IBM-PROJECT-14173-1659543653

Venkata Ratna Sai

DHANALAKSHMI ENGINNERING COLLEGE

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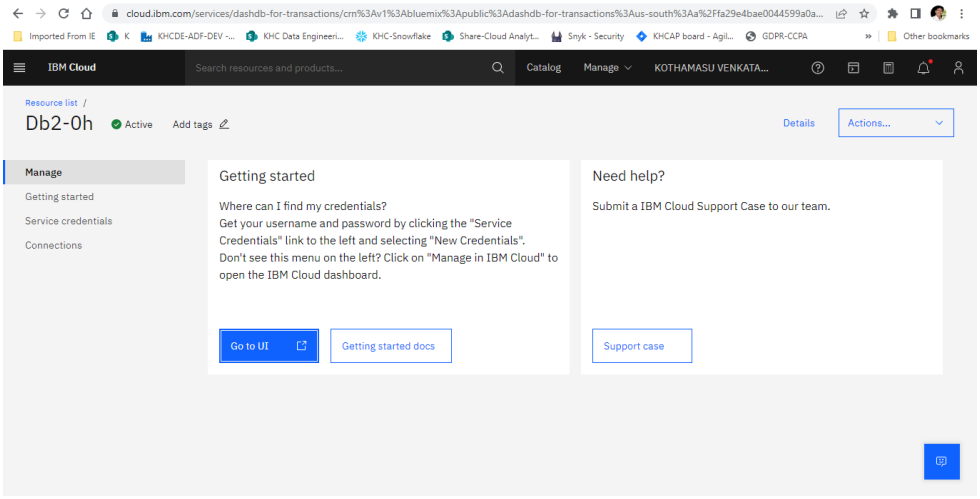
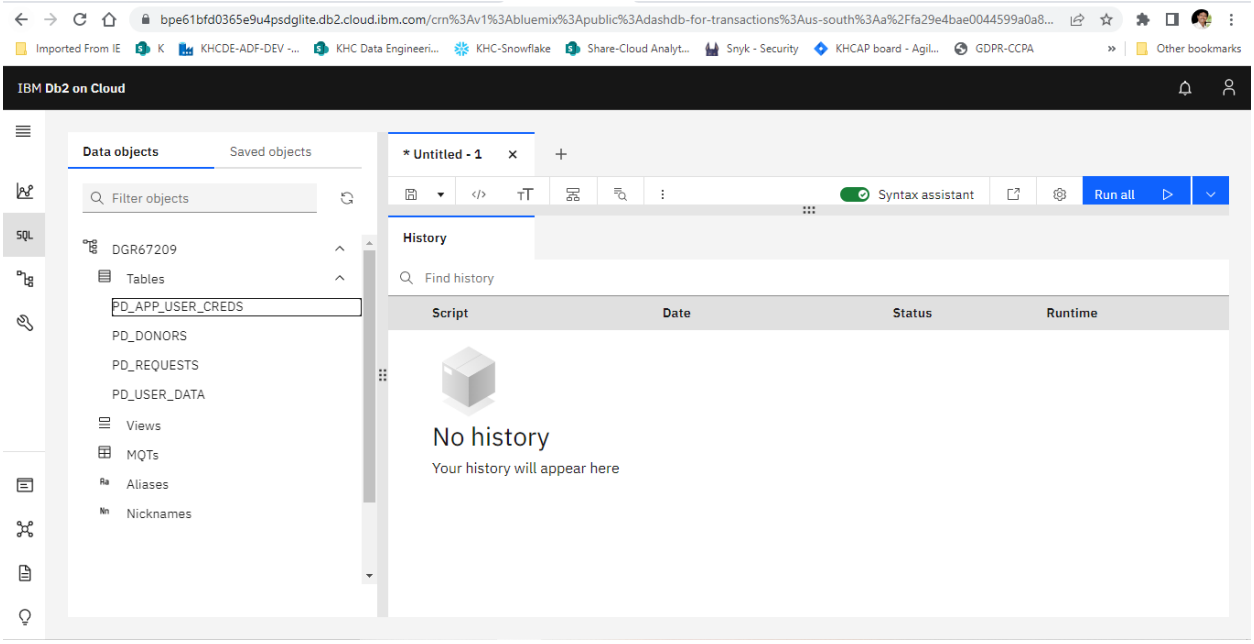
IBM Cloud Setup & Services:

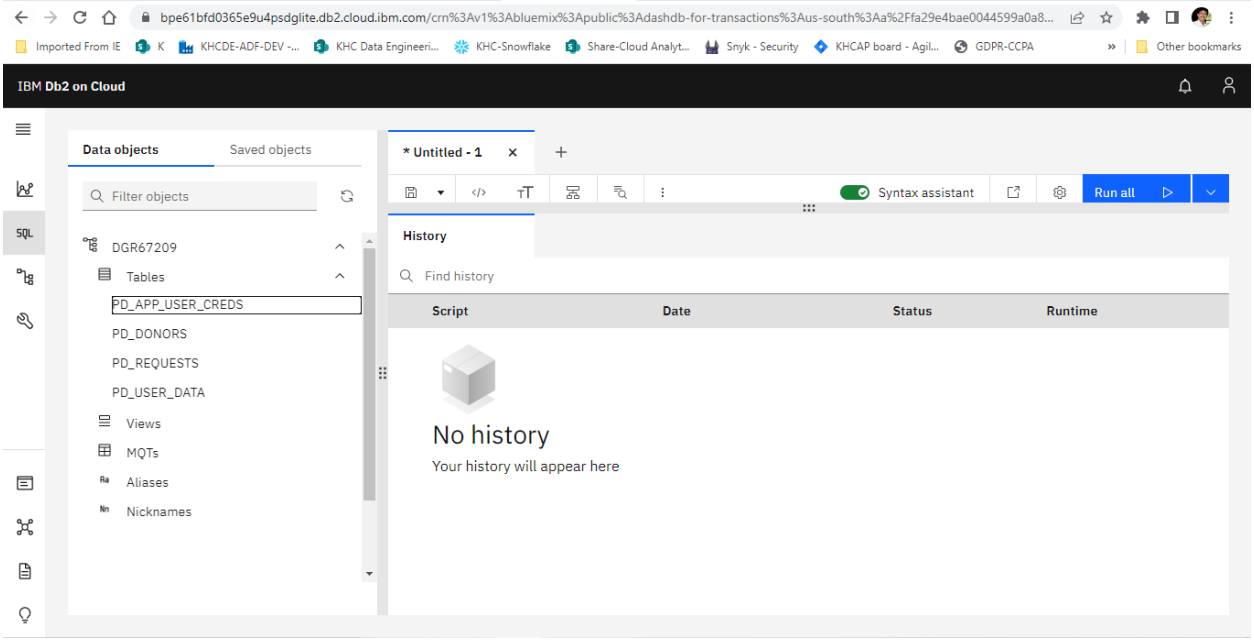
DB 2 – Database:



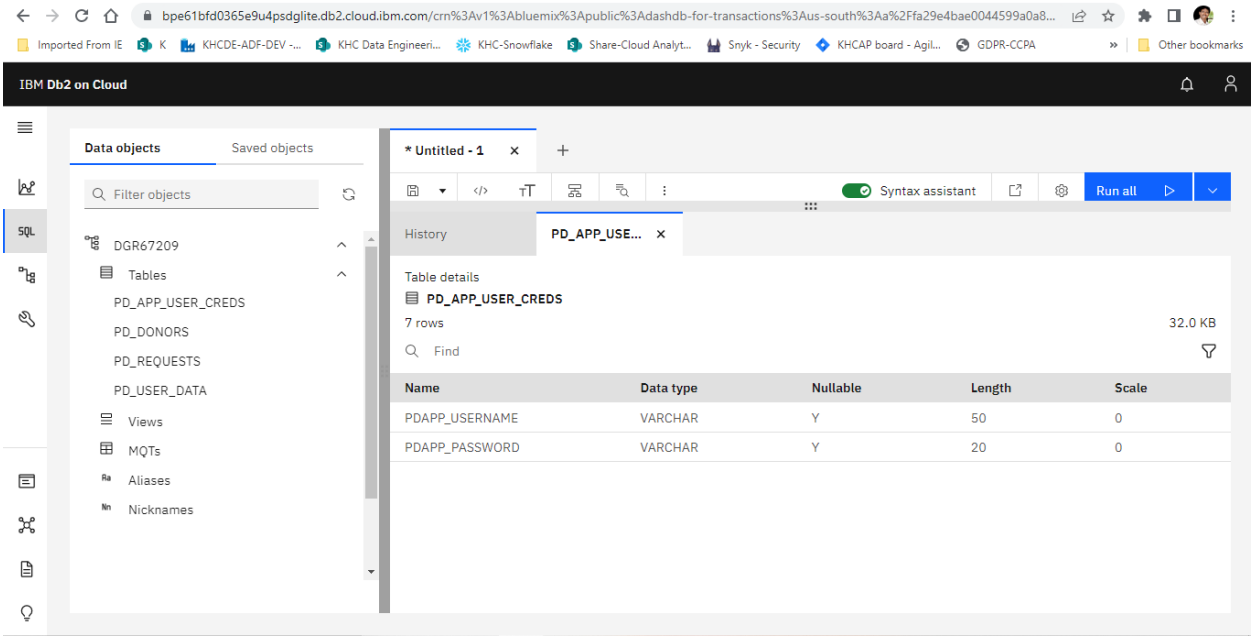
DB 2 – Database Tables:



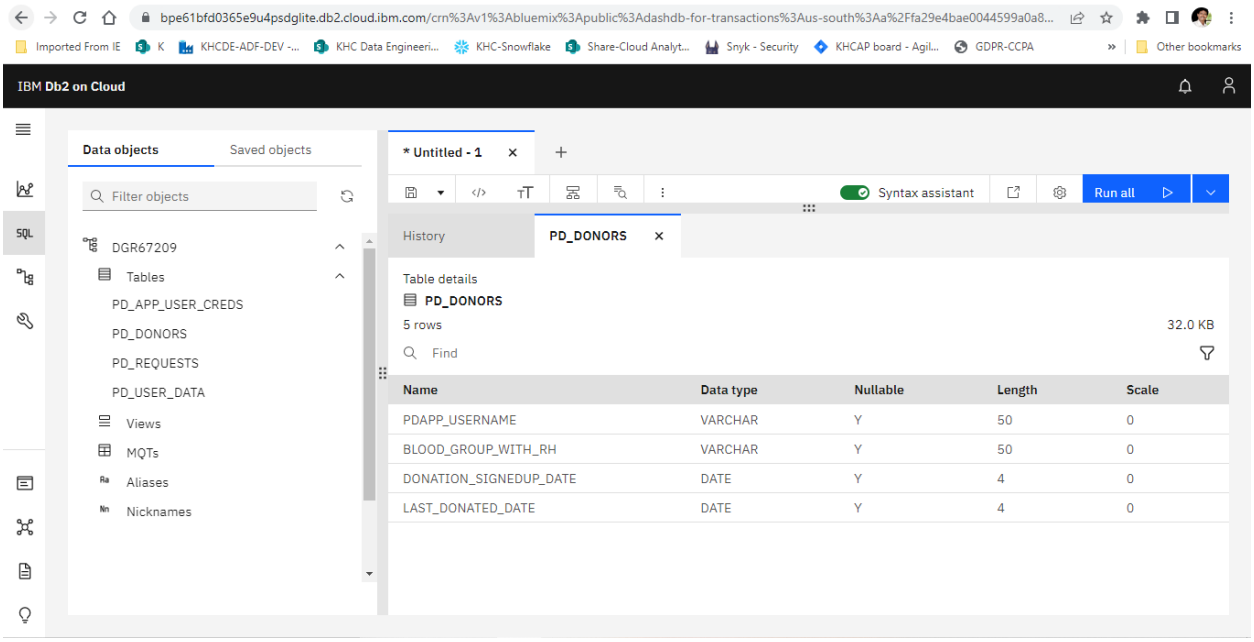
DB2 – Table - ***PD_USER_DATA:***



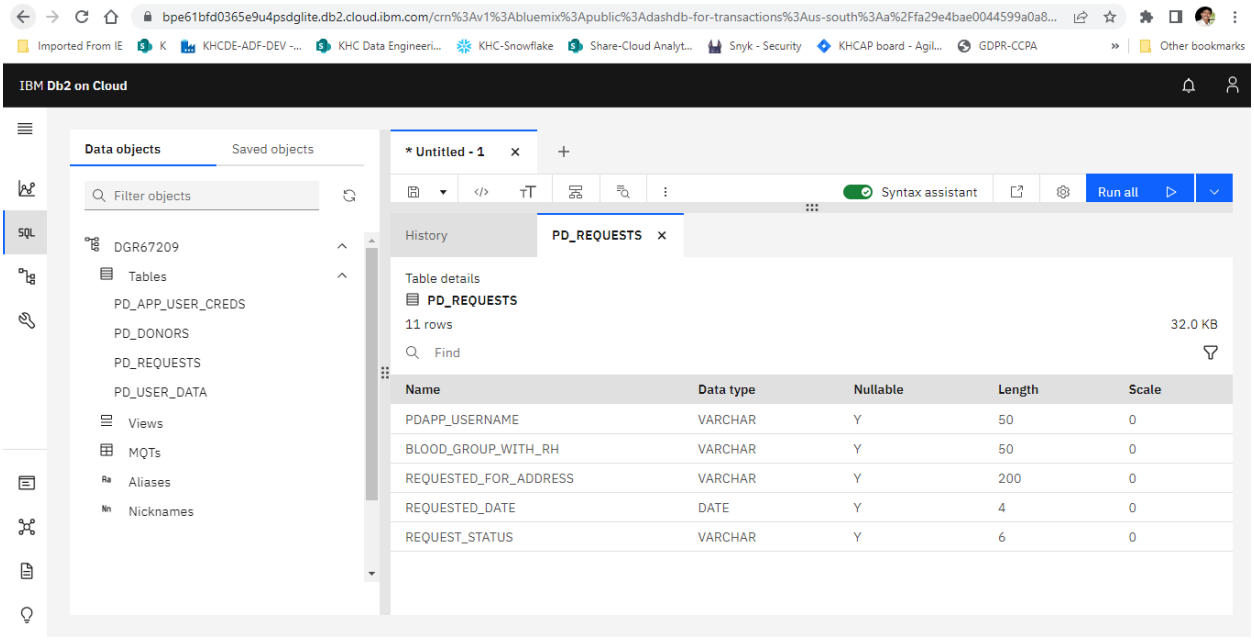
DB2 – Table - ***PD_APP_USER_CREDS:***



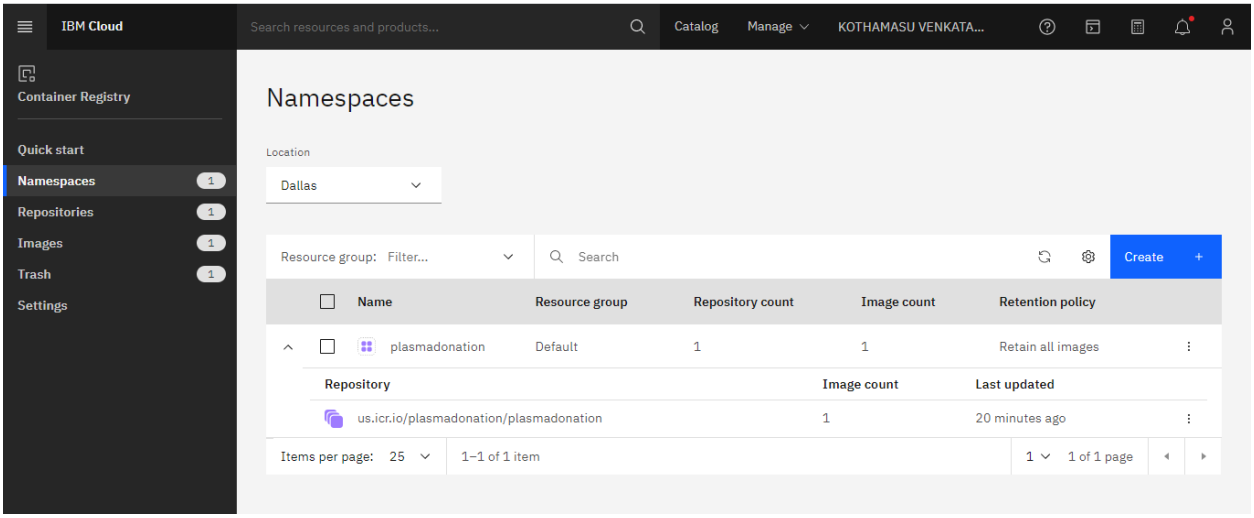
DB2 – Table - ***PD_DONORS:***



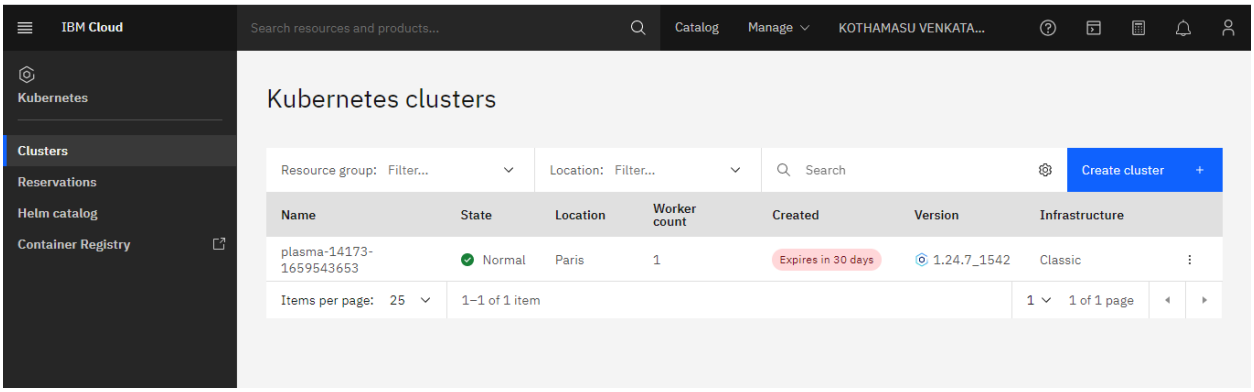
DB2 – Table - ***PD_REQUESTS:***



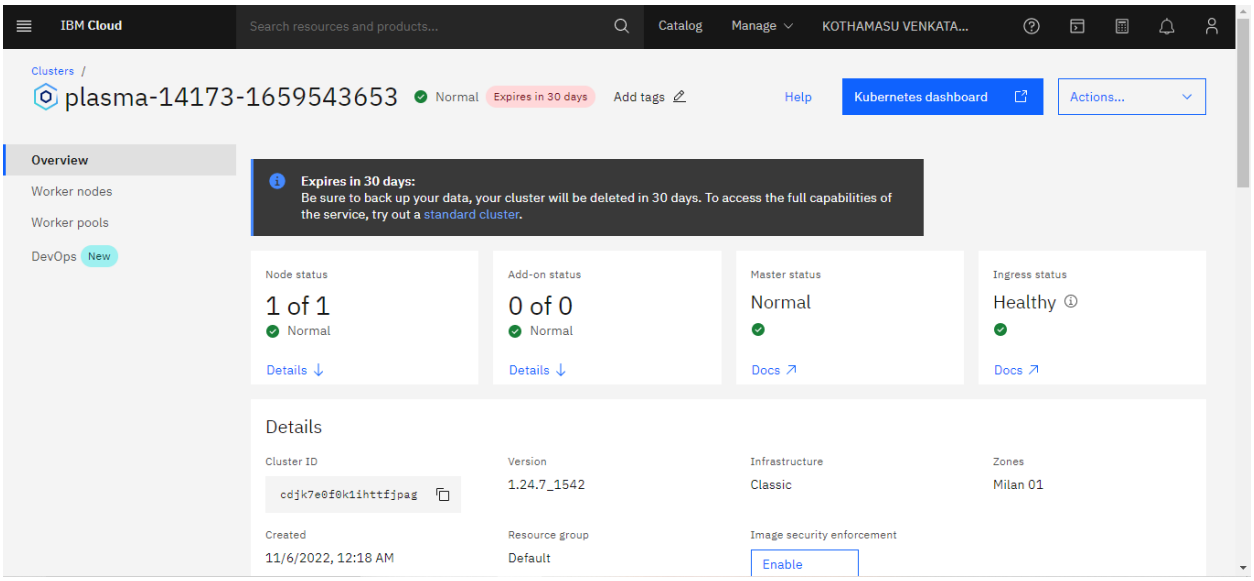
Container Registry:



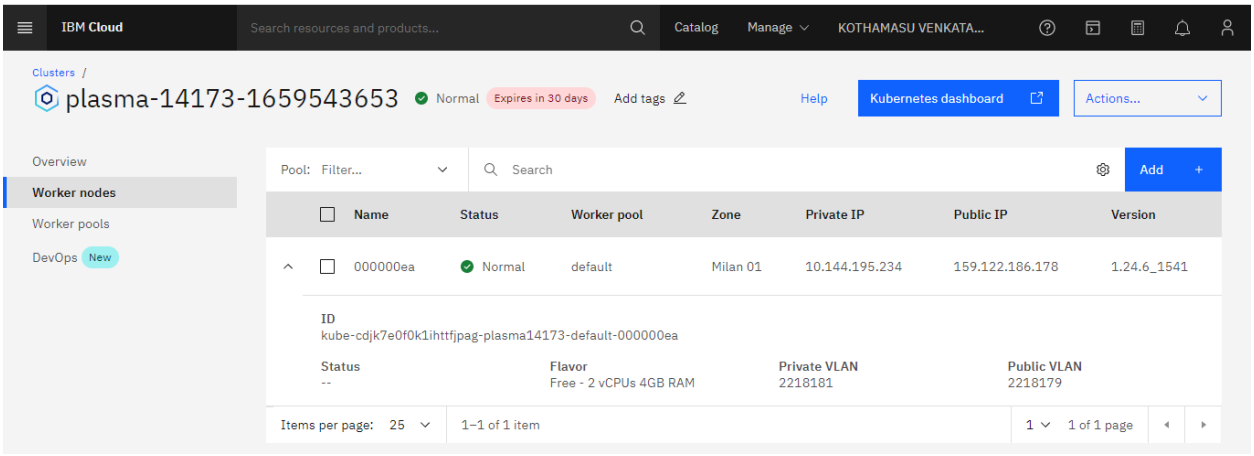
Kubernetes Cluster:



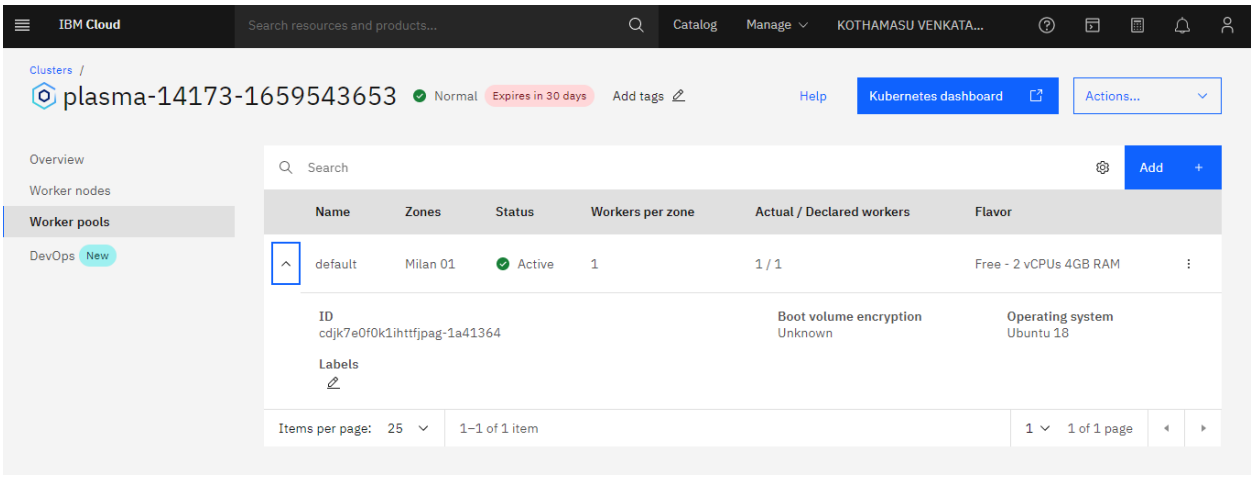
Cluster Overview:



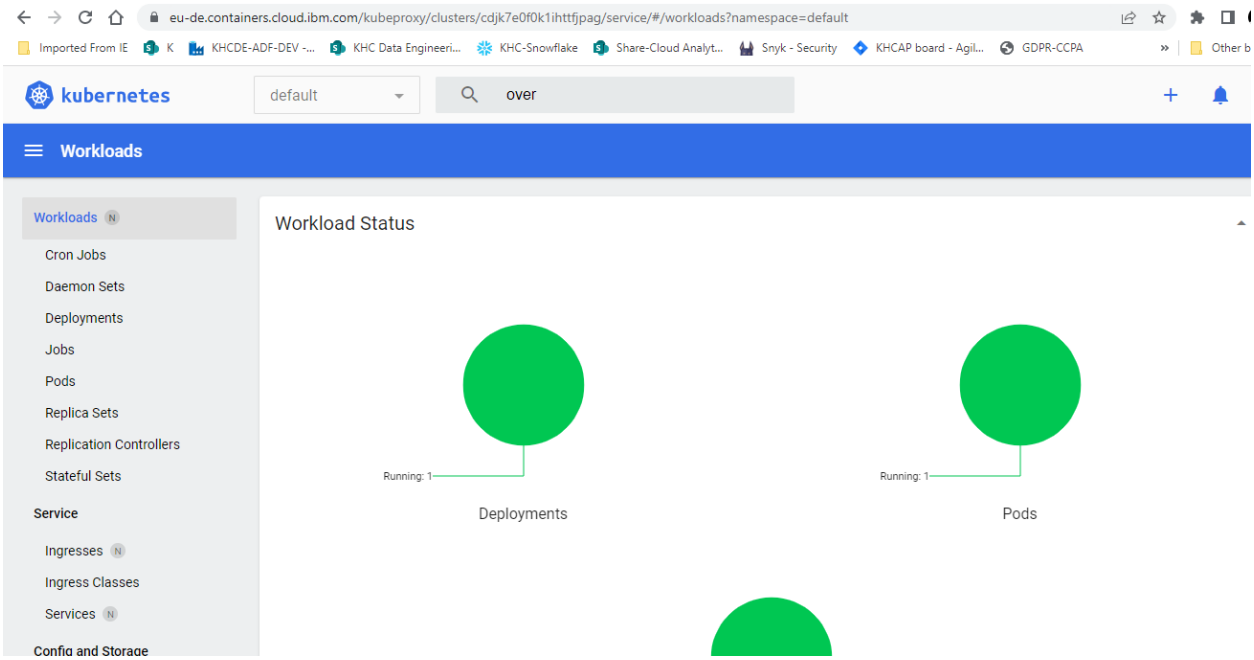
Worker Nodes:



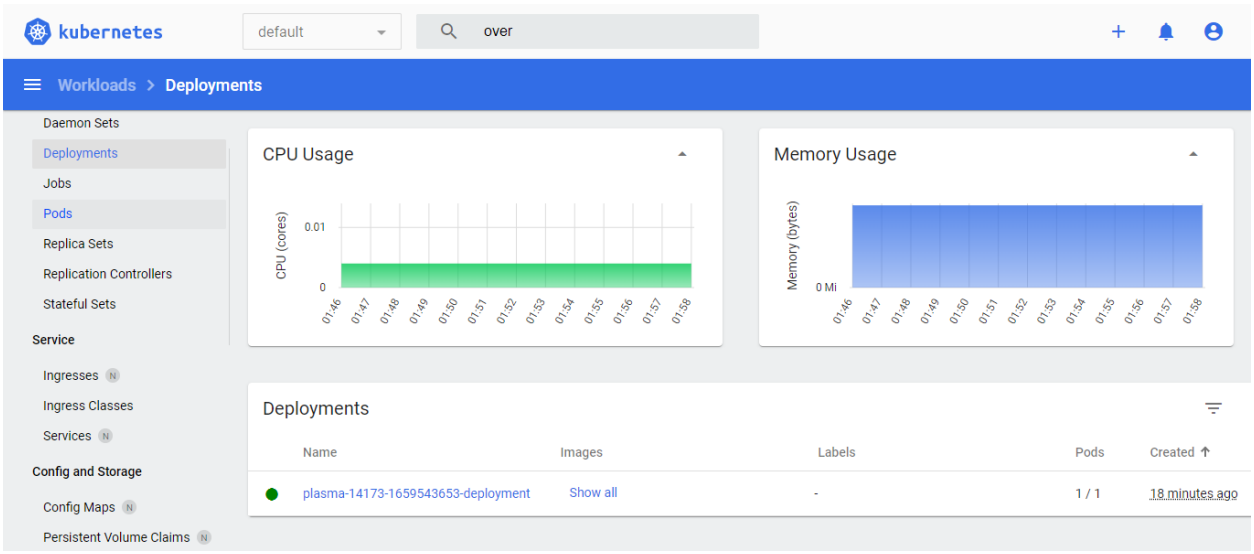
Worker Pods:



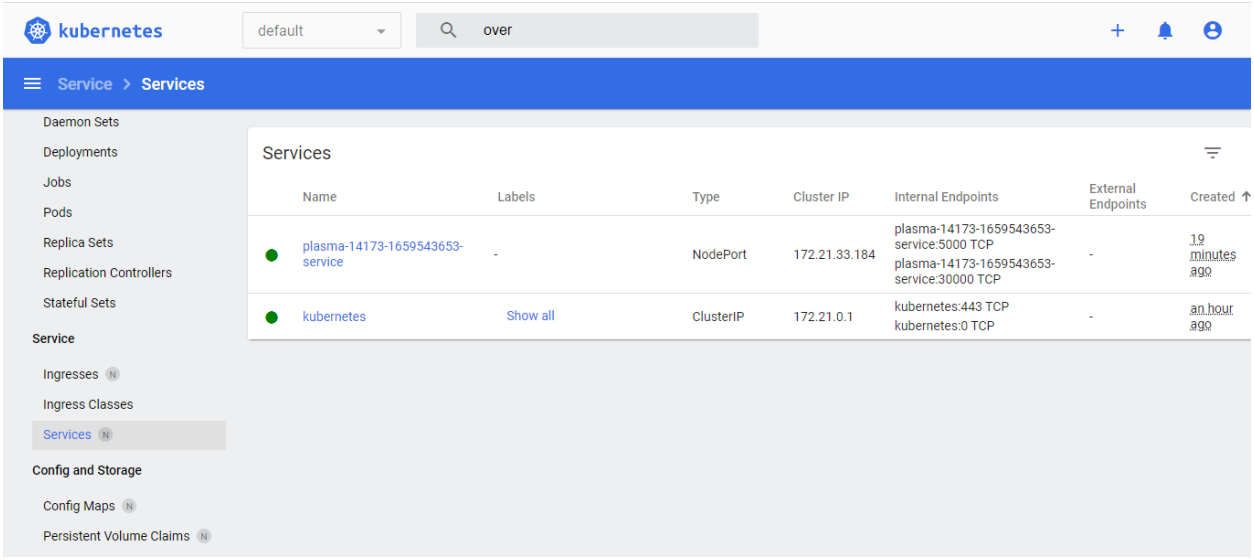
Kubernetes Dashboard:



Deployment:

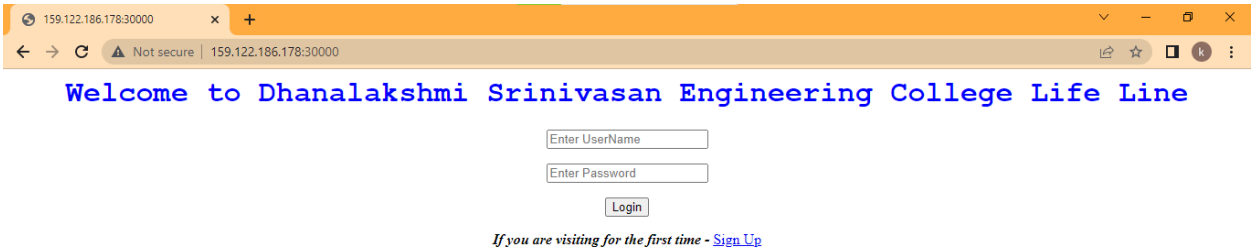


Service:


kubernetes
default
over
Service > Services
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Replication Controllers
Stateful Sets
Service
Ingresses
Ingress Classes
Services
Config and Storage
Config Maps
Persistent Volume Claims
Services
Name
Labels
Type
Cluster IP
Internal Endpoints
External Endpoints
Created
plasma-14173-1659543653-service
-
NodePort
172.21.33.184
plasma-14173-1659543653-service:5000 TCP
plasma-14173-1659543653-service:30000 TCP
-
19 minutes ago
kubernetes
Show all
ClusterIP
172.21.0.1
kubernetes:443 TCP
kubernetes:0 TCP
-
an hour ago

Web App:

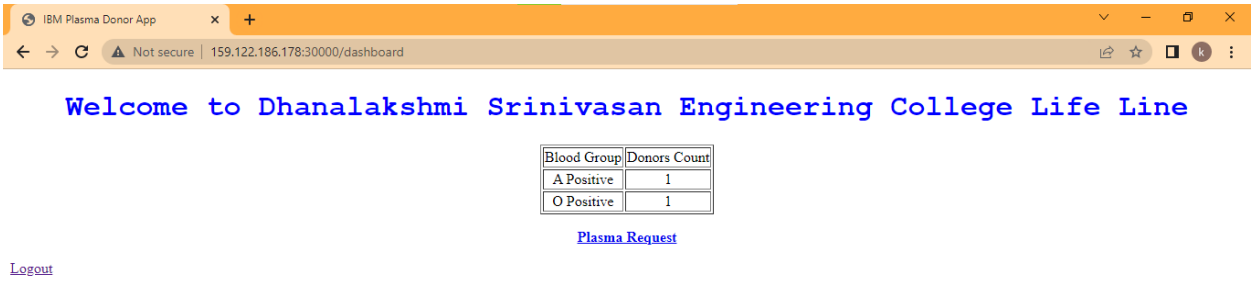
Landing Page:



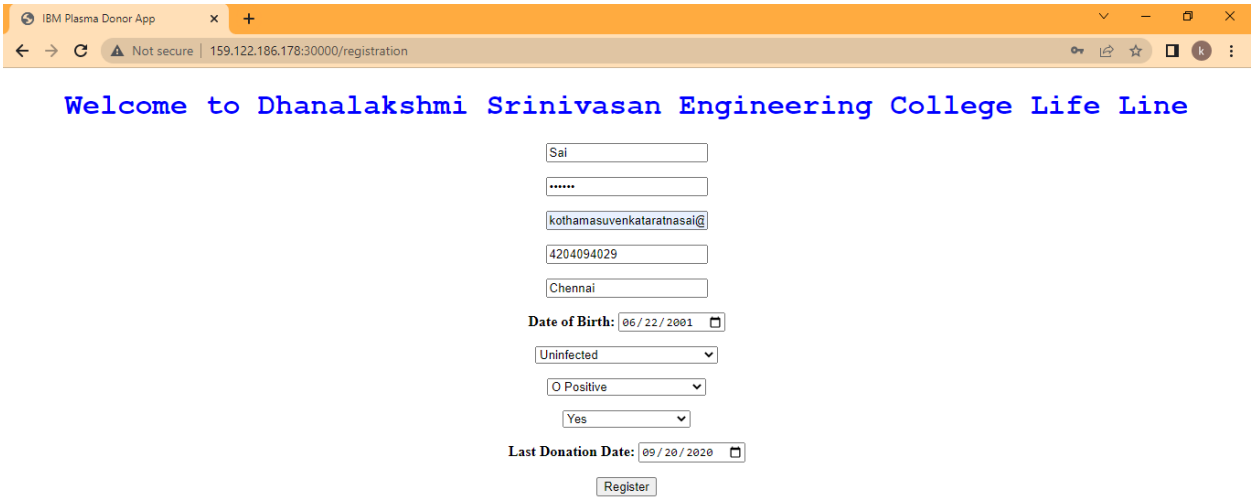
User Validation:

User Password Validation:

Successful Login / Dashboard:

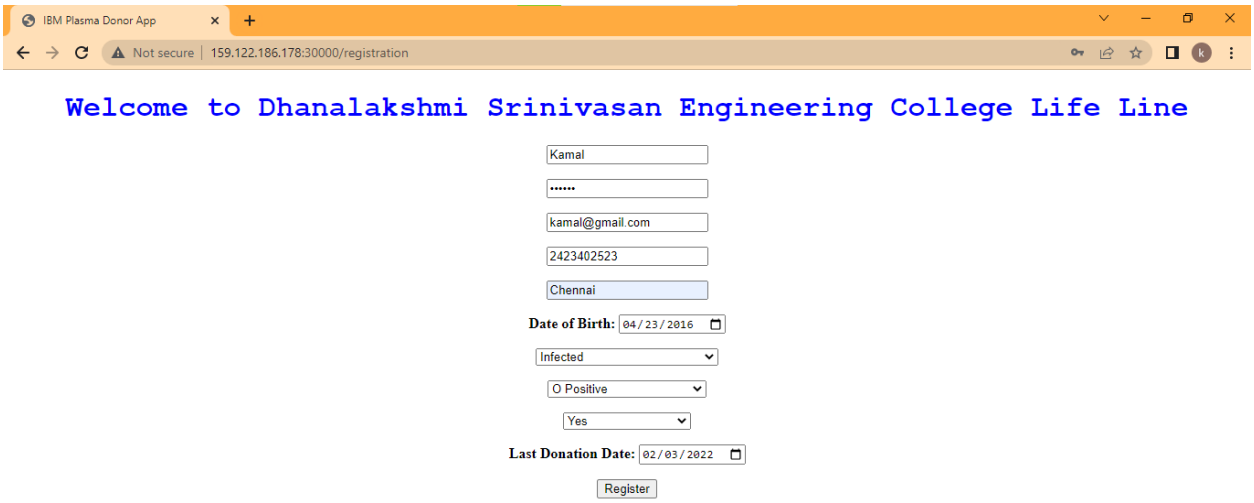


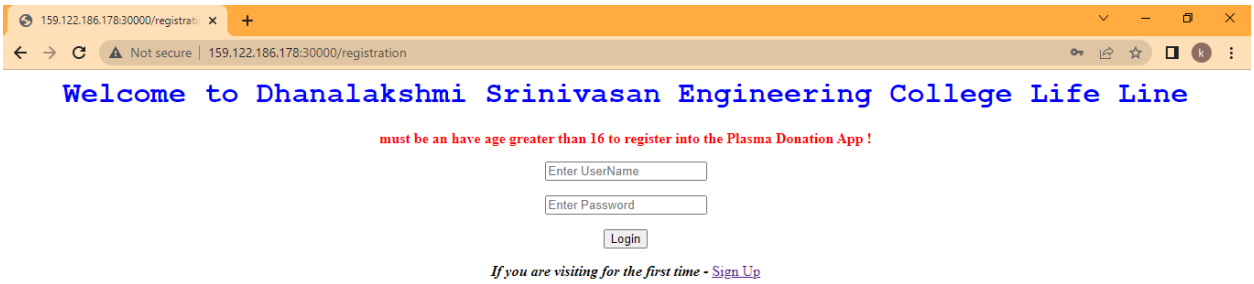
User Registration:



User Successful Registration:

User Registration – Age Validation:



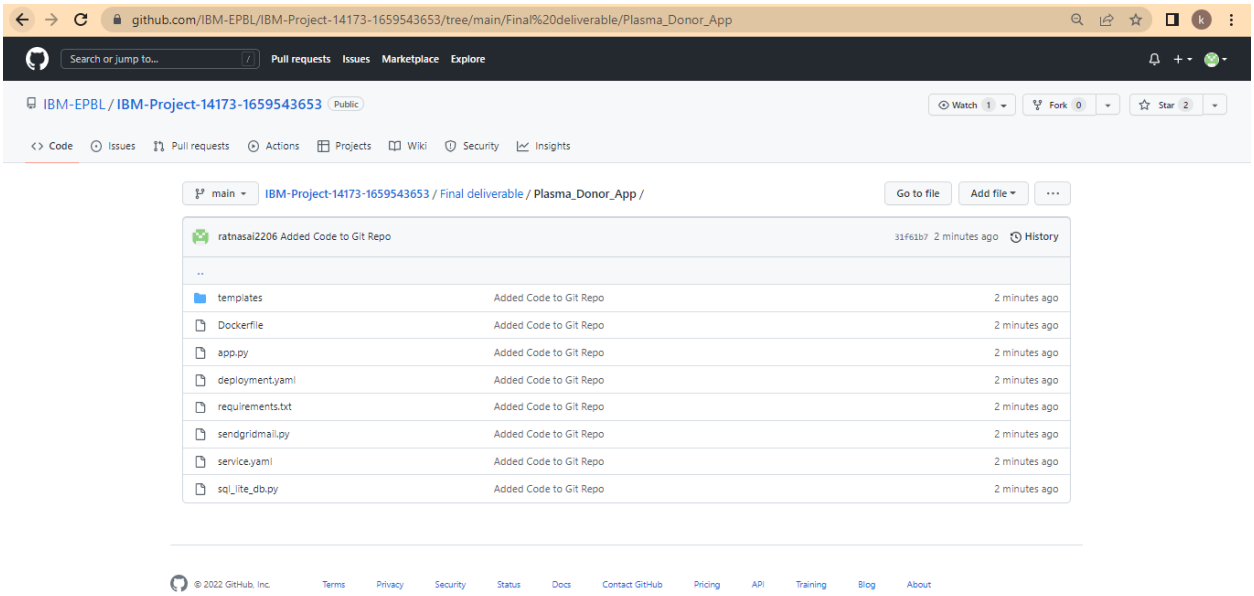


User Registration – Duplicate Registration:

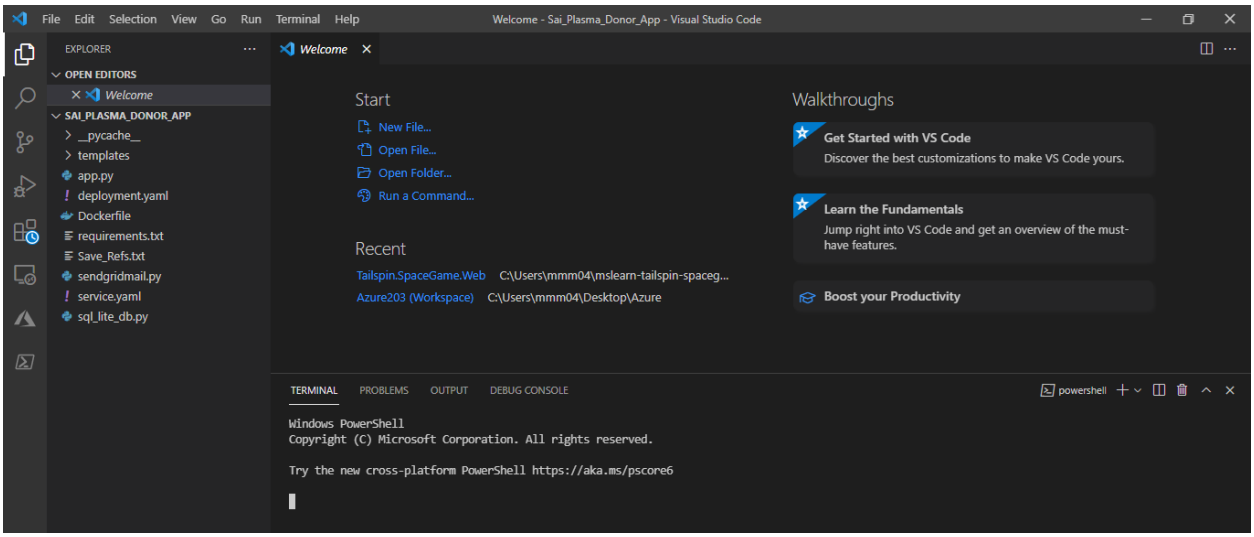
Plasma Request Form:

Code:

Git Repo:



Entire Code Folder:



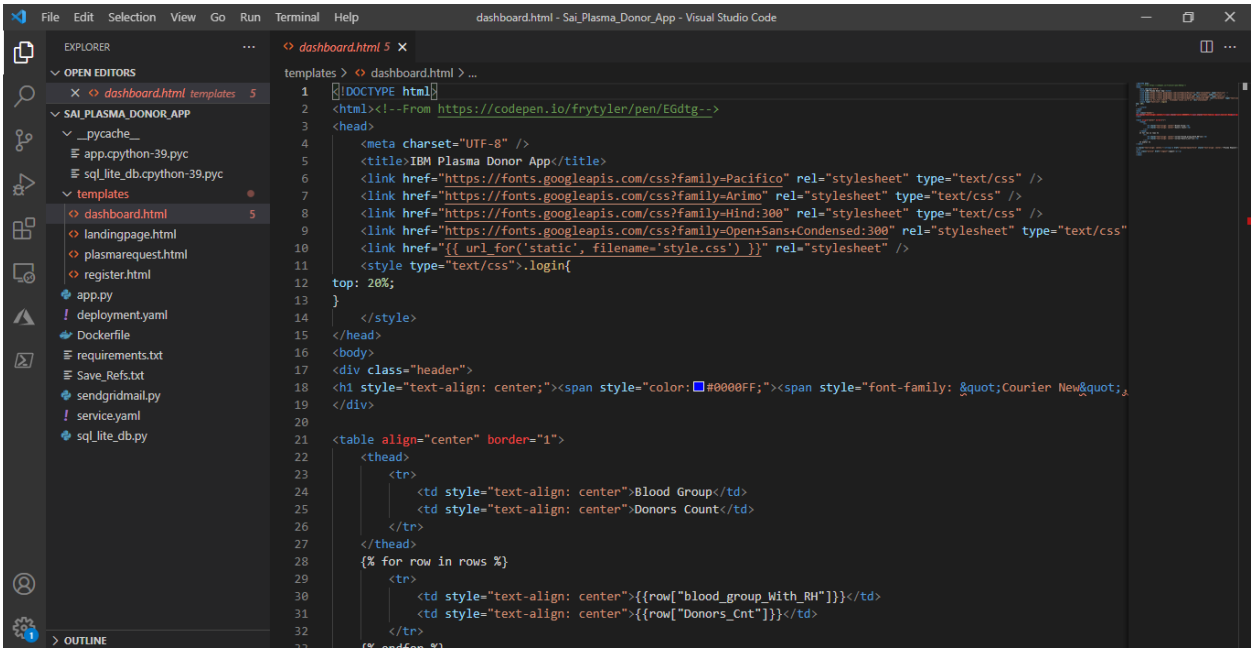
Folder and Files in Code Folder:

Folder Name	File Name	Usage
templates	*.*	Templates folder stores the HTML files used by Flask
templates	\templates\dashboard.html	Dashboard page to list the Donors availability
templates	\templates\landingpage.html	Default Page for the App, Login & Sign-Up Page
templates	\templates\plasmarequest.html	Plasma Requestion form
templates	\templates\register.html	User Sign Up Form
\	app.py	Key Code File with the Flask to run the application

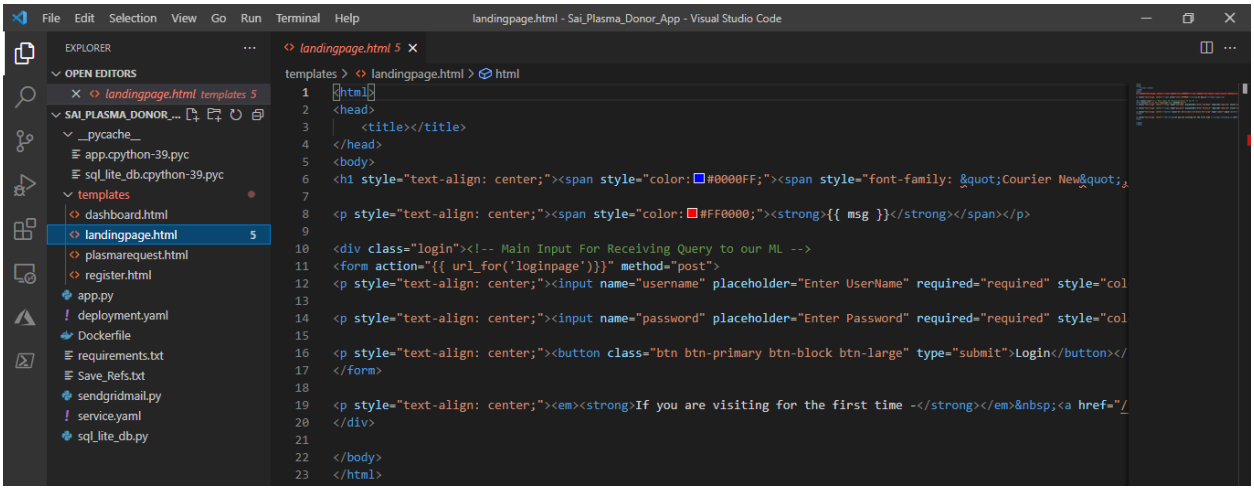
\	requirements.txt	Requirements for Python Package
\	sendgridmail.py	Send Grid Python Script for Sending Emails
\	sql_lite_db.py	For DB & Tables Creation
\	Dockerfile	Docker file for Container Image Creation, which provides the Environment and Code for running the Web Application
\	deployment.yaml	Deployment YAML to push the Container Image to the Kubernetes – A **deployment is responsible for keeping a set of pods running**
\	service.yaml	Service YAML to push the Container Image to the Kubernetes - **A service is responsible for enabling network access to a set of pods**

Each Code File:

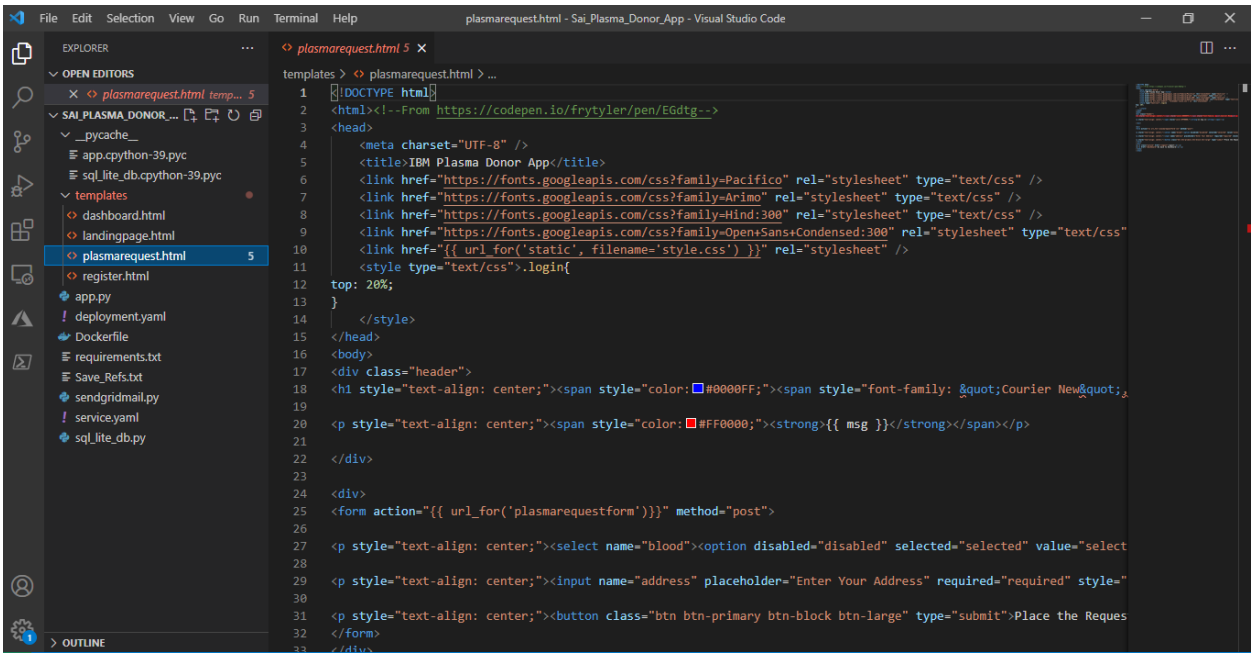
\templates\dashboard.html:



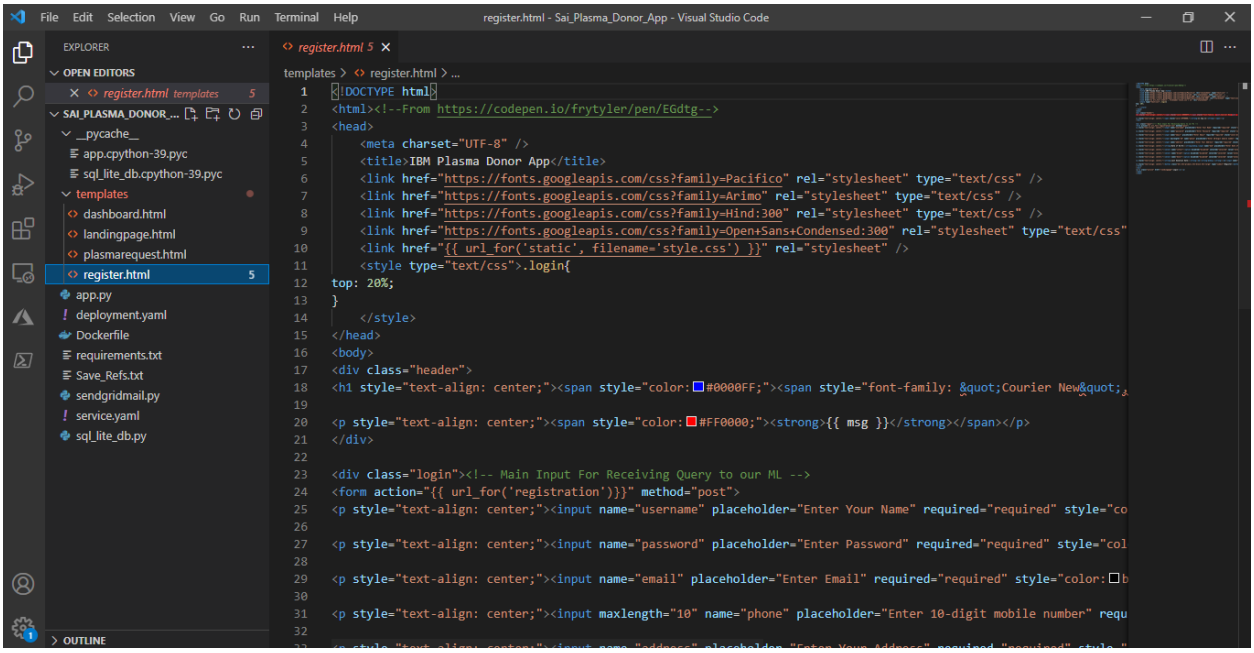
\templates\landingpage.html



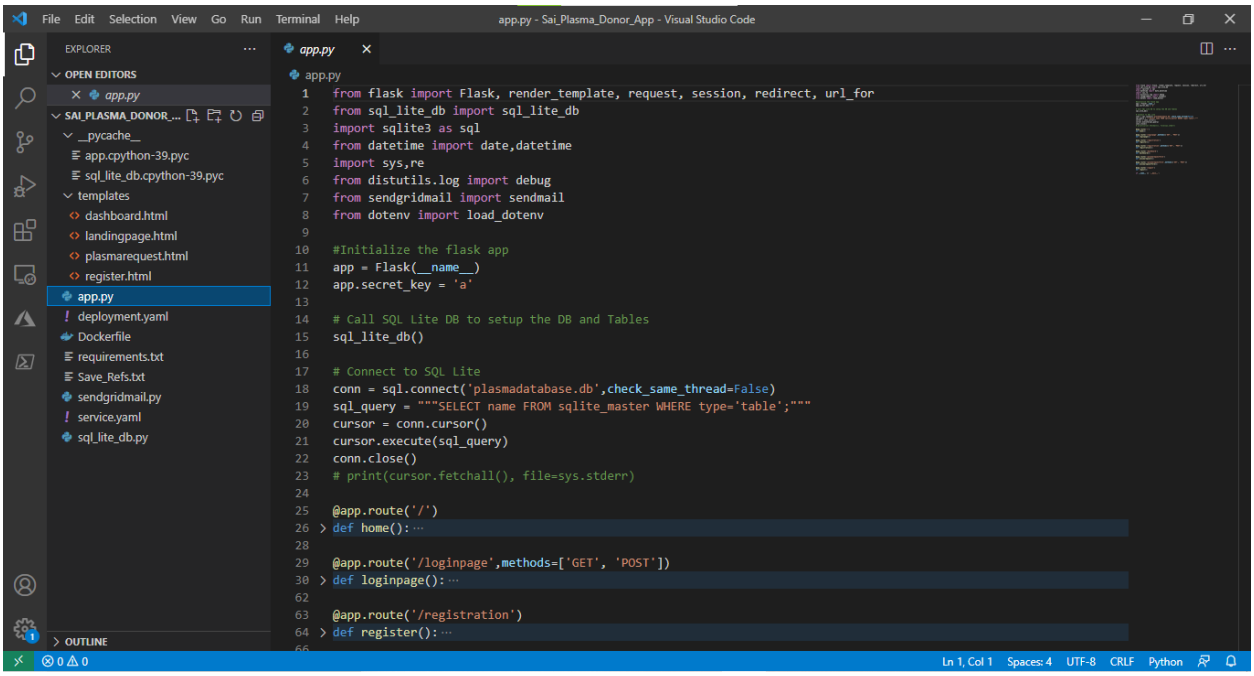
\templates\plasmarequest.html

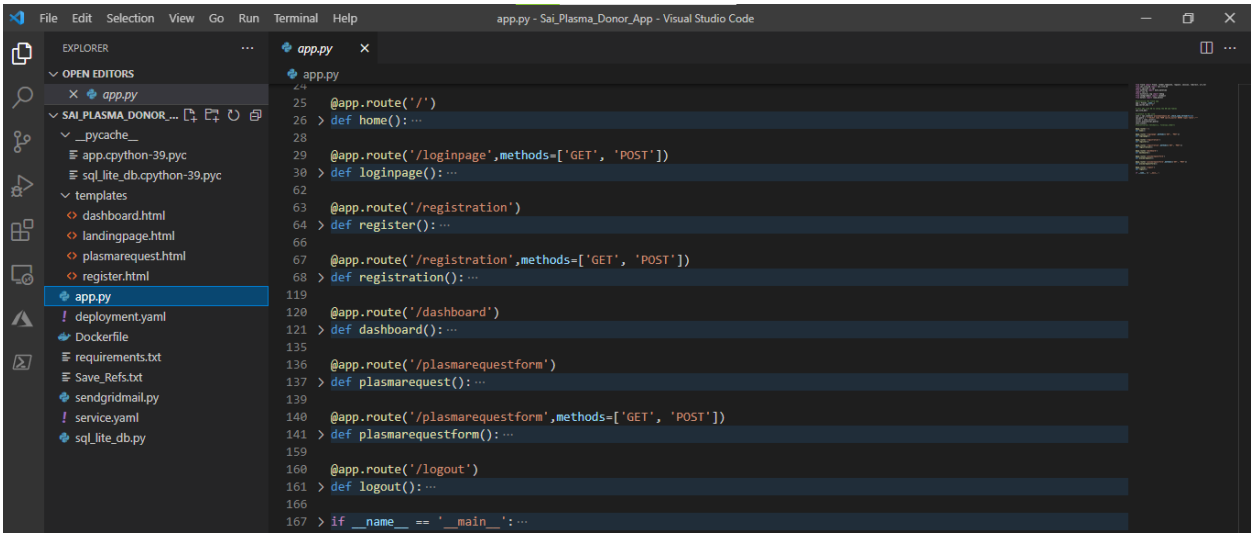


\templates\register.html

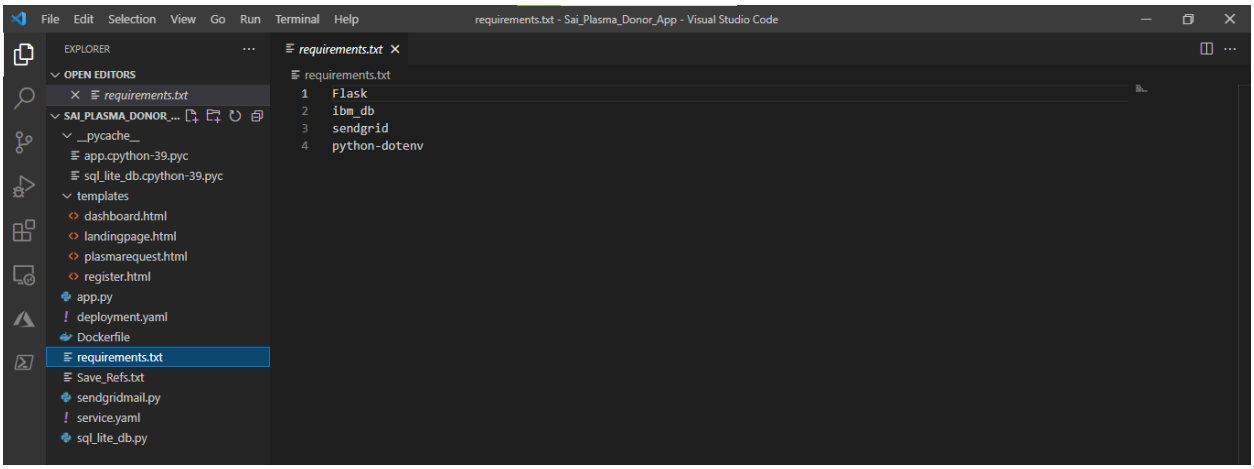


\app.py

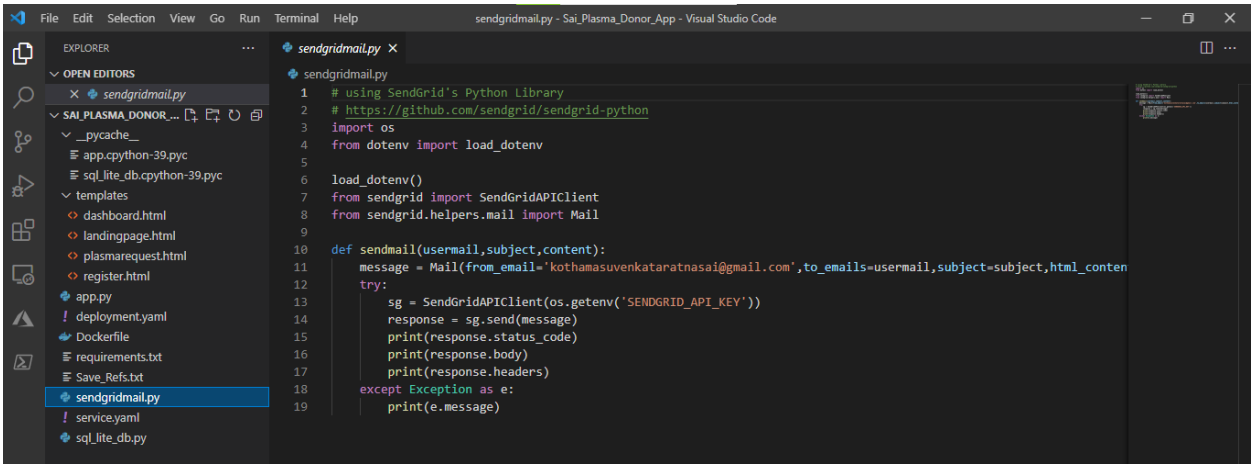




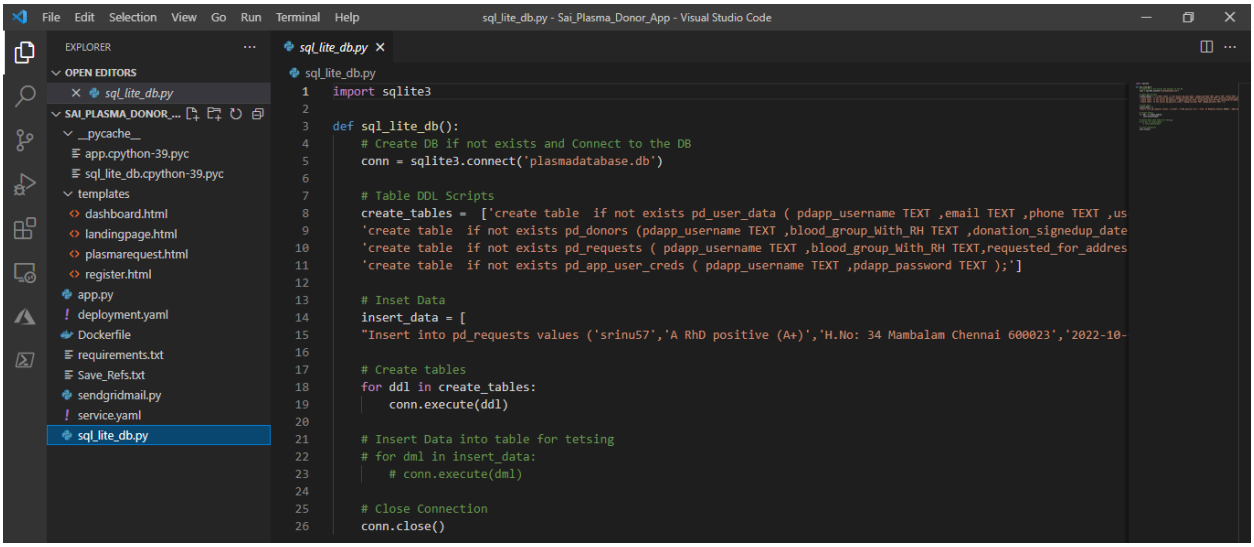
\requirements.txt



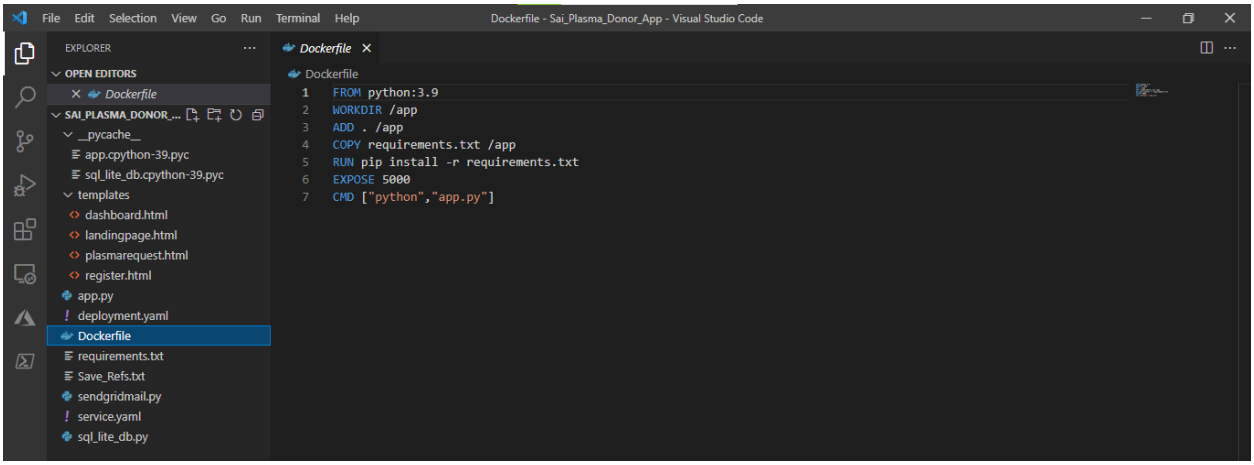
\sendgridmail.py



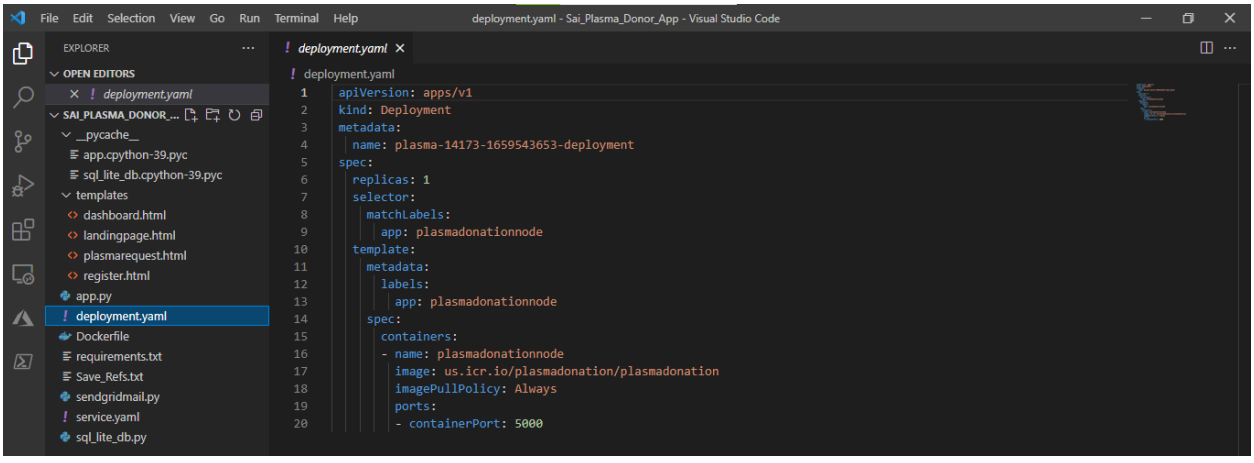
\sql_lite_db.py



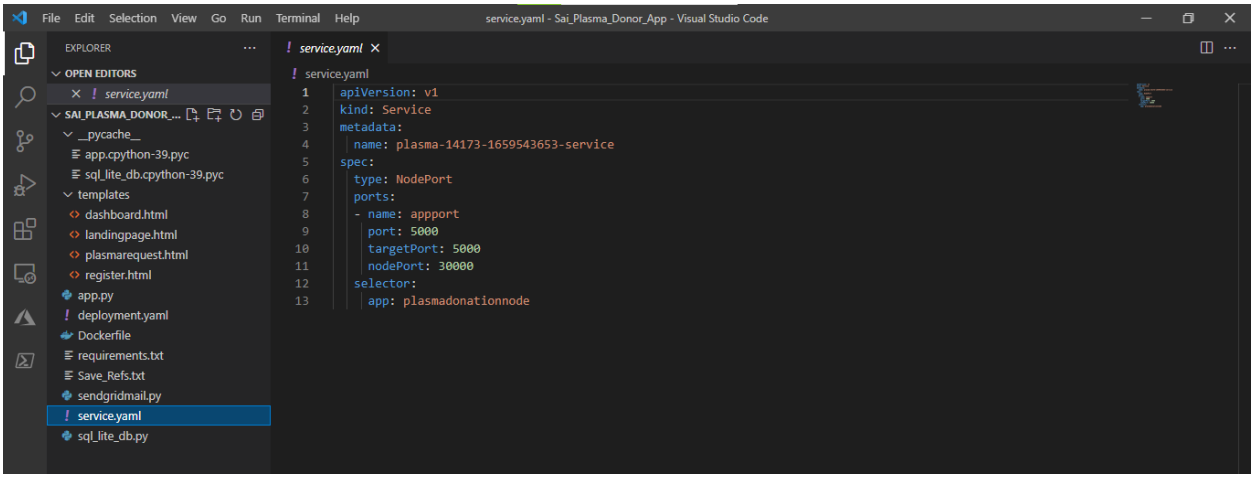
\Dockerfile



\deployment.yaml



\service.yaml



Commands:

Git:

Add Code to Repo:

```
ratnasai@DESKTOP-BIBS72I MINGW64 ~/desktop/IBM-Project-14173-1659543653 (main)
$ git add -A
```

Check the Status to Validate the Changes:

```
ratnasai@DESKTOP-BIBS72I MINGW64 ~/desktop/IBM-Project-14173-1659543653 (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   Final deliverable/Plasma_Donor_App/Dockerfile
        new file:   Final deliverable/Plasma_Donor_App/app.py
        new file:   Final deliverable/Plasma_Donor_App/deployment.yaml
        new file:   Final deliverable/Plasma_Donor_App/requirements.txt
        new file:   Final deliverable/Plasma_Donor_App/sendgridmail.py
        new file:   Final deliverable/Plasma_Donor_App/service.yaml
        new file:   Final deliverable/Plasma_Donor_App/sql_lite_db.py
        new file:   Final deliverable/Plasma_Donor_App/templates/dashboard.html
        new file:   Final deliverable/Plasma_Donor_App/templates/landingpage.html
        new file:   Final deliverable/Plasma_Donor_App/templates/plasmarequest.html
        new file:   Final deliverable/Plasma_Donor_App/templates/register.html
```

Add Commit with Message

```
ratnasai@DESKTOP-BIBS72I MINGW64 ~/desktop/IBM-Project-14173-1659543653 (main)
$ git commit -m "Added Code to Git Repo"
[main 31f61b7] Added Code to Git Repo
 11 files changed, 407 insertions(+)
 create mode 100644 Final deliverable/Plasma_Donor_App/Dockerfile
 create mode 100644 Final deliverable/Plasma_Donor_App/app.py
 create mode 100644 Final deliverable/Plasma_Donor_App/deployment.yaml
 create mode 100644 Final deliverable/Plasma_Donor_App/requirements.txt
 create mode 100644 Final deliverable/Plasma_Donor_App/sendgridmail.py
 create mode 100644 Final deliverable/Plasma_Donor_App/service.yaml
 create mode 100644 Final deliverable/Plasma_Donor_App/sql_lite_db.py
 create mode 100644 Final deliverable/Plasma_Donor_App/templates/dashboard.html
 create mode 100644 Final deliverable/Plasma_Donor_App/templates/landingpage.html
 create mode 100644 Final deliverable/Plasma_Donor_App/templates/plasmarequest.html
 create mode 100644 Final deliverable/Plasma_Donor_App/templates/register.html
```

Push Code from local to Remote (GitHub.com)

```
ratnasai@DESKTOP-BIBS72I MINGW64 ~/desktop/IBM-Project-14173-1659543653 (main)
$ git push origin main
Enumerating objects: 20, done.
Counting objects: 100% (20/20), done.
Delta compression using up to 2 threads
Compressing objects: 100% (16/16), done.
Writing objects: 100% (18/18), 6.67 KiB | 1.11 MiB/s, done.
Total 18 (delta 5), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (5/5), completed with 1 local object.
To https://github.com/IBM-EPBL/IBM-Project-14173-1659543653.git
   0394569..f3057fa  main -> main
```

Docker & Container Registry:

Docker:

Docker build:

$ docker build -t plasmadonation .

Sending build context to Docker daemon 45.57kB

```
Step 1/7 : FROM python:3.9
 ---> ab0d2f900193
Step 2/7 : WORKDIR /app
 ---> Using cache
 ---> a03b16aa12ff
Step 3/7 : ADD . /app
 ---> 56ba053e6159
Step 4/7 : COPY requirements.txt /app
 ---> cf06d9a1d4c4
Step 5/7 : RUN pip install -r requirements.txt
 ---> Running in c9618b0c2a9e
Collecting Flask
  Downloading Flask-2.2.2-py3-none-any.whl (101 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
101.5/101.5 KB 2.9 MB/s eta 0:00:00
Collecting ibm_db
  Downloading ibm_db-3.1.3.tar.gz (1.4 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
1.4/1.4 MB 2.0 MB/s eta 0:00:00
  Installing build dependencies: started
  Installing build dependencies: finished with status 'done'
  Getting requirements to build wheel: started
  Getting requirements to build wheel: finished with status 'done'
  Installing backend dependencies: started
  Installing backend dependencies: finished with status 'done'
  Preparing metadata (pyproject.toml): started
  Preparing metadata (pyproject.toml): finished with status 'done'
Collecting sendgrid
  Downloading sendgrid-6.9.7-py3-none-any.whl (101 kB)
```

```
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
101.1/101.1 KB 2.5 MB/s eta 0:00:00
Collecting python-dotenv
  Downloading python_dotenv-0.21.0-py3-none-any.whl (18 kB)
Collecting click>=8.0
  Downloading click-8.1.3-py3-none-any.whl (96 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
96.6/96.6 KB 5.9 MB/s eta 0:00:00
Collecting importlib-metadata>=3.6.0
  Downloading importlib_metadata-5.0.0-py3-none-any.whl (21 kB)
Collecting Werkzeug>=2.2.2
  Downloading Werkzeug-2.2.2-py3-none-any.whl (232 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
232.7/232.7 KB 2.4 MB/s eta 0:00:00
Collecting itsdangerous>=2.0
  Downloading itsdangerous-2.1.2-py3-none-any.whl (15 kB)
Collecting Jinja2>=3.0
  Downloading Jinja2-3.1.2-py3-none-any.whl (133 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
133.1/133.1 KB 3.4 MB/s eta 0:00:00
Collecting starkbank-ecdsa>=2.0.1
  Downloading starkbank-ecdsa-2.2.0.tar.gz (14 kB)
  Preparing metadata (setup.py): started
  Preparing metadata (setup.py): finished with status 'done'
Collecting python-http-client>=3.2.1
  Downloading python_http_client-3.3.7-py3-none-any.whl (8.4 kB)
Collecting zipp>=0.5
  Downloading zipp-3.10.0-py3-none-any.whl (6.2 kB)
Collecting MarkupSafe>=2.0
```

Downloading MarkupSafe-2.1.1-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (25 kB)

Building wheels for collected packages: ibm_db, starkbank-ecdsa

Building wheel for ibm_db (pyproject.toml): started

Building wheel for ibm_db (pyproject.toml): finished with status 'done'

Created wheel for ibm_db: filename=ibm_db-3.1.3-cp39-cp39-linux_x86_64.whl size=41499651 sha256=c6421d6bbda0f3b87144f0d493a8ed10150c64ef9a4500ec664b19aebe8093ac

Stored in directory: /root/.cache/pip/wheels/3d/6e/19/64e70ce3dde2ccda5c9b35bd6a313a39e46f6af0222c75cc5f

Building wheel for starkbank-ecdsa (setup.py): started

Building wheel for starkbank-ecdsa (setup.py): finished with status 'done'

Created wheel for starkbank-ecdsa: filename=starkbank_ecdsa-2.2.0-py3-none-any.whl size=15986 sha256=7866bb8cd33b5354dc5c7d9659887b991be3c77730708cc6694e9ab3631f1c80

Stored in directory: /root/.cache/pip/wheels/ff/e0/b9/210b1c0209f93792f212d6e61553624523e49aac6cf284151f

Successfully built ibm_db starkbank-ecdsa

Installing collected packages: starkbank-ecdsa, ibm_db, zipp, python-http-client, python-dotenv, MarkupSafe, itsdangerous, click, Werkzeug, sendgrid, Jinja2, importlib-metadata, Flask

Successfully installed Flask-2.2.2 Jinja2-3.1.2 MarkupSafe-2.1.1 Werkzeug-2.2.2 click-8.1.3 ibm_db-3.1.3 importlib-metadata-5.0.0 itsdangerous-2.1.2 python-dotenv-0.21.0 python-http-client-3.3.7 sendgrid-6.9.7 starkbank-ecdsa-2.2.0 zipp-3.10.0

WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

You should consider upgrading via the '/usr/local/bin/python -m pip install --upgrade pip' command.

Removing intermediate container c9618b0c2a9e

---> 32f2f82e0e21

Step 6/7 : EXPOSE 5000

---> Running in a33d08a5d85a

Removing intermediate container a33d08a5d85a

---> bfb591489549

Step 7/7 : CMD ["python","app.py"]

---> Running in 6363c1614c47

Removing intermediate container 6363c1614c47

---> 2bdf31a28da2

Successfully built 2bdf31a28da2

Successfully tagged plasmadonation:latest

SECURITY WARNING: You are building a Docker image from Windows against a non-Windows Docker host. All files and directories added to build context will have '-rwxr-xr-x' permissions. It is recommended to double check and reset permissions for sensitive files and directories.

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

Docker Images:

$ docker images

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
plasmadonation	latest	7df0a7eac614	About a minute ago	1.09GB
python	3.9	ab0d2f900193	11 days ago	915MB

Docker Run (Detached Mode):

$ docker run -d -p 5000:5000 plasmadonation:latest

7e86122b4701f40ff0741a9d6584329083119879783f760cbc02dea7e550fcab

Docker local containers:

$ docker container ls

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
7e86122b4701	plasmadonation:latest	"python app.py"	About a minute ago	Up About a minute	0.0.0.0:5000->5000/tcp	competent_hugle

Delete the Local Container

$ docker kill 7e86122b4701

7e86122b4701

IBM Cloud Container Registry:

IBM Cloud Login (ibmcloud cli):

$ ibmcloud login

API endpoint: https://cloud.ibm.com

Region: us-south

Email> kothamasuvenkataratnasai@gmail.com

Password>

Authenticating...

OK

Targeted account KOTHAMASU VENKATA RATNA SAI's Account (fa29e4bae0044599a0a816aa5d4720d7)

API endpoint: https://cloud.ibm.com

Region: us-south

User: kothamasuvenkataratnasai@gmail.com

Account: KOTHAMASU VENKATA RATNA SAI's Account (fa29e4bae0044599a0a816aa5d4720d7)

Resource group: No resource group targeted, use 'C:\Program Files\IBM\Cloud\bin\ibmcloud.exe target -g RESOURCE_GROUP'

CF API endpoint:

Org:

Space:

IBM Cloud Registry Login & Set Client as Docker (ibmcloud cli):

$ ibmcloud cr login --client docker

Logging 'docker' in to 'us.icr.io'...

Logged in to 'us.icr.io'.

OK

IBM Cloud Registry NameSpace (ibmcloud cli):

$ ibmcloud cr namespace-assign

OK

IBM Cloud Registry NameSpace List:

$ ibmcloud cr namespace-list

Listing namespaces for account 'KOTHAMASU VENKATA RATNA SAI's Account' in registry 'us.icr.io'...

Namespace

plasmadonation

IBM Cloud Registry Add Docker tag:

$ docker tag plasmaappdocker:latest us.icr.io/plasmadonation/plasmaappdocker:latest

IBM Cloud Registry Add Docker tag:

$ docker tag plasmaappdocker:latest us.icr.io/plasmadonation/plasmaappdocker:latest

IBM Cloud Registry Push Image to Cloud:

$ docker push us.icr.io/plasmadonation/plasmadonation:latest

The push refers to repository [us.icr.io/plasmadonation/plasmadonation]

f24e84e8aba1: Pushed

84dcd59995e7: Pushed

6749a6446e3a: Pushed

733c9e138ffe: Mounted from plasmadonation/plasmaappdocker

98c01aa6c3e4: Mounted from plasmadonation/plasmaappdocker

782cce4c7b7f: Mounted from plasmadonation/plasmaappdocker

dde9ab8bf12a: Mounted from plasmadonation/plasmaappdocker

6b183c62e3d7: Mounted from plasmadonation/plasmaappdocker

882fd36bfd35: Mounted from plasmadonation/plasmaappdocker

d1dec9917839: Mounted from plasmadonation/plasmaappdocker

d38adf39e1dd: Mounted from plasmadonation/plasmaappdocker

4ed121b04368: Mounted from plasmadonation/plasmaappdocker

d9d07d703dd5: Mounted from plasmadonation/plasmaappdocker

latest: digest: sha256:9b38b5e59ca8f0596f1e5cb57a16a94a6961dcb18bbd685f890ca577c4b0e96f size: 3052

IBM Cloud Registry List Images:

$ ibmcloud cr image-list

Listing images...

Repository Tag Digest Namespace Created Size Security status

us.icr.io/plasmadonation/plasmadonation latest 9b38b5e59ca8 plasmadonation 1 hour ago 441 MB -

OK

Kubernetes:

List Clusters:

$ ibmcloud ks cluster ls

OK

Name ID State Created Workers Location Version Resource Group Name Provider

plasma-14173-1659543653 cdjk7e0f0k1ihttfjpag deploying 17 seconds ago 1 mil01 1.24.7_1542 Default classic

Set Context:

$ kubectl config current-context

nsaz203kubercluster

Set the Kubeconfig for export:

$ export KUBECONFIG=$(mktemp)

Export the Kubernetes Config:

$ ibmcloud ks cluster config -c plasma-14173-1659543653

OK

The configuration for plasma-14173-1659543653 was downloaded successfully.

Added context for plasma-14173-1659543653 to the current kubeconfig file.

You can now execute 'kubectl' commands against your cluster. For example, run 'kubectl get nodes'.

If you are accessing the cluster for the first time, 'kubectl' commands might fail for a few seconds while RBAC synchronizes.

Echo & Cat and see the Config:

$ echo $KUBECONFIG

/tmp/tmp.uK5in6M7uU

$ cat $KUBECONFIG

apiVersion: v1

clusters:

- cluster:

  certificate-authority: C:\Users\mmm04\.bluemix\plugins\container-service\clusters\plasma-14173-1659543653-cdjk7e0f0k1ihttfjpag\ca-aaa00-plasma-14173-1659543653.pem

Get Nodes:

$ kubectl get nodes

```
NAME          STATUS   ROLES    AGE     VERSION

10.144.195.234   Ready    <none>   5m45s   v1.24.6+IKS
```

Create Deployment:

```
$ kubectl create -f deployment.yaml

deployment.apps/plasma-14173-1659543653-deployment created
```

Get Deployment:

```
$ kubectl get deployment

NAME                          READY   UP-TO-DATE   AVAILABLE   AGE

plasma-14173-1659543653-deployment   1/1     1          1          13m
```

Describe Deployment:

```
$ kubectl describe deployments plasma-14173-1659543653-deployment

Name:                plasma-14173-1659543653-deployment

Namespace:           default

CreationTimestamp:      Sun, 06 Nov 2022 00:41:08 -0500

Labels:              <none>

Annotations:          deployment.kubernetes.io/revision: 1

Selector:            app=plasmadonationnode

Replicas:            1 desired | 1 updated | 1 total | 1 available | 0 unavailable

StrategyType:          RollingUpdate

MinReadySeconds:       0

RollingUpdateStrategy:  25% max unavailable, 25% max surge

Pod Template:

 Labels:  app=plasmadonationnode

 Containers:

  plasmadonationnode:

   Image:       us.icr.io/plasmadonation/plasmaappdocker

   Port:        5000/TCP

   Host Port:    0/TCP

   Environment:  <none>

   Mounts:      <none>
```

```
 Volumes:       <none>
Conditions:
 Type         Status  Reason
 ----         ------  ------
 Available    True    MinimumReplicasAvailable
 Progressing  True    NewReplicaSetAvailable
OldReplicaSets:  <none>
NewReplicaSet:   plasma-14173-1659543653-deployment-d9767b59c (1/1 replicas created)
Events:
 Type    Reason             Age   From                   Message
 ----    ------             ----  ----                   -------
 Normal  ScalingReplicaSet  14m   deployment-controller  Scaled up replica set plasma-14173-
1659543653-deployment-d9767b59c to 1
```

Get Pods:

```
$ kubectl get pods
NAME                                                READY   STATUS    RESTARTS   AGE
plasma-14173-1659543653-deployment-d9767b59c-fhlkc   1/1     Running   0          55s
```

Create Service:

```
$ kubectl create -f service.yaml
service/plasma-14173-1659543653-service created
```

Get Service:

```
$ kubectl get services
NAME                                TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
kubernetes                          ClusterIP   172.21.0.1      <none>        443/TCP          156m
plasma-14173-1659543653-service     NodePort    172.21.33.184   <none>        5000:30000/TCP   78m
```

Describe Service:

```
$ kubectl describe services plasma-14173-1659543653-deployment
Name:              plasma-14173-1659543653-deployment
Namespace:         default
Labels:            <none>
```

Annotations: <none>

Selector: app=plasmadonationnode

Type: ClusterIP

IP: 172.21.11.226

Port: <unset> 5000/TCP

TargetPort: 5000/TCP

Endpoints: 172.30.85.75:5000

Session Affinity: None

Events: <none>

Get Replica Sets:

$ kubectl get replicasets

NAME DESIRED CURRENT READY AGE

plasma-14173-1659543653-deployment-d9767b59c 1 1 1 15m

Describe Replica Sets:

$ kubectl describe replicasets

Name: plasma-14173-1659543653-deployment-d9767b59c

Namespace: default

Selector: app=plasmadonationnode,pod-template-hash=d9767b59c

Labels: app=plasmadonationnode

pod-template-hash=d9767b59c

Annotations: deployment.kubernetes.io/desired-replicas: 1

deployment.kubernetes.io/max-replicas: 2

deployment.kubernetes.io/revision: 1

Controlled By: Deployment/plasma-14173-1659543653-deployment

Replicas: 1 current / 1 desired

Pods Status: 1 Running / 0 Waiting / 0 Succeeded / 0 Failed

Pod Template:

Labels: app=plasmadonationnode

pod-template-hash=d9767b59c

Containers:

plasmadonationnode:

Image: us.icr.io/plasmadonation/plasmaappdocker

Port: 5000/TCP

Host Port: 0/TCP

Environment: <none>

Mounts: <none>

Volumes: <none>

Events:

Type Reason Age From Message

---- ------ ---- ---- -------

Normal SuccessfulCreate 15m replicaset-controller Created pod: plasma-14173-1659543653-deployment-d9767b59c-fhlkc

Check the Ingress Health:

$ ibmcloud ks ingress status -c plasma-14173-1659543653

OK

Ingress Status: healthy

Message: Ingress is not supported for free clusters

References:

1. https://www.html.am/html-editors/online-html-editor.cfm - Online HTML Editor for ease of creating HTML Pages
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3. https://cloud.ibm.com/docs/Registry?topic=Registry-registry_setup_cli_namespace
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