

PRELIMINARY REPORT FOR BACHELOR'S THESIS IN COMPUTER SCIENCE

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1 Introduction

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2 Summary

Chestnut is an educational tool used to teach students concepts behind PKI. We are converting already existing JavaFX implementation to the web.

We will be making use of React for the front-end, Node and Express for the back end, MySQL as the database, Semantic UI for the design and a few other libraries.

We have also considered technologies such as Angular, Mongo, Bootstrap but after looking at them and discussing them further within the group and with our assignment giver, we have concluded that the ones mentioned previously are more suitable.

We consider UI and UX important as the app itself is an educational and it should be easy to use.

As for the development methodology, we will be going with Agile.

3 Issue

Our assignment giver needs a tool that not only makes his job of teaching easier, but also make it easier for students to learn.

Chestnut aims to be a simple educational tool that can be used to teach both students, and others interested, the principles behind PKI (Public Key Infrastructure). Currently, Chestnut has a Java implementation written in JavaFX, but which is not entirely functional.

Our job is to convert Chestnut into a web application. This will solve many of the current issues, such as software portability between different platforms and environments.

4 Goals and technologies

4.1 Goals

The main goal is, first and foremost, to make Chestnut into an intuitive and user-friendly application. That is crucial as the application is mainly intended to be used for educational purposes. It is also important that the application follows the specifications provided by the assignment giver and the specifications agreed upon within the group.

Good choice of technologies, correct prioritization and effective development should be key in achieving what is being proposed.

4.2 Development technologies

4.2.1 React

React is a lightweight but at the same time, potent JS library that deals with the view layer. It allows for code reusability with its components and freedom of choice when it comes to the architecture.

4.2.2 Node

Because React is a front-end only library, we have chosen to use Node for the backend. This will allow us to keep everything consistent by having JS used everywhere.

4.2.3 Express

Express is a web framework that is being used alongside Node almost always. It creates an interface that makes writing code in Node much easier.

4.2.4 MySQL

Our choice here is MySQL. We are choosing a relational type database as we will make use of relations with our data and the rigidity nature of the database will not be an issue.

4.2.5 Semantic UI React

Semantic UI React is the official React integration for Semantic UI.

4.2.6 Cryptographic libraries

Cryptographic libraries necessary for the different algorithms that will be used in the application.

4.3 Project management tools

Git and Github

Trello

Slack

Dropbox

5 Other options

Other options for technologies that we have considered:

Angular

MongoDB

Bootstrap

6 Analysis of effects

Angular was another option we could have chosen. Angular has a more rigid architecture and does not only focus on the view. It is a framework rather than a library with a fully-fledged MVC type of architecture. By using it, we would have a better “out of the box” experience with it, as there is not much need for extra libraries.

MongoDB is something we have considered because of the MERN stack. We are already using Express, React and Node and our mind immediately went to Mongo when trying to find a database. Upon looking at it closer and discussing it, we found MySQL to be a more suitable choice. Our datasets will not change over time, so there is no need for the flexibility Mongo offers.

Bootstrap and Semantic UI are quite similar. We could have easily used Reactstrap but went with Semantic UI because we prefer the more modern look and have some prior experience with it.

7 Work plan

We will make use of the Agile methodology while working on this project. This promotes continuous iteration of development and simultaneous testing. We also have daily meetings where we both discuss and develop for up to 4-5 hours.

Starting with week 4, we are starting the work with the planning phase where we make concepts and designs. This is immediately followed by the early development phase which is basically development of an MVP (Minimum Viable Product).

Further development consists of the development of additional functionalities and polishing. These will be determined based on the time we have left and prioritized by their importance.

Report writing and testing will be done in parallel and incrementally.

Below is the work plan we have created.

