Gutech Jobs

(Web Design Project 2)

Supervised by

Dr Nabil

Done by:

Hajid Alkindi

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Project Overview

The project's goal is to develop a web application that simplifies the process of job searching and job hiring. It gives users a place to look through a variety of job postings, apply for jobs, and monitor the progress of their applications. The application provides administrators with strong functionalities to handle job listings, handle applications, and carry out specific actions like approval, rejection, or deletion.

This application makes use of two famous JavaScript frameworks: Express.js and Node.js for the back end and React.js for the front end. Using the knowledge I gained from GUtech's "Database Management" course, I have created a database design that is effective and low in redundancy. The project also uses email integration, Firebase storage for effective data management, and a variety of API requests for handling dynamic data.

In summary, The project has aided me to understand many concepts and possibilities in full stack development, Moving forward, I am excited to apply my knowledge to real world applications.

Back-end

SQL

Relational database systems are the most commonly used type of database systems, as its very easy to create, and work with, however my reasoning towards choosing to use a relational database system was mainly due to scalability, for a project like this, it is expected to have many job listings and applicants and administrators working on the application and a NOSQL solution would have made the application much more complicated, therefore i've used a SQL database system.

phpmyadmin

	Table	Action	Rows	Type	Collation	Size	Overhead
☐	applications	☆ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_general_ci	48.0 KiB	-
☐	jobs	☆ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_general_ci	32.0 KiB	-
☐	job_skills	☆ Browse Structure Search Insert Empty Drop	7	InnoDB	utf8mb4_general_ci	32.0 KiB	-
☐	skills	☆ Browse Structure Search Insert Empty Drop	49	InnoDB	utf8mb4_general_ci	16.0 KiB	-
☐	users	☆ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_general_ci	16.0 KiB	-
	5 tables	Sum	65	*InnoDB*	*utf8mb4_general_ci*	144.0 KiB	0 B

Firebase storage

The project involved the process of storing images, and pdf files, such as personal photos and resumes of applicants, and for simplicity sake, i have decided to go with firebase storage, as it provided a free plan for storage with 1 free GB for usage, in addition it also provided excellent Javascript SDK to integrate with React.

Firebase SDK

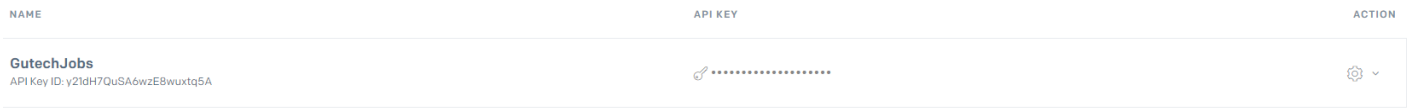
Firebase SDK Initialization

```
import { initializeApp } from "firebase/app";
import { getAnalytics } from "firebase/analytics";


const firebaseConfig = {
  apiKey: "[redacted]",
  authDomain: "gutechjobs.firebaseapp.com",
  projectId: "gutechjobs",
  storageBucket: "gutechjobs.appspot.com",
  messagingSenderId: "[redacted]",
  appId: "[redacted]",
  measurementId: "[redacted]"
};

// Initialize Firebase
const firebaseapp = initializeApp(firebaseConfig);
const analytics = getAnalytics(firebaseapp);

export default firebaseapp;
```

Firebase.js

Email Configuration

The Project had few cases where emails were sent to administrators or applicants, in which I've utilised SendGrid free plan that offers free 100 emails sending per day, and I'm connecting to this service using an api key provided by sendgrid.



API-Endpoints

One of the biggest challenges with SQL databases, is the speed it takes to perform read and write operations between client side and server side, in which api end-points were the solution to this issue, Define APIs

Environmental variables

Environmental variables are variables that stored in .env file for security purposes, and those variables in my case include the following:

1. JWT Secret Key
2. SendGRID Api key
3. Sender Email
4. Database Host
5. Database username
6. Database Password
7. Database name

```
JWT_SECRET=[redacted]
SENDGRID_API_KEY=[redacted]
SENDER_EMAIL=21-0099@student.gutech.edu.om

DB_HOST=localhost
DB_USER=Hajid
DB_PASSWORD=[redacted]
DB_NAME=reactproject
```

That later can be utilised in express js endpoints by

```
require("dotenv").config();
```

And using the variables as following:

```
sgMail.setApiKey(process.env.SENDGRID_API_KEY);
const db = mysql.createConnection({
    host: process.env.DB_HOST,
    user: process.env.DB_USER,
    password: process.env.DB_PASSWORD,
    database: process.env.DB_NAME
});
```

List of endpoints

POST /sendemail

```
app.post('/sendemail', async (req, res) => {
    const { to, subject, text } = req.body;

    const msg = {
      to: to,
      from: process.env.SENDER_EMAIL, r
      subject: subject,
      text: text,
    };

    try {
      await sgMail.send(msg);
      res.status(200).send('Email sent successfully');
    } catch (error) {
      console.error(error);

      if (error.response) {
        console.error(error.response.body)
      }
      res.status(500).send('Error in sending email');
    }
  });
```

Send an email using SendGrid. Requires recipient details in the request body.

POST /admin-signup

```
const saltRounds = 10;

app.post('/admin-signup', (req, res) => {
    const { username, password, email } = req.body;


    db.query('SELECT * FROM users WHERE username = ? OR email = ?', [username, email], (err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error checking for existing user' });
        }

        if (results.length > 0) {
            // Username or email already exists
            return res.status(409).json({ error: 'Username or email already exists' });
        }

        // Hashing the password
        bcrypt.hash(password, saltRounds, (hashErr, hash) => {
            if (hashErr) {
                console.error(hashErr);
                return res.status(500).json({ error: 'Error hashing password' });
            }

            // Store admin user with hashed password
            db.query('INSERT INTO users (username, password, email, user_type) VALUES (?, ?, ?, "admin")',
                     [username, hash, email],
                     (insertErr, insertResults) => {
                if (insertErr) {
                    console.error(insertErr);
                    return res.status(500).json({ error: 'Error signing up' });
                }
                res.status(200).json({ message: 'Admin signup successful' });
            });
        });
    });
});
```

Allows admin users to sign up. Checks for existing users and stores hashed passwords.

POST /signup

```
app.post('/signup', (req, res) => {
    const { username, password, email } = req.body;

    // First, check if the username or email already exists
    db.query('SELECT * FROM users WHERE username = ? OR email = ?', [username, email], (err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error checking for existing user' });
        }

        if (results.length > 0) {
            // Username or email already exists
            return res.status(409).json({ error: 'Username or email already exists' });
        }

        // Hash the password
        bcrypt.hash(password, saltRounds, (hashErr, hash) => {
            if (hashErr) {
                console.error(hashErr);
                return res.status(500).json({ error: 'Error hashing password' });
            }


            // Store user with hashed password
            db.query('INSERT INTO users (username, password, email, user_type) VALUES (?, ?, ?, "normal")',
                     [username, hash, email],
                     (insertErr, insertResults) => {
                if (insertErr) {
                    console.error(insertErr);
                    return res.status(500).json({ error: 'Error signing up' });
                }
                res.status(200).json({ message: 'Signup successful' });
            });
        });
    });
});
```

Allows normal users to sign up. Similar to admin signup but assigns a different user type.

POST /login

```
app.post('/login', (req, res) => {
    const { username, password } = req.body;


    db.query('SELECT * FROM users WHERE username = ?', [username], (err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error logging in' });
        }


        if (results.length > 0) {
            const user = results[0];


            bcrypt.compare(password, user.password, (error, isMatch) => {
                if (error) {
                    console.error(error);
                    return res.status(500).json({ error: 'Error checking password' });
                }

                if (isMatch) {
                    // Passwords match, create a token
```

```
                    const token = jwt.sign(
                        { id: user.id, username: user.username },
                        process.env.JWT_SECRET,
                        { expiresIn: '24h' } // Token expires in 24 hours
                    );

                    // Remove the password from the user object before sending
                    const { password, ...userWithoutPassword } = user;

                    res.status(200).json({
                        message: 'Login successful',
                        token,
                        user: userWithoutPassword
                    });
                } else {
                    // Passwords do not match
                    res.status(400).json({ message: 'Username or password is incorrect' });
                }
            });
        } else {
            // User not found
            res.status(400).json({ message: 'Username or password is incorrect' });
        }
    });
});
```

Authenticates a user and provides a JWT token for session management.

GET /jobs

```
pp.get('/jobs', verifyToken, (req, res) => {
    const query = `
        SELECT j.job_id, j.title, j.type, j.salary, j.description,
j.picture, j.created_at, j.updated_at,
               GROUP_CONCAT(s.name SEPARATOR ', ') AS skills
        FROM jobs j
        LEFT JOIN job_skills js ON j.job_id = js.job_id
        LEFT JOIN skills s ON js.skill_id = s.skill_id
        GROUP BY j.job_id
    `;

    db.query(query, (err, results) => {
        if (err) throw err;
        res.json(results);
    });
});
```

Returns list of jobs posted on the site

PUT /updatejob/:jobId

Updates the details of a job specified by jobId. Handles associated skills.

DELETE /deletejob/:jobId

Deletes a job and its associated skills from the database.

PUT /update-application-status/:applicationId/:newStatus

Updates the status of a job application to either 'rejected' or 'accepted'.

GET /user-applications

```
app.get('/user-applications', (req, res) => {
    const userId = req.query.userId;
    console.log(userId);
    db.query('SELECT * FROM applications WHERE user_id = ?', [userId],
(err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error fetching
applications' });
        }
        res.json(results);
    });
});
```

Fetches applications for a specific user, based on userId.

POST /apply

```
app.post('/apply', (req, res) => {
    console.log(req.body);
    const { userId, jobId, name, email, personalPhoto, cv } = req.body;
    const query = "INSERT INTO applications (user_id, job_id, name,
email, personal_photo, cv) VALUES (?, ?, ?, ?, ?, ?)";

    db.query(query, [userId, jobId, name, email, personalPhoto, cv],
(err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error submitting
application' });
        }
        res.status(200).json({ message: 'Application submitted
successfully' });
    });
});
```

Allows a user to apply for a job. Submits application details to the database.

POST /add-job

```
app.post('/add-job', (req, res) => {
    const { user_id, title, type, salary, description, picture, skills } = req.body;
    const jobQuery = "INSERT INTO jobs (user_id, title, type, salary, description, picture) VALUES (?, ?, ?, ?,
?, ?)";

    // First, insert the job into the jobs table
    db.query(jobQuery, [user_id, title, type, salary, description, picture], (err, results) => {
        if (err) {
            console.error(err);
            return res.status(500).json({ error: 'Error adding job' });
        }

        const jobId = results.insertId;

        // Now, insert skills associated with the job
        if (skills && skills.length) {
            const skillQuery = "INSERT INTO job_skills (job_id, skill_id) VALUES ?";
            const skillValues = skills.map(skillId => [jobId, skillId]);

            db.query(skillQuery, [skillValues], (err, results) => {
                if (err) {
                    console.error(err);
                    return res.status(500).json({ error: 'Error adding job skills' });
                }
                res.status(200).json({ message: 'Job and job skills added successfully' });
            });
        } else {
            res.status(200).json({ message: 'Job added successfully, no skills to add' });
        }
    });
});
```

Allows an admin to add a new job listing, including associated skills.

GET /skills

Retrieves a list of all available skills from the database.

GET /admin/jobs

```
app.get('/admin/jobs', (req, res) => {
    const adminId = req.query.adminId;

    db.query('SELECT * FROM jobs WHERE user_id = ?', [adminId], (err, jobs) => {
      if (err) {
        console.error(err);
        return res.status(500).json({ error: 'Error fetching jobs' });
      }

      const jobsWithSkillsPromises = jobs.map(job => {
        return new Promise((resolve, reject) => {
          db.query('SELECT skills.* FROM job_skills JOIN skills ON job_skills.skill_id = skills.skill_id WHERE
job_skills.job_id = ?', [job.job_id], (err, skills) => {
            if (err) {
              return reject(err);
            }
            job.skills = skills.map(skill => ({ value: skill.skill_id, label: skill.name }));
            resolve(job);
          });
        });
      });

      Promise.all(jobsWithSkillsPromises)
        .then(jobsWithSkills => res.json(jobsWithSkills))
        .catch(err => {
          console.error(err);
          res.status(500).json({ error: 'Error fetching job skills' });
        });
    });
  });
```

Fetches all jobs posted by a specific admin user.

GET /job/:jobId

Fetches details for a specific job based on jobId.

GET /job-applications

Retrieves applications for a specific job, based on jobId.

DELETE /delete-application/:applicationId

Deletes a specific job application based on applicationId.

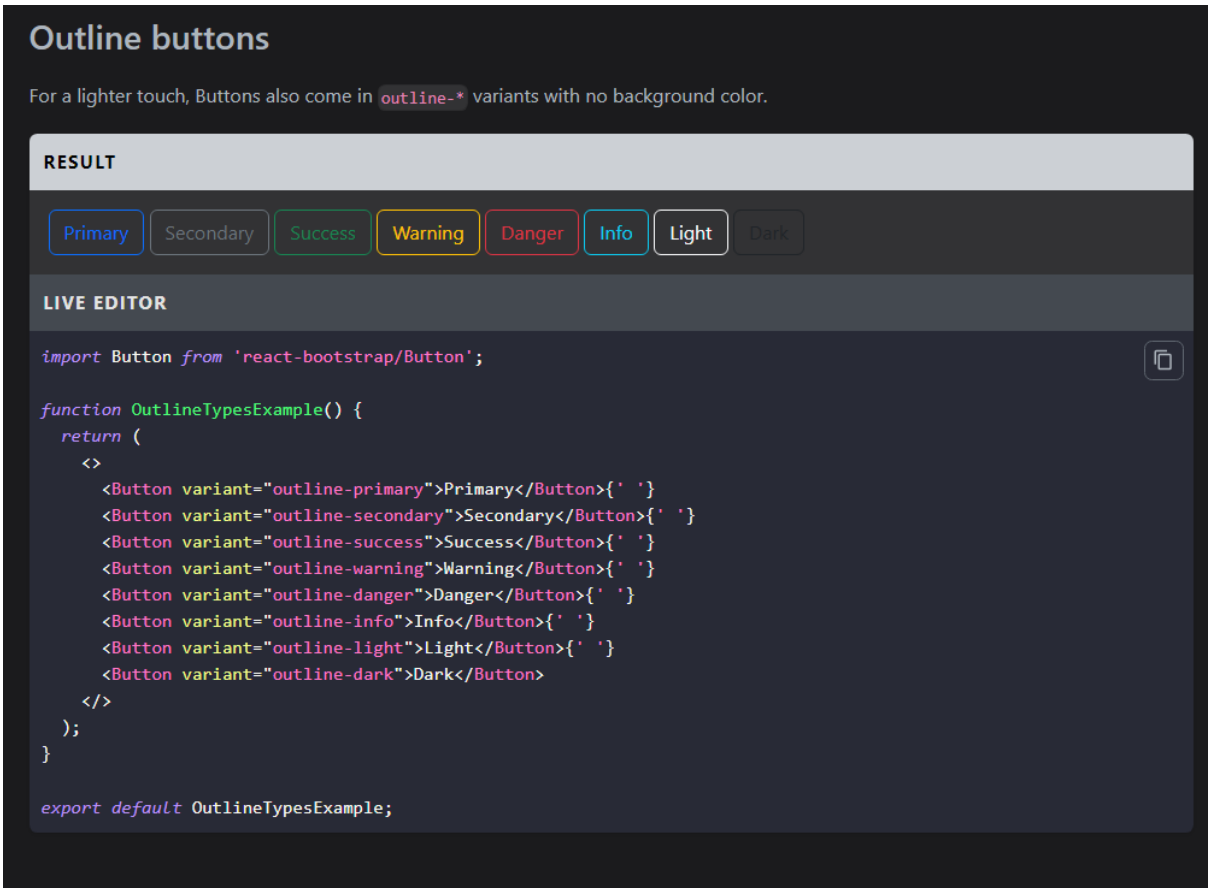
Front-End

React.js

React js is a javascript library used for building user interfaces, react is a easy to use framework that has excellent documentation that is very easy for intermediate programmers to use.

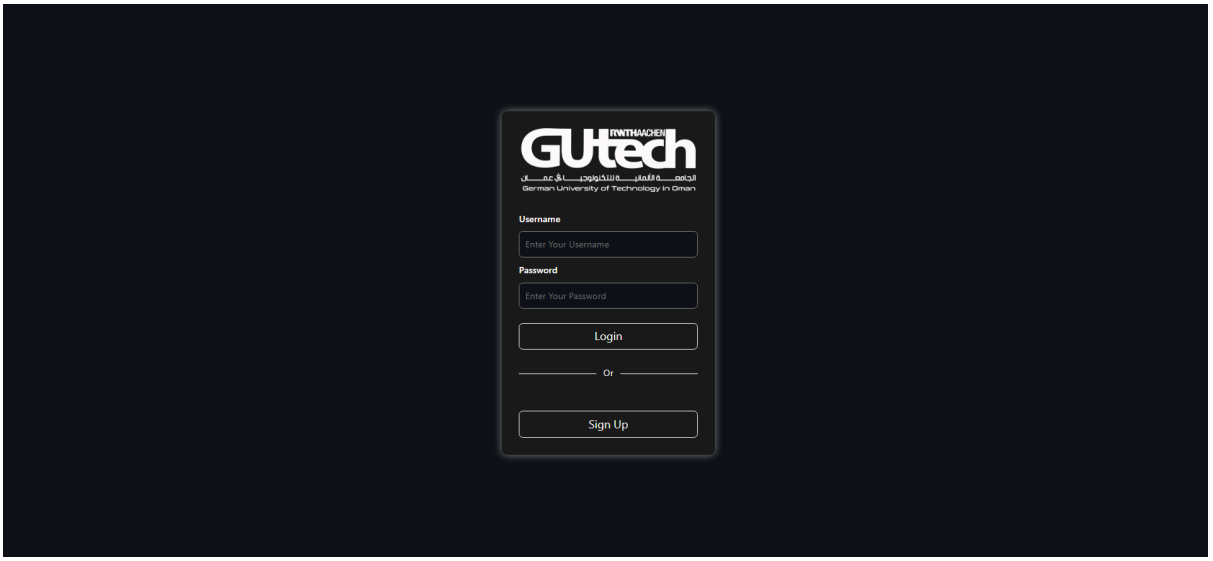
React-Bootstrap

React-bootstrap is a UI library that provides easy to use components such as buttons, cards, navigation menu components that a user can easily integrate in their code and utilise to produce amazing looking user interfaces, in addition react bootstrap provides very good documentation on how to implement those components and initialise react-bootstrap in the project.



Screenshots Demonstration

Login (Admin & User)

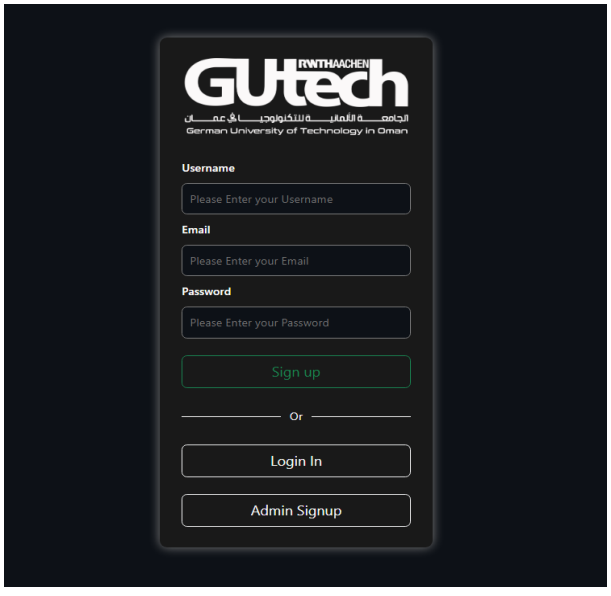


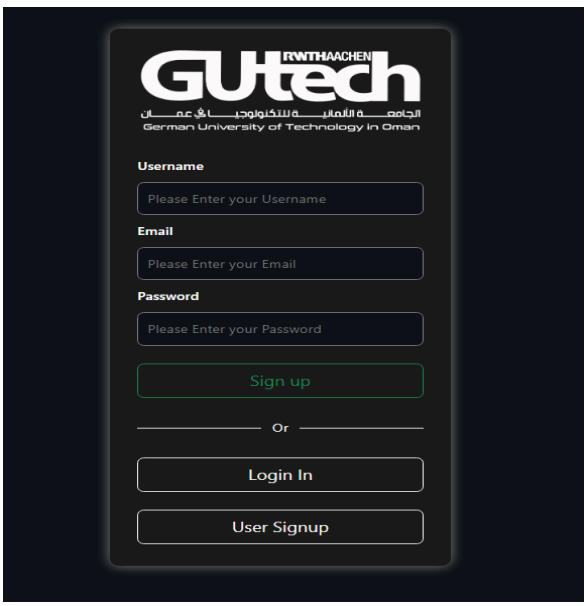
The Program is able to determine the user type either admin or user and redirect them to the corresponding navigation view, if the user doesn't have an account they can click on the sign up screen which will redirect them to sign up.

Signup

There are two sign up screens, user and admin signup and can be toggled through through user signup button and admin signup button.

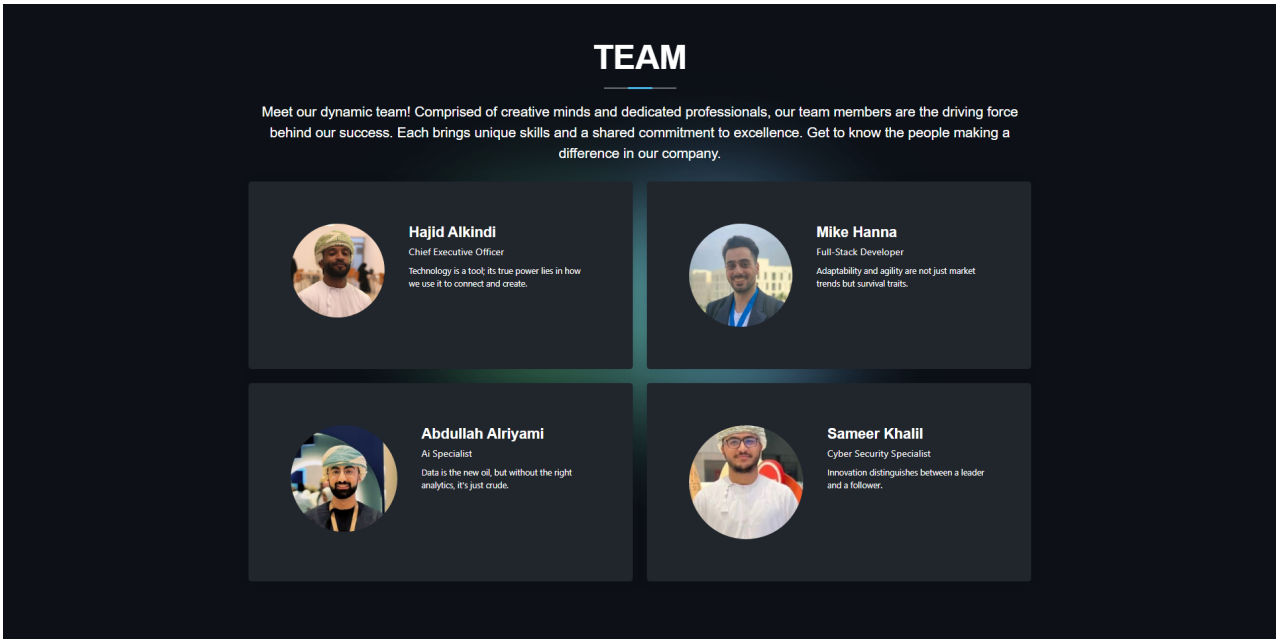
User & Admin Sign Up





Homepage

This is the homepage view that is accessible to all user types, the get started button redirects you to /jobs and in addition the home page displays the team.

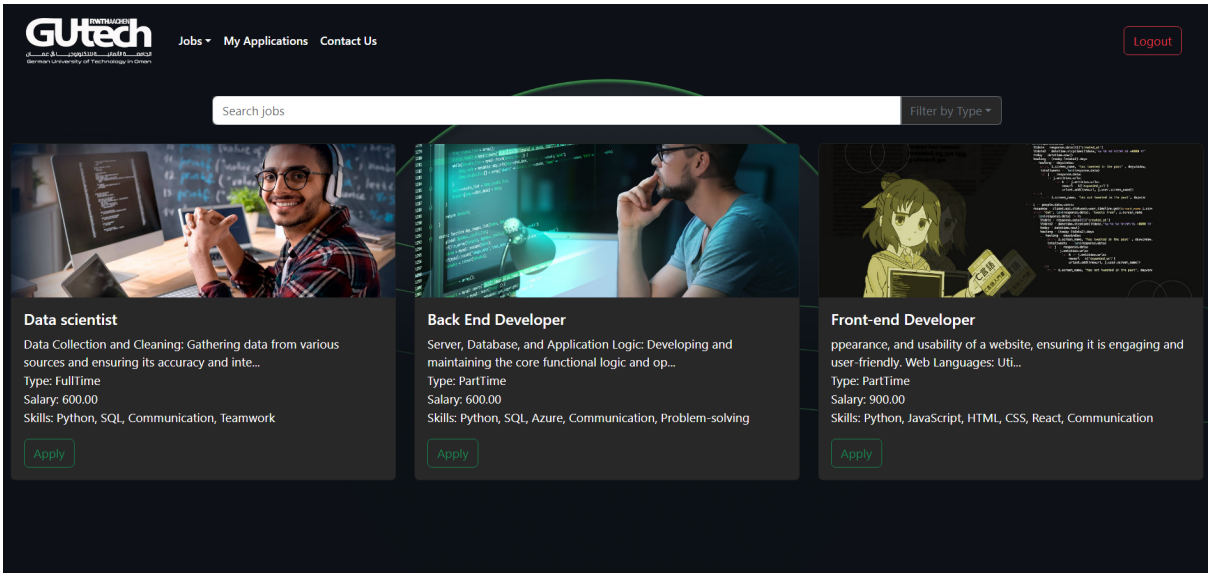


User View

Navigation menu

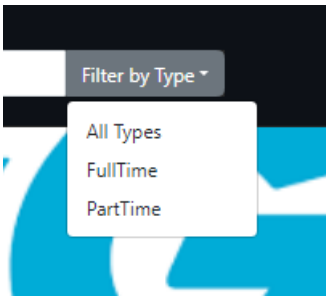
The user menu allows user to browse through, homepage, jobs view, contact us and my application pages

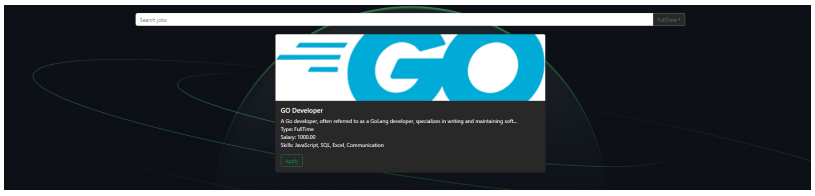
View Jobs

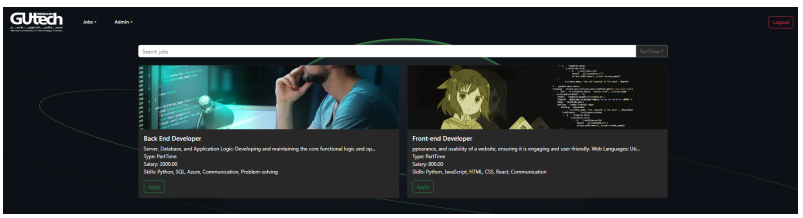


The user is able to search for jobs by name and also is able to filter that based on part time jobs and full time jobs, and he is able to click apply on a job and be redirected to the next page.

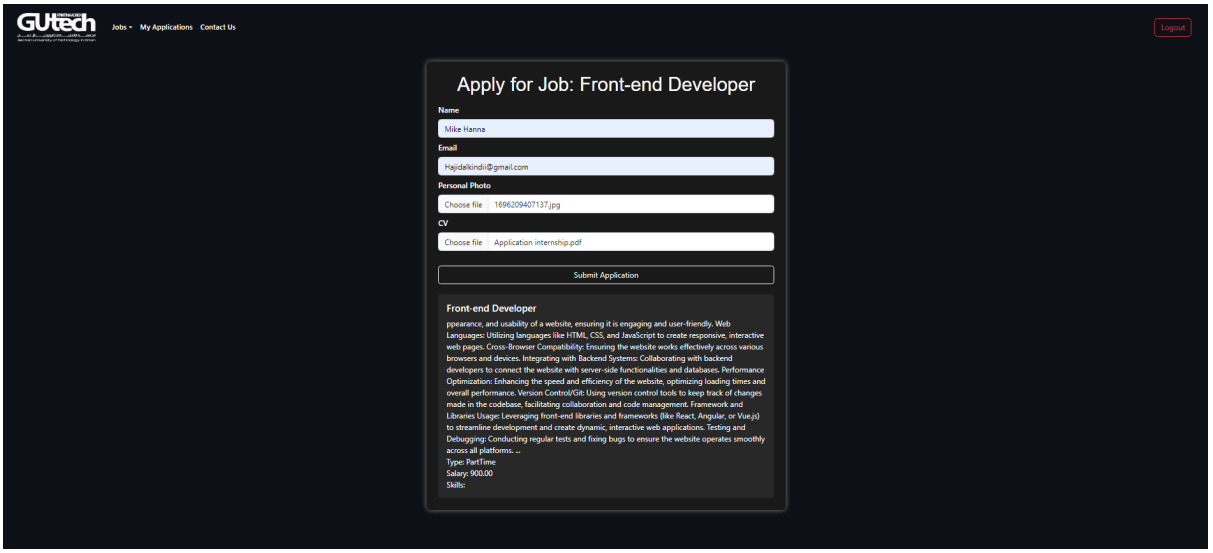
Filter function







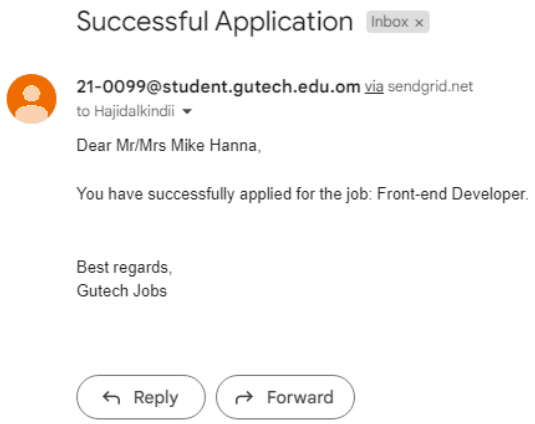
Apply for Job



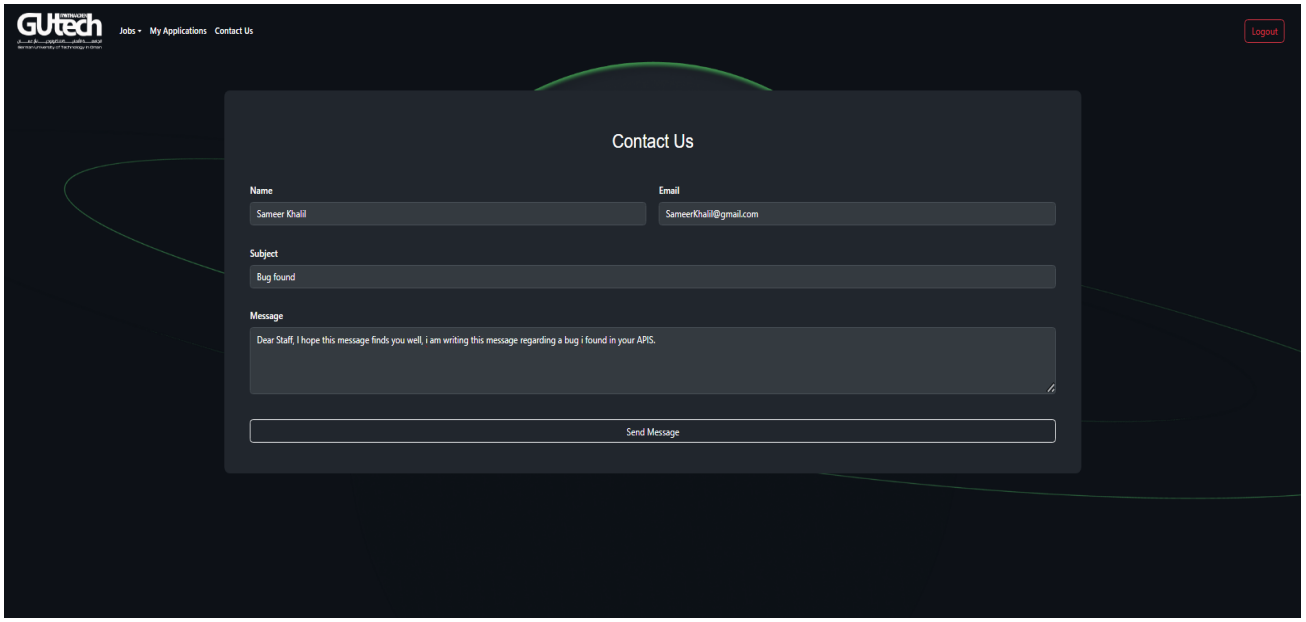
Users will fill in application details, such as name, email and upload personal photo and CV which is stored in firebase storage and the link to the firebase storage is stored in the SQL database for reference.

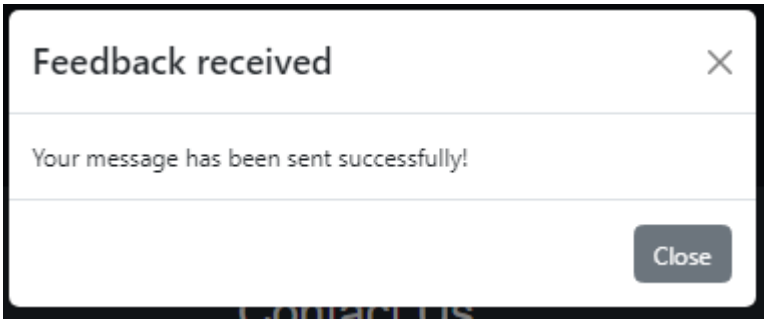
My applications

My applications page will display the applications that were submitted by the current logged in user, and show their status(pending, rejected or approved), when a user gets their application updated, they will receive this email:

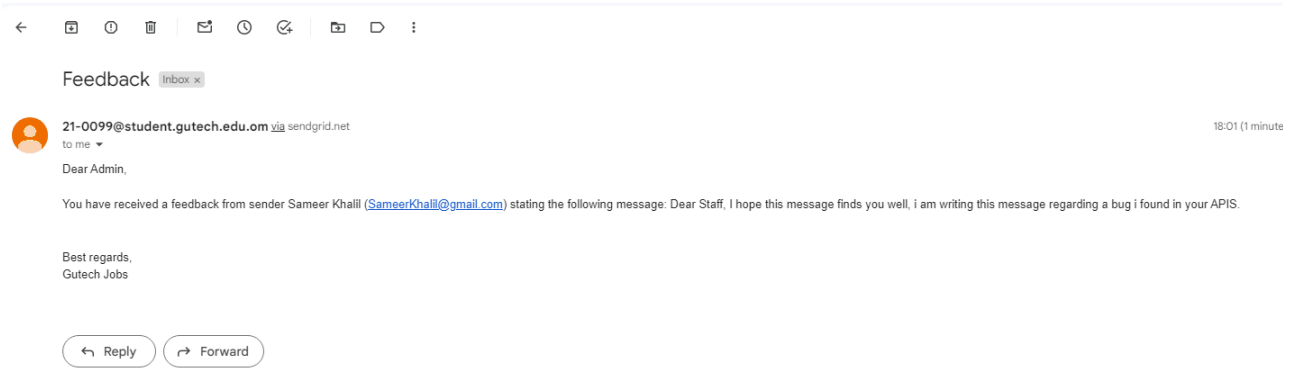


Contact us



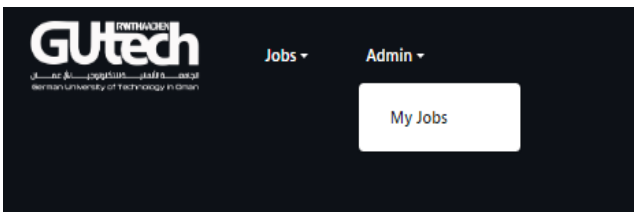


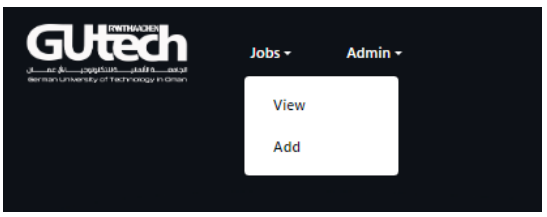
This page provides a contact us form, which will send an email feedback to the admin, like this:



Admin View

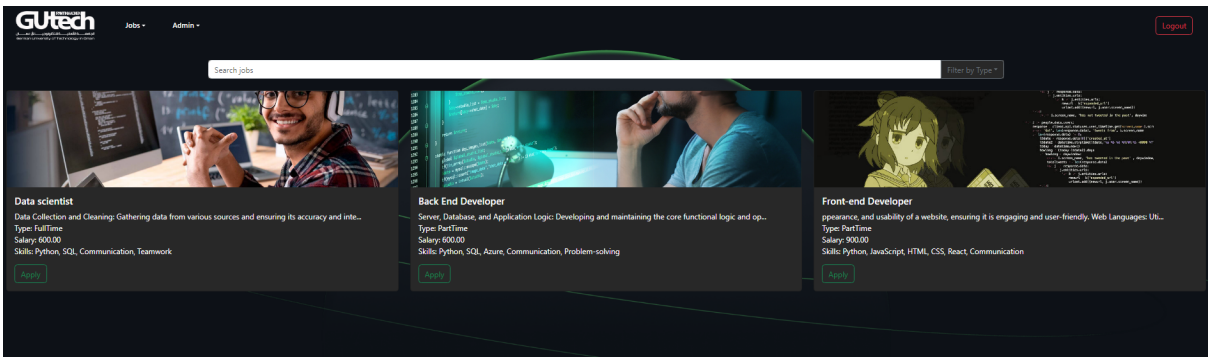
Navigation menu





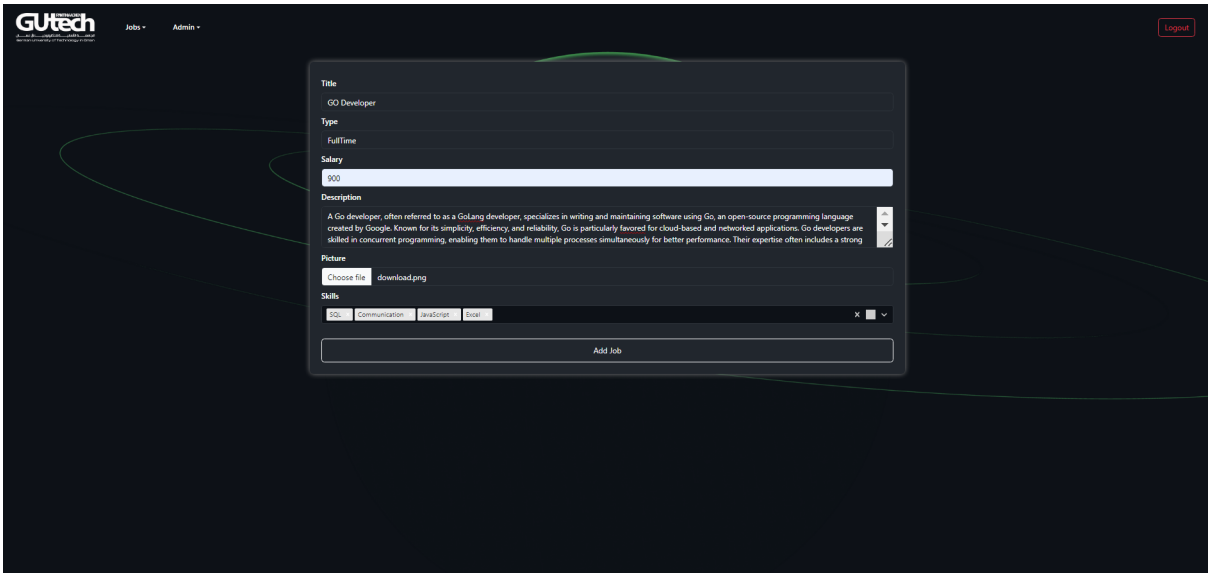
The admin menu allows user to browse through, homepage, jobs view & add pages and admin jobs (my jobs)

View Jobs

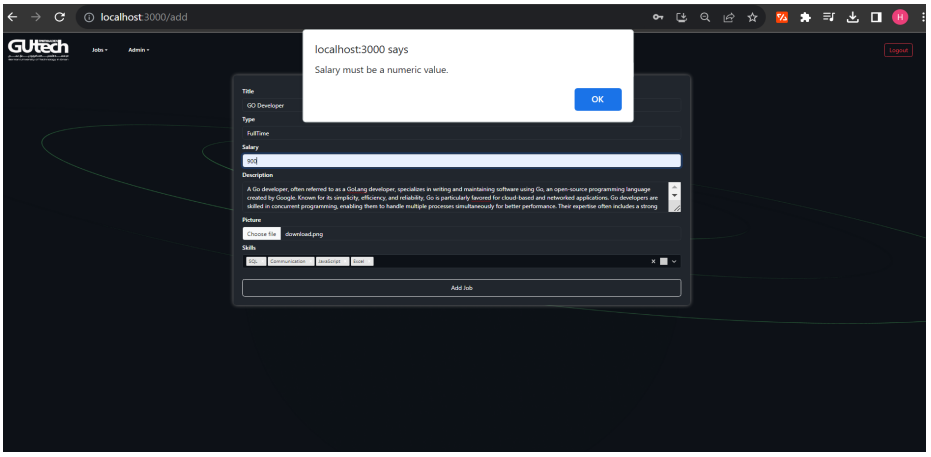


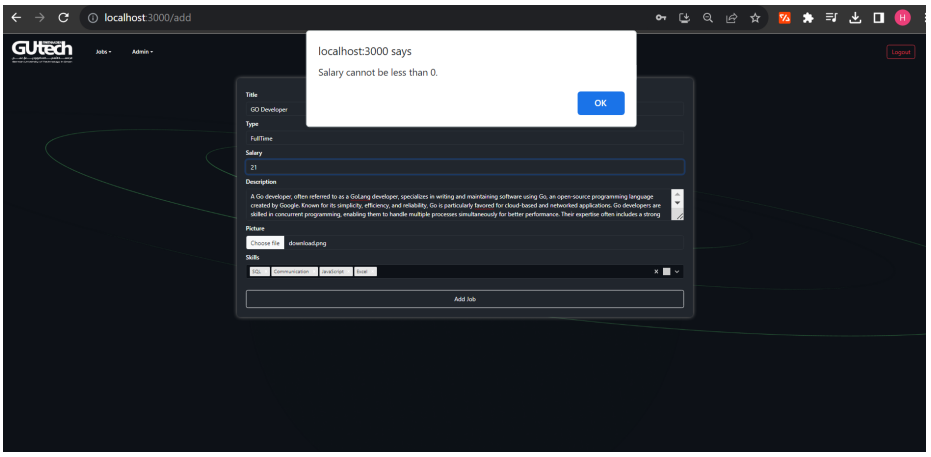
The view is very simple, pretty much the same as the user page that displays the available jobs with the filter logic.

Add Jobs



This page will allow an admin to post a job listing, and fill out details such as salary, title, description, choose set of skills and the form has input checks such that for example salary cannot be less then 0 and cannot be letters:

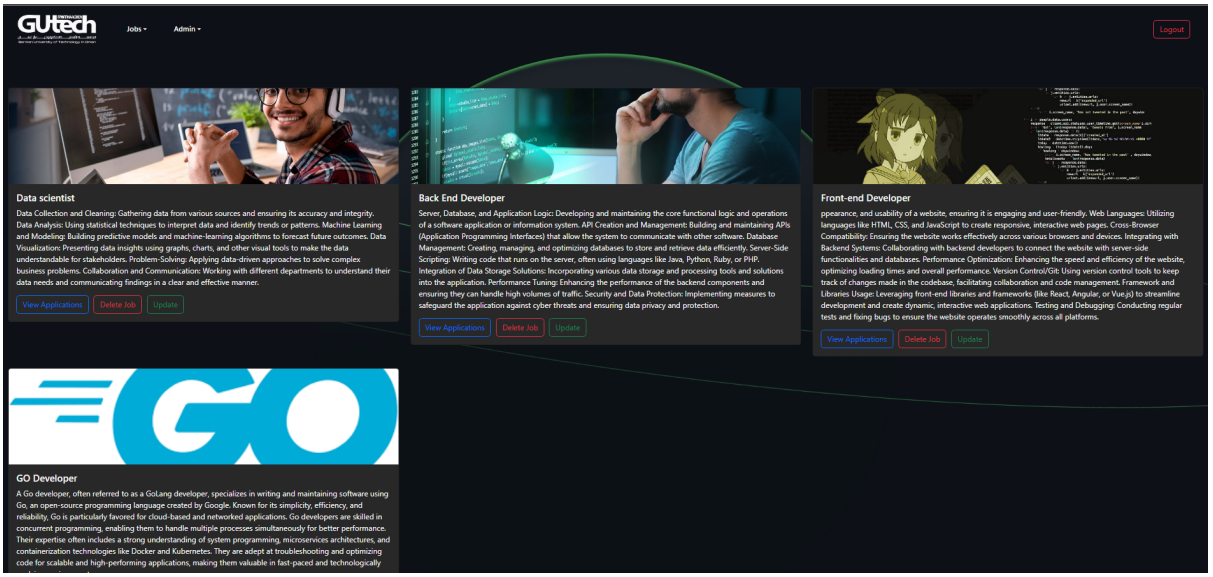




Additionally when admin added a job they will receive this email:

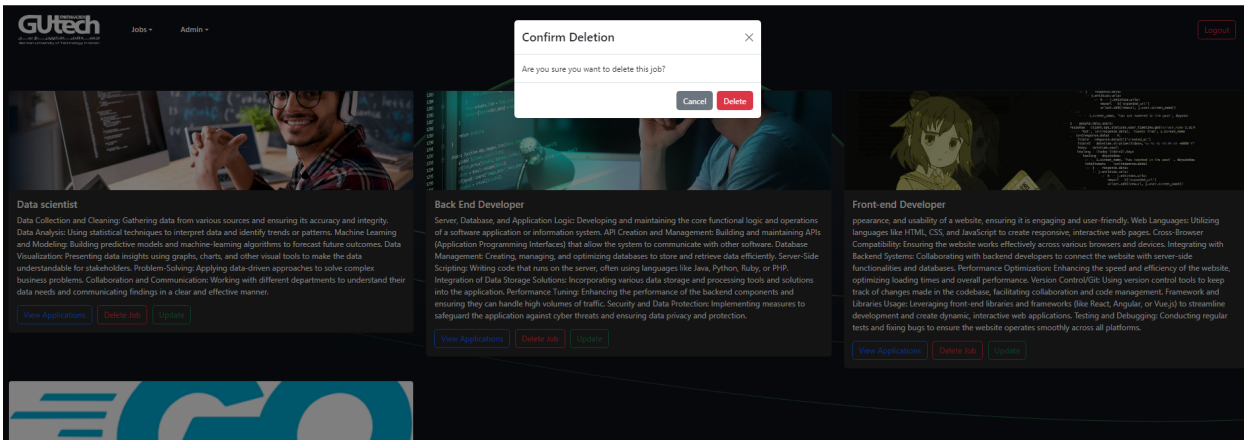
Admin section

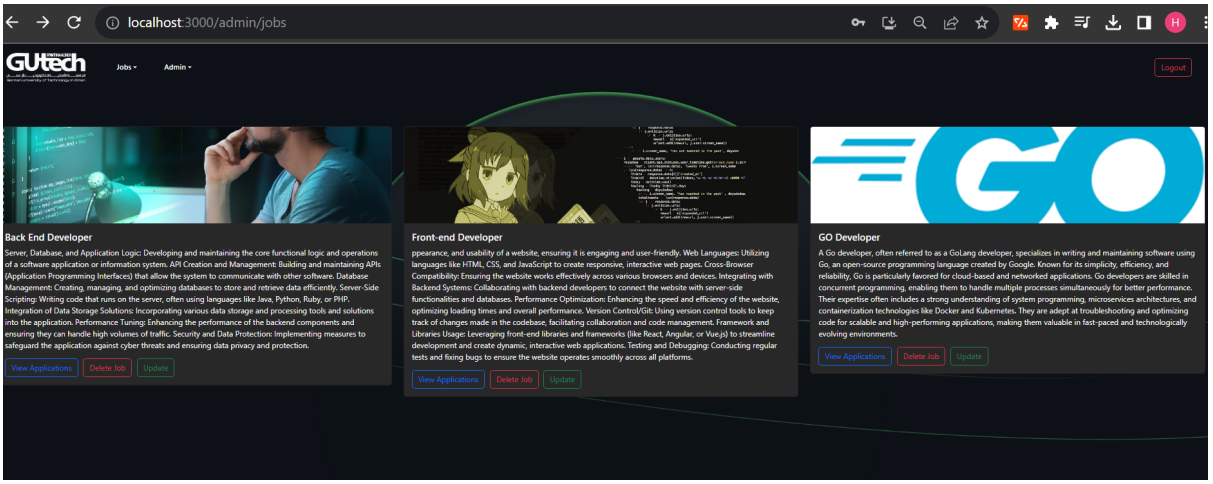
My Jobs



This page will allow an admin to view their posted jobs, and be able to create changes to the job postings such as, update, delete and additionally they can also view the applications submitted by the users for a job

Delete Job Function

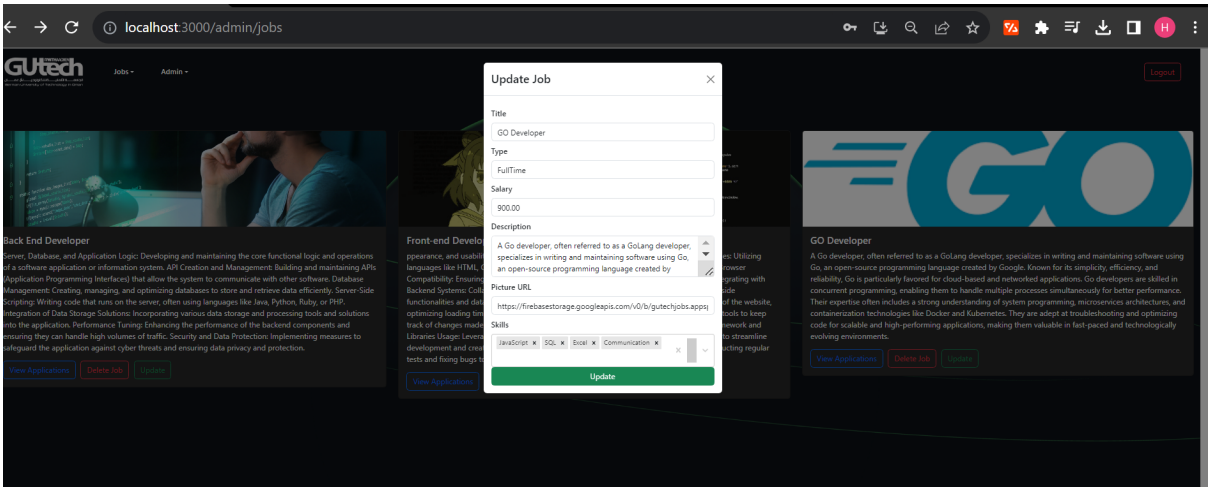




Admin is able to delete a job listing, and when deleted all the applicants associated with that job will also be deleted from the database.

Update Job Function

Admin is able to update job details, such as changing the title. description , set of skills and so on.

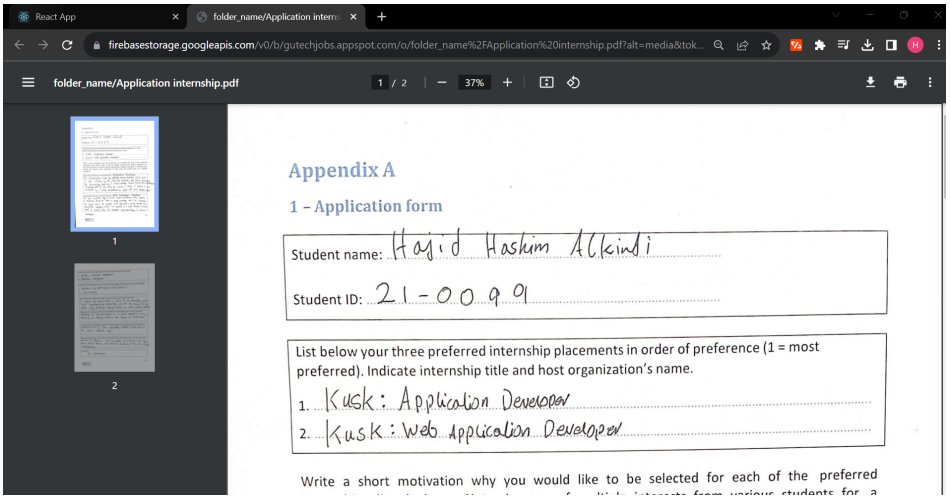


View job Applications

The page will show the submitted applications that the users submitted for a job.

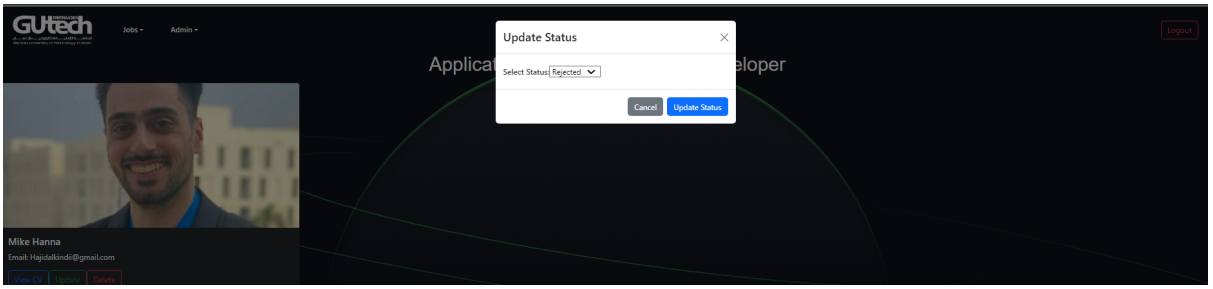
The admin then can:

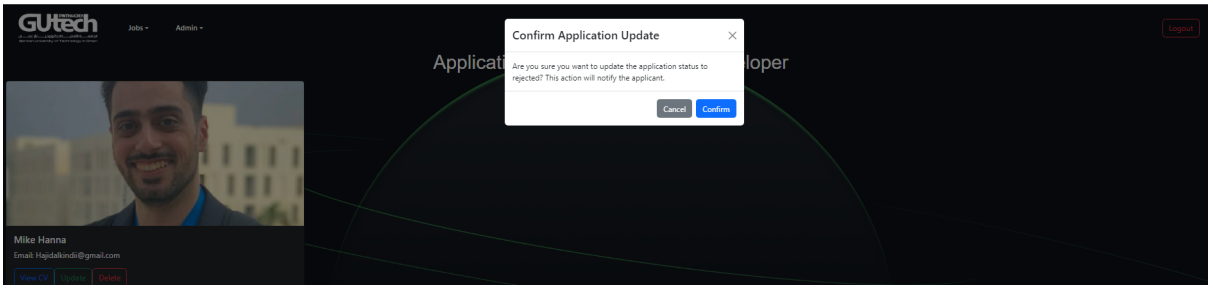
1. View CV



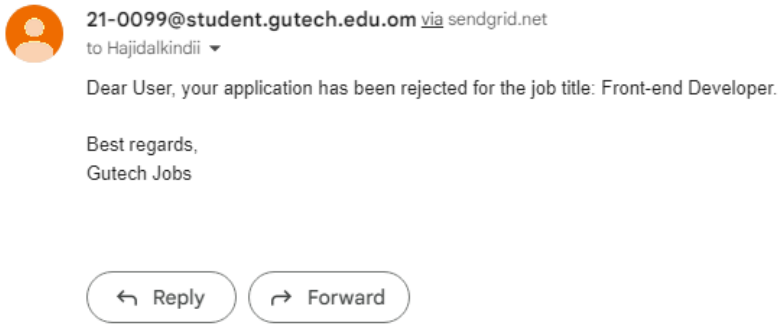
View the CV file stored in firebase storage.

2. Update Application status

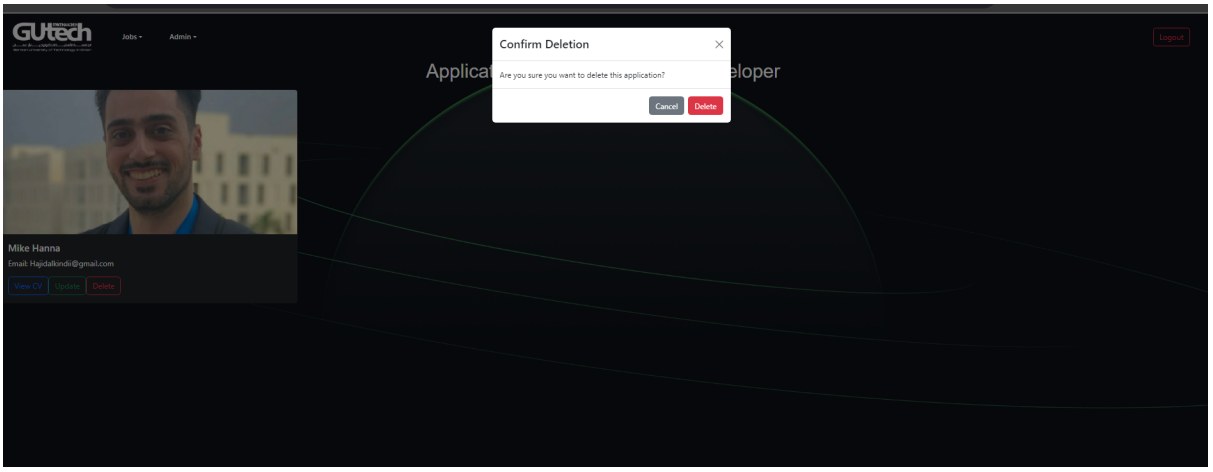




Update an application status, to either pending, rejected or approved and when updated the associated applicant that status was changed will receive an email like this:



3. Delete Application



Delete a user's application if the admin wishes to.

Conclusion

As we approach the conclusion of this endeavour, it's important for me to pause and reflect on the journey - the highs and lows encountered. Merging the elements of front-end and back-end tech to create an integrated, functional tool has been a truly eye-opening experience.

References

https://react.dev/

https://www.w3schools.com/REACT/DEFAULT.ASP

https://www.youtube.com/watch?v=QrVYLLpoyMw

https://react-bootstrap.netlify.app/