Term Project: CareConnect Health System

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CEIT390: Database Management Systems

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Month Day, 2024

Introduction

Computer Education and Instructional Technology is one of the most important disciplines under education. However, most hospital systems have end-user interfaces that are not efficient. In Database Management Systems (DBMS), our aim is to build a structure that can achieve the following goals:

- Ensure compatibility and optimal performance across all devices.
- Minimize data loss and enhance data security.
- Provide a user-friendly interface.
- Assist users in making accurate and informed selections

In our project, the database management system (DBMS) plays a central role in ensuring the efficiency and functionality of our system. Every action performed by the users is saved and can be monitored by the database administrator.

In our system, we were unable to focus on essential aspects such as security, improved locking mechanisms, and enforcing constraints to prevent simultaneous work on the same task by multiple users. The primary aim of this system is to demonstrate and execute some of its expected functionalities.

Our DBMS includes the following functionalities:

- A Log-In mechanism to distinguish user groups, specifically designed for patient access.
- Patient functionalities include:
 - Adjusting personal information.
 - Scheduling new appointments with their desired department, doctor, and location.
 - Viewing one's scheduled appointments.
 - Receiving suggestions on which department to visit based on their symptoms by answering a series of questions, and guidance to book the appropriate appointment.

- o Viewing their medical history and doctor associations.
- o Accessing test results and medical images such as MRIs and X-rays.
- All actions performed by patients are saved and can be monitored by the database administrator for maintenance and oversight purposes.

For this project, we developed the user interfaces using Visual Studio 2022 IDE. The database management system was implemented using phpMyAdmin

Schema Design

The database schema and table properties were developed using the phpMyAdmin management tool. Below, we present the design properties for each table:

Register_info Schema

#	Name	Туре	Collation	Attributes	Null
1	tc 🔑	bigint(20)			No
2	pwd	varchar(255)	utf8mb4_general_ci		No
3	register_date	datetime			No

- tc: This column stores the Turkish Republic number, which serves as the primary key and login identifier for users.
- pwd: This column stores the password information for user authentication.
- register_date: This column records the date when the user registered in our system.

Kisisel_bilgiler Schema

#	Name	Туре
1	tc 🔑	bigint(20)
2	isim	varchar(50)
3	soyisim	varchar(50)
4	cinsiyet	enum('Erkek', 'Kadın')
5	kan_grubu	enum('A Rh+', 'A Rh-', 'B Rh+', 'B Rh-', 'AB Rh+',
6	adres	text
7	aile hekimi	varchar(100)

- tc: This column stores the Turkish Republic number, serving as the primary key and login identifier for users.
- isim: This column stores the user's first name.
- soyisim: This column stores the user's surname.
- gender: This column indicates the user's gender.
- kan grubu: This column stores the user's blood type.
- adres: This column stores the user's address information.

aile hekimi: This column stores the name of the user's responsible doctor.

The 'Register_info' and 'kisisel_bilgiler' tables are related. In instances where a user registers but has not yet provided personal information, the 'kisisel_bilgiler' table will be created with null values, resulting in a blank display. Subsequently, as users decide to furnish their personal information, the table will be updated accordingly. However, it is noteworthy that in the general usage of the system, the presence or absence of data in the 'kisisel_bilgiler' table does not significantly impact the functionality of the program. The relation is provided below;



Randevular schema

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	tc	bigint(20)			Yes	NULL		
2	doktor_ıd	int(20)			Yes	NULL		
3	randevu_id 🔑	int(11)			No	None		AUTO_INCREMENT
4	tarih	date			Yes	NULL		

- **tc:** This column stores the Turkish Republic number, serving as a unique identifier for patients.
- **doktor_id:** This column stores the ID of the doctor selected by the patient. It is related to the 'doktorlar' schema.
- randevu_id: This column serves as an exclusive identifier for each appointment, facilitating unique selection for update, delete, and filtering purposes.
- tarih: This column stores the date of the appointment.

Doktorlar schema

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	doktor_ıd 🔑	int(20)			No	None		AUTO_INCREMENT
2	doktor_isim	varchar(255)	utf8mb4_general_ci		Yes	NULL		
3	departman 🔎	varchar(255)	utf8mb4_general_ci		Yes	NULL		
4	hastane 🔊	varchar(255)	utf8mb4_general_ci		Yes	NULL		

- doktor_id: This column serves as a unique identifier for doctors and is auto-incremented.
- doktor isim: This column stores the name of the doctors.
- departman: This column stores the department to which the doctor belongs. This information is retrieved from another table called 'departmanlar' to avoid redundancy.
- hastane: This column stores the hospital where the doctor is currently working. This information is retrieved from another table called 'hastane', which contains details about the hospital, including its name and location.

Departmanlar schema



- department_id: This column serves as an auto-incremented unique identifier for departments.
- departman_adi: This column stores the name of the departments.

Hastane schema

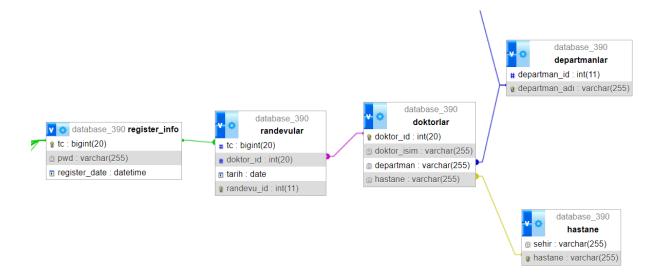
#	Name	Туре	Collation
1	sehir	varchar(255)	utf8mb4_general_ci
2	hastane 🔑	varchar(255)	utf8mb4_general_ci

- sehir: This column stores the location (city) of the hospital.
- hastane: This column stores the name of the hospital.

Relation of appointment system

Buraya relation fotosu gelecek(Buse)

"randevular" table is related to the "register_info" table to take "tc" info and related to the "doktorlar" table to take "doktor_id". "doktorlar" table is related to the "departmanlar" table to take "departman_adi" and related to the "hastane" table to take "hastane" which stored the hospital names and to take "sehir" which stores the city the hospital is located. When creating a new appointment, the user first selects a city, and this city information is taken from the "sehir" column in the "hastane" table. After selecting the city, the user is asked to select a hospital. These hospital names are the hospital names in the selected city. These hospital names are pulled from the "hastane" column in the "hastane" table. After selecting the hospital, the user is asked to select a department. These department names are pulled from the "departman_adi" column in the "departmanlar" table. After selecting the department, the user is asked to select a doctor. These doctor names are pulled from the "doktor_adi" column in the "doktorlar" table. Additionally, doctor names are listed according to the selected city, hospital and department. After selecting the doctor, the user is asked to select an appointment date. After everything is selected, the user clicks the "kaydet" button, and all information is saved in the "randevular" table via "tc".



Sorular schema



- soru_id: This column serves as the unique identifier for questions and is used in the 'soru_cevapları' table to save users' answers accordingly.
- soru_icerik: This column contains the questions presented to users to help determine which department will best address their health issues.

Soru cevapları schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- soru_id: This column holds the information about the questions to which the user has responded "yes".

Relation neyim_var system

For neyim_var system "departmanlar", "sorular" and "soru_cevaplari" tables are related. "Departmanlar" table is already holding the departman names with associated id's. To use the "sorular" table, the system is using the department id's to relate questions to only one department. It enables the form to show questions one by one with their special id's. Furthermore, "soru_cevaplari" table is using the ids in the "sorular" table to hold which questions are answered yes in array, so "soru_id" in the "soru_cevaplari" table could hold responses in divided by comma format (1,2,5,6) etc.



Hastalıklar schema



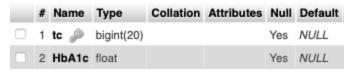
- hastalık_adı: This column stores the name of the disease.
- departman_adi: This column stores the name of the department related to the disease.

BOSAnalizi schema

#	Name	Туре	Collation	Attributes
1	tc 🔊	bigint(20)		
2	Renk	varchar(255)	utf8mb4_general_ci	
3	Gorunum	varchar(255)	utf8mb4_general_ci	
4	Miktar	float		
5	Protein	float		
6	Seker	float		
7	LaktikAsit	float		
8	Hucreler	float		
9	Eritrosit	float		
10	Lokosit	float		
11	Monosit	float		
12	Notrofil	float		
13	Lenfosit	float		
14	Eozinofil	float		
15	Bazofil	float		
16	EritrositSedimentasyonHizi	float		
17	SitolojikDegerlendirme	varchar(50)	utf8mb4_general_ci	

- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- Renk: This column holds information about the color of the sample.
- Gorunum: This column holds information about the appearance of the sample.
- Miktar: This column holds information about the quantity of the sample.
- Protein: This column holds information about the protein level in the sample.
- Seker: This column holds information about the sugar level in the sample.
- LaktikAsit: This column holds information about the lactic acid level in the sample.
- Hucreler: This column holds information about the cells present in the sample.
- Eritrosit: This column holds information about the erythrocyte level in the sample.
- Lokosit: This column holds information about the leukocyte level in the sample.
- Monosit: This column holds information about the monocyte level in the sample.
- Notrofil: This column holds information about the neutrophil level in the sample.
- Lenfosit: This column holds information about the lymphocyte level in the sample.
- Eozinofil: This column holds information about the eosinophil level in the sample.
- Bazofil: This column holds information about the basophil level in the sample.
- EritrositSedimentasyonHizi: This column holds information about the erythrocyte sedimentation rate in the sample.
- SitolojikDegerlendirme: This column holds the cytological evaluation of the sample.

Dahiliye_testi schema



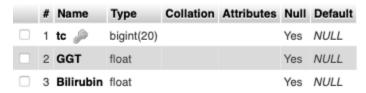
- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- HbA1c: This column contains information about the HbA1c level in the sample.

D_vitamini schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- OH_Kalsiferol: This column contains information about the OH-Kalsiferol level in the sample.

Genelcerrahitesti schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- GGT: This column contains information about the GGT level in the sample.
- Bilirubin: This column contains information about the Bilirubin level in the sample.

Görüntüleme schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- görüntÜ: This column stores jpg files containing hospital imaging results.

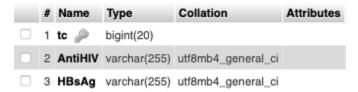
Hemogram Schema

#	Name	Туре	Collation	Attributes	Null	Default
1	Hb	float			Yes	NULL
2	Hct	float			Yes	NULL
3	RBC	float			Yes	NULL
4	MCV	float			Yes	NULL
5	мсн	float			Yes	NULL
6	мснс	float			Yes	NULL
7	RDW	float			Yes	NULL
8	Trombosit	float			Yes	NULL
9	WBC	float			Yes	NULL
10	Nötrofil	float			Yes	NULL
11	Lenfosit	float			Yes	NULL
12	Monosit	float			Yes	NULL
13	Eozinofil	float			Yes	NULL
14	Bazofil	float			Yes	NULL
15	tc 🔑	bigint(20)			Yes	NULL

- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- hb: This column contains information about the hemoglobin level in the blood sample.
- Hct: This column contains information about the hematocrit level in the blood sample.
- RBC: This column contains information about the red blood cell count in the blood sample.
- MCV: This column contains information about the mean corpuscular volume in the blood sample.
- MCH: This column contains information about the mean corpuscular hemoglobin in the blood sample.
- MCHC: This column contains information about the mean corpuscular hemoglobin concentration in the blood sample.
- RDW: This column contains information about the red cell distribution width in the blood sample.
- Trombosit: This column contains information about the platelet count in the blood sample.
- WBC: This column contains information about the white blood cell count in the blood sample.
- Nötrofil: This column contains information about the neutrophil level in the blood sample.
- Lenfosit: This column contains information about the lymphocyte level in the blood sample.
- Monosit: This column contains information about the monocyte level in the blood sample.
- Eozinofil: This column contains information about the eosinophil level in the blood sample.

Bazofil: This column contains information about the basophil level in the blood sample.

Hivtest schema



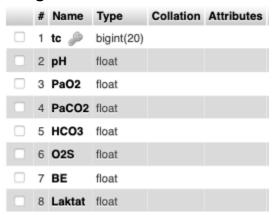
- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- AntiHIV: This column contains information about the AntiHIV level in the blood sample.
- HBsAg: This column contains information about the HBsAg level in the blood sample.

Kadındogum schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- bHCG: This column contains information about the bHCG level in the blood sample.

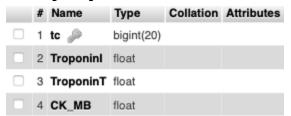
Kangazı schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- pH: This column contains information about the pH level in the blood sample.
- PaO2: This column contains information about the partial pressure of oxygen in the blood sample.
- PaCO2: This column contains information about the partial pressure of carbon dioxide in the blood sample.
- HCO3: This column contains information about the bicarbonate level in the blood sample.

- O2S: This column contains information about the oxygen saturation in the blood sample.
- BE: This column contains information about the base excess in the blood sample.
- Laktat: This column contains information about the lactate level in the blood sample.

KardiyolojiTestleri schema



- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- TroponinI: This column contains information about the Troponin I level in the blood sample.
- TroponinT: This column contains information about the Troponin T level in the blood sample.
- CK_MB: This column contains information about the CK-MB (Creatine Kinase-MB) level in the blood sample.

Uroloji_testi schema

#	Name	Туре	Collation	Attributes	Null	Default
1	tc 🔑	bigint(20)			Yes	NULL
2	renk	float			Yes	NULL
3	gorunum	float			Yes	NULL
4	yogunluk	float			Yes	NULL
5	ph	float			Yes	NULL
6	protein	float			Yes	NULL
7	glukoz	float			Yes	NULL
8	ketondis	float			Yes	NULL
9	bilirubin	float			Yes	NULL
10	urobilinojen	float			Yes	NULL
11	nitrit	float			Yes	NULL
12	eritrosit	float			Yes	NULL
13	lokosit	float			Yes	NULL
14	silendir	float			Yes	NULL
15	bakteri	float			Yes	NULL
16	epitel_hucreleri	float			Yes	NULL
17	kristaller	float			Yes	NULL

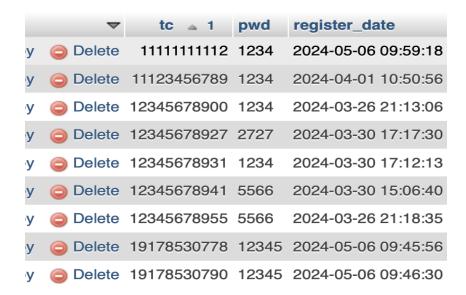
- tc: This column stores the Turkish Republic number, serving as a unique identifier for users, consistent with other schemas.
- renk: This column contains information about the color of the urine sample.
- gorunum: This column contains information about the appearance of the urine sample.
- yogunluk: This column contains information about the density of the urine sample.
- ph: This column contains information about the pH level of the urine sample.
- protein: This column contains information about the protein level in the urine sample.
- glukoz: This column contains information about the glucose level in the urine sample.
- ketondis: This column contains information about the ketone level in the urine sample.
- bilirubin: This column contains information about the bilirubin level in the urine sample.
- urobilinojen: This column contains information about the urobilinogen level in the urine sample.
- nitrit: This column contains information about the nitrite level in the urine sample.
- eritrosit: This column contains information about the erythrocyte level in the urine sample.
- lokosit: This column contains information about the leukocyte level in the urine sample.
- silendir: This column contains information about the presence of casts in the urine sample.
- bakteri: This column contains information about the presence of bacteria in the urine sample.
- epitel_hucreleri: This column contains information about the presence of epithelial cells in the urine sample.

 kristaller: This column contains information about the presence of crystals in the urine sample.

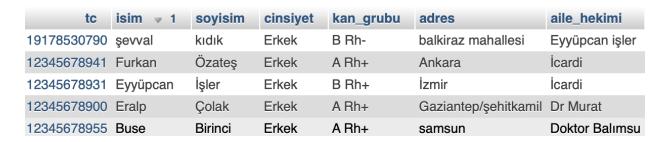
Populated Tables

To populate the tables, we utilized test records. These records were also updated during the development phase. The final versions of these tables, including the populated data, are presented in this section:

Register_info table



Kisisel_bilgiler table



Randevular table



Sorular table



Soru_cevapları table

tc	soru_id
12345678900	3
12345678900	1
12345678900	2,4
12345678900	1,2,3,4,5,6,7,8,9,10
12345678900	1,5,8
12345678900	1,2,5
12345678955	1,2,3,7,10
12345678955	1,5,8
12345678900	6
12345678900	1,2,3,4,5,6

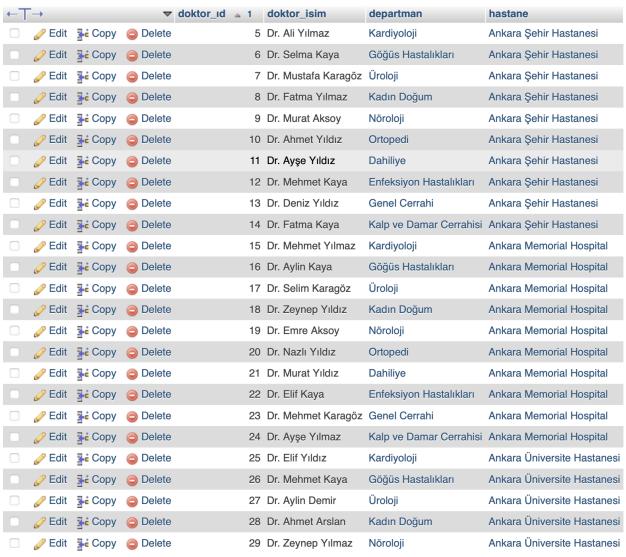
Departmanlar table



Hastane table

←Ţ	− →		∇	sehir 🔺 1	hastane
		≩ Copy	Delete	Ankara	Ankara Şehir Hastanesi
	Edit	≩ Copy	Delete	Ankara	Ankara Memorial Hospital
		≩ Copy	Delete	Ankara	Ankara Üniversite Hastanesi
	Edit	≩ Copy	Delete	Antalya	Antalya Şehir Hastanesi
		≩ Copy	Delete	Antalya	Medical Center Hastanesi
	Edit	≩ Copy	Delete	Antalya	Antalya Üniversite Hastanesi
		≩ Copy	Delete	Bursa	Liv Hospital
	Edit	≩ Copy	Delete	Bursa	Acıbadem Hastanesi
		≩ Copy	Delete	Bursa	Bursa Şehir Hastanesi
	Edit	≩ Copy	Delete	İstanbul	İstanbul Şehir Hastanesi
		≩ Copy	Delete	İstanbul	İstanbul İstinye Hastanesi
		≩ Copy	Delete	İstanbul	İstanbul Medical Park Hastanesi
		≩ € Copy	Delete	Samsun	Atasam Hastanesi
		≩ € Copy	Delete	Samsun	Gazi Devlet Hastanesi
		≩≟ Copy	Delete	Samsun	Samsun Eğitim Araştırma Hastanesi

Doktorlar table



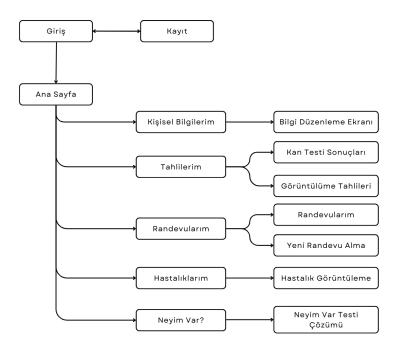
Hastalıklar Table



BOSAnalizi Table
Dahiliye_testi Table
D_vitamini table
Genelcerrahitesti table
Görüntüleme table
Hemogram table
Hivtest table
Kadındogum table
Kangazı
KardiyolojiTestleri table
Uroloji_testi table

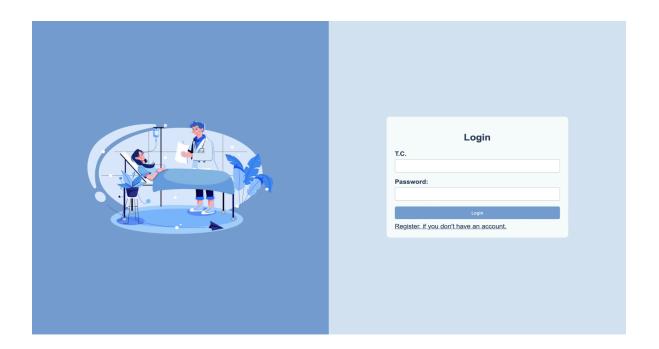
Screens

In this section, we aim to define our screens in a manner akin to a technical manual. We have categorized the screens based on patients (the user)perspectives. Additionally, there is a hierarchical structure between users and screens, as illustrated in the following figure:



Each screen will be presented with its screenshot, the related tables, and the queries utilized within each screen.

General screens



Log-in screen is the first screen in our CareConnect Health Care system. The purpose of this page is to enable the user to log in to the system by entering "TC" and password information in the appropriate places. At the same time, there is a guidance under the password section for users who will register to the system for the first time. New users can click here to register to the system, create their "TC" and password as shown in the image below and log in to the system from the login screen again.



Only query work for this page work through Log-In table;