

Automation Of Grievance Redressal Mechanism



BTech/III Year CSE/V Semester

15CSE302/Database Management Systems

Project Review -2

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Chapter 4 Normalization

Tables created from relational schema mapping

- User(Aadhar_no, Username(FK), Name, email, City, State, DOB)
- Phone_no(Aadhar_no, phone_no)
- Grievance_status(Grievance_id, id, Aadhar_no (FK), Emp_aadhar (FK)Contact_id, status)
- Department(dep_name, dep_id, No_of_complaints)
- Employee(Emp_aadhar, Username (FK), emp_name, count, email, city, state)
- Phone_no(Emp_aadhar, phone_no)
- Inquires(Emp_aadhar,dep_id,inquiry_sent_date)
- Grievance(grievance_id, Aadhar_no,grievance_type, Received_date, Department)
- Login Details(Username, Password)

All attributes put together in one table:

Grievance_Mechanism (Username, Password, uname, uemail, ucity, ustate, aadharNo, phone_no, u_dob, count, emp_name, emp_aadhar, emp_city, emp_state, ephone_no, count, emp_email, emp_dob, grievance_id, received_date, grievance_type, Inquiry_sent_date, dep_id, Dep_name, no_of_complaints, status,emp_id)

Table populated with 5 records :

[Initial Populated Table](#)

Functional Dependencies:

- grievance_id -> dep_id
- grievance_id -> grievance_type
- grievance_id -> received_date
- grievance_id -> status
- username -> uname
- username -> uemail
- username -> ucity
- username -> ustate
- username -> aadhar_no
- username -> password
- username -> phone_no
- username -> u_dob

- username -> emp_name
- username -> emp_aadhar
- username -> emp_city
- username -> emp_state
- username -> ephone_no
- username -> emp_email
- username -> emp_dob
- username -> emp_id
- emp_id -> count
- dep_id -> dep_name
- dep_id -> no_of_complaints
- emp_id -> inquiry_sent_date
- username -> grievance_id

Attribute Closure:

- $Grievance_id^+ = \{dep_id, grievance_type, received_date, status\}$
- $Username^+ = \{uname, uemail, ucity, ustate, aadhar_no, password, phone_no, u_dob, emp_name, emp_aadhar, emp_city, emp_state, ephone_no, emp_email, emp_dob, emp_id, count, inquiry_sent_date\}$
- $Emp_id^+ = \{count, inquiry_sent_date\}$
- $Dep_id^+ = \{dep_name, no_of_complaints\}$

FD Closure:

- username -> count
- username -> dep_id, grievance_type, received_date, status
- grievance_id -> dep_name, no_of_complaints.
- grievance_id -> dep_name, grievance_type, received_date, status
- username -> uname, uemail, ucity, ustate, aadhar_no, dob, password, phone_no, u_dob, emp_name, emp_aadhar, emp_city, emp_state, ephone_no, emp_email, emp_dob, emp_id
- emp_id -> count, inquiry_sent_date
- dep_id -> dep_name, no_of_complaints

Canonical Cover:

- grievance_id -> dep_name, grievance_type, received_date, status
- username -> uname, uemail, ucity, ustate, aadhar_no, dob, password, phone_no, u_dob, emp_name, emp_aadhar, emp_city, emp_state, ephone_no, emp_email, emp_dob, emp_id
- emp_id -> count, inquiry_sent_date
- dep_id -> dep_name, no_of_complaints, inquiry_sent_date

A Table is in 1NF if it satisfies the below conditions:

- Primary key is there for all the tables
- No Repeating group of columns
- Atomic value of attributes

Checking if they are in 1NF:

- Primary Key: username, grievance_id, dep_id
- Repeating group of columns: There are repeating group of columns like uemail, emp_email; emp_state, ustate; ucity, emp_city; u_dob, emp_dob so they all can be removed and only one column can be kept for each type and can be put in the same table.
- Atomic value of attributes: No they don't have atomic values so they can be put in different rows. So the primary key can be put like:
username, grievance_id, dep_id, phone_no

Thus, the tables are in 1NF.

So now the schema is:

Grievance_Mechanism(Username, grievance_id, dep_id, emp_id, phone_no, Password, name, email, city, state, aadharNo, dob, phone_no, received_date, count, grievance_type, Inquiry_sent_date, Dep_name, no_of_complaints, status,)

Anomalies:

- Update anomaly: Yes, When a user changes email_id it has to be changed in multiple rows if the user has multiple phone_no.
- Insertion anomaly: Yes, Even if the user has not yet sent any grievance then you can't add the value because grievance_id is one of the attributes in the primary key.

- Deletion anomaly: Yes, if the user deletes his account then the information about the grievance is also lost.

A Table is in 2NF if it satisfies the below conditions:

- It is in 1NF
- No partial dependency exists.

Checking if they are in 2NF:

- They are in 1NF
- The following partial dependency exists
 - grievance_id -> dep_name, grievance_type, received_date, status
because the attribute grievance id is part of the composite primary key
 - username -> name, email, city, state, aadhar_no, dob, password
as username is one of the prime attributes
 - dep_id -> dep_name, no_of_complaints
as dep_id is one of prime attributes

As the tables are not in 2NF it is decomposed, to the tables as mentioned below.

Now the schema is:

- Login_Details(username,password)
- Details(username,name,email,state,city,dob,aadhar_no)
- Phone_no(username,phone_number)
- Department(dep_id,dep_name,no_of_complaints)
- Emp_count(emp_id,count)
- Grievance(grievance_id,username,emp_id,dep_id,grievance_type,received_date,dep_name,status,inquiry_sent_date)
- employee_identification(username,emp_id)

A Table is in 1NF if it satisfies the below conditions:

- All the tables should have a primary key
- Atomic value of attributes
- No repeating group of columns

Checking if they are in 1NF:

- All the decomposed tables have a primary key
 - Login_Details - username
 - Details - username
 - Phone_no - username
 - Department - dep_id
 - Emp_count - emp_id,
 - Grievance - grievance_id,username,emp_id,dep_id
- No Repeating group of columns - In all the decomposed tables there are no repeating group of columns.
- Atomic value of attributes - All the values are atomic in nature, the multi-valued attribute phone number is put in a different table

Thus the tables are in 1NF.

A Table is in 2NF if it satisfies the below conditions:

- The tables have to be in 1NF
- All non-key attributes are fully functionally dependent on the primary key.

Checking if they are in 2NF:

- All the decomposed tables are in 1NF.
- All decomposed tables Login_Details ,Details,Phone_no,Department, Emp_count have only a primary key with one attribute therefore they have no partial dependencies where as in the case of the table Grievance there exists a partial dependencies as the non prime attributes depend only on grievance_id which is part of the composite primary key. Thus it is further decomposed into tables.

As the decomposed tables are not in 2NF, it is further decomposed, to the tables as mentioned below.

Now the schema is:

- Login_Details(username,password)
- Details(username,name,email,state,city,dob,aadhar_no)
- Phone_no(username,phone_number)
- Department(dep_id,dep_name,no_of_complaints)
- Grievance_dept(username,grievance_id,emp_id)

- Inquiry(emp_id, grievance_id, dep_id, inquiry_sent_date)
- Emp_count(emp_id, count)
- Grievance(grievance_id, grievance_type, received_date, dep_name, status)
- employee_identification(username, emp_id)

A Table is in 1NF if it satisfies the below conditions:

- All the tables should have a primary key
- Atomic value of attributes
- No repeating group of columns

Checking if they are in 1NF:

- All the decomposed tables have a primary key
 - Login_Details - username
 - Details - username
 - Phone_no - username
 - Department - dep_id
 - Grievance_dept - username, grievance_id, emp_id
 - Inquiry - emp_id, grievance_id, dep_id
 - Emp_count - emp_id
 - Grievance - grievance_id
 - Employee_Identification- username, emp_id
- No Repeating group of columns - In all the decomposed tables there are no repeating group of columns, The repeating group of columns where combined earlier.
- Atomic value of attributes - All the values are atomic in nature, the multi-valued attribute phone number is put in a different table.

Thus the tables are in 1NF.

A Table is in 2NF if it satisfies the below conditions:

- The tables have to be in 1NF
- All non-key attributes are fully functionally dependent on the primary key.

Checking if they are in 2NF:

- All the decomposed tables are in 1NF.
- All non-key attributes are fully functionally dependent on the primary key, tables Emp_count, Grievance, Login_Details, Details, Phone_no, Department have only a single attribute primary key, In the other tables there are no practical dependencies.

Thus the tables are in 2NF.

A Table is in 3NF if it satisfies the below conditions:

- Table is in 2NF
- No transitive dependency exists in the relations.

Checking if they are in 3NF:

- The tables are in 2NF as proved above.
- The decomposed tables don't contain any transitive dependencies, therefore it is in third normal form

Thus the tables are in 3NF.

A Table is in BCNF if it satisfies the below conditions:

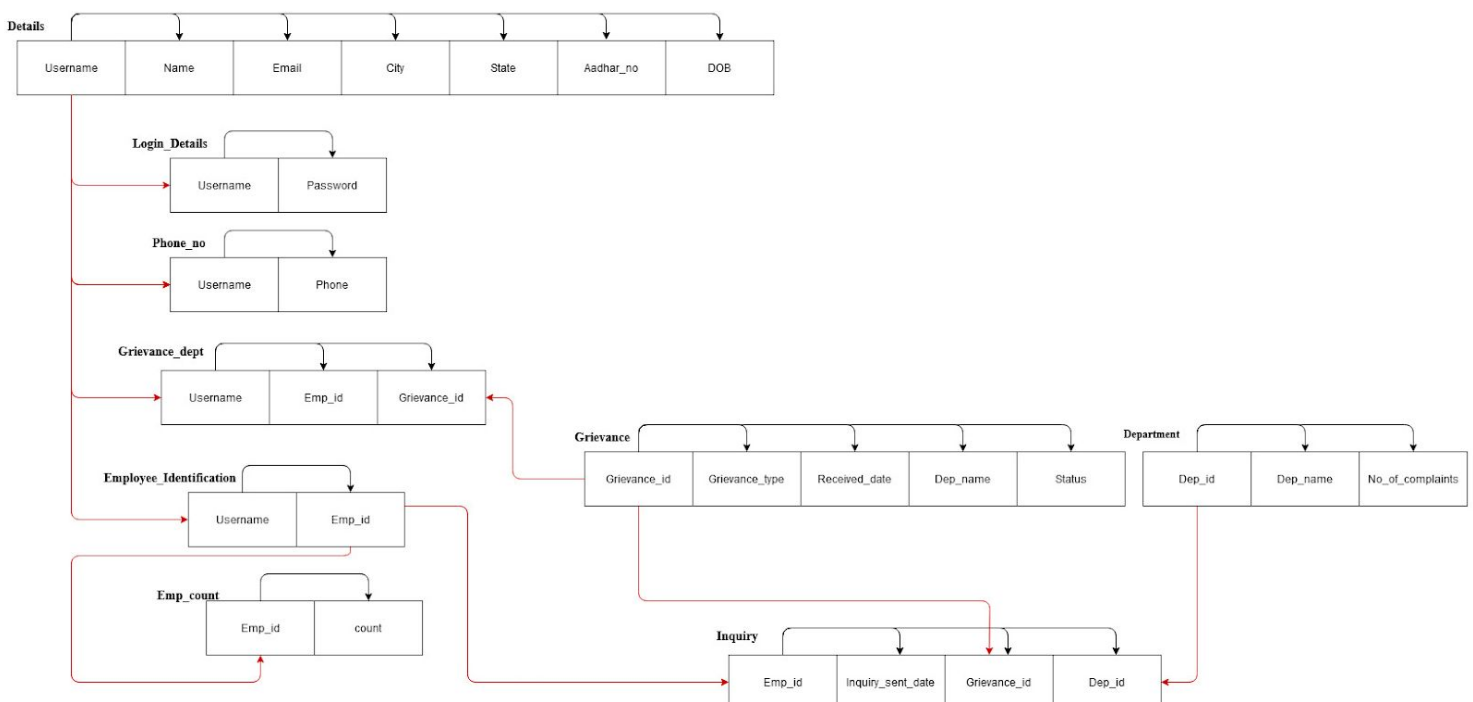
- Table is in 3NF
- No non-trivial dependencies exist, all non prime attributes depend on the primary keys/key of their respective tables.

Thus the tables are in BCNF.

Lossless Decomposition using chase method

[Chase Method - XLS](#)

Dependency Diagram:



Dependency Preserving Proof:

Dependencies of each table:

- Login_Details(username,password):
Dependency: username -> password
- Details (username, name,email,state,city,dob,aadhar_no):
Dependency: username -> name,email,state,city,dob,aadhar_no
- Phone_no(username,phone_number):
Dependency: username -> phone_number
- Department(dep_id,dep_name,no_of_complaints):
Dependency: dep_id -> dep_name,no_of_complaints
- Grievance_dept(username,grievance_id,emp_id):
Dependency: username -> grievance_id, emp_id
- Inquiry(emp_id,grievance_id,dep_id,inquiry_sent_date):
Dependency: emp_id -> inquiry_sent_date
- Emp_count(emp_id,count):
Dependency: emp_id -> count
- Grievance(grievance_id,grievance_type,received_date,dep_name,status):
Dependency: grievance_id -> grievance_type, received_date, dep_name, status
- Employee_identification(username,emp_id):
Dependency: username -> emp_id

Union of all dependencies from decomposed table:

- Username -> Password, Name, Email, City ,State,Aadhar_no,DOB,Phone_number, Grievance_id, Emp_id
- Dep_id -> Dep_name, No_of_complaints
- Emp_id -> Count, Inquiry_sent_date
- Grievance_id -> Grievance_type, Received_date, Dep_name, Status

Functional dependencies:

- Username -> Password
- Username -> name
- Username -> email
- Username -> city
- Username -> state
- Username -> aadharNo
- Username -> dob

- Username -> phone_no
- Username -> Emp_id
- Username -> grievance_id
- Dep_id -> Dep_name
- Dep_id -> no_of_complaints
- grievance_id -> dep_id
- grievance_id -> status
- grievance_id -> received_date
- grievance_id -> grievance_type
- emp_id -> count
- emp_id -> inquiry_sent_date

Since all dependencies present in the schema are present in the union of all dependencies from the decomposed table, we can say that the decomposition is dependency preserving.

Tables

[Final Schema with the data](#)

Chapter 5 - Creation of tables:

Database table screenshots:

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'SCHEMAS' tree with 'usersdb' expanded, showing tables like 'department', 'details', 'employee', 'employee_count', 'grievance', 'grievance_dept', 'inquiry', 'login', 'phone_no', 'Columns', 'Indexes', 'Foreign Keys', and 'Triggers'. The main query editor shows a query: `select * from `usersdb`.`grievance_dept`;`. The 'Result Grid' displays the following data:

username	grievance_id	emp_id
tusharkr	KU754	A0010
junaifez	UI752	A0020
virajram	AJ890	A0021
sakshipalak	JB865	B0010
devikav	BH128	C0010
anadjosh	DF223	C0020
raunak_77	BK675	C0021
vijayp_89	AK122	D0010
radhikash	KF452	D0011
jayepay2	WD998	E0010
NULL	NULL	NULL

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'SCHEMAS' tree with 'usersdb' expanded, showing tables like 'department', 'details', 'employee', 'employee_count', 'grievance', 'grievance_dept', 'inquiry', 'login', 'phone_no', 'Columns', 'Indexes', 'Foreign Keys', and 'Triggers'. The main query editor shows a query: `SELECT * FROM usersdb.department;`. The 'Result Grid' displays the following data:

dep_id	dep_name	no_of_complaints
A001	Department of Economic Affairs	30
B001	Department of Expenditure	20
C001	Department of Revenue	15
D001	Department of Financial Services	45
E001	Department of Investment and Public Asset Ma...	35
NULL	NULL	NULL

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator: Query 1 SQL File 1* SQL File 2* SQL File 4* SQL File 5* SQL File 7* SQL File 8* SQL File 9* SQL File 10* SQL File 11* department details x

SCHEMAS

Filter objects

sakila
 Tables
 Views
 Stored Procedures
 Functions
 sys
 usersdb
 Tables
 department
 details
 employee
 employee_count
 grievance
 grievance_dept
 inquiry
 login
 phone_no
 Views
 Stored Procedures
 Functions
 world

Administration Schemas

Information

Table: details

1 • SELECT * FROM usersdb.details;

Result Grid

username	name	email	state	city	dob	aadhar_no
anandjoshi	Anandhi Bai Joshi	anandjoshi@gmail.com	Maharashtra	Pune	1989-03-29	498067608621
ananthu	Anant Kausik	ananth@gmail.com	Uttar Pradesh	Bareilly	1992-06-10	753167349010
devikav	Devika Vatsa	devikavatsa389@gmail.com	Maharashtra	Mumbai	1987-10-20	336700622347
jayapay2	Jayant Parekh	jayapaye890@gmail.com	Andhra Pradesh	Hyderabad	1998-04-23	902134568934
junaifez	Junaid Feroz	junaidkhan@gmail.com	Tamil Nadu	Chennai	1985-10-02	510927678934
muditmuk09	Mudit Anand	muditmukanand@gmail.com	Himachal Pradesh	Manali	1993-02-10	898067678934
murugeshmani	Murugesh Mankandan	muran98@gmail.com	Tamil Nadu	Neyveli	1991-10-10	498067679021
navyanavy	Navya Naveli	navyarajdeep@gmail.com	Andhra Pradesh	Guntur	1986-04-08	753109098934
rachitkj	Rachit Jain	rachitj@gmail.com	Punjab	Amritsar	1991-02-08	753109098934
radhikash	Radhika Verma	radhikash89@gmail.com	Madhya Pradesh	Bhopal	1998-06-05	236876459421
raunak_77	Raunak Ram	raunakr@gmail.com	Karnataka	Bangalore	1989-01-21	895510239891
sakshipalak	Sakshi Palak	sakship9021@gmail.com	Punjab	Amritsar	1989-08-17	602309098934
sashatri	Sasha Tripathi	sashatripathi@gmail.com	Rajasthan	Jaipur	1978-01-20	567167679891
shreya_p	Shreya Padman	shreyasashi@gmail.com	Kerala	Kochi	1992-03-20	567190239891
somesh_puri	Somesh Puri	smeshwar23@gmail.com	Karnataka	Mangalore	1988-01-27	301990239891
tanmayk	Tanmay Kankaria	tanmayk@gmail.com	Maharashtra	Mumbai	1990-09-01	336789012345
tusharkr	Tushar Krishnan	tskumar90@gmail.com	Uttar Pradesh	Lucknow	2004-07-10	320967349123
vijayp_89	Vijay Prasad	vijayprad21@gmail.com	Keral	Kannur	1998-11-20	320067679891

Apply Revert

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator: SQL File 1* SQL File 2* SQL File 4* SQL File 5* SQL File 7* SQL File 8* SQL File 9* SQL File 10* SQL File 11* department details inquiry x

SCHEMAS

Filter objects

sakila
 Tables
 Views
 Stored Procedures
 Functions
 sys
 usersdb
 Tables
 department
 details
 employee
 employee_count
 grievance
 grievance_dept
 inquiry
 login
 phone_no
 Views
 Stored Procedures
 Functions
 world

Administration Schemas

Information

Table: inquiry

1 • SELECT * FROM usersdb.inquiry;

Result Grid

grievance_id	emp_id	dep_id	inquiry_sent_id
KU754	A0010	A001	2020-01-18
UI752	A0020	B001	2020-03-05
AJ890	A0021	C001	2017-10-02
JB865	B0010	B001	2020-08-01
BH128	C0010	D001	2020-01-21
DF223	C0020	C001	2020-07-18
BK675	C0021	D001	2019-12-12
AK122	D0010	A001	2018-05-21
KF452	D0011	E001	2019-03-12
WD998	E0010	A001	2020-04-12
NULL	NULL	NULL	NULL

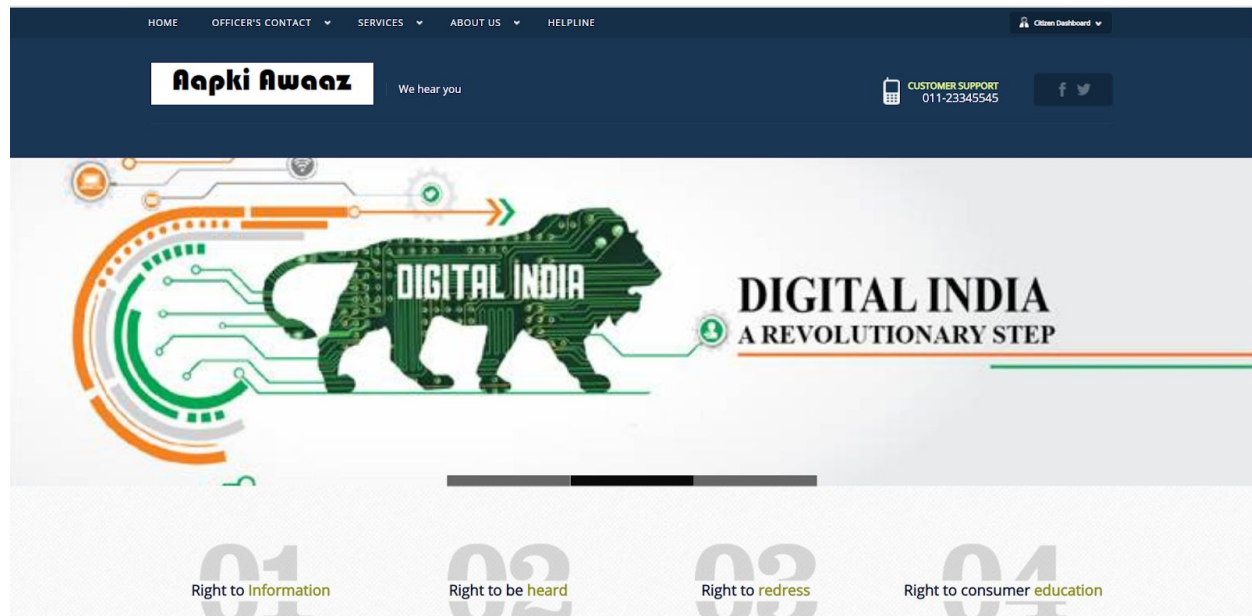
Apply Revert

Chapter 6 - UI screenshots:

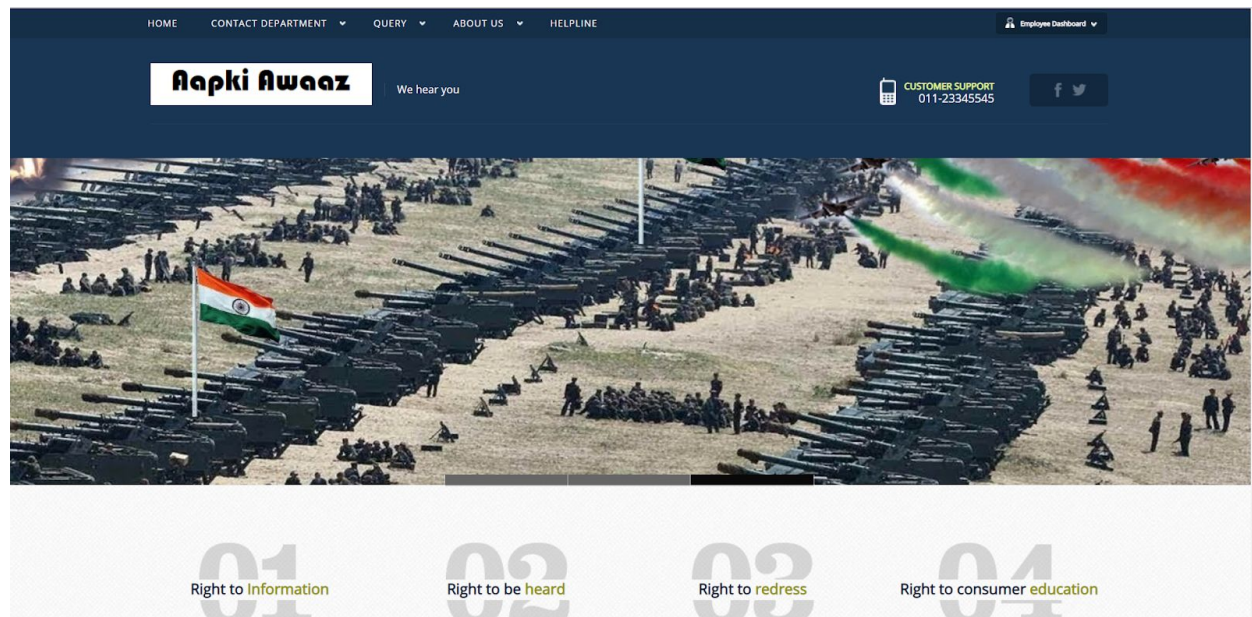
Website dashboard



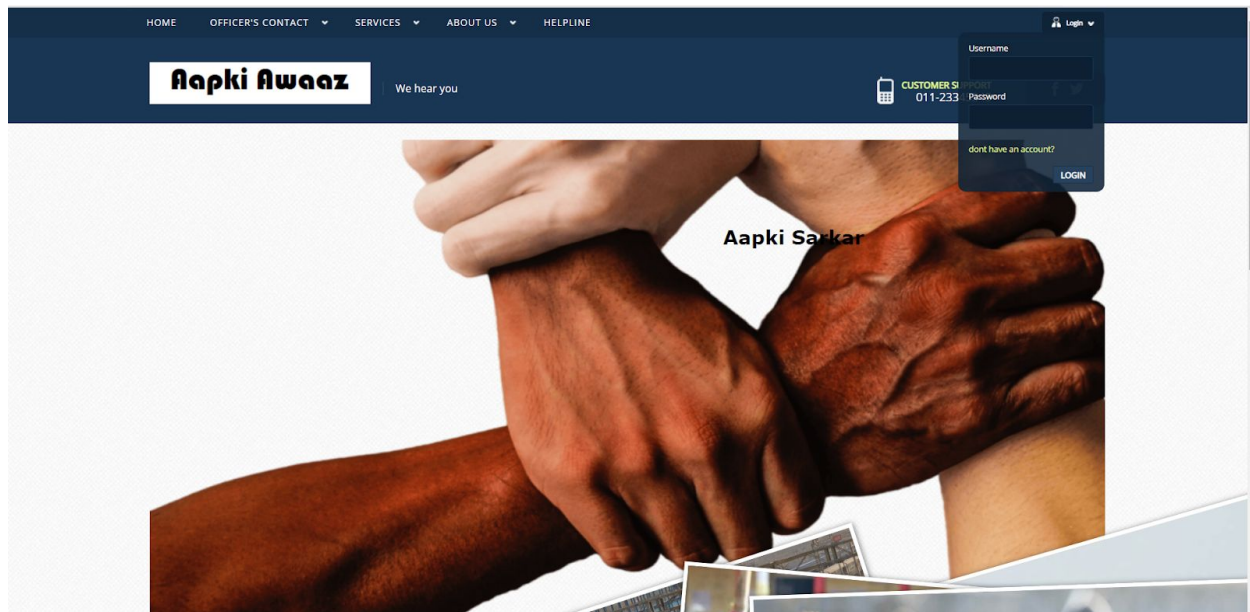
User Dashboard:



Employee Dashboard:

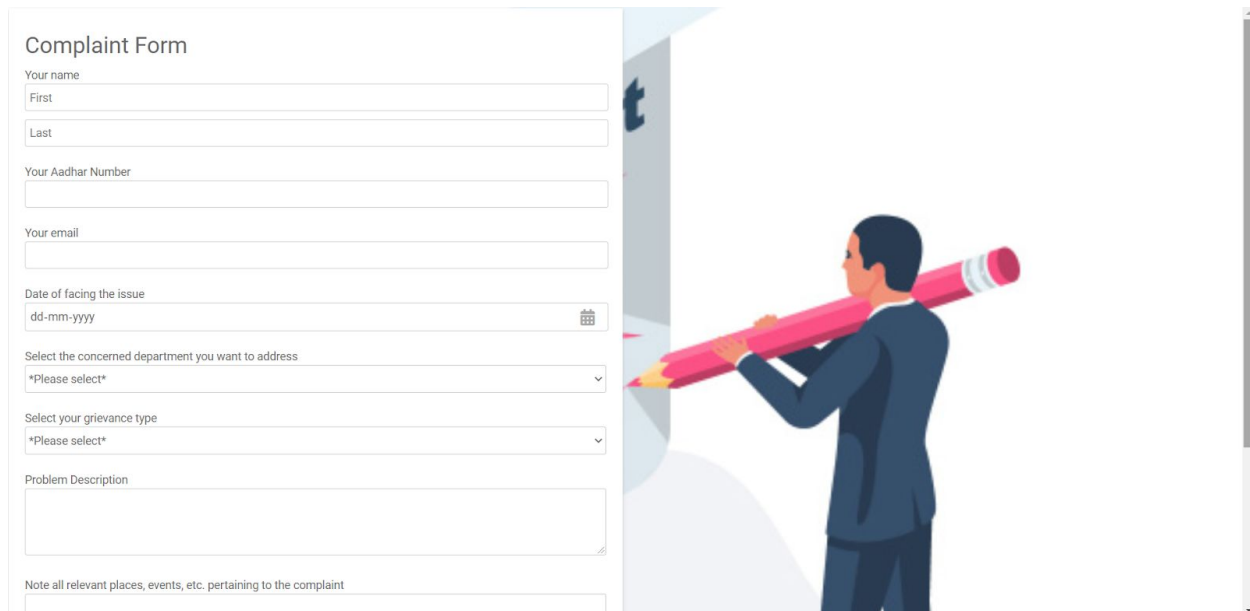


User login page:



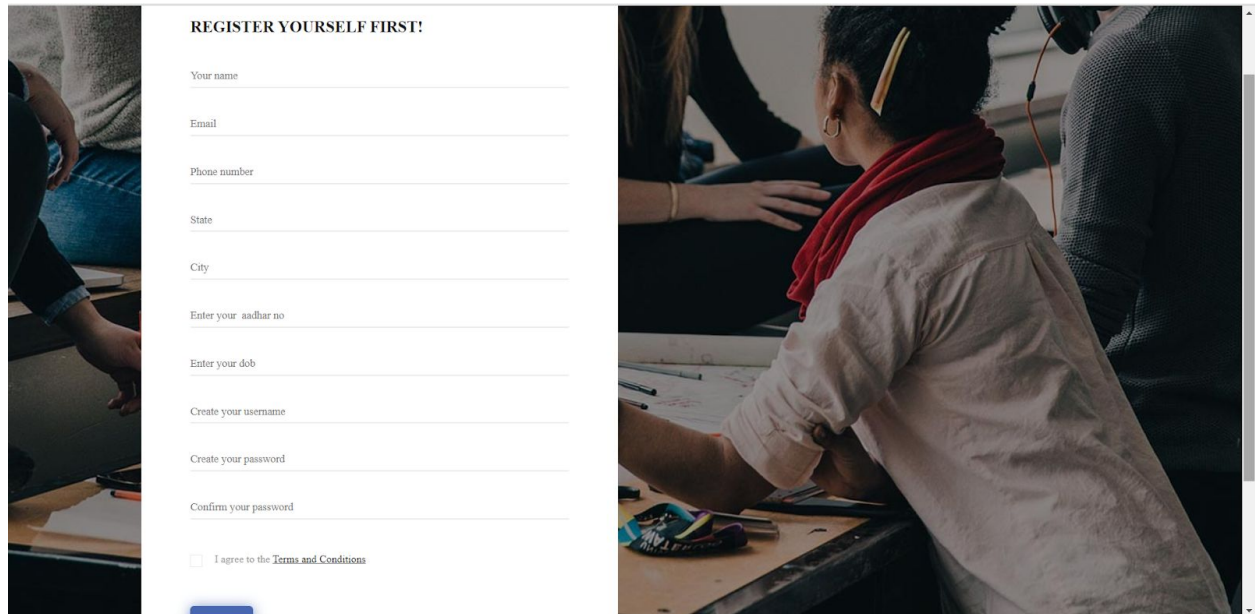
The screenshot shows the user login page of the Aapki Awaaz portal. The header is dark blue with navigation links: HOME, OFFICER'S CONTACT, SERVICES, ABOUT US, and HELPLINE. The Aapki Awaaz logo is prominently displayed, along with the tagline 'We hear you'. A customer service icon and the number 011-233 are also visible. On the right, there is a login form with fields for Username and Password, a 'Login' button, and a link for 'dont have an account?'. The background features a large image of hands clasped together, with the text 'Aapki Sarkar' overlaid.

Complaint Form:



The screenshot displays the Complaint Form on the Aapki Awaaz portal. The form is titled 'Complaint Form' and includes the following fields: Your name (First and Last), Your Aadhar Number, Your email, Date of facing the issue (dd-mm-yyyy), Select the concerned department you want to address (*Please select*), Select your grievance type (*Please select*), Problem Description, and a note field for relevant places, events, etc. pertaining to the complaint. To the right of the form is a large illustration of a man in a blue suit holding a large pink pencil, standing next to a wall with a large 't' logo.

Registration Form:



The image is a composite of two parts. On the left, there is a registration form titled "REGISTER YOURSELF FIRST!". The form includes input fields for "Your name", "Email", "Phone number", "State", "City", "Enter your Aadhar no", "Enter your dob", "Create your username", "Create your password", and "Confirm your password". At the bottom, there is a checkbox labeled "I agree to the Terms and Conditions" and a blue button. On the right, there is a photograph of a person with dark hair tied back, wearing a white shirt and a red scarf, sitting at a desk and working on a laptop. The person is wearing a headset with a microphone. The background is slightly blurred, showing other people in a similar setting.

REGISTER YOURSELF FIRST!

Your name _____

Email _____

Phone number _____

State _____

City _____

Enter your Aadhar no _____

Enter your dob _____

Create your username _____

Create your password _____

Confirm your password _____

☐ I agree to the [Terms and Conditions](#)

References:

[1] Page Title: Data.gov.in - Database, Accessed: 7th October 2020
URL: <https://data.gov.in/search/site?query=Darpg>

[2] Page Title: CPGRAMS-home, Accessed: 6th October 2020
URL: <https://pgportal.gov.in/>

[3] Page Title: National Government of India, Accessed: 6th October 2020
URL: <https://www.india.gov.in/>