



Bilkent University

CS353

DATABASE SYSTEMS

Project Design Report

**Company Interview and Employment Review
Platform Database System**

GROUP 5

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1. Description of MESA

MESA is an online review company and interview review platform for the participants in various sectors to contribute and share their experiences. In the platform users can give reviews related to companies, jobs, and interview processes. In the platform, users can share information regarding their employment status, qualifications, resume, and their desired jobs. The reviews related to a company and its employment reviews can be seen by all the other users of the platform, and thus provide an environment of connectedness.

Companies can post about the currently available job offerings within their ranks with the pre-requirements they are looking for. The users can list the available jobs from the platform, filter the results according to their desires and sort them in the way they are interested. If they come across a job offering that they are suitable for they can send an application for the position. The companies, by again using the platform, can approve or decline the incoming application.

Companies can develop projects, by providing a set of required descriptive information about the project. ----

2. Separation of Labour

❖ Mehmet Sanisoğlu

- Proposal,design and final report.
- Worked on the transition between screens.
- Worked on the user mode identification and visual improvements

❖ Mehmet Selim Özcan

- Proposal,design and final report.
- Worked on several pages design and implementation
- Worked on database design and implementation.

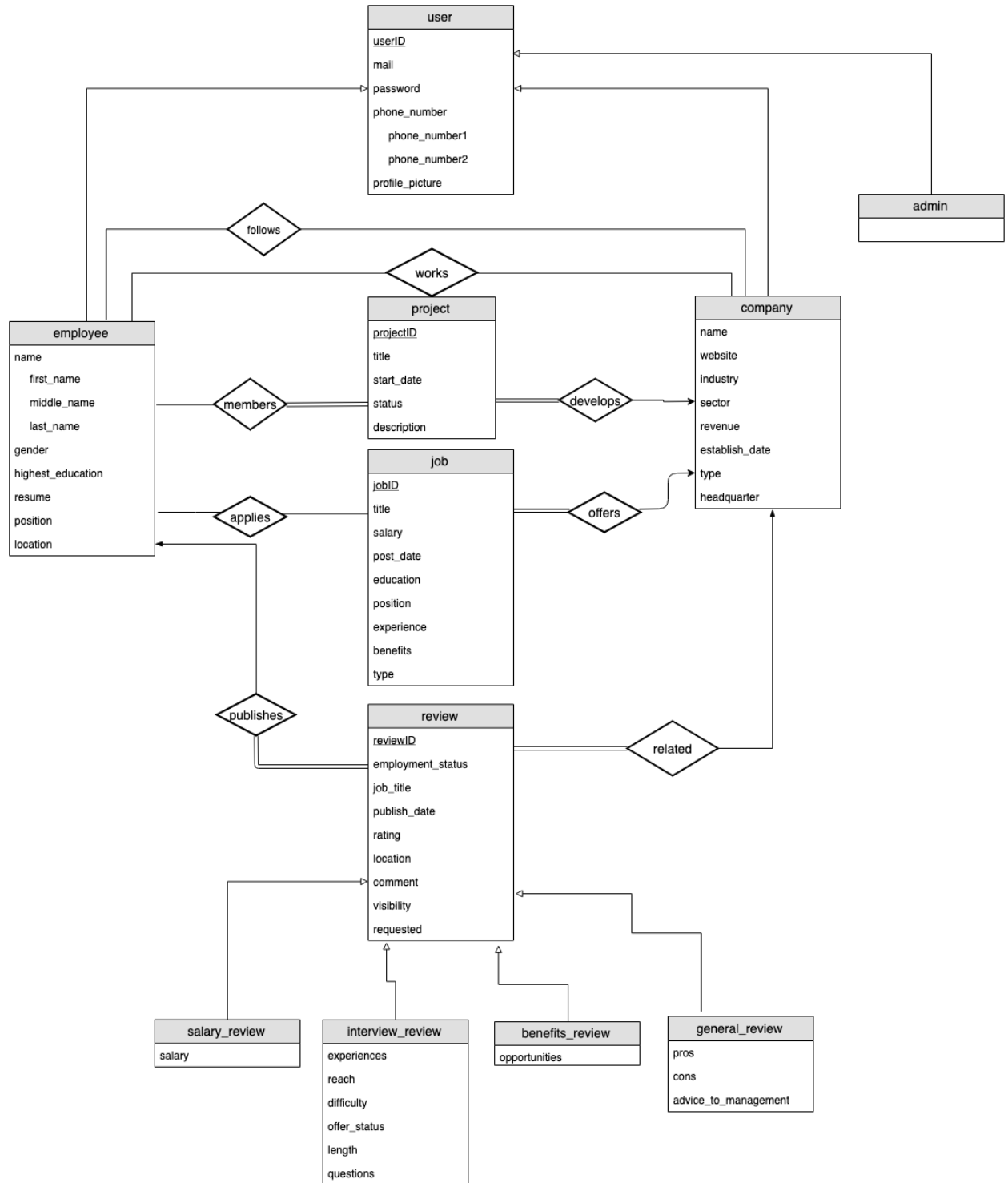
❖ Ayça Begüm Taşcıoğlu

- Proposal,design and final report.
- Worked on reviews and admin pages.
- Worked on appearance of GUI.

❖ Erdem Ege Maraşlı

- Proposal,design and final report.
- Worked on database design and implementation.
- Worked on list structures such as project list, job list etc.
- Worked on several pages design and implementation.

2.Final E/R Diagram



3. Final List of Table Schemas

4.1 User

Relational Model:

user(userID, mail, password, phone_number1, phone_number2, profile_picture)

Functional Dependencies:

userID -> mail, password, phone_number1, phone_number2, profile_picture

mail -> password, phone_number1, phone_number2, profile_picture

Candidate Keys:

{ (userID), (mail) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE user(  
    userID      varchar(20) PRIMARY KEY,  
    mail        varchar(40) NOT NULL,  
    password    varchar(20) NOT NULL,  
    phone_number1    varchar(20),  
    phone_number2    varchar(20),  
    profile_picture varchar(200) ) Engine=InnoDB;
```

4.2 Employee

Relational Model:

employee(employeeID, first_name, middle_name, last_name, gender, highest_education, resume, position, Location)

Functional Dependencies:

employeeID -> first_name, middle_name, last_name, gender, highest_education, resume, position, Location

Candidate Keys:

{{employeeID}}

Normal Form:

BCNF

Table Definition:

CREATE TABLE employee(

 employeeID varchar(20) PRIMARY KEY,

 first_name varchar(40) NOT NULL,

 middle_name varchar(40),

 last_name varchar(40) NOT NULL,

 gender varchar(20),

 highest_education varchar(40),

 resume varchar(40) NOT NULL,

 position varchar(40),

 Location varchar(40),

 FOREIGN KEY(employeeID) REFERENCES user(userID) ON UPDATE CASCADE
ON DELETE CASCADE) Engine=InnoDB;

4.3 Company

Relational Model:

company(companyID, name, website, industry, sector, revenue, establish_date, type, headquarter)

Functional Dependencies:

companyID -> name, website, industry, sector, revenue, establish_date, type, headquarter

Candidate Keys:

{ (companyID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE company(  
    companyID    varchar(20) PRIMARY KEY,  
    name         varchar(20) NOT NULL,  
    website      varchar(50),  
    industry     varchar(10) NOT NULL,  
    sector       varchar(10) NOT NULL,  
    revenue      double,  
    establish_data date NOT NULL,  
    type         varchar(10) NOT NULL,  
    headquarter  varchar(10) NOT NULL,  
    FOREIGN KEY(companyID) REFERENCES user(userID) ON UPDATE CASCADE  
ON DELETE CASCADE ) Engine=InnoDB;
```

4.4 Follows

Relational Model:

follows(employeeID, companyID)

Functional Dependencies:

None

Candidate Keys:

{ (employeeID, companyID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE follows(  
    employeeID      varchar(20),  
    companyID       varchar(20),  
    PRIMARY KEY(employeeID, companyID),  
    FOREIGN KEY(employeeID) REFERENCES employee(employeeID)ON UPDATE  
CASCADE ON DELETE CASCADE,  
    FOREIGN KEY(companyID) REFERENCES company(companyID)ON UPDATE  
CASCADE ON DELETE CASCADE ) Engine=InnoDB;
```


4.5 Works

Relational Model:

works(employeeID, companyID)

Functional Dependencies:

None

Candidate Keys:

{ (employeeID, companyID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE works(  
    employeeID      varchar(20),  
    companyID       varchar(20),  
    PRIMARY KEY(employeeID, companyID),  
    FOREIGN KEY(employeeID) REFERENCES employee(employeeID)ON UPDATE  
CASCADE ON DELETE CASCADE,  
    FOREIGN KEY(companyID) REFERENCES company(companyID)ON UPDATE  
CASCADE ON DELETE CASCADE ) Engine=InnoDB;
```

4.6 Job

Relational Model:

job(jobID, title, salary, post_date, education, position, experience, benefits, type)

Functional Dependencies:

(jobID) -> title, salary, post_date, education, position, experience, benefits, type

Candidate Keys:

{{jobID}}

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE job(  
    jobID          varchar(20),  
    title          varchar(40),  
    salary         double,  
    post_date      date,  
    education      varchar(40),  
    position       varchar(20) NOT NULL,  
    experience     varchar(40),  
    benefits       varchar(40),  
    type          varchar(40) NOT NULL,  
    PRIMARY KEY(jobID)) Engine=InnoDB;
```

4.7 Project

Relational Model:

project(projectID, title, start_date, status, description)

Functional Dependencies:

(projectID) -> title, start_date, status, description

Candidate Keys:

{{projectID}}

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE project(  
    projectID          varchar(20),  
    title              varchar(20),  
    start_date         date,  
    status             varchar(40),  
    description        varchar(40),  
    PRIMARY KEY(projectID)) Engine=InnoDB;
```

4.8 Applies

Relational Model:

applies(employeeID, jobID)

Functional Dependencies:

None

Candidate Keys:

{ (employeeID, jobID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE applies(  
    employeeID    varchar(20),  
    jobID         varchar(20),  
    PRIMARY KEY ( employeeID, jobID ),  
    FOREIGN KEY ( employeeID) REFERENCES employee(employeeID) ON UPDATE  
    CASCADE ON DELETE CASCADE,  
    FOREIGN KEY ( jobID) REFERENCES job(jobID) ON UPDATE CASCADE ON  
    DELETE CASCADE) Engine=InnoDB;
```

4.9 Review

Relational Model:

review(reviewID, employment_status, job_title, date, rating, location, comment, visibility)

Functional Dependencies:

reviewID -> employment_status, job_title, date, rating, location, comment, visibility

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE review(  
    reviewID          int PRIMARY KEY,  
    Employment_status bit NOT NULL,  
    job_title         varchar(40) NOT NULL,  
    publish_date      date NOT NULL,  
    rating            double NOT NULL,  
    location          varchar(40) NOT NULL,  
    comment           varchar(500) NOT NULL,  
    visibility        bit NOT NULL )  
requested           bit NOT NULL) Engine=InnoDB;
```

4.10 Publishes

Relational Model:

publishes(reviewID, employeeID)

Functional Dependencies:

None

Candidate Keys:

{ (reviewID, employeeID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE publishes(  
    reviewID          int,  
    employeeID        varchar(20),  
    PRIMARY KEY (reviewID),  
    FOREIGN KEY (reviewID) references review(reviewID) ON UPDATE CASCADE ON  
DELETE CASCADE,  
    FOREIGN KEY (employeeID) references employee(employeeID) ON UPDATE  
CASCADE ON DELETE CASCADE) Engine=InnoDB;
```

4.11 Related

Relational Model:

related(reviewID, companyID)

Functional Dependencies:

None

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE related(  
    reviewID          int,  
    companyID         varchar(20),  
    PRIMARY KEY ( reviewID),  
    FOREIGN KEY ( reviewID) references review(reviewID)ON UPDATE CASCADE ON  
DELETE CASCADE,  
    FOREIGN KEY ( companyID) references company(companyID) ON UPDATE  
CASCADE ON DELETE CASCADE) Engine=InnoDB;
```

4.12 Admin

Relational Model:

admin(adminID)

Functional Dependencies:

None

Candidate Keys:

{ (adminID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE admin(  
    adminID          varchar(20) PRIMARY KEY,  
    FOREIGN KEY(adminID) REFERENCES user(userID) ON UPDATE CASCADE ON  
    DELETE CASCADE) Engine=InnoDB;
```


4.13 Salary_Review

Relational Model:

salary_review(reviewID, salary)

Functional Dependencies:

reviewID -> salary

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE salary_review(  
    reviewID          int PRIMARY KEY,  
    salary            double NOT NULL,  
    FOREIGN KEY(reviewID) REFERENCES review(reviewID) ON UPDATE CASCADE  
ON DELETE CASCADE) Engine=InnoDB;
```

4.14 Benefits_Review

Relational Model:

benefits_review(reviewID, opportunities)

Functional Dependencies:

reviewID -> opportunities

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE benefits_review(  
    reviewID          int PRIMARY KEY,  
    opportunities     varchar(100) NOT NULL,  
    FOREIGN KEY(reviewID) REFERENCES review(reviewID) ON UPDATE CASCADE  
ON DELETE CASCADE) Engine=InnoDB;
```

4.15 General_Review

Relational Model:

general_review(reviewID, pros, cons, advice_to_management)

Functional Dependencies:

reviewID -> pros, cons, advice_to_management

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE general_review(  
    reviewID                int PRIMARY KEY,  
    pros                    varchar(100) NOT NULL,  
    cons                    varchar(100) NOT NULL,  
    advice_to_management    varchar(200),  
    FOREIGN KEY(reviewID) REFERENCES review(reviewID) ON UPDATE CASCADE  
ON DELETE CASCADE) Engine=InnoDB;
```

4.16 Interview_Review

Relational Model:

interview_review(reviewID, experiences, reach, difficulty, offer_status, length, questions)

Functional Dependencies:

reviewID -> experiences, reach, difficulty, offer_status, length, questions

Candidate Keys:

{ (reviewID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE interview_review(  
    reviewID                int PRIMARY KEY,  
    experiences              varchar(200) NOT NULL,  
    reach                    varchar(20) NOT NULL,  
    difficulty                int NOT NULL,  
    offer_status              bit NOT NULL,  
    length                    int NOT NULL,  
    Questions                varchar(200) NOT NULL,  
    FOREIGN KEY(reviewID) REFERENCES review(reviewID) ON UPDATE CASCADE  
    ON DELETE CASCADE ) Engine=InnoDB;
```

4.17 Members

Relational Model:

members(employeeID, projectID)

Functional Dependencies:

None

Candidate Keys:

{(employeeID, projectID)}

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE members (  
    employeeID      varchar(20),  
    projectID       varchar(10),  
    PRIMARY KEY ( employeeID, projectID),  
    FOREIGN KEY ( employeeID ) references employee(employeeID)ON UPDATE  
CASCADE ON DELETE CASCADE,  
    FOREIGN KEY ( projectID ) references project(projectID)ON UPDATE CASCADE  
ON DELETE CASCADE ) Engine=InnoDB;
```

4.18 Develops

Relational Model:

develops(projectID, companyID)

Functional Dependencies:

None

Candidate Keys:

{ (projectID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE related(  
    projectID          varchar(10),  
    companyID          varchar(20),  
    PRIMARY KEY ( projectID),  
    FOREIGN KEY ( projectID) references project(projectID) ON UPDATE CASCADE  
ON DELETE CASCADE,  
    FOREIGN KEY ( companyID) references company(companyID) ON UPDATE  
CASCADE ON DELETE CASCADE) Engine=InnoDB;
```

4.19 Offers

Relational Model:

offers(jobID, companyID)

Functional Dependencies:

None

Candidate Keys:

{ (jobID) }

Normal Form:

BCNF

Table Definition:

```
CREATE TABLE related(  
    jobID          varchar(10),  
    companyID      varchar(20),  
    PRIMARY KEY ( jobID),  
    FOREIGN KEY ( jobID) references job(jobID),  
    FOREIGN KEY ( companyID) references company(companyID) ) Engine=InnoDB;
```

4. Implementation Details

We have approached the project from three main branches: database; for storing the models and data, the frontend; for the view of the platform and the backend, for managing the interactions in between these two. We used the MariaDB server on the Dijkstra platform to build our database. In order to establish the connection between our local machines and the Dijkstra server we have used XAMPP. Our platform is based heavily on PHP and HTML, as the backbone of our backend is a combination of simple and complex HTML manipulations by the PHP scripts. The database is updated according to these manipulations and provides another a different view. We used a template from “Landed by HTML5up” as a starting point and changed it according to our needs in each step as we progressed.

❖ Technical problems that we faced

GitHub Integration

In order to increase our development speed and utilize each member’s potential we have worked separately, but kept up with each other’s progress via GitHub. The initial stages of integration and concurrent usage proved to be chaotic and inhibited our progress via faulty merges and connection failures.

Dijkstra Server

We needed to see the results of our backend manipulations, however the frontend of our system has not always been capable of visually displaying our progress. In this aspect, we have been using the Putty to directly access our database and seeing the contents of our tables. Direct access was essential to overcoming the obstacles on the way. However, the Putty system only allowed one terminal to work at a time, so all the other members of the group were forced out of the system, which caused a burden on our overall development speed.

5. Advanced Database Features

❖ Views

```
CREATE VIEW exceptAdmin AS (SELECT * FROM user WHERE userID > 9);
```

We use exceptAdmin view in admin_userList.page that admins can view user except themselves and remove them if they want. This view provides protection that admins cannot remove their accounts.

❖ Triggers

```
CREATE TRIGGER triger_review_after_delete
```

```
AFTER DELETE
```

```
ON company
```

```
FOR EACH ROW
```

```
BEGIN
```

```
DELETE FROM review WHERE reviewID in ( SELECT reviewID
```

```
FROM related
```

```
WHERE companyID = OLD.companyID)
```

```
END;
```

We use triger_review_after_delete in every page which requires deletion on company such as admin_userList.page.

6. User Manual

7.1 Register Page

Employee Sign Up

Fill the given from to register (*areas are mandatory)

*First Name

*Last Name

mehmet.sanisoglu@ug.bilkent.edu.tr

.....

Sign Up

Reset

The register pages differ according to the user type. There are two possible user types: employee and company. The system allows the employees to register to the system by providing minimal information such as: name, surname, a valid email address and password. On the other hand a company register requires more detailed information about the company's specifications.

Company Sign Up

Fill the given from to register (*areas are mandatory)

Aselsan

Tech

Comm

Burbank

mehmet.sanisoglu@ug.bilkent.edu.tr

.....

Private

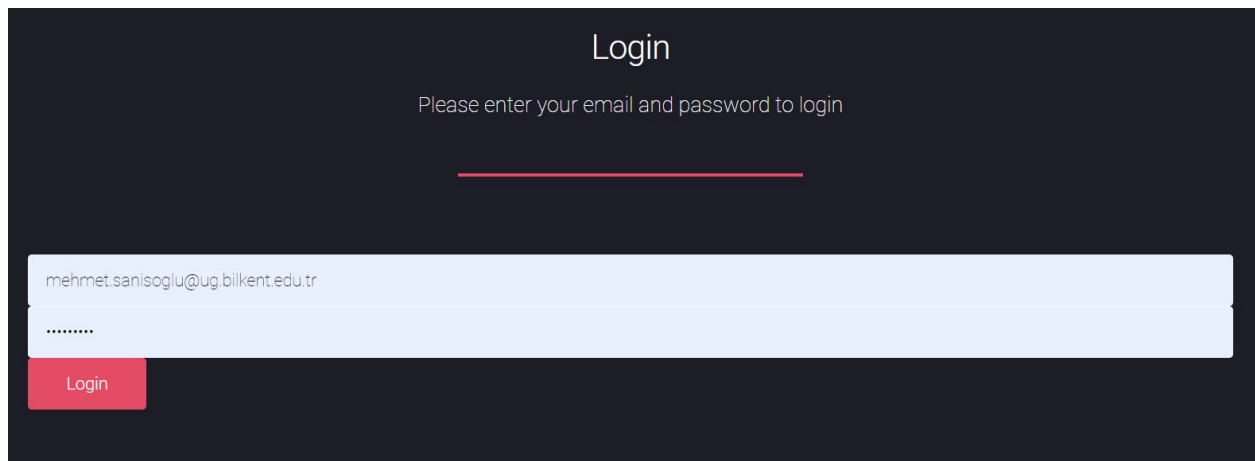
*Establish Date: 12/12/1997

Sign Up

Reset

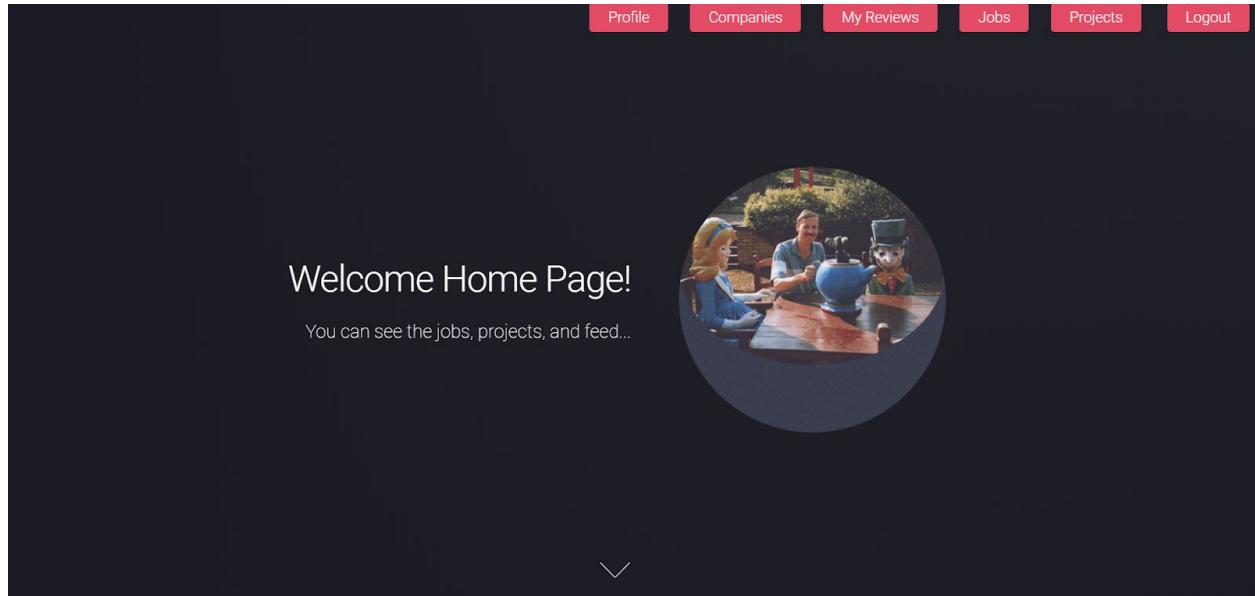
7.2 Login Page

After acquiring an account the user can enter their email and password to enter the system. The system checks and determines the user type from the provided email address, which is unique for every user.

The image shows a login page with a dark blue background. At the top center, the word "Login" is written in white. Below it, a message says "Please enter your email and password to login". A red horizontal line is positioned below the message. There are two light blue input fields: the first contains the email address "mehmet.sanisoglu@ug.bilkent.edu.tr" and the second contains a masked password "*****". A red "Login" button is located at the bottom left of the input fields.

7.3 Home Page

The home page acts as an anchor point for the user to come back to and access the full navigation that the site offers. The home page itself includes news, and feeds for the user.



7.4 Profile Page

The profile page differs according to the user type. These screens display the related information about their profiles.

My Profile		Home	Companies	My Reviews	Jobs	Projects	Logout
Details							
First Name	Mehmet						
Middle Name	Albert						
Last Name	Durmaz						
Gender	Male						
Position	Student						
Highest Education	Bachelors						
Location	Ankara						
Phone Number 1	05335212958						
Phone Number 2	-						
Email	mehmet@ug.bilkent.edu.tr						
Password	mehmet123						

7.5 Edit Profile Page

Each user can enter or update the information regarding their accounts in this screen. After their editing is done, they are transferred back to their profile page.

Edit Profile

Home

Profile

Companies

Jobs

Projects

First Name

Mehmet

Middle Name

Albert

Last Name

Durmaz

Highest Education

Bachelors

Position

Student

Location

Ankara

Phone Number 1

05335212958

Phone Number 2

-

Gender

Male

Email

mehmet@ug.bilkent.edu.tr

Password

mehmet123

Resume

Enthusiastic and willing ...

Update

Cancel

7.6 Company List Page

Home

Profile

Companies

Jobs

Projects

Logout

Company List

ipsum dolor feugiat aliquam tempus sed magna lorem consequat accumsan

Search Company

Select Filter(All show all companies)

Find

Sort By

Ascending Sort

Descending Sort

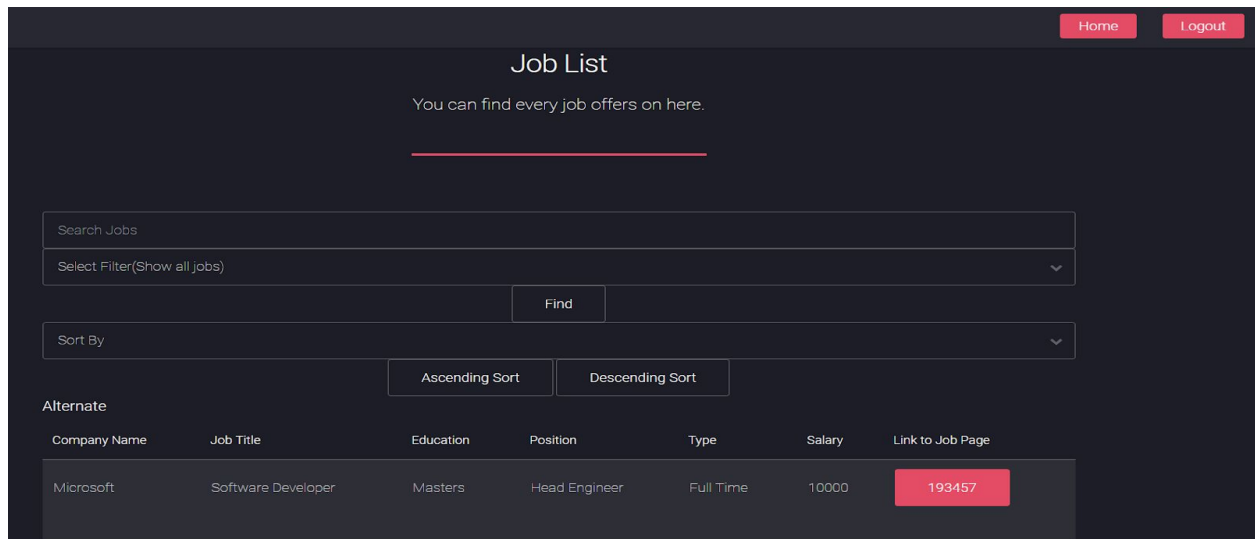
Alternate

Company Name	Industry	Sector	Revenue	Headquarter	Link to Company Page
Microsoft	Comm	Tech		Los Angeles	719733

The user can get a list view of the available job offers and go to their related pages. In order to ease the search process, the user can use the filter and sort features to examine the list easily.

7.7 Job List Page

The job list displays all the available jobs offers from different companies to the user. The user in turn, can filter and sort the offers and select one of them to get more information. The user is directed to the selected job's page.



The screenshot shows a web interface for a job listing page. At the top right, there are two buttons: "Home" and "Logout". The main heading is "Job List" with a subtitle "You can find every job offers on here." Below this is a search bar labeled "Search Jobs" and a filter dropdown labeled "Select Filter(Show all jobs)". A "Find" button is positioned between the search bar and the filter dropdown. Below the filter dropdown is a "Sort By" dropdown menu. Underneath the "Sort By" menu are two buttons: "Ascending Sort" and "Descending Sort". At the bottom, there is a table with the heading "Alternate". The table has seven columns: "Company Name", "Job Title", "Education", "Position", "Type", "Salary", and "Link to Job Page". The first row of data shows "Microsoft" as the company, "Software Developer" as the job title, "Masters" as education, "Head Engineer" as position, "Full Time" as type, "10000" as salary, and a red button labeled "193457" as the link to the job page.

Company Name	Job Title	Education	Position	Type	Salary	Link to Job Page
Microsoft	Software Developer	Masters	Head Engineer	Full Time	10000	193457

7.8 Job Page

Here the user can get more detailed information about the job they have selected. If they are content with the job specifications they can apply for the position, or they can choose to go back to jobs list.

My Profile

HomeLogout

Job Details

Job Title	Software Developer
Salary	10000
Post Date	2004-05-10
Education	Masters
Position	Head Engineer
Experience	5 years
Benefits	Insurance included
Type	Full Time

Apply this Job

Return to All Jobs

7.9 Project List Page

From the home page the user can access a list of projects that are developed by various companies and keep up with the ongoing trends in different sectors.

HomeProfileCompaniesJobsProjects

Project List

You can find every projects here.

Search Projects

Select Filter(Show all projects)

Find

Sort By

Ascending SortDescending SortFilter Finished ProjectsFilter Ongoing Projects

Alternate

Company Name	Project Title	Status	Link to Project Page
Microsoft	bkhj	Finished	207518

7.10 Project Page

The project page can inform the user about the details of the project they have selected.

Project Details		Home	Companies	Jobs	Projects	Logout
Project Title	bkhj					
Start Date	0001-01-01					
Status	Finished					
Description	jkbh					
Return To Project List		Go To Company Page				

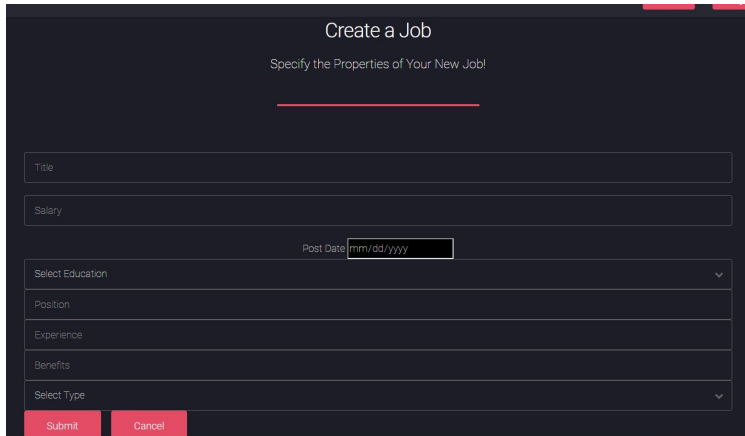
7.11 Followers Page

A company can see its followers in the Followers Page. Followers can be sorted or filtered by their first names, surnames and highest educations. Company can search among all followers by using search bar.

Followers		Home	Logout
This is your folowers			
<hr/>			
<input type="text" value="Search Employee"/>			
<input type="text" value="Select Filter(All followed companies)"/>			
		<input type="button" value="Find"/>	
<input type="text" value="Sort By"/>			
		<input type="button" value="Ascending Sort"/> <input type="button" value="Descending Sort"/>	
Alternate			
Employee Name	Employee Surname	Highest Education	Link to Employee Page
ayca	begum	Empty	<input type="button" value="992779"/>

7.12 Create a Job Page

By specifying the related information, the company user can create a new job offer for other users to search and apply to.



The screenshot shows a web form titled "Create a Job" with the subtitle "Specify the Properties of Your New Job!". The form is set against a dark background. It contains several input fields: "Title", "Salary", and "Post Date" (with a date picker icon and the format "mm/dd/yyyy"). Below these are five dropdown menus labeled "Select Education", "Position", "Experience", "Benefits", and "Select Type". At the bottom of the form are two buttons: "Submit" and "Cancel".

7.13 Create a Project Page

A company can create a project by specifying its title, project status, start date and project description.

[Home](#)[Logout](#)

Create a Project

Create a project of your own!

Start Date

Enter your project description here.

Submit

Cancel

7.14 Job List Page

Here the company user can see all of the job offers that they have put up and go to their detailed information pages.

[Home](#)
[Logout](#)

Job List

You can find your company's job offerings from here.

Alternate

Job Title	Experience	Position	Link to Job Page
Software Developer	5 years	Head Engineer	193457

7.15 Project List

With the help of Project List view, the company can keep track of the projects they have been developing with a list view. They can select a project for more detailed information.

[Home](#)
[Profile](#)
[Logout](#)

Project List

You can find every projects from the company here.

Alternate

Project Title	Status	Link to Project Page
blkhj	Finished	207518

7.16 My Reviews Page

A company can see its reviews by their reviewIDs, Publisher Names, Review Types and Status. If a company want to request from admins to delete a review, the company should press

DISPLAY button and redirect to the Display Review Page, and then request that review to be deleted. If the requested review is deleted, deleted review will be disappeared.

MY REVIEWS				
You can see all reviews here. If your requests are accepted, they will disappear.				
Review ID	Publisher Name	Review Type	DISPLAY	Status
121727	ayca	benefits_review	121727	not requested
222038	ayca	salary_review	222038	waiting for removal
406930	Mehmet	interview_review	406930	not requested

7.17 Add a Worker Page

The company can use this screen to add their companies' rooster.

Search Employee			
Select Filter(All employees)			
Find			
Alternate			
Employee Name	Employee Surname	Highest Education	Link to Employee Page
erdem	ege		190223
Mehmet	Durmaz	Bachelors	222646
ayca	begum	Empty	992779
ugur	gudukbay		995408

7.18 Show Workers

The company user can get a list view of the employees that work for them and go to their profile pages for additional information.

Workers

These are your workers

Select Filter(All workers)

▼

Find

Sort By

▼

Ascending Sort

Descending Sort

Alternate

Employee Name	Employee Surname	Highest Education	Link to Employee Page
ayca	begum	Empty	992779

8. Website

Our project directory with reports

Project directory:

<https://github.com/aeyc/Company-Interview-and-Employment-Review-Platform-Database-System.git>