

ADVANCED PROGRAMMING

(SMJE 4383)

WEB BASED PROJECT REPORT:

EMPLOYEE ATTENDANCE

GROUP :

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INTRODUCTION

1.1 Background Research

In this project assignment, the goal of it is to let every students to experience the process of creating web-based applications. Each student is required to develop real-world applications as a group and implementing the use of standard technology such as HTML, Python language, git, Flask and etc. Web applications are shooting up in its everyday use in all kind of sectors. For example, industrial sector. In fact, web-based applications are a great replacement to desktop applications and becoming a significant instrument for small and large businesses around the world. According to Alex Chaffee, 2012, "a web application is a collection of servlets, html pages, classes, and other resources that can be bundled and run-on multiple containers from multiple vendors. A web application is rooted at a specific path within a web server". The popularity and convenience of web-based apps is because developers don't have to write multiple versions of the same application for different operating systems, the users won't have to install additional software. In this project, Linux platform is used as it is a great web development platform as it has tools to make the task easier. Due to lots of advantages offered, web-based applications are commonly used in businesses for its promising future.

1.2 PROBLEM STATEMENT

During the study for this project, we are planning to develop an application that facilitates the need in businesses. We fairly acknowledged the problem faced by most of employees and managers. The traditional way of attendance tracking such as card swiping, manually putting names and working hours on spreadsheets and etc are somewhat a hassle, especially during this Covid-19 pandemic, many employees are encouraged to work from home. So the traditional way of tracking attendance need to be further developed. To keep up with the technology, we have developed a web-based attendance tracker to minimize the hassle faced by both employers and employees as attendance management is essential to every companies.

1.3 OBJECTIVES

Several objectives in this project are stated to achieve solutions for solving the problem statements. Following are the objectives from this project:

- 1. To develop a web based application using python 3 and virtual environment
- 2. To solve the industrial-based problem and easy work environment and experience.

1.4 DISTRIBUTION OF WORKLOAD

TASK	NASUHA	AZLINA	KAR OON
Project discussion and online group meeting	1	1	/
Project idea presentation		/	/
Construct web based app using Ubuntu 20.04	/		
Present the roughly idea and design for the app interface			/
Prepared the project report	/	/	/
Code and simulate the program in python	/		
Project report: Introduction		/	
Project report: Methodology	/		
Project report: Result and discussion	/		
Project report: Conclusion			/

Table 1: Project Task Allocation of Members

METHODOLOGY

2.1 PROJECT DEVELOPMENT

2.1.1 FLOWCHART FOR WEB BASED APPLICATION

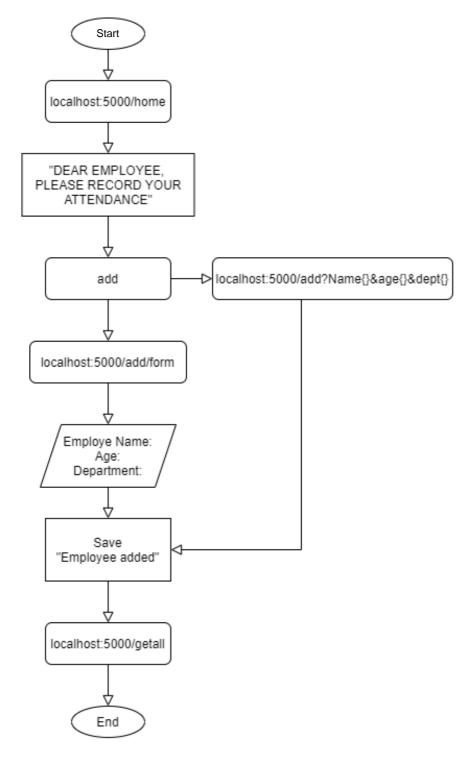


Fig.2 Flowchart for Project Application

2.1.2 WEB BASED APPLICATION INTERFACE

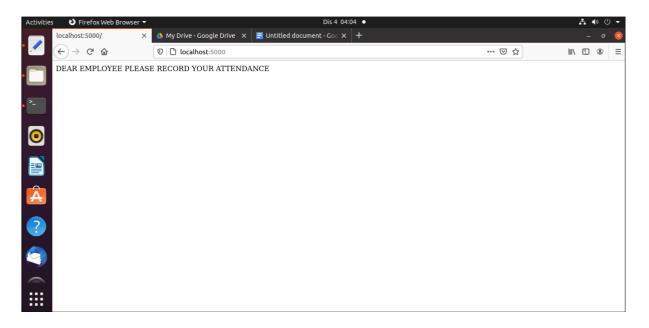


Fig 2.1 localhost:5000/home

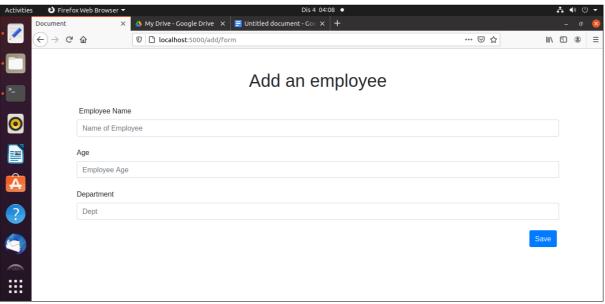


Fig 2.2 localhost:5000/add/form

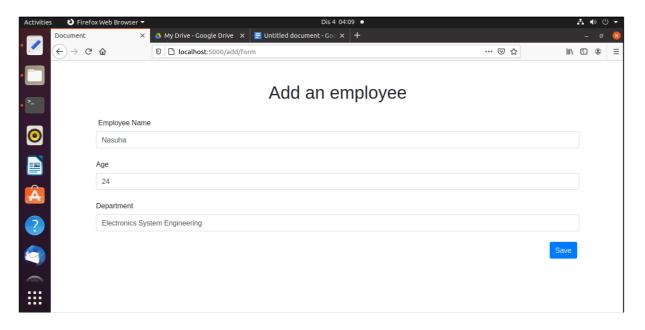


Fig 2.3 key in employee details

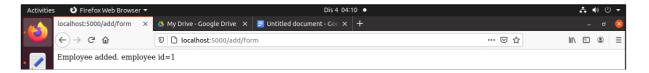


Fig 2.4 Employee added

Fig 2.5 localhost:5000/getall

DISCUSSION

3.1 PROJECT ANALYSIS

In this project, Ubuntu version 20.04, and python3 were installed along with pip3. Also PostgreSQL version 12.5 were installed to create a database and a user. An installation of a flask and virtual environment in python is run as well to use all the required package needed for developing the web app before lastly run database migration. Database migration is a process of writing code in python file to create a table instead of creating table directly in psql (postgres shell). Hence, by run those code in python file created the database and the table. "devopsdb" and "devopsuser" are the name used to create the database and user in postgres sql. This project application developed running using local host and TCP port 5432, 127.0.0.1:5432.

An installation of virtual environment is done by running command pip3 install virtual env in a directory file name 'python-flask-app' where a virtual environment named venv is created inside. The virtual environment is activated during the whole process of developing a web app. Then run the pip3 command to install all the dependencies such as flask, flask sqlchemy, flask script, flask migrate and psycopg2 binary.

Next, a file .env is created in which to set up the environment variables and source .env file to pick up the development config from config module. Furthermore, the database is connected using the url for connectivity. Means, connect to postgresql with the user and database in local host.

Lastly, the migration were run after created a database scheme by initially run a command python3 manage.py db init where it is going to create a migration static and database scheme. Created a migrations file by running migrate command python3 manage.py db migrate. A code is provided after migration which is a code to create the table. Run the command python3 manage.py db upgrade to create required table. Finally, run the web application using command python3 manage.py runserver. Thus, our application running on local host 5000 port.

3.2 PROJECT SIMULATION

```
suhxx@suhxx:-/python-flask-app

suhxx@suhxx:-/s sudo -u postgres psql -c "SELECT version();"
[sudo] password for suhxx:
sudo: psql: command not found
suhxx@suhxx:-/s sudo apt-get install postgresql postgresql-contrib
Reading package lists... Done
Bullding dependency tree
Reading state information... Done
The following additional packages will be installed:
postgresql-12 postgresql-client-12 postgresql-client-common postgresql-common
Suggested packages:
postgresql-12 postgresql-doc-12 libjson-perl
The following NEW packages will be installed:
postgresql postgresql-12 postgresql-client-12 postgresql-client-common postgresql-common postgresql postgresql postgresql-lot postgresql postgresql postgresql-lot postgresql postgresql postgresql postgresql postgresql-client-12 postgresql-client-common postgresql-common postgresql-contrib
0 upgraded, 6 newly installed, 0 to remove and 70 not upgraded.
Need to get 0 B/14.7 MB of archives.
After this operation, 45.8 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Preconfiguring packages ...
Selecting previously unselected package postgresql-client-common.
(Reading database ... 188041 files and directories currently installed.)
Preparing to unpack .../0-postgresql-client-common_214ubuntu0.1_all.deb ...
Unpacking postgresql-client-12 (21.5-0buntu0.20.04.1_amd64.deb ...
Unpacking postgresql-client-12 (12.5-0buntu0.20.04.1_amd64.deb ...
Unpacking postgresql-client-12 (12.5-0buntu0.20.04.1) ...
Selecting previously unselected package postgresql-common.
Preparing to unpack .../2-postgresql-client-12.
Preparing to unpack .../2-postgresql-common_214ubuntu0.1_all.deb ...
Adding 'diversion of /usr/bin/pg_config to /usr/bin/pg_config.libpq-dev by postgresql-common'
```

Fig 3.1 Installing postgres sql

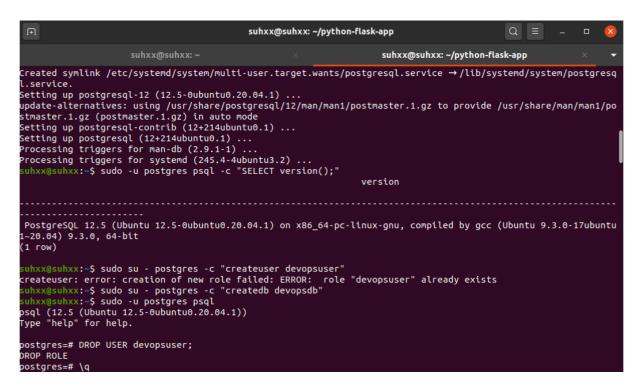


Fig 3.2 Creating database and user

```
suhxx@suhxx: ~/python-flask-app
                                                                                                                         suhxx@suhxx: ~/python-flask-app
oostgres=# \q
postgres=# (q
suhxx@suhxx:~$ sudo su - postgres -c "createuser devopsuser"
suhxx@suhxx:~$ sudo -u postgres psql
psql (12.5 (Ubuntu 12.5-0ubuntu0.20.04.1))
Type "help" for help.
postgres=# grant all privileges on database devopsdb to devopsuser;
postgres=# alter user devopsuser with password 'devops';
ALTER ROLE
oostgres=# \q
suhxx@suhxx:-$ sudo vi /etc/postgresql/10/main/postgresql.conf
suhxx@suhxx:-$ netstat -tlupn | grep 5432
(Not all processes could be identified, non-owned process info
will not be shown, you would have to be root to see it all.)
tcp 0 0 127.0.0.1:5432 0.0.0.0:*
                                                                                                                LISTEN
 uhxx@suhxx:~$ mkdir python-flask-app
uhxx@suhxx:~$ cd python-flask-app
subxxggsuhxx:-/python-flask-app$ pip3 install virtualenv
Requirement already satisfied: virtualenv in /home/suhxx/.local/lib/python3.8/site-packages (20.2.1)
Requirement already satisfied: distlib<1,>=0.3.1 in /home/suhxx/.local/lib/python3.8/site-packages (from virtualenv) (
 .3.1)
Requirement already satisfied: six<2,>=1.9.0 in /usr/lib/python3/dist-packages (from virtualenv) (1.14.0)
Requirement already satisfied: filelock<4,>=3.0.0 in /home/suhxx/.local/lib/python3.8/site-packages (from virtualenv)
 3.0.12)
Requirement already satisfied: appdirs<2,>=1.4.3 in /home/suhxx/.local/lib/python3.8/site-packages (from virtualenv) (
 .4.4)
                       python-flask-app$ sudo apt install python3-venv
```

Fig 3.3 Enable Local host and setup TCP Port 5432

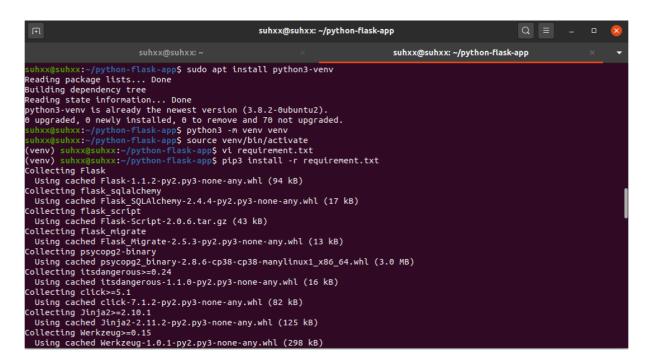


Fig 3.4 installing virtual environment flask

Fig 3.5 Creating .py files for writing source code in python

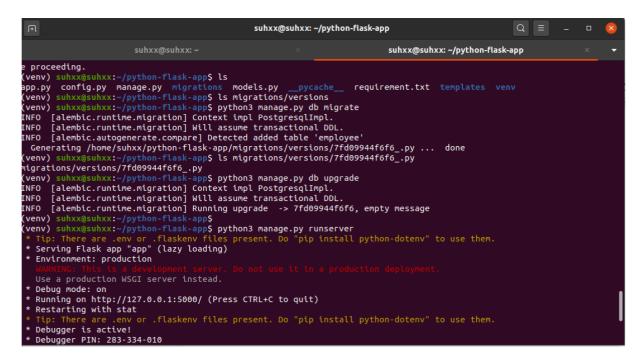


Fig 3.6 Run migration

```
Debug mode: on
     Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
     Restarting with stat
                                  .env or .flaskenv files present. Do "pip install python-dotenv" to use them.
  * Debugger is active!
  * Debugger PIN: 283-334-010
127.0.0.1 - - [04/Dec/2020 03:50:50] "GET / HTTP/1.1" 200 -
                          [04/Dec/2020 03:50:56] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - -
                          [04/Dec/2020 04:08:06] "GET /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:08:11] "GET /favicon.ico HTTP/1.1" 404 -
[04/Dec/2020 04:10:31] "POST /add/form HTTP/1.1" 200 -
127.0.0.1 - -
127.0.0.1 - -
127.0.0.1 - -
                          [04/Dec/2020 04:10:31] POST /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:13:37] "GET /getall HTTP/1.1" 200 -
[04/Dec/2020 04:14:31] "GET /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:15:05] "POST /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:15:20] "GET /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:15:55] "BOST /add/form HTTP/1.1" 200 -
127.0.0.1 - -
127.0.0.1 - -
127.0.0.1 - -
127.0.0.1 - -
                          [04/Dec/2020 04:15:55] "POST /add/form HTTP/1.1" 200 -
[04/Dec/2020 04:16:05] "GET /getall HTTP/1.1" 200 -
[04/Dec/2020 04:17:15] "GET /details HTTP/1.1" 200 -
127.0.0.1 - -
127.0.0.1 - -
127.0.0.1 - -
                          [04/Dec/2020 04:20:10] "GET /Nasuha HTTP/1.1" 404 -
[04/Dec/2020 04:21:26] "GET /name/Nasuha HTTP/1.1" 200 -
[04/Dec/2020 04:21:45] "GET /details HTTP/1.1" 200 -
127.0.0.1 - -
127.0.0.1 - -
127.0.0.1 - -
                          [04/Dec/2020 04:21:58] "GET / HTTP/1.1" 200 -
[04/Dec/2020 04:22:10] "GET /add HTTP/1.1" 200 -
127.0.0.1 -
127.0.0.1 -
```

Fig 3.7 Web app running History/ track

CONCLUSION

In a nutshell, a web-based attendance tracking application is successfully developed by using python 3 and virtual environment. This can be used in industrial to take the attendance remotely especially during this Covid-19 pandemic as employee are encouraged to work from home. The employer can keep track the attendance of the employees through this application, and this enable the employer to make evaluation of their employee and also calculate the pay for their employee. Besides, this application can replace the traditional method of taking attendance of card swiping and bring so much of benefit compare to the old days.

APPENDICES

APPENDIX A - CODE FOR PROJECT

APP.PY

```
from flask import Flask, request, jsonify, render_template
from flask sqlalchemy import SQLAlchemy
import os
app = Flask(__name__)
app.config.from_object(os.environ['APP_SETTINGS'])
app.config['SOLALCHEMY TRACK MODIFICATIONS'] = False
db = SQLAlchemy(app)
from models import Employee
@app.route("/")
def hello():
       return "DEAR EMPLOYEE PLEASE RECORD YOUR ATTENDANCE"
@app.route("/name/<name>")
def get_employee_name(name):
       return "name : { }".format(name)
@app.route("/details")
def get_employee_details():
       age=request.args.get('age')
       dept=request.args.get('dept')
       return "Age : { }, Dept: { }".format(age,dept)
@app.route("/add")
def add_employee():
       name=request.args.get('name')
       age=request.args.get('age')
       dept=request.args.get('dept')
       try:
       employee=Employee(
       name=name,
       age=age,
       dept=dept
       db.session.add(employee)
       db.session.commit()
       return "Employee added. employee id={}".format(employee.id)
       except Exception as e:
       return(str(e))
@app.route("/add/form",methods=['GET', 'POST'])
def add_employee_form():
       if request.method == 'POST':
       name=request.form.get('name')
```

```
age=request.form.get('age')
        dept=request.form.get('dept')
        try:
        employee=Employee(
        name=name,
        age=age,
        dept=dept
        db.session.add(employee)
        db.session.commit()
       return "Employee added. employee id={}".format(employee.id)
       except Exception as e:
       return(str(e))
       return render_template("getdata.html")
@app.route("/getall")
def get_all():
       try:
        employees=Employee.query.all()
       return jsonify([e.serialize() for e in employees])
       except Exception as e:
       return(str(e))
@app.route("/get/<id_>")
def get_by_id(id_):
        try:
        employee=Employee.query.filter_by(id=id_).first()
       return jsonify(book.serialize())
       except Exception as e:
       return(str(e))
if __name__ == '__main__':
        app.run()
```

CONFIG .PY

```
import os
basedir = os.path.abspath(os.path.dirname(__file__))
class Config(object):
       DEBUG = False
       TESTING = False
       CSRF\_ENABLED = True
       SECRET_KEY = 'this-really-needs-to-be-changed'
       SQLALCHEMY_DATABASE_URI = os.environ['DATABASE_URL']
class ProductionConfig(Config):
       DEBUG = False
class StagingConfig(Config):
       DEVELOPMENT = True
       DEBUG = True
class DevelopmentConfig(Config):
       DEVELOPMENT = True
       DEBUG = True
class TestingConfig(Config):
       TESTING = True
```

MODELS .PY

```
from flask_sqlalchemy import SQLAlchemy
from app import db
class Employee(db.Model):
       __tablename__ = 'employee'
       id = db.Column(db.Integer, primary_key=True)
       name = db.Column(db.String())
       age = db.Column(db.String())
        dept = db.Column(db.String())
        def __init__(self, name, age, dept):
        self.name = name
        self.age = age
       self.dept = dept
        def __repr__(self):
       return '<id { }>'.format(self.id)
        def serialize(self):
       return {
        'id': self.id,
        'name': self.name,
        'age': self.age,
        'dept':self.dept
```

MANAGE .PY

```
from flask_migrate import Migrate, MigrateCommand
from app import app, db
migrate = Migrate(app, db)
manager = Manager(app)
manager.add_command('db', MigrateCommand)
if __name__ == '__main__':
        manager.run()
Getdata.html
<!DOCTYPE html>
<html lang="en">
<head>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
        <meta http-equiv="X-UA-Compatible" content="ie=edge">
        <title>Document</title>
        k rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css"
integrity="sha384-MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPMO"
        crossorigin="anonymous">
</head>
<body>
        <div class="container">
        <div class="container">
        <hr>>
        <br>>
        <div class="row align-items-center justify-content-center">
        <h1>Add an employee</h1>
        </div>
        <br>
        <form method="POST">
        <label for="name">Employee Name</label>
        <div class="form-row">
                <input class="form-control" type="text" placeholder="Name of Employee" id="name" name="name">
        </div>
        <br>>
        <div class="form-row">
                <label for="author">Age</label>
                <input class="form-control" type="text" placeholder="Employee Age" id="age" name="age">
        </div>
        <br>>
        <div class="form-row">
                <label for="published">Department</label>
                <input class="form-control" type="text" placeholder="Dept" id="dept" name="dept">
        </div>
```

```
<br>
        <button type="submit " class="btn btn-primary " style="float:right ">Save</button>
        </form>
        <br>><br>>
        </div>
        </div>
        <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="sha384-</pre>
h8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo "
        crossorigin="anonymous "></script>
        <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js" integrity="sha384-</pre>
ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIPm49 "
        crossorigin="anonymous "></script>
        <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/js/bootstrap.min.js" integrity="sha384-</pre>
ChfqqxuZUCnJSK3+MXmPNIyE6ZbWh2IMqE241rYiqJxyMiZ6OW/JmZQ5stwEULTy"
        crossorigin="anonymous "></script>
</body>
</html>
```