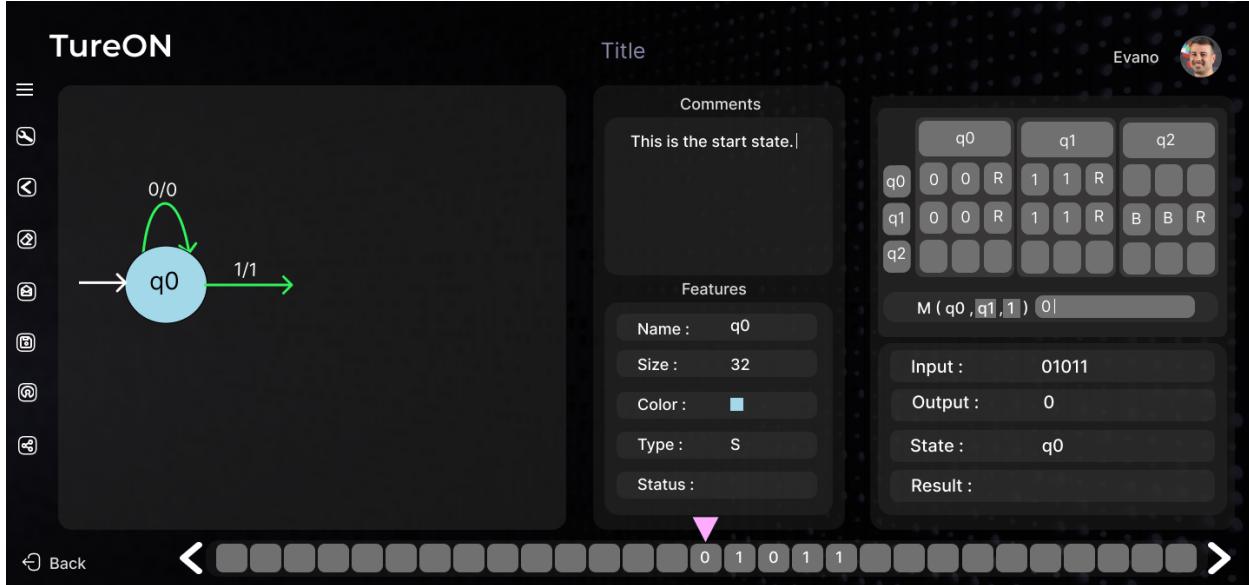
- Opening a created project and favorite project

The user can open any of his projects or the projects that he likes can be both altered and run whereas favorite projects can only be run.

- Sharing a project

The users can share their work for others to run as a link.

## TureOn: Turing machine Visualization



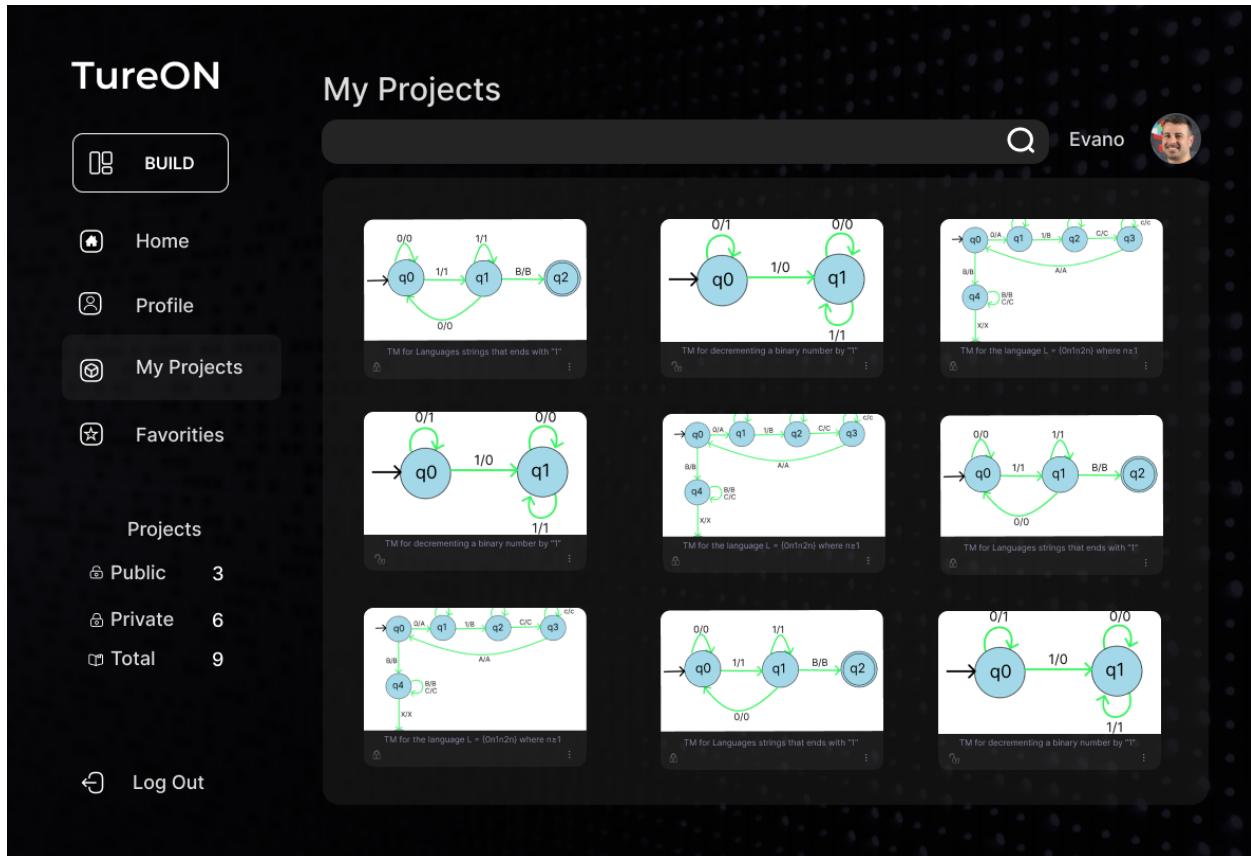
- My Project Page:

In the workflow schema the user reaches here from the home page primarily and through the navigation bar of any page. Here the user can view and access all his projects. This page connects the user to his end result.

- Accessing created projects and changing project features:

## TureOn: Turing machine Visualization

The user can access his created projects, alter its features like name accessibility etc and can either build or run the project. It also provides the user with all pages navigation facilities and help the user to search different projects etc.

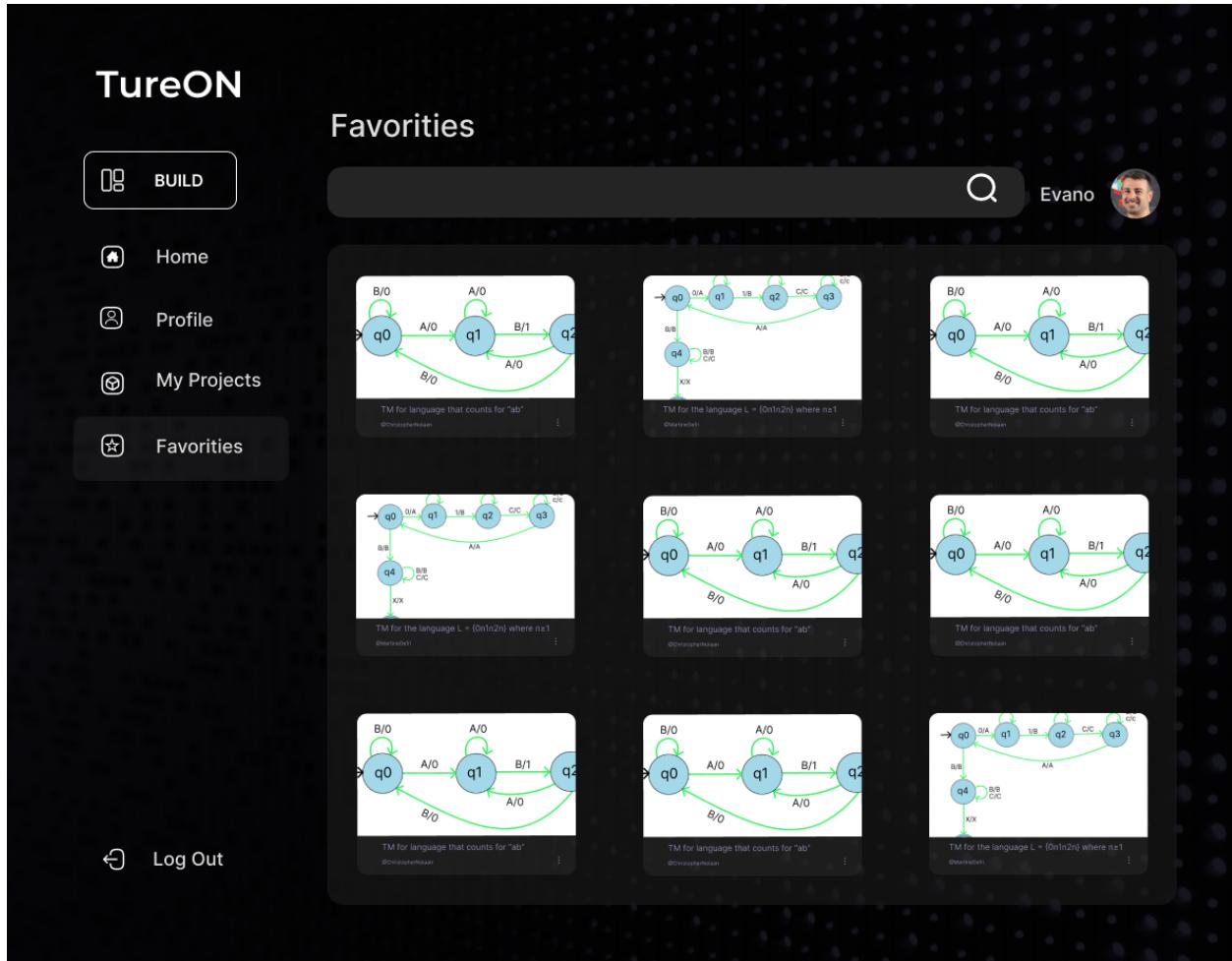


- Favorites Page:

This page provides the learning feature of the website and allows users to directly run all the projects saved by the user who can save different projects and run later. This page creates the workflow to connect teachers and students who access this platform and take the website to its learning edge.

- Accessing different saved projects:

The user can access all the liked projects and run them. The user is not provided a facility to clone it or alter it but can run the projects with different inputs.

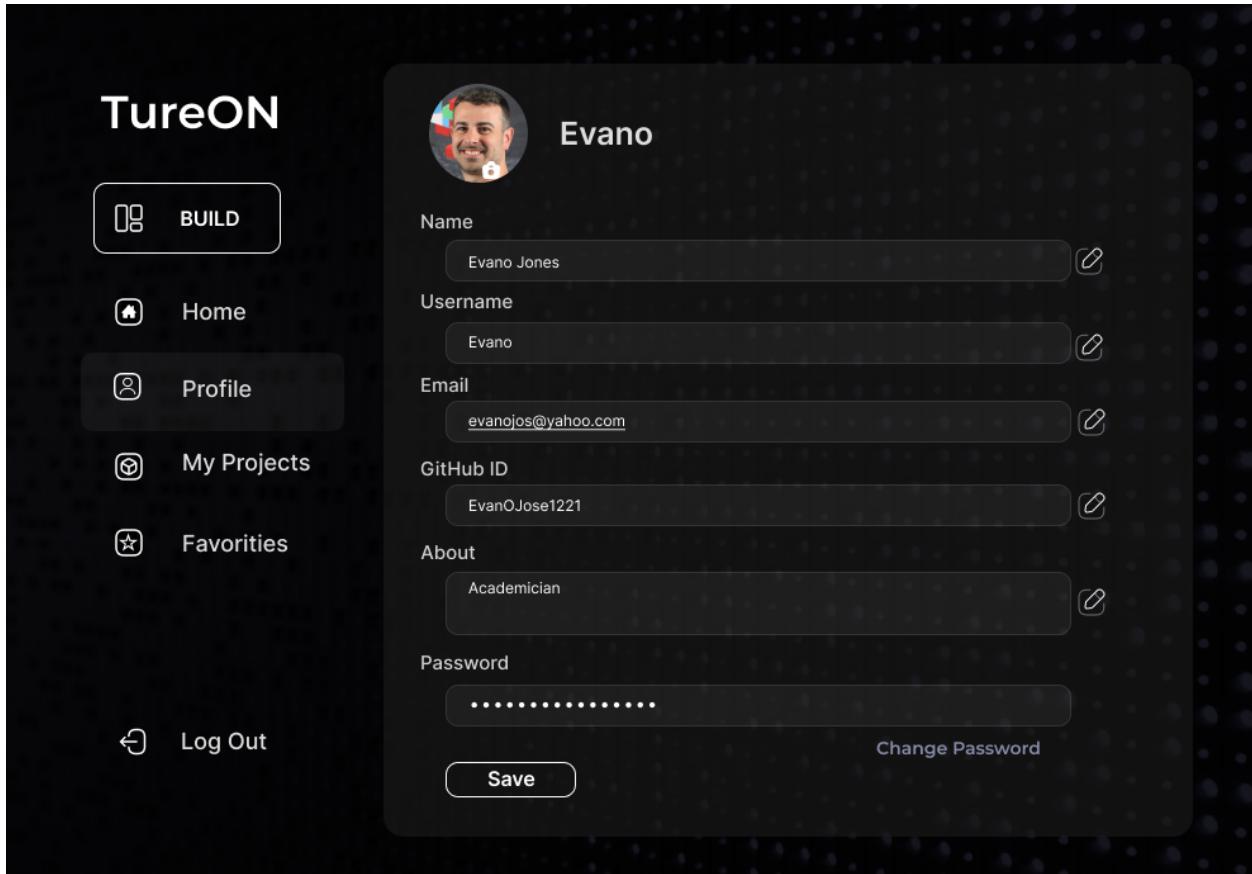


- Profile Page:

This page helps the user to just update his personal information. Minimal information is at present for the user and only his username, name and about is available for outside audience. This is to create a basic image of the user and the workflow from home page to this page is clearly for basic purpose .

- View and Update personal details:

The user can view and update all his information like his photo, name, about etc. He can also change his password through verifying himself with his old password.



## 2. APIs

- For cross checking username and password:

An API is required to cross check the username and password provided by the user, using REST API, get operation can be performed by sending a request to, by passing the username and password. A response depending on whether or not access is granted is returned which will be used to either show invalid credentials or take the user to the home page.

- For creating new password:

For creating a new password an API is required which sends a request with the email Id so that a 6 digit code can be sent to the user for verification it requires a post operation with a request to create the 6 digit code. The API should facilitate the sending of 6 digit mail and the following up process of

changing the password that requires an API with put operation to the endpoint which is the database.

- For creating a new account:

The API should collect the details of the user and get it transferred to the database. That is done using the post operation where all the details are taken as parameters and passed to the end point that is database with required header as a json file

- For creating a projects:

For creating a project a request to create a row in the project table and create corresponding state and transition tables is required, an API that can perform a post operation is needed for this.

- For saving a projects:

To save a project details regarding the project and changes should be sent as a put request and an update on whether saved or not is required as a response. The same API help in altering project details as it helps updating the values to the database through the put request, similarly it can be modified to produce an API for altering personal details.

- For accessing projects:

For accessing different projects an API is required compass the request and collect the details of the automata as response using a get operation

- For liking a project:

When a project is liked an API should fetch the name of project and creator and add to the favorite table of the user so he can access it later it require both post and get operation to be performed

- For sharing a project:

This requests an API to return the link to the page as a response to the request so other people can access it.

- For searching:  
An API need to go through entire database by passing the query provided as parameters

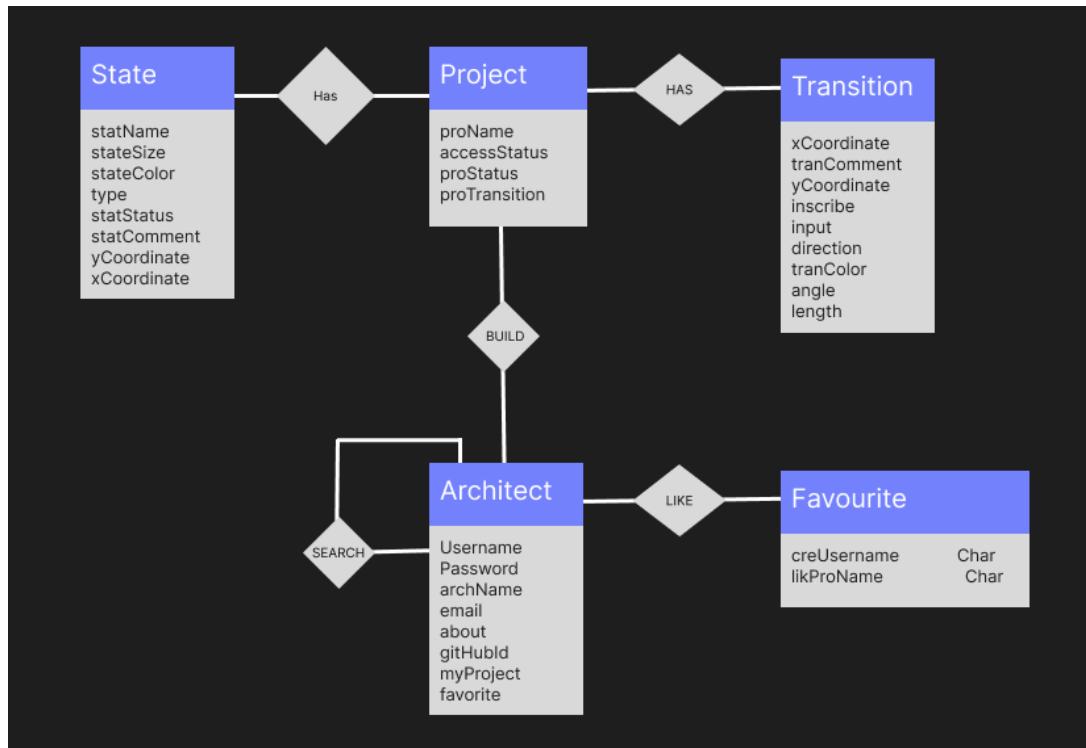
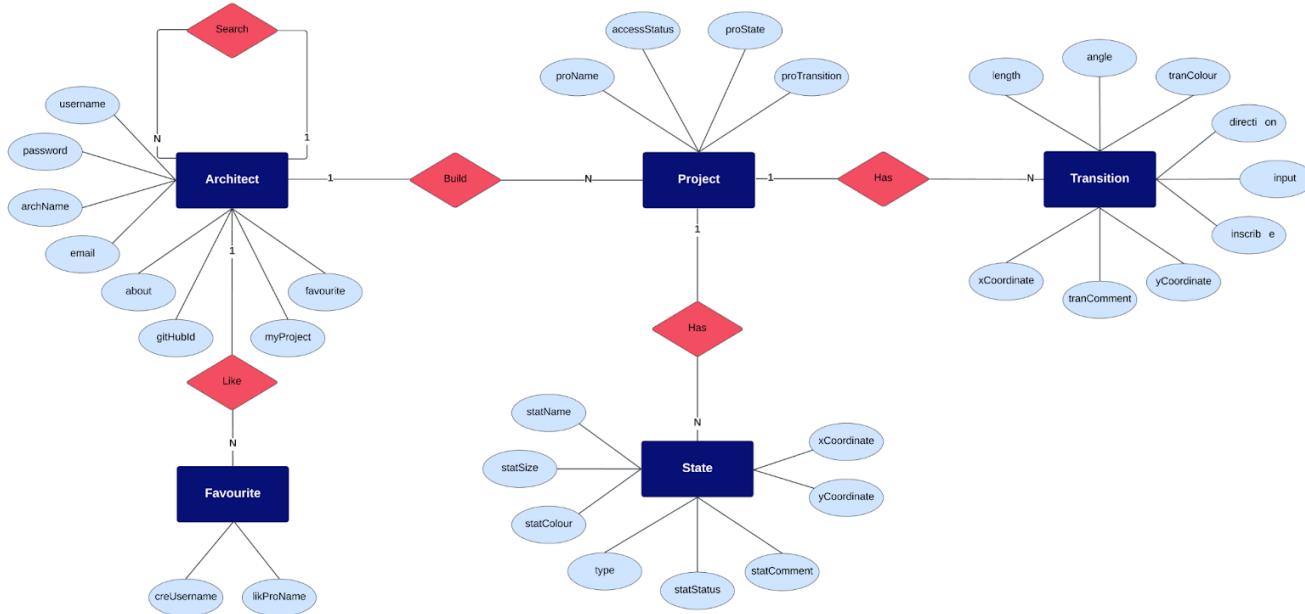
### 3. User Story

- As a user architect would be able to log in to the website by creating a profile
- If, user architect forgot the password it would be
- Architect would be able to log in to the profile using the authenticated email id and password
- The user architect would log in to Home page corresponding to the particular user
- As a user architect profile it would list the recent projects created, architects profile pic and name etc.
- As User each button would take user to the corresponding pages based on the API responses
- User architect's most recent project on clicking would move to the run page of the particular project with the Turing Machine built by the user, matrix corresponding, details of the corresponding state in selection and input tape with the last tested string on the tape.
- As a User Architect home page recent projects should display the most active, saved, and shared projects in the main rows and it should be actively runnable with two clicks.
- As the user profile details should be able to be edited as per the requirement without any error.
- As the user all my project works would be listed in the order of their recently viewed
- As the user architect the projects of other users which are liked by me should be able to be listed in the order of their most recently viewed manner.

## TureOn: Turing machine Visualization

- As the user the profile page could be easily safely logged out properly
- As the user architect should be able to draw the Turing Machine in an easy click-and-drop manner, would be able to draw the transition arrows, fill the transition with corresponding input and read value, would be able to fill the tape with infinite number of input string as per the requirement with easy rotations.

## 4. ER Diagram and Database Design



## 5. Software Architecture Diagram

