

## TME1. Introduction to frontend and backend aspects

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### Exercise 1.

We plan to develop a search engine application on the text of books made available to the community by [The Gutenberg Project](#). A basic wireframe schematic is given below.

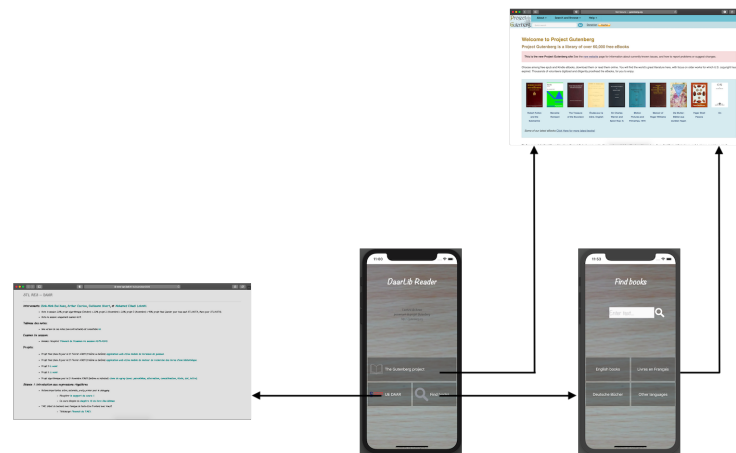


Figure 1: Two principal views of a search app for library books.

Implement the first view of this search app, by extending the VueJS code given at

- <https://gutenberg-daar-2020.netlify.app>.

**Extra-Exercise 1.1.** HTML/CSS training, e.g. with *FlexBox Froggy* and *CSS Grid Garden* on

- <https://flexboxfroggy.com/>
- <https://cssgridgarden.com/>

### Exercise 2.

We would like to prepare the backend of this app, starting with a search feature by RegEx matching. The algorithmic method is that of the book Aho-Ullman, chapter 10 pages 571 - 582, available at

- <http://infolab.stanford.edu/~ullman/focs.html>

For all following questions, your implementation must be confronted to a concrete example. One suggestion is

- RegEx: "S(a|g|r)+on" or "S[a-z]+on".
- input text file: [Book about Babylone](#).
- N.B.: we restrict ourselves to the following RegEx specifications: parenthesis, alternation, concatenation, star, dot, ASCII letter.

**Question 2.1.** Read *Extended Regular Expressions* specification available at

- <http://pubs.opengroup.org/onlinepubs/7908799/xbd/re.html>

Implement the parsing step in order to transform a RegEx string into a RegEx tree. An example of what is expected is given in Figure 10.29 of the Aho-Ullman book. We can be inspired by [these lines of Java code](#).

**Question 2.2.** Implement the transformation of the RegEx tree into an automaton with epsilon transition. An example of what is expected is given in Figure 10.27 and 10.28 of the Aho-Ullman book.

**Question 2.3.** Implement the determinisation of the automaton previously obtained, using subset construction. A description of what is expected is given in Aho-Ullman book, pages 547 – 552.

**Question 2.4.** Implement a minimization of the previously obtained automaton. A naive method is given in Aho-Ullman book, page 555.