



UML MODELING AND DEVELOPMENT OF A MONITORING SYSTEM FOR SLEEP QUALITY

GROUP 8

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AIM OF THE WORK

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- Developing a functioning platform to handle the management of a sleep-care hospital program including:



- **Storage and comparison** of different physiological **parameters** for each patient and their specialized practitioner



- **Booking** of visits and overnight monitoring



- Allowing the medical staff to **remotely watch over** the health of a wider range of patients

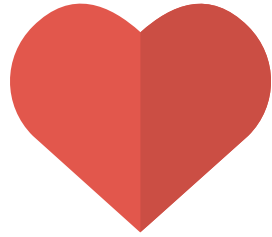
SYSTEM DESIGN

- Contextual analysis
- UML modeling
- System use case
- Activity diagrams
- Class Diagram
- Database Model

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SYSTEM DESIGN: CONTEXT ANALYSIS

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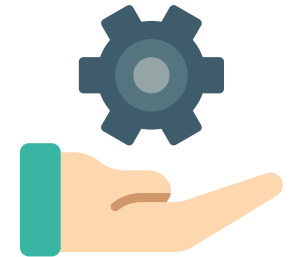


Prevent
sleep-related
diseases



Avoid drowsiness
during daytime

Why do we
care about
SLEEP?



Increase daily
productivity

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SYSTEM DESIGN: ASSUMPTIONS

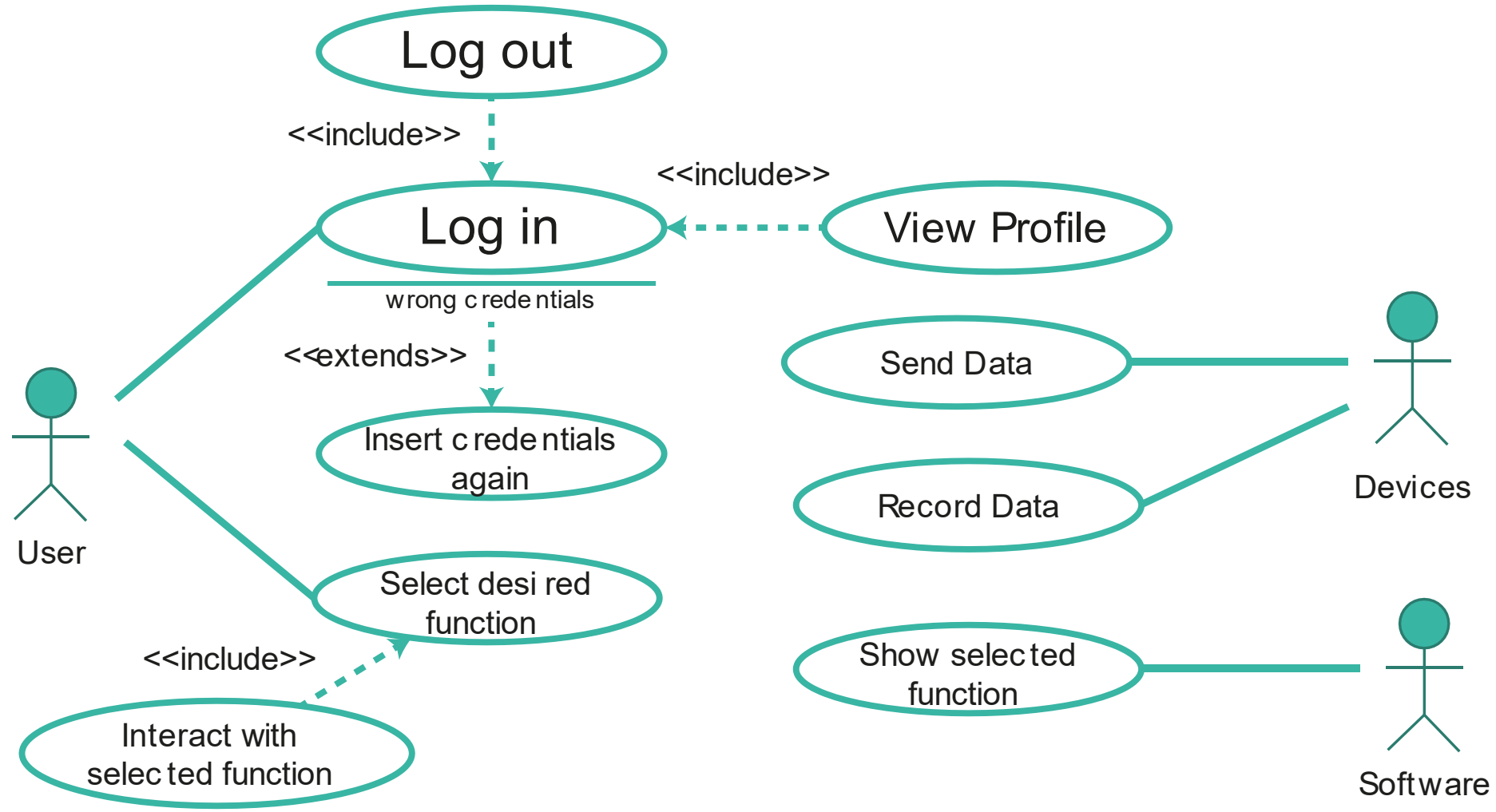
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- Standalone IT system
- Automatically synched data
- Full control over accounts
- Can only see anagraphic data
- Can access data about every patient
- Can insert physiological data only during visit

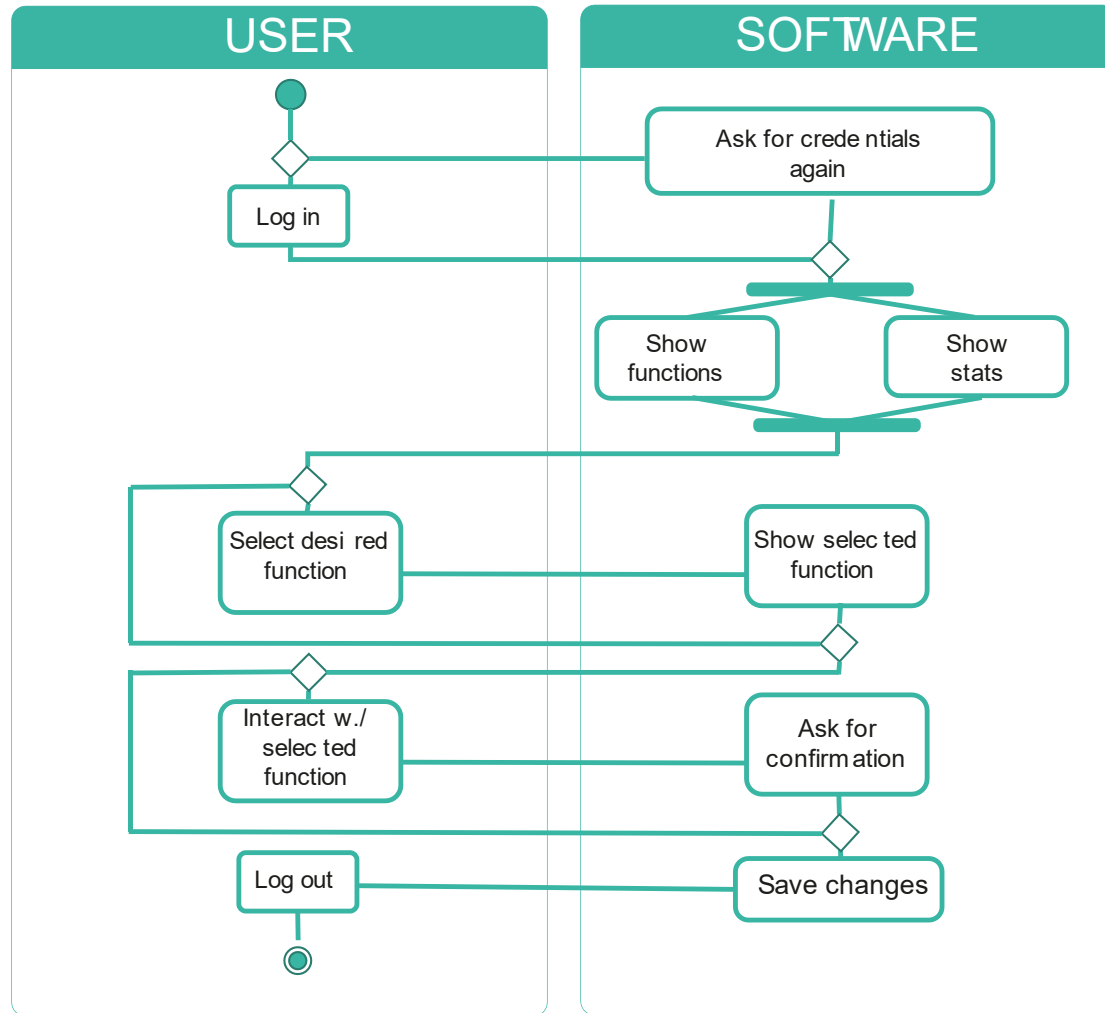
SYSTEM DESIGN: USE CASE

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SYSTEM DESIGN: ACTIVITY DIAGRAM

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- **Technical Administrators can:**

- Add / Remove / Edit Users
- View Usage statistics

- **Specialized Practitioners can:**

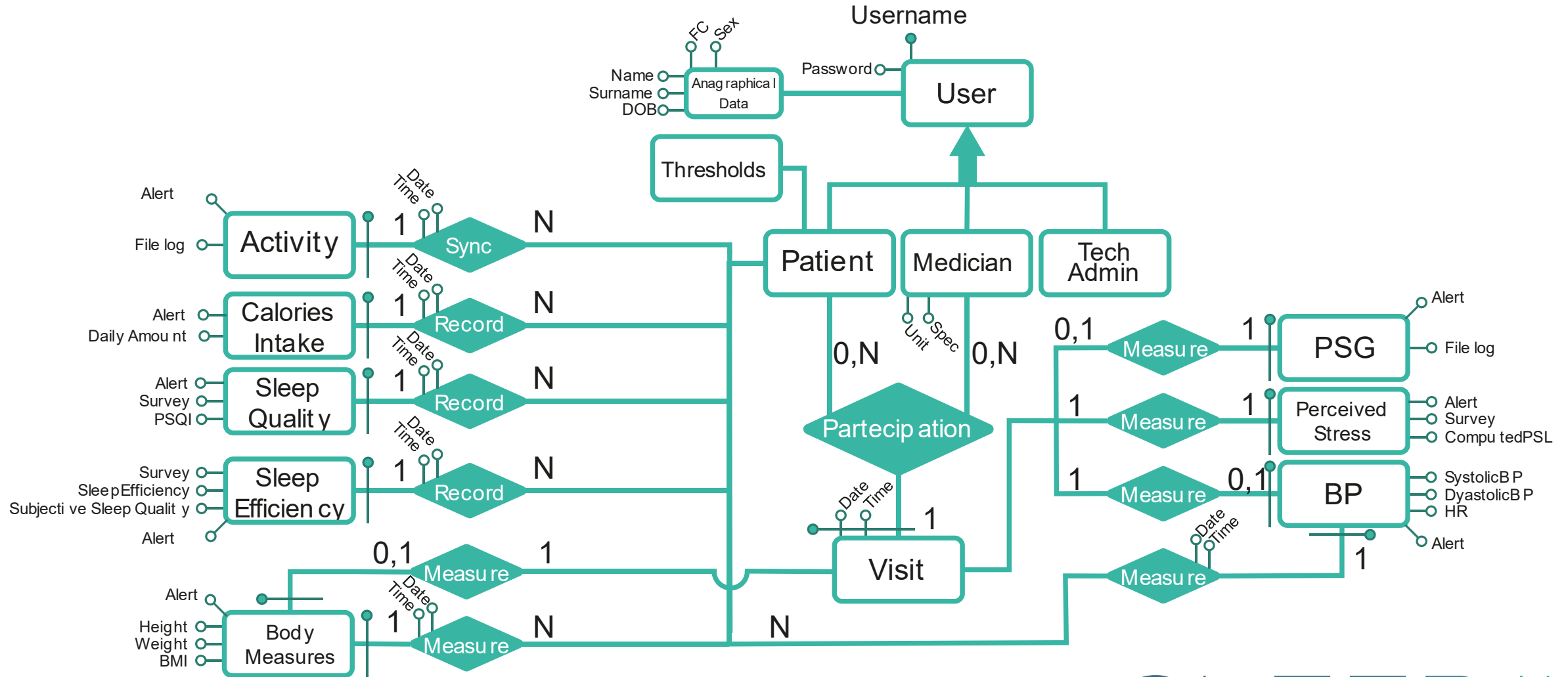
- Book / Edit Booked Visits
- Add Patients Parameters
- Set Patient Thresholds

- **Patients can:**

- Add their Parameters
- View their own statistics
- View a list of their visits

SYSTEM DESIGN: DATABASE MODELING (E-R DIAGRAM)

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SYSTEM IMPLEMENTATION

- Tools
- Tables
- Queries
- Graphical User Interface

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SYSTEM IMPLEMENTATION: 3 TIER WEB APPLICATION

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Data Storage Tier

Database Server

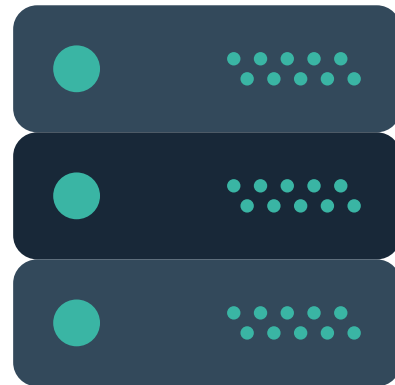
Python3.6.5 + SQLite3



Business Logic Tier

Application Server

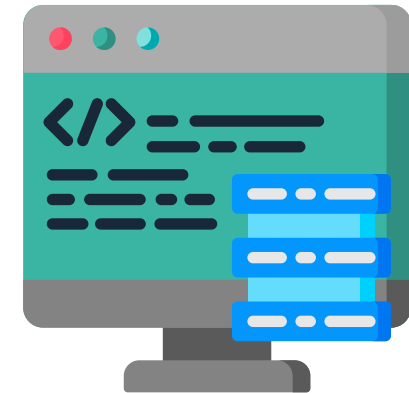
Python3.6.5 + Flask1.0.2



Presentation Tier

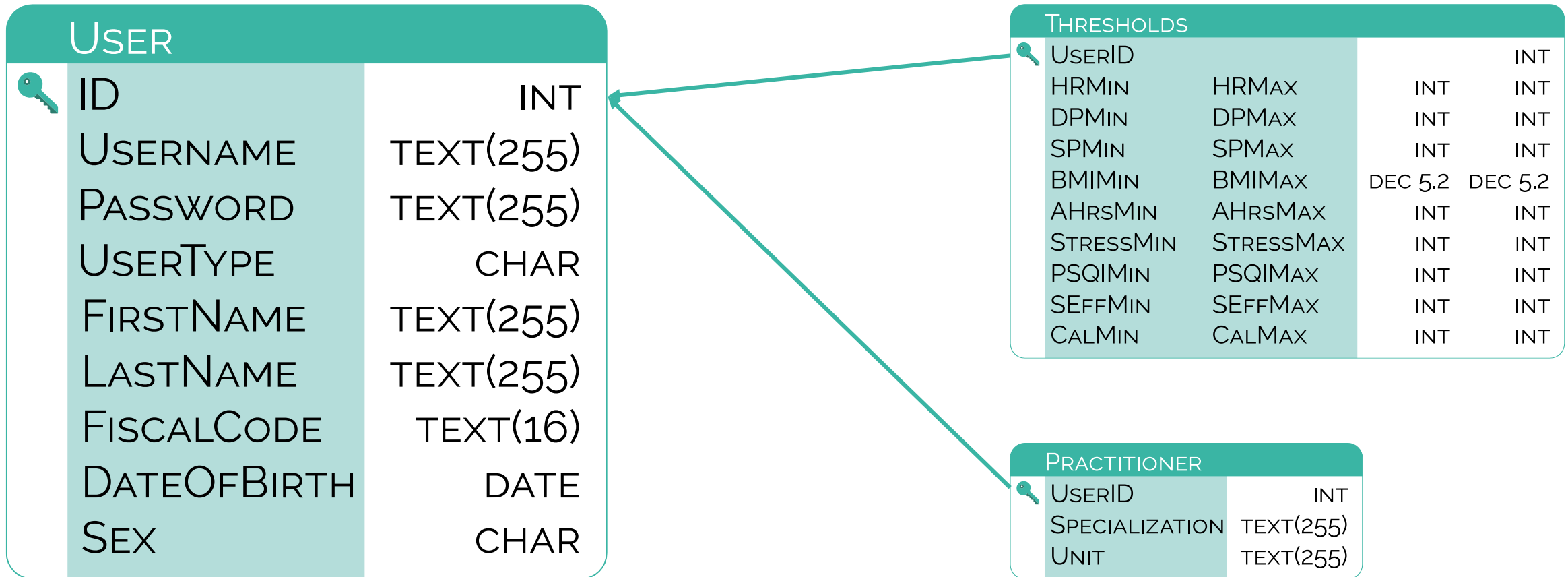
Client - User Interface

JavaScript + Jinja2




SYSTEM IMPLEMENTATION: TABLES


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SYSTEM IMPLEMENTATION: TABLES

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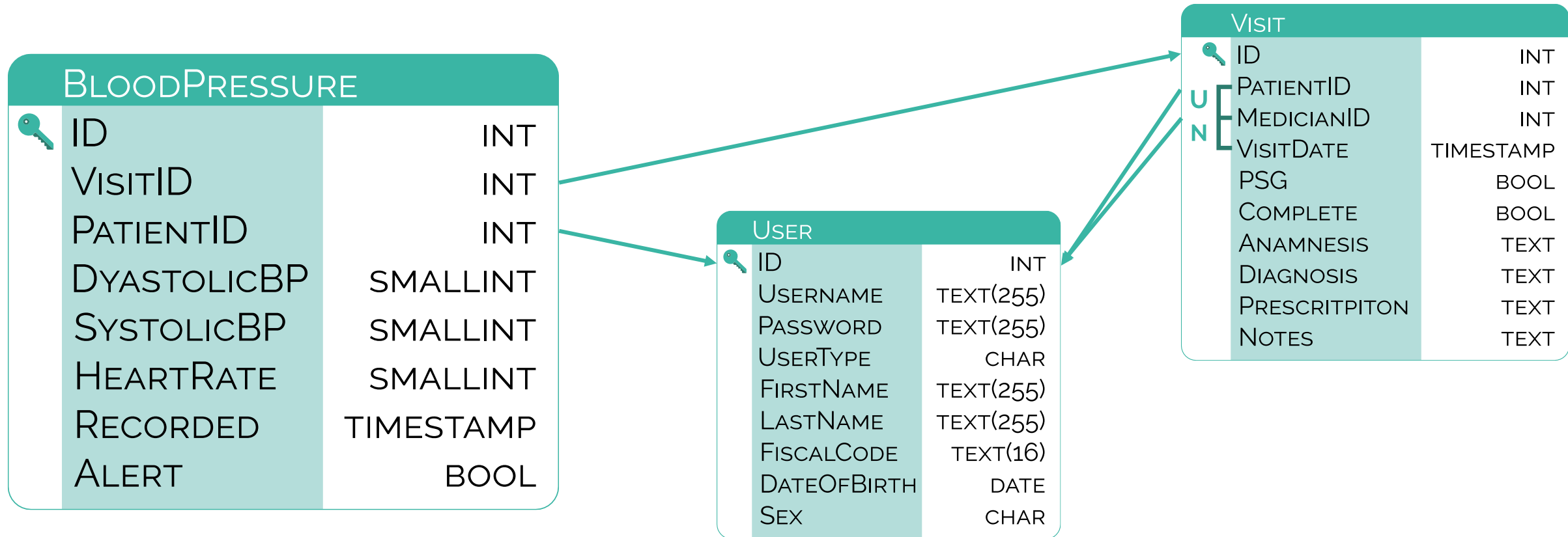
VISIT		
UN	 ID	INT
	PATIENTID	INT
	MEDICIANID	INT
	VISITDATE	TIMESTAMP
	PSG	BOOL
	COMPLETE	BOOL
	ANAMNESIS	TEXT
	DIAGNOSIS	TEXT
	PRESCRITPITON	TEXT
	NOTES	TEXT

USER		
 ID	INT	
USERNAME	TEXT(255)	
PASSWORD	TEXT(255)	
USER TYPE	CHAR	
FIRSTNAME	TEXT(255)	
LASTNAME	TEXT(255)	
FISCALCODE	TEXT(16)	
DATEOFBIRTH	DATE	
SEX	CHAR	



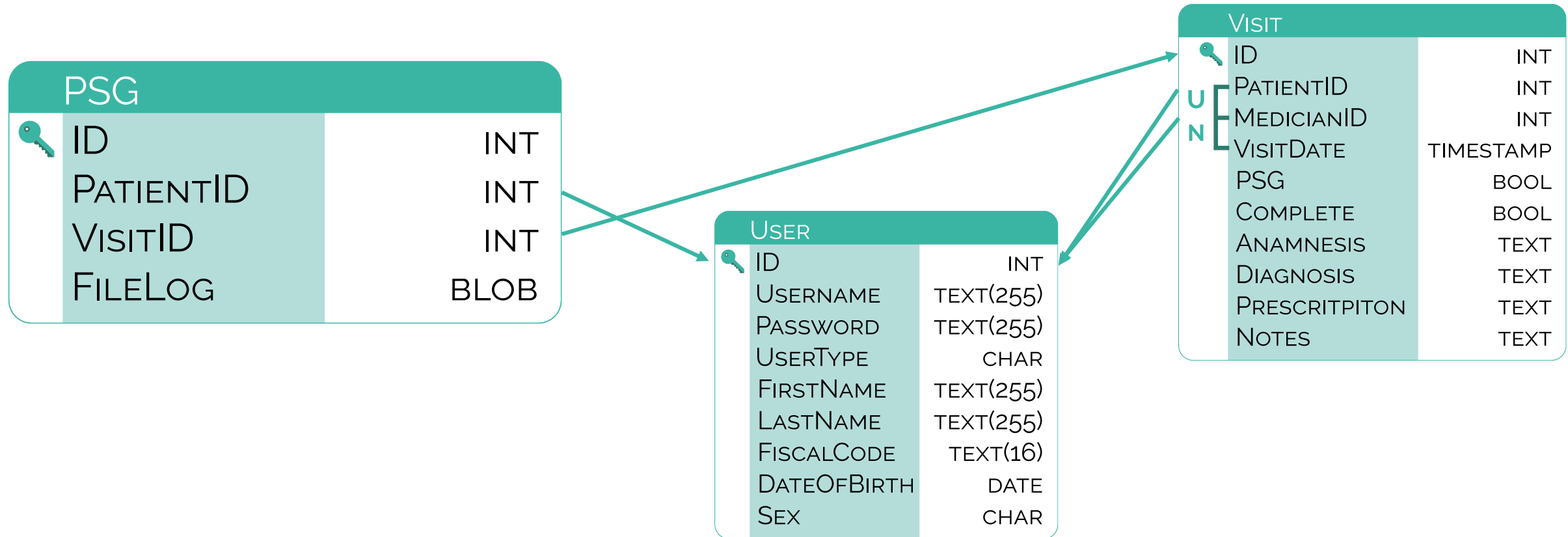
SYSTEM IMPLEMENTATION: TABLES

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SYSTEM IMPLEMENTATION: TABLES


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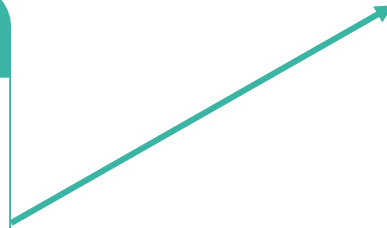


SYSTEM IMPLEMENTATION: TABLES

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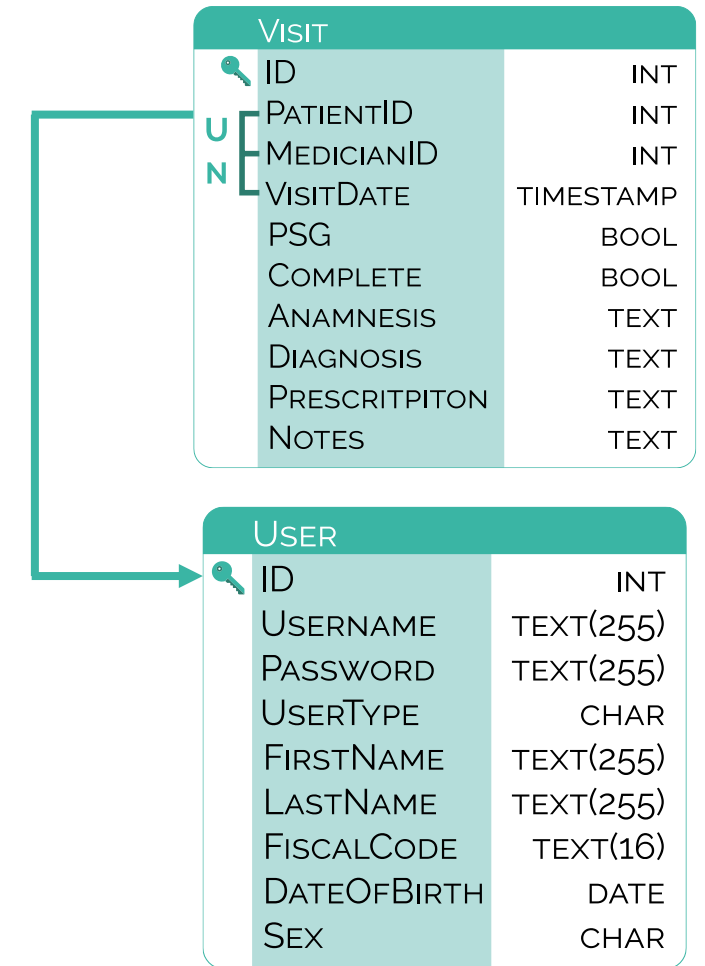
ACTIVITY		
	ID	INT
	PATIENTID	INT
	HOURS	SMALLINT
	ACTIVITYDATA	BLOB
	RECORDED	TIMESTAMP
	ALERT	BOOL

USER		
	ID	INT
	USERNAME	TEXT(255)
	PASSWORD	TEXT(255)
	USERTYPE	CHAR
	FIRSTNAME	TEXT(255)
	LASTNAME	TEXT(255)
	FISCALCODE	TEXT(16)
	DATEOFBIRTH	DATE
	SEX	CHAR



Retrieve the list of patient along with the date of the last control visit they attended

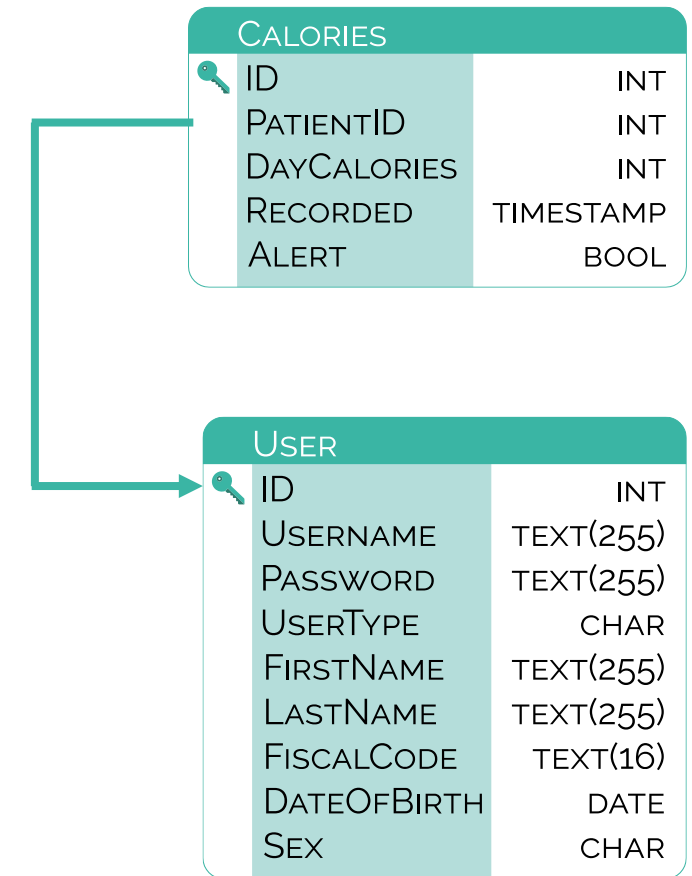
```
SELECT U.ID, U.FirstName, U.Surname, MAX(V.VisitDate)
FROM Visit AS V, User AS U
WHERE U.ID=V.PatientID AND V.Complete=1
GROUP BY V.PatientID
```

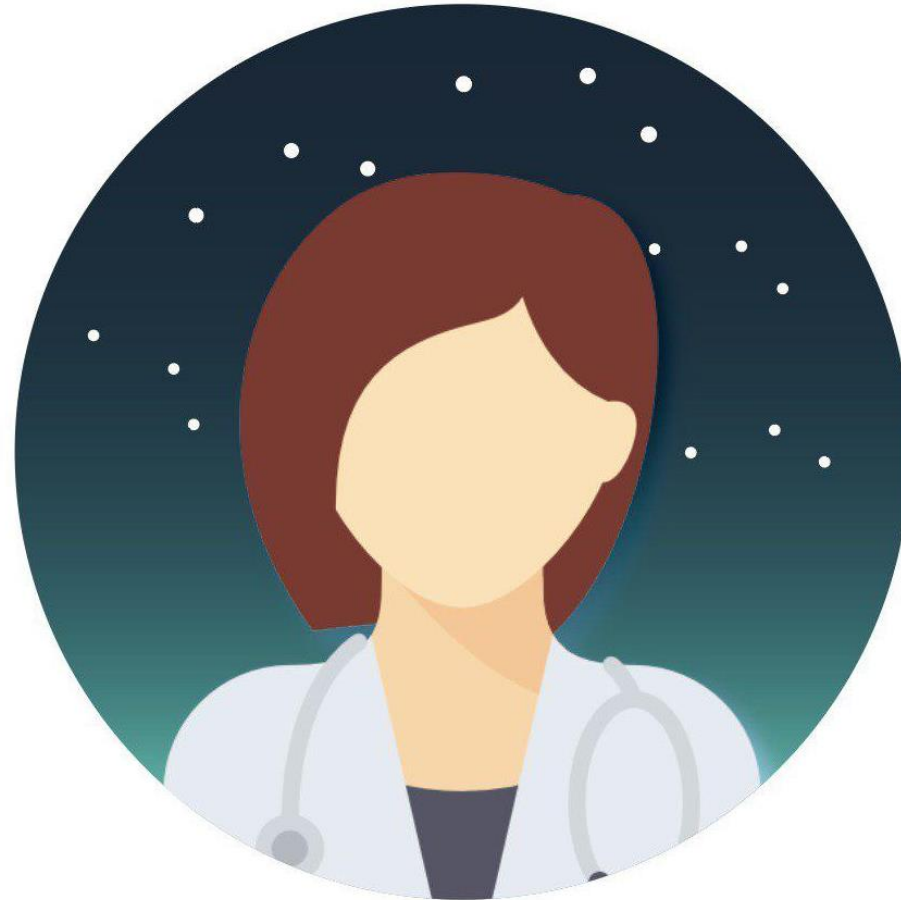


Create table: Calories

CREATE TABLE IF NOT EXISTS Calories

```
(  
  ID integer PRIMARY KEY,  
  PatientID integer,  
  Recorded timestamp,  
  DailyCalories integer,  
  Alert boolean,  
  FOREIGN KEY (PatientID) references User(ID) ON UPDATE  
  CASCADE ON DELETE CASCADE  
)
```





CONCLUSIONS

- Limitations
- Future Works

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CONCLUSIONS: LIMITATIONS AND FUTURE WORKS

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Portability



Backend scalability



Security
improvements

THANK YOU FOR YOUR ATTENTION!

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