



King Fahd University of Petroleum and Minerals

College of Computer Sciences and Engineering (CCSE)

COE 485

Senior Design Project

Final Report

FPGA Lab Virtualization

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Abstract

This is the final report of the virtual FPGA lab project. In this report I will illustrate the tools used, implementation and screenshots of the output. In addition, I will explain briefly why have selected those specific tools for the design. This report is split into three main sections tools used, implementations and result.

1 Introduction

Our main project was to virtualize The Digital Logic Design Lab. There are several required use cases to accomplish this goal. I will focus on some of them only, like creating the website, allow the students and instructor to communicate via text or video and creating database to prevent outside users from entering the virtual classroom. To achieve this, I need to work on both back and front ends. I have to set up servers and create some codes.

2 Tools and Languages Used

There are several tools I have dealt with to complete this project. I stopped working with some of them but I will mention them any way:

- Microsoft Azure
- MySQL Database
- Firebase
- xampp
- GitHub
- netlify
- PHP
- html
- css

regarding Microsoft Azure, I start hosting the website from its server in

addition to create database server. Unfortunately my free usage limit as a student has been reached then I could not access my resources again. I tried to upgrade my account but my used resources are not shown any more. I tried to contact the help centre and sent help case but I did not get a helpful solution. Since they take long time to response, I have decided to stop working with Microsoft Azure,

for MySQL database I have created a list of users information and password in the cloud using phpMyAdmin tool.

I used Firebase to host the WebRTC application to create video and sound sharing room. I was planning to use Firebase for hosting the whole project but they demand the government ID card. I sent it but I did not get a response to validate my account.

I have used xampp application to host the website and database in a local host.

I have used GitHub and Netlify to host the project in the web but I did not complete all the steps, I counter a problem which is css files cannot be opened there. I think it is an installation problem,

Finally, I create the webpages using html, PHP and css languages.

3 implementations

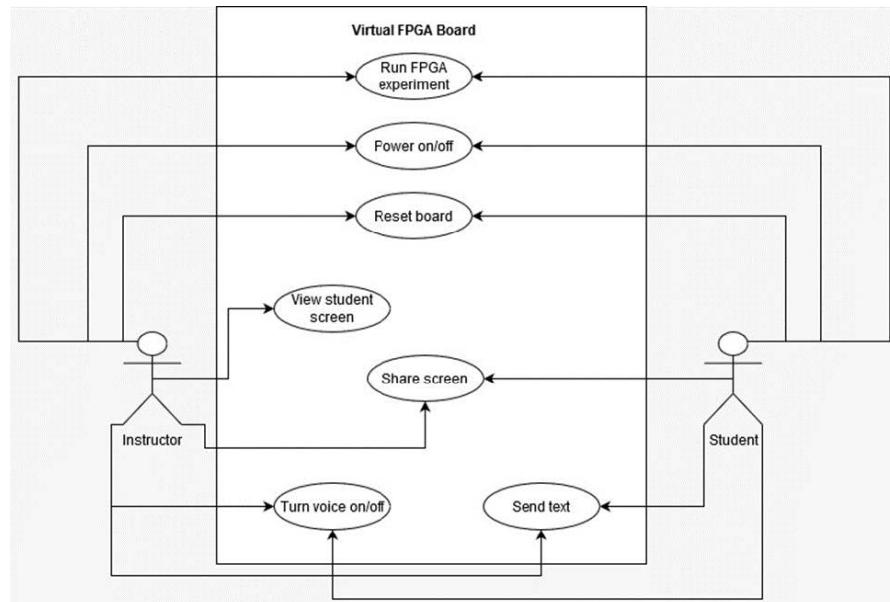


Figure 1: Use case diagram

The use case diagram for the project is shown above. As I mentioned before, I will create website to assure that the text, audio and video communication is applicable. since Azure removed all my resources even though I have worked on them for months. I tried to go for alternative solution. Netlify is a great app to host website through GitHub but usually GitHub faces a lot of complicated issues in installations taking into consideration it deal with the file using branches and different commands that need to be changed repeatedly. This is the link of the project hosted by netlify but it is not useful since the files are not working <https://kfupm-virtuallab.netlify.app> I have created table that stores user name, password, date and message using MySQL. I have used XAMPP to host the project files. its screenshots will be shown in the next section.

I wrote html file to design the homepage, PHP File to design the login page and css files to style them. Similarly I have designed the chat system. I have used FirebaseWebRTC to create Video/Audio communication room at this link <https://virtuallabfpga.web.app>

4 Outcome

I will upload screenshot for every part of the website in this section.

4.1 MySQL

Showing rows 0 - 3 (4 total, Query took 0.0191 seconds.)					
SELECT * FROM `login`					
<input type="checkbox"/> Show all Number of rows: <select value="25">25</select>		Filter rows: <input type="text" value="Search this table"/>		Sort by key: <select value="None">None</select>	
+ Options					
ID	username	password	date	message	
1	admin	s201@aQ	2021-01-18 05:20:57		Edit Copy Delete
2	student0	s202@aQ	2021-01-18 05:20:57		Edit Copy Delete
3	student1	s203@aQ	2021-01-18 05:20:57		Edit Copy Delete
4	student2	s204@aQ	2021-01-18 05:20:57		Edit Copy Delete

Figure 2: MySQL table indexes screenshot

As shown in Figure 2 above, I have created 4 users with proper passwords for each one of them. Then I can use these information to accept or deny login.

4.2 Login Page

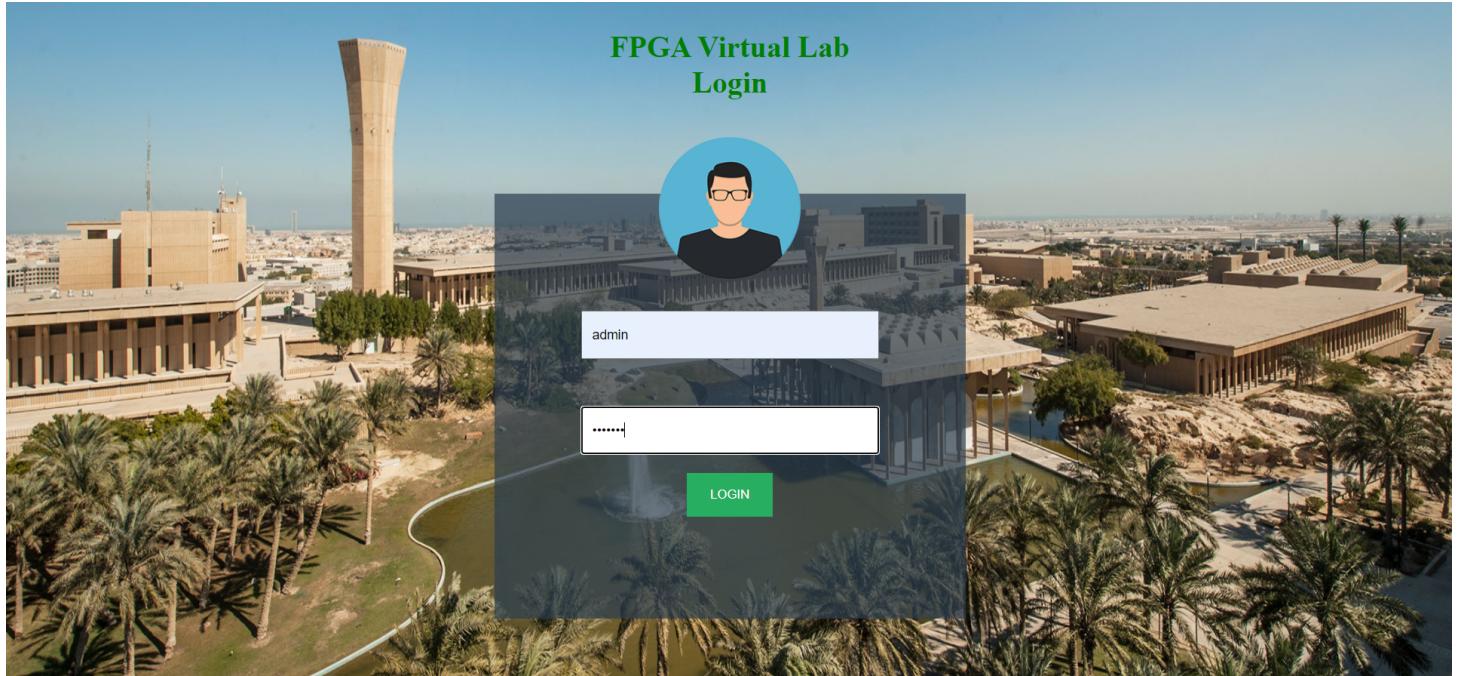


Figure 3: login page screenshot

Figure 4 shows what happen if someone entered a wrong password.

You Have Entered Incorrect Password

Figure 4: Login unaccepted screenshot

4.3 Home Page

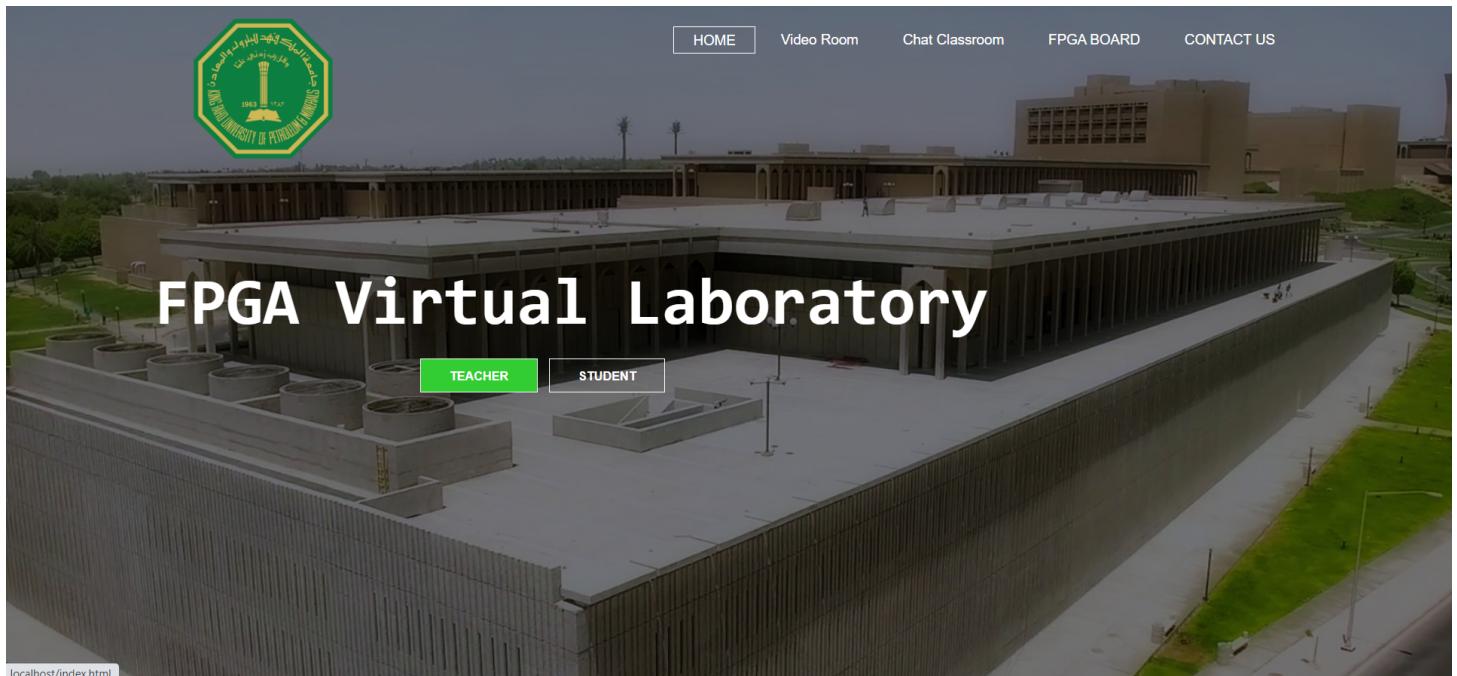


Figure 5: Home Page screenshot

Figure 5 shows the home page of the website. If a user entered a correct password he will be directed to this page, From here, he can click on the chat title or video room to switch to them..

4.4 Chat Classroom



Figure 6: Chat classroom screenshot

Figure 6 shows How students can send and get messages from each others. The messages will be saved as well as its time and date.

4.5 Video Classroom



Figure 7: FirebaseWebRTC webpage screenshot

Figure 7 shows How users can join or create video and audio classroom. This is the end of the virtual lab website. As we can see, now students can attend classes and communicate safely with insurance security.

5 Conclusion

To conclude, I have completed creating virtual classroom which has text, audio and video communication. It was long project because it has many components and we have to link them together. It was not easy work for me especially because I have not dealt with webpage coding before. Microsoft Azure has deleted all my resources because when I exceeds the free limit, I have exceeded the given allowed time before paying for upgrading. Finally, This project have riched my knowledge in many aspects like real time databases, cloud databases, hosting servers and webpage design.