Introduction

According to the survey conducted among the IBM Slovakia employees, 100% of respondents (24 employees) are either doing a certification or preparing for one. Third of them spends more than 8 hours a week preparing for the certification. A lot of the time is spent searching for the information and the practice tests instead of actual productive learning. Thus, it seems to be convenient if practice tests and most useful information resources for a large set of certifications were available at hand via the mobile app, and, according to the survey, 92% of IBM SK employees agree to this statement. After research of the market no apps satisfying all the requirements at once were found. This created an idea for such an app, that would save the time for IBM employees, allowing them to prepare for the certifications more efficiently.

Technically the app represents a client-server architecture, where the Spring Boot framework is used for the backend part and the frontend is developed using React Native. All data is stored in NoSQL MongoDB database on the server side and is accessed by the frontend through the API interface via the HTTP protocol.

The following chapters will be focusing on the main aspects of the app. They will provide a deeper research of the problem, present the technologies and the technical design.

1 Problem statement

This chapter gives a complete image of the problem along with the existing solutions. First, a brief introduction into the certifications is given. Then, a closer look at the results of the survey with analysis is provided. Finally, there are a few chapters presenting the results of the market research of existing solutions and a list of theses covering similar problems.

1.1 Certifications

Certifications are a good way to strengthen one's CV. Awarded by professional organizations, they confirm a person's ability to do a specific job or his possession of specific knowledge. Certifications are acquired through passing an exam and usually valid for a limited amount of time.
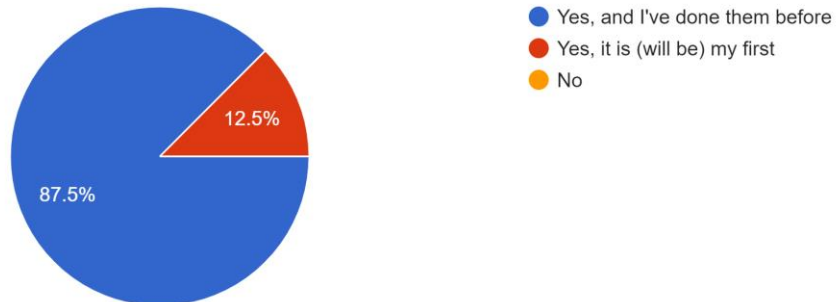
Most popular IT certifications include ones from Amazon, Microsoft, RedHat and Oracle. For example, Amazon offers an "AWS Certified Cloud Practitioner" certification. As the company states "Earning AWS Certified Cloud Practitioner validates cloud fluency and foundational AWS knowledge." [1]
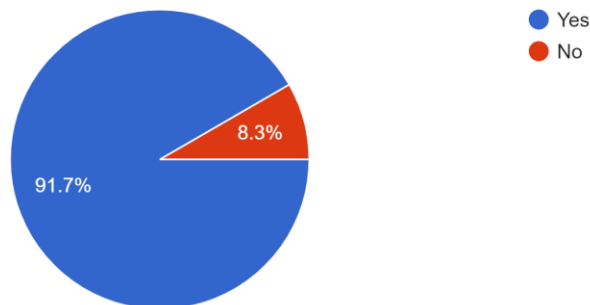
1.2 Survey results

The survey results confirm that certifications are a vital step towards career progress. All participants of the survey are doing the certifications or at least planning to do so soon.

Are you doing (going to do) a certification in the near future?
24 responses

- ● Yes, and I've done them before
- ● Yes, it is (will be) my first
- ● No

87.5%   12.5%

Most of the respondents also stated that it would be helpful to have an app which would provide the necessary preparation materials. This is probably caused by the fact that the currently available information related to the specific certification is scattered across the Internet, making it rather time-consuming to look for it.

In your opinion, would it be helpful if there was an app with practice certification exam questions?
24 responses

- ● Yes
- ● No

91.7%   8.3%

The survey also included a few questions regarding the information resources IBM employees use for the preparation. Respondents had to evaluate the usefulness and the ease of use (by

marking it from 1 to 10) of the following resources: Slack[1] channels, notes from a colleague, official courses and web resources. They were asked to provide some concrete examples, as well. The most popular were web resources, which were used by approximately 87.5% of respondents. However, the easiest ones to use were official courses with an average mark of 7.7 and notes from a colleague with an average mark of 7.2, while web resources and official courses were the most useful with average marks of 8.1 and 7.8 respectively. Therefore, the resources tab of the app should certainly include links to the web resources like Udemy, which is the most popular of them, and official preparation courses. [2]

1.3 Existing solutions

There are a few apps preparing for the certifications available on the market. However, no such theses were found, that would consider the same problem this thesis is considering. Thus, we will have a closer look at a few theses considering student testing apps or good examples of server-client architecture implementations.

1.3.1 Apps with a similar purpose

I have searched the biggest app stores for Android and iOS: Google Play and App Store. A few certification preparation apps were found there.

1.3.1.1 Certification Questions – Free Exams & Dumps [3]

This app provides training tests for a variety of IT certifications. It also tries to reproduce the exam environment with a timer ticking in the top left corner, although it also provides an explanation for each question, which is quite useful.

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[1] Slack is a business communication platform widely used among IT companies. [7]
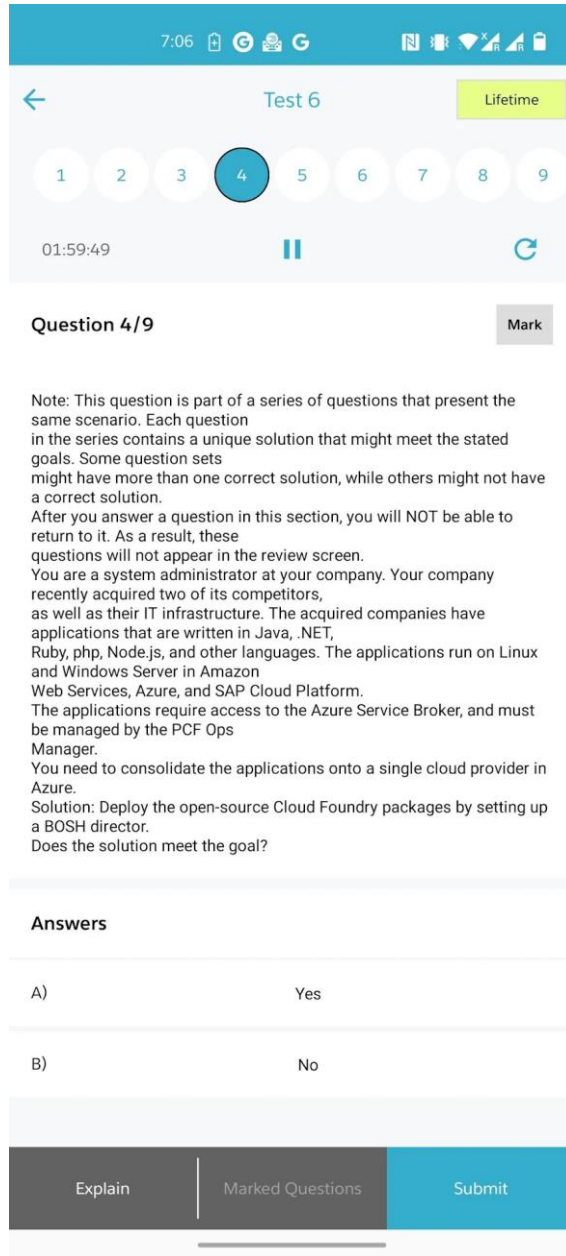
Figure 1. A screenshot of the "Certification Questions – Free Exams & Dumps" app

1.3.1.2 PMP Certification Mastery [4]

This app is available on iOS devices and provides a great preparation environment for the Project Management Professional (PMP)® certification. It offers exam-like practice questions, PMP concepts explanation, quiz questions and instructional videos.
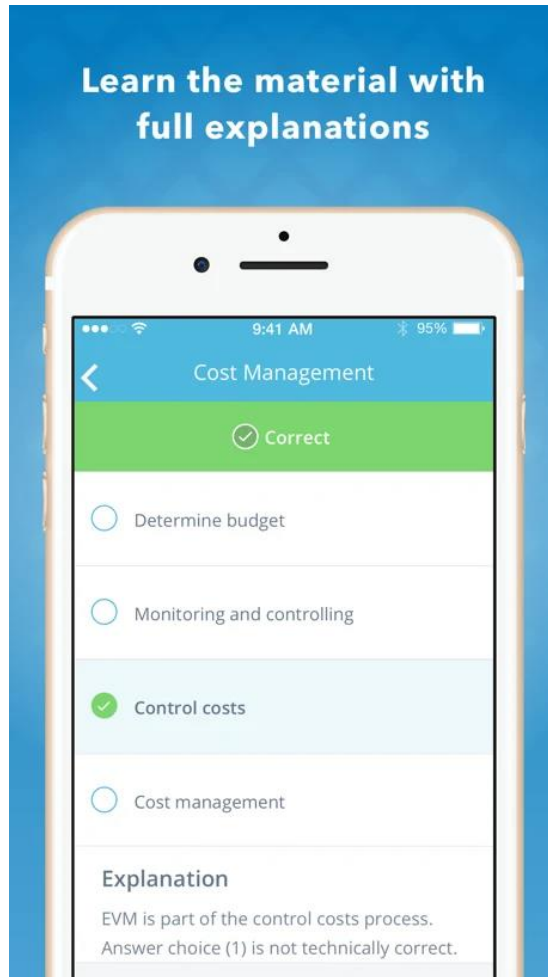

Figure 2. An image of the PMP certification mastery app.

1.3.2 Similar theses

Among the theses listed in the online Academic Library of Comenius University [5] none aim to provide any kind of environment designed to prepare for certifications. However, I managed to find a web app with a similar purpose.

1.3.2.1 "Interactive laboratory for programming lessons", M. Reguly [6]

This bachelor thesis aims to provide an environment to be used in Python programming courses. It allows to run Python code through the web interface and test it against the teacher's solution. The system is based mainly on Python Django framework and uses AJAX Socket communication.

Figure 3. A screenshot of the web interface of the app created by Martin Reguly.

2 Architecture

This chapter aims to give a full understanding of the technical aspects regarding the app implementation. First, the design of the solution will be considered in detail. Then, we will cover the DevOps side of the app.

2.2 App Design

2.3 DevOps side

3 Implementation

3.1 Technologies

This section describes the technological solutions used by the app. They are divided into subsections: backend and frontend. The former lists the tools required for the server side of the app; the latter lists the tools required by the client side.

3.1.1 Backend

3.1.1.1 Java

3.1.1.2 Spring Boot

3.1.1.3 Swagger-UI

3.1.1.4 RAML

3.1.2 Frontend

3.1.2.1 JavaScript

3.1.2.2 React Native

3.1.2.3 Expo

3.2 App structure

3.3 App deployment

4 Bibliography

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