Node Project

Adam NASSIR

CDOF5

Part 1: The models/tables

Users :

	user_id [PK] integer	username character varying (128)	email character varying (128)	password character varying (128)	last_login timestamp with time zone
1	1	john_doe	john@example.com	hashed_password	2023-12-31 15:07:54.325+01
2	2	Niphto	adamnassir2001@gmail.com	abc	2023-12-31 15:09:26.41+01

A user needs to register with a Username, an email address and a password. Here, the password can be seen in the database yet my initial desire was to use the "bcrypt" module to hash the each user's password so that there would be a layer of security yet when trying to use Angular in conjunction with my backend in NodeJS, there seemed to be a discrepancy between what the user put as their password and what was actually hashed, thus I had to discard this idea for now. The parts of the code that would have been used are still partly present in "UserRoutes" but as comments.

Decks :

	deck_id [PK] integer	user_id integer	name character varying (128)	description character varying (256)
1	1	1	Sample Deck	This is a sample deck.
2	2	2	Deck 1	Test
3	3	2	Deck 2	Test 2

A user, once logged in, could create decks with a short description of what they entailed, thus the user would be able to personally manage their deck inventory (more on that later).

Flashcards :

	card_id [PK] integer	deck_id integer	front_content text	back_content text
1	1	1	Front of the card	Back of the card
2	7	2	Hello	Correct
3	8	2	Hello3	Correct3

Each deck would have a set of cards assigned to it that could be personally added by the user, both the front content and the back content could be personnalized.

Tags:

	tag_id [PK] integer	name character varying (128)
1	1	Seen
2	2	Not Seen
3	3	Too hard
4	4	Too Easy

Tags were added to the flashcards, so that the user could categorize the flashcards in each deck according to their preference.

Flashcards-Tags :

	id [PK] integer	flashcardId integer	tagId integer
1	11	7	1
2	12	8	3

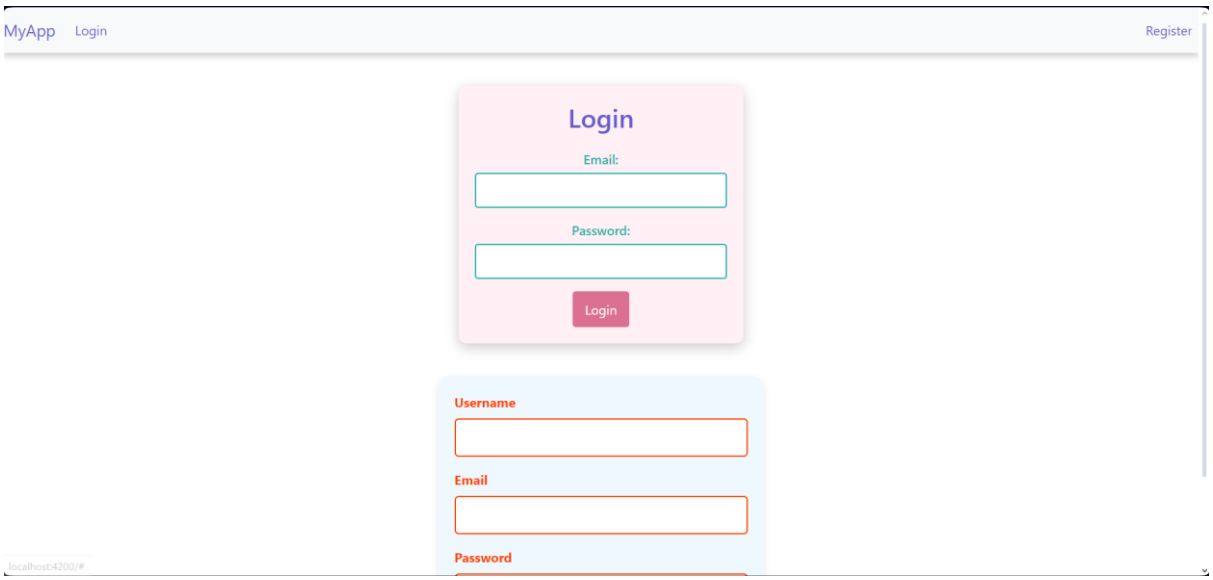
A table used to link flashcards with tags, as a flashcard could have multiple tags attached to it and a tag could belong to multiple flashcards at the same time.

WorkData :

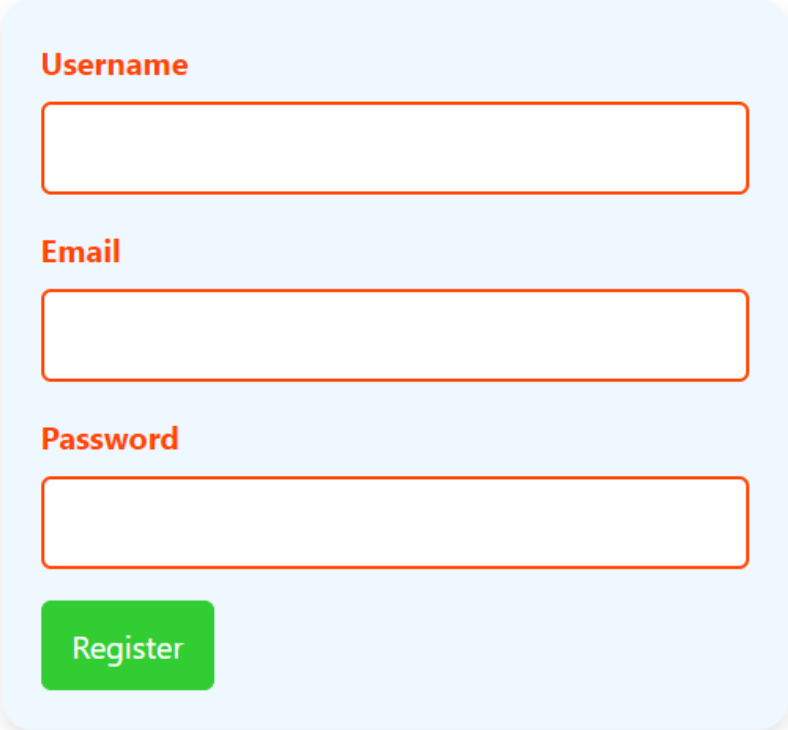
data_id [PK] integer	user_id integer	card_id integer	last_reviewed timestamp with time zone	next_review_due timestamp with time zone	repetition_number integer	easiness_factor double precision	interval integer
1	1	1	2023-12-31 15:07:54.339+01	2023-12-31 15:07:54.339+01	1	2.5	1

A table that would track the data of each user for each card, according to their performance with a certain card, the function "updateRepetitionData" in "WorkDataFunc.ts" would return the values of repetition number, easiness_factor and interval. Repetition number being the number of times a user has reviewed a flashcard ; easiness_factor represents how easy or hard a certain flashcard is ; interval represents the recommended duration between two reviews of a certain flashcard. Thus "updateRepetitionData" would tell the user when they should probably review a flashcard next in regards to optimizing their learning ability.

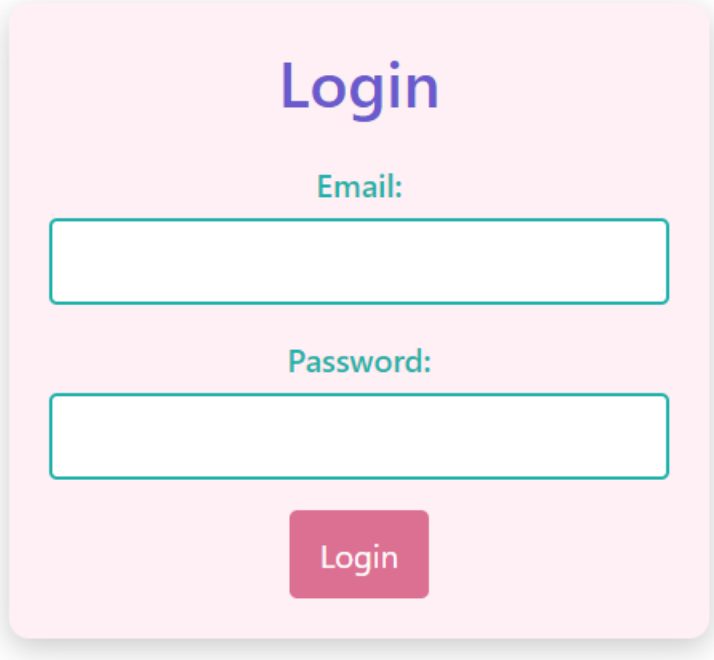
Part 2: What appears when you launch the app



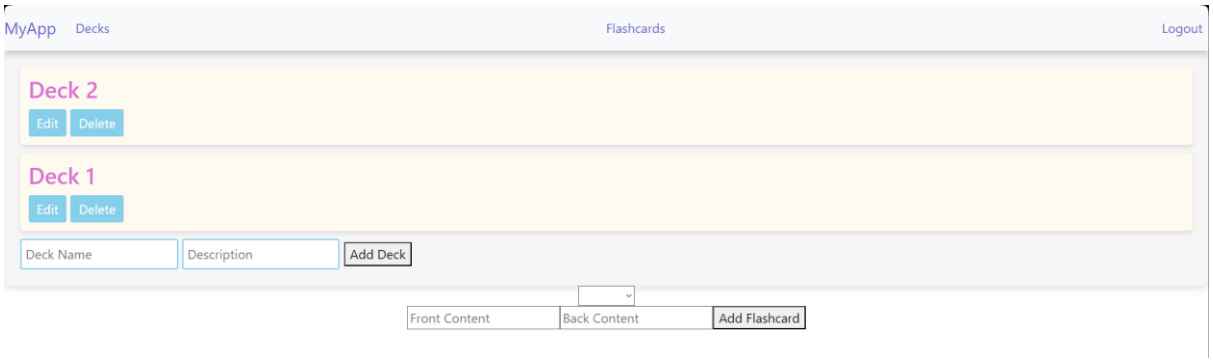
This is the initial page, there you can either click register or login. Clicking register gives this following page :



And clicking login gives the following :

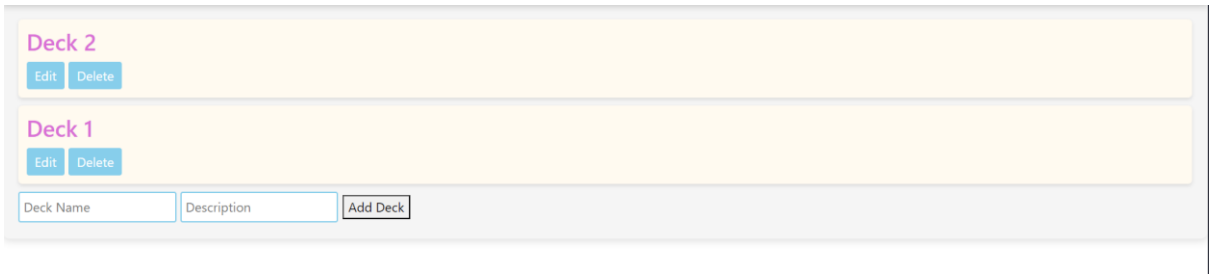


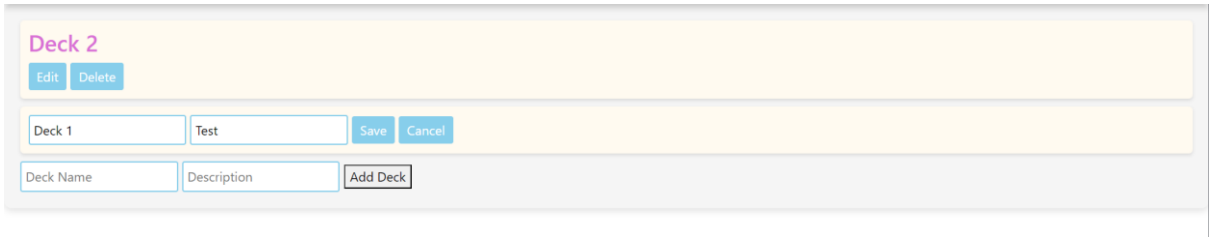
Once logged in, you arrived at this page :



There you can either view your decks, your flashcards in each deck and log out if you desire to do so.

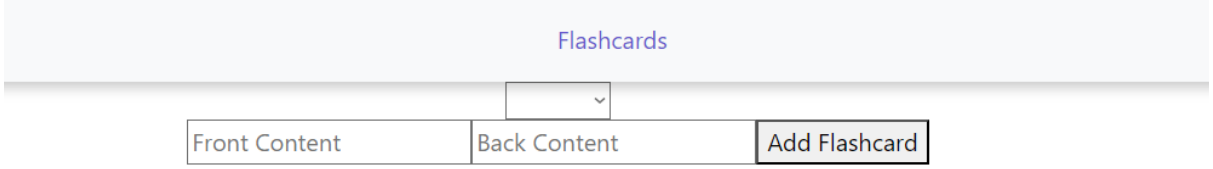
Decks :

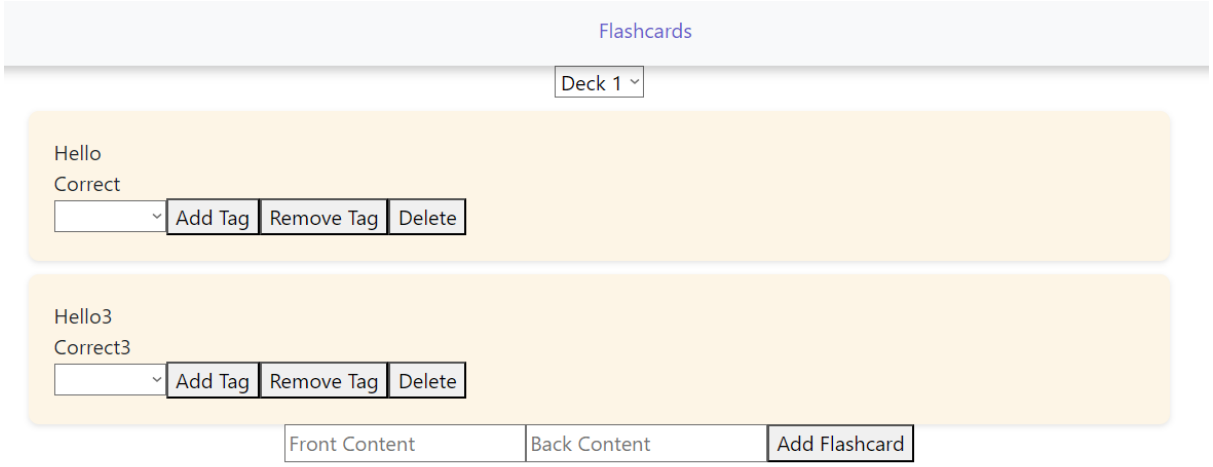


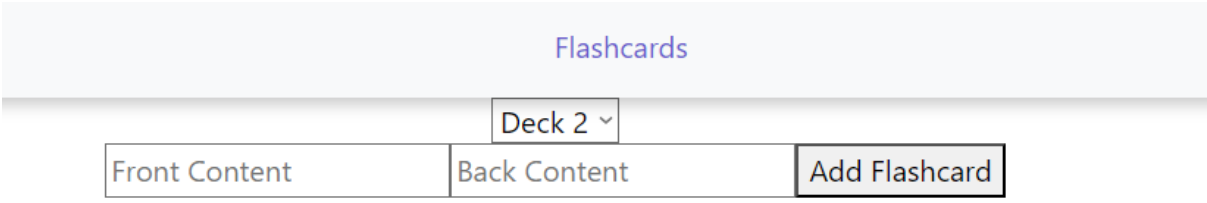


Here, you can create new decks and edit them by changing their name and description, you can also delete them if you wish to do so.

Flashcards :

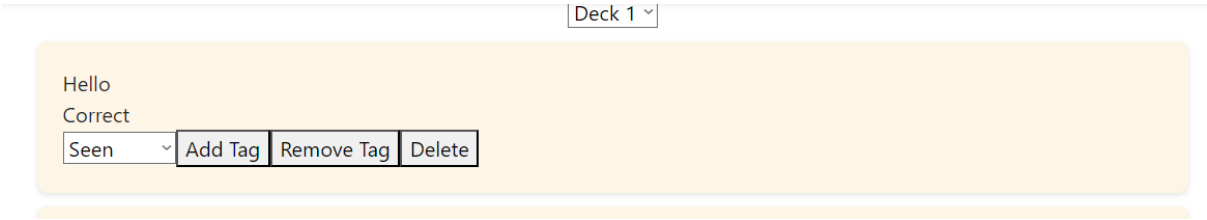






On this page, you can view the flashcards present in each deck, you can see that choosing a deck with no flashcards in it shows nothing.

You can delete any flashcard from any deck you possess, also, you can add tags to your flashcards, and remove them if you want.



Part 3: What couldn't make it to frontend

I was able to implement multiple things in the backend part of my work that I either couldn't implement in my frontend part because of time restrictions or because I couldn't find how to do it even though some parts of them are present in the frontend part of things, even though they technically do no work.

```
4 usages
class SpacedRepetitionService {
    2 usages
    public static updateRepetitionData(repetitionData: WorkData, userPerformance: number): void {
        if (userPerformance < 3) {
            repetitionData.repetition_number = 0;
            repetitionData.interval = 1;
        } else {
            repetitionData.repetition_number += 1;
            if (repetitionData.repetition_number === 1) {
                repetitionData.interval = 1;
            } else if (repetitionData.repetition_number === 2) {
                repetitionData.interval = 6;
            } else {
                repetitionData.interval *= repetitionData.easiness_factor;
            }
        }
        repetitionData.easiness_factor = this.calculateEasinessFactor(repetitionData.easiness_factor, userPerformance);
        repetitionData.next_review_due = new Date( value: Date.now() + repetitionData.interval * 24 * 60 * 60 * 1000);
        repetitionData.save();
    }

    1 usage
    private static calculateEasinessFactor(easinessFactor: number, userPerformance: number): number {
        easinessFactor -= 0.8 - 0.28 * userPerformance - 0.02 * userPerformance * userPerformance;
        return Math.max( values: 1.3, easinessFactor);
    }
}
```

This part was for actually tracing the work of each user corresponding to their review of each flashcard according to the deck of their choosing, I used SuperMemo-2 algorithm as a basis for this function to determine interval from other attributes.

```
export class ReviewComponent implements OnInit {
  @Input() deckId: number| null = null;
  flashcards: any[] = [];
  currentFlashcardIndex: number = 0;
  currentFlashcard: any = null;
  userRating: number = 0;
  reviewCompleted: boolean = false;
  userWorkData: any[] = [];

  no usages   new *
  constructor(
      private flashcardService: FlashcardService,
      private workDataService: WorkDataService
  ) { }

  no usages   new *
  ngOnInit(): void {
    this.loadFlashcards();
  }
```

```
  loadFlashcards(): void {
    if (this.deckId) {
      this.flashcardService.getFlashcards(this.deckId).subscribe( observerOrNext: data => {
        this.flashcards = data;
        this.currentFlashcard = this.flashcards[this.currentFlashcardIndex];
      });
    }
  }

  1 usage   new *
  rateFlashcard(rating: number): void {
    this.workDataService.updateRepetitionData(this.currentFlashcard.card_id, rating).subscribe( observerOrNext: () : void  => {
      if (this.currentFlashcardIndex < this.flashcards.length - 1) {
        this.currentFlashcardIndex++;
        this.currentFlashcard = this.flashcards[this.currentFlashcardIndex];
      } else {
        this.reviewCompleted = true;
        this.userWorkData = [];
        this.flashcards.forEach(card => {
          this.workDataService.getWorkData(card.card_id).subscribe( observerOrNext: data => {
            this.userWorkData.push(data);
          });
        });
      }
    });
  }
}
```

```
<div *ngIf="!reviewCompleted">
    <div *ngIf="currentFlashcard" class="flashcard-review">
        <p>Front: {{ currentFlashcard.front_content }}</p>
        <p>Back: {{ currentFlashcard.back_content }}</p>
        <label>Rate (1-5):
            <input type="number" [(ngModel)]="userRating" min="1" max="5">
        </label>
        <button (click)="rateFlashcard(userRating)">Submit Rating</button>
    </div>
</div>

<div *ngIf="reviewCompleted">
    <h2>Review Completed</h2>
    <div *ngFor="let workData of userWorkData">
        <p>Card ID: {{ workData.card_id }}</p>
        <p>Easiness Factor: {{ workData.easinessFactor }}</p>
    </div>
</div>
```

The review part in my frontend work should have let a user access a page to review a deck of their choosing using a start button that would be next to each deck, yet when trying to actually do that, nothing appeared and yet no error was being sent my way. I couldn't understand why nothing appeared and to this day I still don't know what the problem was, as you see, once choosing a deck, a user would rate their performance from 1 to 5, then the "updateRepetitionData" would be applied to it and return then, at the end of the deck, the user would get their work data for each flashcard they reviewed

Part 4: Issues I had

For some weird reason, I wasn't able to simply use router-outlet in app.component.html to link the different routes in app.routes through app.module which would have been easier for actually sharing different functions and other methods through differing components that would need to work in tandem sometimes. Thus I had to modify each component as standalone ones, which meant I had to individually input the routes :

```
<app-login *ngIf="showLogin"></app-login>
<app-register *ngIf="showRegister"></app-register>
<app-deck *ngIf="showDecks"></app-deck>
<app-flashcard *ngIf="showFlashcards"></app-flashcard>
<app-review *ngIf="showReviewSection" [deckId]="selectedDeckIdForReview"></app-review>
```

For example, to link my decks to their review sections (part which I couldn't make work), I had to create a shared service between the two that would let the app know which deck was selected and if one was selected so that every component could be affected as a result : hiding everything but the review section, which is always hiddent until the start button is pressed next to a deck (I erased the button in the deck.component.html for convenience but it would simply be a start button linked to the "startDeck" method in deck.component.ts)

The backend part was marginally easier than the frontend part, honestly Angular is really hard to work with for me personally.

If you have any questions, please feel free to contact me at adam.nassirdu.devinci.fr.

Thank you !