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| Name: N. S. De Alwis |
| Student Reference Number: 10707160 |



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| Module Code: PUSL3111 | Module Name: API Software Development | |
| Coursework Title: API Coursework | | |
| Deadline Date: 11th May 2022 | | Member of staff responsible for coursework: Dr. Rasika Ranaweera |
| Programme: BSc (Hons) Plymouth Software Engineering | | |
| Please note that University Academic Regulations are available under Rules and Regulations on the University website [www.plymouth.ac.uk/studenthandbook](http://www.plymouth.ac.uk/studenthandbook). | | |
| Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.  J.A. Mujeeb – 10707284  G.M.D.D. Ratnayake – 10707351  S.O. Perera – 10707315  N. S. De Alwis – 10707160  M. D. A. Medhavi – 10707278  P. P. L. Dilhani – 10709402  ***We confirm that we have read and understood the Plymouth University regulations relating to Assessment Offences and that we are aware of the possible penalties for any breach of these regulations. We confirm that this is the independent work of the group.***  Signed on behalf of the group: N. S. De Alwis | | |
| Individual assignment: ***I confirm that I have read and understood the Plymouth University regulations relating to Assessment Offences and that I am aware of the possible penalties for any breach of these regulations. I confirm that this is my own independent work.***  Signed : | | |
| Use of translation software: failure to declare that translation software or a similar writing aid has been used will be treated as an assessment offence.  I \*have used/not used translation software.  If used, please state name of software………………………………………………………………… | | |
| **Overall mark \_\_\_\_\_% Assessors Initials \_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_** | | |

* + \*Please delete as appropriateSci/ps/d:/students/cwkfrontcover/2013/14

# Acknowledgement -

First and foremost, we’d like to extend our sincere gratitude towards Dr. Rasika Ranaweera, our module lecturer. We are extremely humbled and grateful to have been able to receive his mentorship, guidance, and support.

The overall accomplishment of this project demanded a significant amount of guidance from many individuals. As a team, we are extremely fortunate to have had this from start to finish.

Finally, we wouldn’t have been able to successfully complete this assignment without the hard work and assistance of all the team colleagues itself. We all enjoyed working with each other.

## Abstract

This assignment comprises of a documented report on an API Web Application and Mobile Application, pertinent to the Sri Lanka Bureau of Foreign Employment (SLBFE).

Coursework Supervisor: Dr. Rasika Ranaweera

Group: Group No. 22

Deadline: 11th of May 2022

## Introduction

The Sri Lanka Bureau of Foreign Employment (SLBFE) is a government owned foreign employment agency that assists its citizens in the procurement of global employment opportunities.

It is evident that labour is a fundamental asset that would greatly contribute towards substantial job creation, playing a key role in securing a stable source of foreign currency inflow. It also recognizes predicaments related unemployment, helping more Sri Lankans escape the risks of poverty, bestowing the potentiality to further enhance their prosperity and well-being.

### Quick Start Guide (figure out proper order)

* **Let’s start off by unzipping the folders containing the code [folder name]**
* **Choose a code ide of your choice (VS code recommended) and open up the SLBFE API and the SLBFE client-side application same goes for the mobile application.**
* **Once everything is set up let us import the relevant data into our computer {need to correct}**
* **By typing following commands**
* To import the databases, we type the following**.**

**Graphical user interface, text

Description automatically generated**

Figure 1: Type "php artisan migrate"

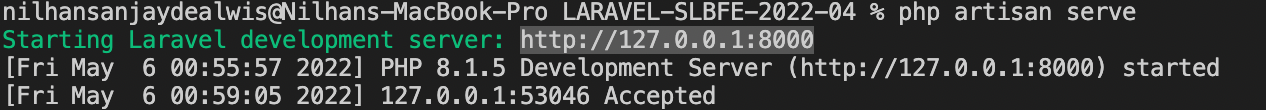
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Figure 2: Type "php artisan migrate"

Next when running on the client application it needs to be served in a different port , since the API is running in port 8000 , the client application should run on port 8001 for that we type the following code

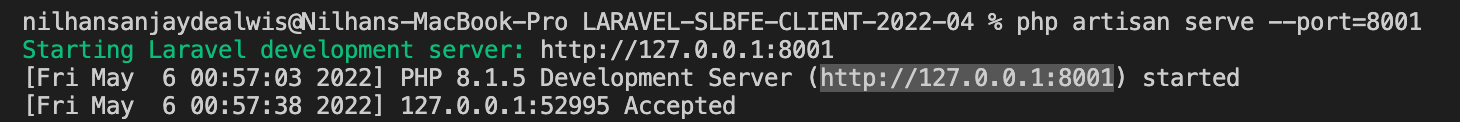


Figure 3: Type "php artisan serve –port=8001"

Now let us configure the database.



Figure 4: database configuration

After click create the following rows will be visible (check vid tutorial again)

Graphical user interface

Description automatically generated with low confidence

Through the SLBFE, any citizen can hold the potentiality to acquire membership via free online registration. Those that are on the lookout for jobs can utilize the system to update and upload their qualifications, CVs, birth certificates, etc. Bureau Officers is authorized to view and validate the uploaded information. Furthermore, foreign companies and bureau officers can look for workers based on their respective qualifications.

Those who have left for foreign employment must update their real-time location once they go to the foreign company.

Citizens are also permitted to be able to post complaints, which bureau officers can parallelly view and respond to. We have developed a RESTful API web application to address the above scenario.

Admin is the bureau officer

Assumptions –

Bureau officers can also look for workers based on their respective qualifications.

\*\*\*\*Locations are not available.

# Project Scope

The project scope mainly caters towards bestowing the Sri Lankan citizens with productive employment opportunities.

## Citizens

* Can make complaints once registered
* Citizen can register with their name, NIC, company, company address, email, password.
* If they have already signed up, they only need email and password.
* Once signed in, they are taken to a page that consists of profile, complaint, seekers, and logout option.
* By updating the citizens qualification and uploading their CV’s, birth certificate, etc., they can seek jobs offers.
* Foreign investors should be empowered to find employees based on their qualifications.
* Anyone can file a complaint, and bureau officers should be able to see it and respond appropriately.

## Bureau Officers (acts as an admin)

The bureau helps the public to find suitable work outside of country. They also help companies find suitable qualified workers to work in foreign companies.

The bureau checks up on the foreign employee’s wellbeing and handle complaints that are headed their way, from fellow members of their families.

## Foreign Companies

The foreign companies are another party concerned as their review on the citizens who have gone for foreign employment should update their current location as soon as they visit the company. The foreign companies should be able to find workers based on the qualifications.

# System Architecture

## Context Diagram

## Data Flow Diagram Level 0

## Data Flow Diagram Level 1

## Use Case Diagram

# API Documentation

* POST /citizens

Citizens and officers can register themselves with details including a national ID, name, age, address, current location (latitude and longitude), profession, email, affiliation, password, etc.

Route::post('register', [AuthController::class, 'register']);

Route::post('login', [AuthController::class, 'login']);

* PUT /citizens/:nid

Job seekers should be able to update their qualifications and upload certificates.

Route::put('vacancy/add', [JobController::class, 'addVacancy']);

Route::put('location/add', [JobController::class, 'location']);

Route::put('complaints/add', [ComplaintsController::class, 'add']);

Route::put('complaints/reply', [ComplaintsController::class, 'reply']);

* GET /citizens/:nid

Officers should be able to access any citizen’s information by their national id

Route::get('vacancy/list', [JobController::class, 'listVacancy']);

Route::get('qualification/get', [JobController::class, 'getQualifications']);

Route::get('qualification/search', [JobController::class, 'searchQualifications']);

Route::get('complaints/get', [ComplaintsController::class, 'get']);

Route::get('users/get', [UserController::class, 'get']);

* PUT /citizens/:nid

Officers should be able to verify the information

* GET /citizens/find(:qualifications)
  + Company officers should be able to find candidates based on qualifications
* DELETE /citizens/:nid

The SLBFE staff can deactivate an individual’s account if the citizen is deceased.

Route::delete('users/delete', [UserController::class, 'delete']);

* GET /citizens/:nid/contacts

The SLBFE staff should be able to collect information about contacts of any citizen.

Code efficiency –(ss)

* POST /citizens
* PUT /citizens/:nid
* GET /citizens/:nid
* PUT /citizens/:nid
* GET /citizens/find(:qualifications)
* DELETE /citizens/:nid
* GET /citizens/:nid/contacts

## JSON Requests and Responses

## XML requests and responses

# Tools and technologies

This project has two applications running.

To create the API, we have used Laravel framework which uses PHP as its coding language. The web application also uses the same framework with the same coding language.

(Ask nilhan about JSON and XML response to retrieve data).

We have used Android studios to create our mobile application, Android Studios uses SDK that are specified for android technologies. Android studios uses Java coding language to code. Android studios allow developers to create very high profile and high-performance products. Android studio allows developers to create emulators according to their preference and these emulators are very fast and feature rich. Android studio also allows various testing mechanisms which would be very helpful to many developers to test and maintain their projects.

## PhpMyAdmin

In pursuance of securing a successful project outcome, we have contended in carefully choosing the most suitable tools and technologies.

* Web Application - PHP based Laravel
* mobile application – Java

Since PHP has been used to code the Web Application, it was more coherent to utilize PhpMyAdmin for MySQL database management. PhpMyAdmin is an open-source third-party software tool, written in PHP. The primary objective of utilizing phpMyAdmin is to superintend and operate the administration of MySQL over the web. It is also feasible to run CRUD operations like databases, copy, tables, rename, databases, tables, columns, etc.

phpMyAdmin can run on any server or any OS as it has a web browser.

With the utilization of phpMyAdmin, it is possible to edit, create or delete the database without much difficulty. In collation to the MySQL command-line editor, it is easier to manage elements with the utilization of the phpMyAdmin graphical interface. Several servers can also be operated simultaneously. Data can also be exported into various formats like Word, PDF, SQL, XML, Spreadsheet, etc.

## Laravel

Laravel is a PHP framework that adheres to an MVC design pattern.

It is possible to increase the overall web application scalability with the Laravel framework.

The utilization of Laravel framework is deemed time-saving, as the existing framework components that aid in the creation of the web application is reused.

Laravel reuses the existing components of different frameworks which helps in creating a web application. The web application thus designed is more structured and pragmatic.

Laravel offers a rich set of functionalities which incorporates the basic features of PHP frameworks like CodeIgniter, Yii and other programming languages like Ruby on Rails. Laravel has a very rich set of features which will boost the speed of web development.

If you are familiar with Core PHP and Advanced PHP, Laravel will make your task easier. It saves a lot time if you are planning to develop a website from scratch. Moreover, a website built in Laravel is secure and prevents several web attacks.

A free and open-source PHP Web framework intended for developing web applications following a model view controller (MVC) architectural pattern. Among its many features Eloquent ORML object – relational mapping, Query building, Reverse routing are advanced PitP implementations for the development of applications now.

Laravel provides auto loading of classes without the need of manual maintenance. Views, serve as customizable logical code units that can be executed when loaded. Laravel RESTful Controller provides the option of separating the logic behind HTTP GET and POST request as well, making routing easier to understand. Services such as Migrations offered, provide a Version Control system for database schemas, making changes code based and changes to the database layout a possibility. This process simplifies deployment and updating of Laravel based applications. Laravel’s command line interface (CLI) is called, Artisan. Its features are mapped into different subcomponents of the artisan command – line utility. Its common users go for managing database migrations, publishing package assets etc. User authentication is of common in relevance to web applications. Laravel makes it easy when it comes to authentication as it includes features such as register, forgot password, and send reminders. (Peter, 2021) (Tawde) (Example of Laravel QR Code generator with Laravel 5.8, 2012)

## PHP

The general purpose of PHP is that it’s an open-source scripting language that is well suited for the web development whether they are web application, dynamic websites or static websites, and the code can be embedded to HTML in the server-side.

### Why did we choose PHP?

One of main reason why our team choose PHP is that it is platform independent, meaning it can be used on windows, Linux, macOS and also supports almost all web browser. It also works with all major web servers, making it simple to deploy on a variety of systems and platforms at a low cost.

PHP makes it easier to connect to almost any databases. This provided us more flexibility in deciding which database would be ideal for the application we were developing.

One of the other main reasons why we chose PHP is that it is very simple to get started with. Even without extensive knowledge or experience in the web development, our team could create a web page using PHP in short period of time. The syntax seems to be simple and learning the function is not hard, which means chances of errors are lower in PHP than other languages.

## XML

XML is a markup language that defines a set of rules for data encoding in a document that can be understood by both humans and machines.

Simplicity, generality, and usability and Its design goals

It simplifies data transfer, shared storage, data compatibility etc. It allows extending or switching to new software, operating systems (OS) without missing a single detail. XML can be defined as knowledge enclosed within identifiers. (force, 2014)

## Java

Java has been utilized in the Mobile Application of our project due to its robustness, ease of use, and cross-platform development competencies. It is secure, straightforward, and easy to comprehend, making code implementation relatively easier. As it is an Object-Oriented Programming Language, OOPs concepts like abstraction, encapsulation and inheritance help in the enhancement of security. It is also compatible and platform-independent, meaning that code written once can be run anywhere else (on other systems that also possess Java). As it is a High-Level Programming Language, it has fewer and simpler syntaxes.

## JavaScript Object Notation (JSON)

Standard text-format that is used to act for the purpose of transmitting data within web applications. It is a language-independent format that is easy for humans to understand (read and write) and it is also uncomplicated when parsing data.

# (No Heading Yet)

## Client Website features

## Client Mobile Application features

# Individual contributions

## N. S. D. Alwis (10707160)

## G. M. D. D. Rathnayake (10707351)

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## S. O. Perera (10707315)

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## P. P. L. Dilhani (10709402)

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## J.A. Mujeeb (10707284)

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## M. D. A. Medhavi (10707278)

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# Team Contribution

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| * + Name | * + Student ID | * + Contribution |
| * + J.A. Mujeeb | 10707284 | * + 16.7% |
| * + G.M.D.D. Ratnayake | 10707351 | * + 16.7% |
| * + S.O. Perera | * + 10707315 | * + 16.7% |
| * + N. S. De Alwis | * + 10707160 | * + 16.7% |
| * + M. D. A. Medhavi | 10707278 | * + 16.7% |
| * + P. P. L. Dilhani | 10709402 | * + 16.7% |