



FACULTY OF ENGINEERING AND APPLIED SCIENCE

SOFE 3980U SOFTWARE QUALITY LABORATORY REPORT

Professor: **Dr. Mohamed El-Darieby**

Experiment:

LAB REPORT #: 3

LAB CRN NUMBER and group #: CRN: **73385** | Group: **N/A**

LAB GROUP MEMBERS				
#	Surname	Name	ID	Signature
1	Radadiya	Rohan	100704614	R.R

ROHAN RADADIYA - 100704614 - CRN 73385
 SOFE 3980U - LAB 3

GITHUB LINK:

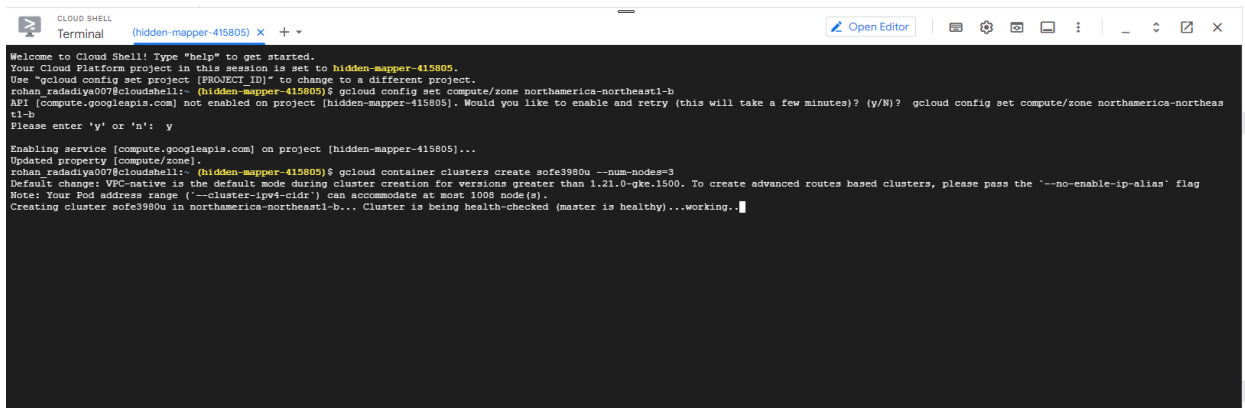
Github: <https://github.com/rohanradadiya/SoftwareQualityLab3>

VIDEO LINKS:

Part 1: <https://youtu.be/pZYbW8YtpNc>

Part 2: <https://youtu.be/oYZDUFeenuo>

Screenshots when setting up the lab:

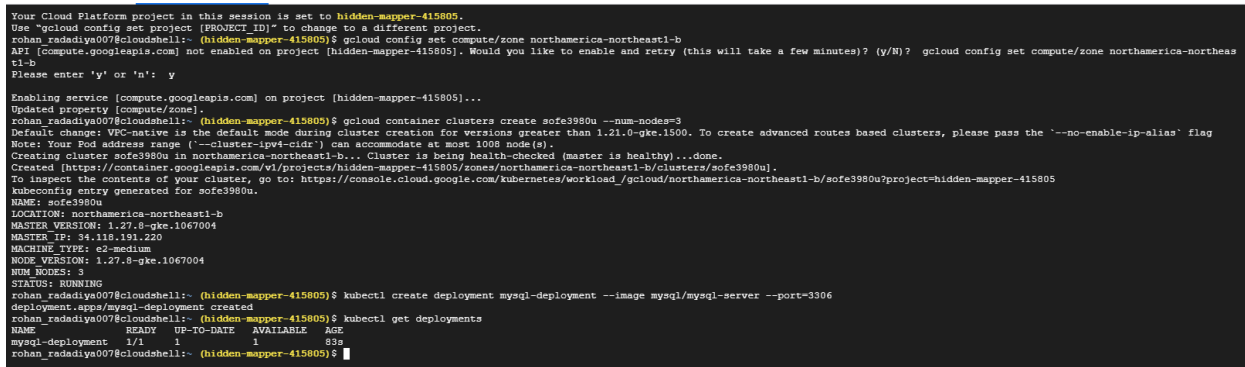


```

Welcome to Cloud Shell. Type "help" to get started.
Your Cloud Platform project in this session is set to hidden-mapper-415805.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ gcloud config set compute/zone northamerica-northeast1-b
API [Compute.googleapis.com] not enabled on project [hidden-mapper-415805]. Would you like to enable and retry (this will take a few minutes)? (y/N)? gcloud config set compute/zone northamerica-northeast1-b
Please enter 'y' or 'n': y

Enabling service [compute.googleapis.com] on project [hidden-mapper-415805]...
Updated property [compute/zone].
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ gcloud container clusters create sofe3980u --num-nodes=3
Default change: VPC-native is the default mode during cluster creation for versions greater than 1.21.0-gke.1500. To create advanced routes based clusters, please pass the '--no-enable-ip-alias' flag
Note: Your Pod address range ('--cluster-ip4-cidr') can accommodate at most 1008 node(s).
Creating cluster sofe3980u in northamerica-northeast1-b... Cluster is being health-checked (master is healthy)...working..

```



```

Your Cloud Platform project in this session is set to hidden-mapper-415805.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ gcloud config set compute/zone northamerica-northeast1-b
API [Compute.googleapis.com] not enabled on project [hidden-mapper-415805]. Would you like to enable and retry (this will take a few minutes)? (y/N)? gcloud config set compute/zone northamerica-northeast1-b
Please enter 'y' or 'n': y

Enabling service [compute.googleapis.com] on project [hidden-mapper-415805]...
Updated property [compute/zone].
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ gcloud container clusters create sofe3980u --num-nodes=3
Default change: VPC-native is the default mode during cluster creation for versions greater than 1.21.0-gke.1500. To create advanced routes based clusters, please pass the '--no-enable-ip-alias' flag
Note: Your Pod address range ('--cluster-ip4-cidr') can accommodate at most 1008 node(s).
Creating cluster sofe3980u in northamerica-northeast1-b... Cluster is being health-checked (master is healthy)...done.
Created [https://container.googleapis.com/v1/projects/hidden-mapper-415805/zones/northamerica-northeast1-b/clusters/sofe3980u].
To inspect the contents of your cluster, go to: https://console.cloud.google.com/kubernetes/workload/_gcloud/northamerica-northeast1-b/sofe3980u?project=hidden-mapper-415805
kubectl config entry generated for sofe3980u.
NAME: sofe3980u
LOCATION: northamerica-northeast1-b
MASTER VERSION: 1.27.8-gke.1067004
MASTER IP: 34.118.191.220
MACHINE TYPE: c2-medium
NODE VERSION: 1.27.8-gke.1067004
NUM NODES: 3
STATUS: RUNNING
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl create deployment mysql-deployment --image mysql/mysql-server --port=3306
deployment.apps/mysql-deployment created
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
mysql-deployment  1/1     1             1           83s
rohan_radadiya007@cloudshell:~ (hidden-mapper-415805) $

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command terminated with exit code 1
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl exec -it mysql-deployment-6c5b9848f7-tz2cm -- mysql -uroot -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 8.0.32

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> ALTER USER 'root'@'localhost' IDENTIFIED BY '100100' ;
Query OK, 0 rows affected (0.01 sec)

mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.01 sec)

mysql>

```

```

4 rows in set (0.01 sec)

mysql> exit
Bye
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl exec -it <pod-name> -- mysql -uroot -p100100
-bash: pod-name: No such file or directory
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl exec -it mysql-deployment-6c5b9848f7-tz2cm -- mysql -uroot -p100100
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 13
Server version: 8.0.32 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>

```

```

mysql> CREATE USER 'user'@'%' IDENTIFIED BY 'sofe3980u';
Query OK, 0 rows affected (0.03 sec)

mysql> GRANT ALL PRIVILEGES ON *.* TO 'user'@'%' WITH GRANT OPTION;
Query OK, 0 rows affected (0.01 sec)

mysql> CREATE USER 'user'@'%' IDENTIFIED BY 'sofe3980u';
ERROR 1396 (HY000): Operation CREATE USER failed for 'user'@'%'
mysql> GRANT ALL PRIVILEGES ON *.* TO 'user'@'%' WITH GRANT OPTION;
Query OK, 0 rows affected (0.00 sec)

mysql> exit
Bye
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl expose deployment mysql-deployment --type=LoadBalancer --name=mysql-service
service/mysql-service exposed
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl get service
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.24.0.1        <none>            443/TCP           23m
mysql-service        LoadBalancer       10.24.9.235      <pending>         3306:32502/TCP    12s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl get service
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.24.0.1        <none>            443/TCP           24m
mysql-service        LoadBalancer       10.24.9.235      <pending>         3306:32502/TCP    32s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl expose deployment mysql-deployment --type=LoadBalancer --name=mysql-service
Error from server (AlreadyExists): services "mysql-service" already exists
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl get service
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.24.0.1        <none>            443/TCP           24m
mysql-service        LoadBalancer       10.24.9.235      35.203.48.78     3306:32502/TCP    48s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $

```

External-IP finally exists after re-running the previous command again repeatedly.

```

mysql> exit
Bye
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl delete deployment mysql-deployment
kubectl delete service mysql-service
deployment.apps "mysql-deployment" deleted
service "mysql-service" deleted

```

```

->
->
->
-> \c
mysql> exit
Bye
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ kubectl delete deployment mysql-deployment
kubectl delete service mysql-service
deployment.apps "mysql-deployment" deleted
service "mysql-service" deleted
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ cd -
git clone https://github.com/GeorgeDaoud3/SOFE3980U-Lab3.git
Cloning into 'SOFE3980U-Lab3'...
remote: Enumerating objects: 243, done.
remote: Counting objects: 100% (88/88), done.
remote: Compressing objects: 100% (79/79), done.
remote: Total 243 (delta 35), reused 43 (delta 9), pack-reused 155
Receiving objects: 100% (243/243), 1.53 MiB | 16.35 MiB/s, done.
Resolving deltas: 100% (92/92), done.
rohan radadiya007@cloudshell:~ (hidden-mapper-415805) $ cd ~/SOFE3980U-Lab3/MySQL
kubectl create -f mysql-deploy.yaml
deployment.apps/mysql-deployment created
rohan radadiya007@cloudshell:~/SOFE3980U-Lab3/MySQL (hidden-mapper-415805) $

```

```

Resolving deltas: 100% (92/92), done.
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ cd ~/SOFE3980U-Lab3/MySQL
kubectl create -f mysql-deploy.yaml
deployment.apps/mysql-deployment created
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get deployment
NAME          READY  UP-TO-DATE  AVAILABLE  AGE
mysql-deploy  1/1    1            1           54s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get pods
NAME          READY  STATUS    RESTARTS  AGE
mysql-deploy-6757466877-647s4  1/1    Running   0          65s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ cd ~/SOFE3980U-Lab3/MySQL
kubectl create -f mysql-service.yaml
service/mysql-service created
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   33m
mysql-service  LoadBalancer 10.24.12.115     <pending>    3306:32355/TCP 18s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     <pending>    3306:32355/TCP 30s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     <pending>    3306:32355/TCP 37s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     35.203.48.78  3306:32355/TCP 39s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$

```

```

NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     <pending>    3306:32355/TCP 30s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     <pending>    3306:32355/TCP 37s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ kubectl get service
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)  AGE
kubernetes    ClusterIP     10.24.0.1        <none>        443/TCP   34m
mysql-service  LoadBalancer 10.24.12.115     35.203.48.78  3306:32355/TCP 39s
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ mysql -uuser -psofe3980u -h35.203.48.78
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.32 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use Readings;
Database changed
mysql> create table meterType (ID int, type varchar(50), cost float);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into meterType values(1,'hoston',100.5);
Query OK, 1 row affected (0.04 sec)

mysql> insert into meterType values(2,'denver',120);
Query OK, 1 row affected (0.03 sec)

mysql> insert into meterType values(3,'losang',155);
Query OK, 1 row affected (0.03 sec)

mysql> select * from meterType where cost>=110;

```

```

mysql> insert into meterType values(3,'losang',155);
Query OK, 1 row affected (0.03 sec)

mysql> select * from meterType where cost>=110; exit
+----+-----+-----+
| ID | type | cost |
+----+-----+-----+
| 2  | denver | 120  |
| 3  | losang | 155  |
+----+-----+-----+
2 rows in set (0.03 sec)

->

```

```

-> kubectl delete -f mysql-deploy.yaml
-> kubectl delete -f mysql-service.yaml
-> exit
-> \c
mysql> cd ~/SOFE3980U-Lab3/MySQL
-> kubectl delete -f mysql-deploy.yaml
-> kubectl delete -f mysql-service.yaml
-> exit
-> \c
mysql> exit
bye
rohan radadiya007@cloudshell:~ (hidden-mapper-415805)$ cd ~/SOFE3980U-Lab3/MySQL
kubectl delete -f mysql-deploy.yaml
kubectl delete -f mysql-service.yaml
deployment.apps/mysql-deployment deleted
service/mysql-service deleted

```

```

Downloaded from central https://repo.maven.apache.org/maven2/org/eclipse/sisu/org.eclipse.sisu.inject/0.3.2/org.eclipse.sisu.inject-0.3.2.jar (370 KB at 2.0 MB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/3.3.9/maven-plugin-api-3.3.9.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-classworlds/2.5.2/plexus-classworlds-2.5.2.jar (53 KB at 293 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-component-annotations/1.6/plexus-component-annotations-1.6.jar (3.2 KB at 21 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.0.1/maven-common-artifact-filters-3.0.1.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/maven-settings/3.3.9/maven-settings-3.3.9.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/maven-model/3.3.9/maven-model-3.3.9.jar (144 KB at 761 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-shade-plugin/3.2.1/maven-shade-plugin-3.2.1.jar
Downloaded from central https://repo.maven.apache.org/maven2/com/google/inject/guice/4.0/guice-4.0-no_aop.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-artifact-transfer/0.10.0/maven-artifact-transfer-0.10.0.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/3.3.9/maven-plugin-api-3.3.9.jar (47 KB at 221 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/maven-settings/3.3.9/maven-settings-3.3.9.jar (44 KB at 201 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/commons-codec/commons-codec/1.11/commons-codec-1.11.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.0.1/maven-common-artifact-filters-3.0.1.jar (61 KB at 276 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm/7.0/asm-7.0.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-shade-plugin/3.2.1/maven-shade-plugin-3.2.1.jar (114 KB at 486 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-analysis/7.0/asm-analysis-7.0.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/7.0/asm-tree-7.0.jar (50 KB at 204 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/jdom/jdom2/2.0.6/jdom2-2.0.6.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm/7.0/asm-7.0.jar (48 KB at 481 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-tree/3.0.1/maven-dependency-tree-3.0.1.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/7.0/asm-commons-7.0.jar (19 KB at 312 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/vafer/jdependency/2.1.1/jdependency-2.1.1.jar
Downloaded from central https://repo.maven.apache.org/maven2/commons-codec/commons-codec/1.11/commons-codec-1.11.jar (235 KB at 1.3 MB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/jdom/jdom2/2.0.6/jdom2-2.0.6.jar (305 KB at 1.1 MB/s)
Downloaded from central https://repo.maven.apache.org/maven2/com/google/guava/guava/19.0/guava-19.0.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/vafer/jdependency/2.1.1/jdependency-2.1.1.jar (176 KB at 640 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-util/7.0-beta/asm-util-7.0-beta.jar
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-analysis/7.0/asm-analysis-7.0.jar (33 KB at 118 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-tree/3.0.1/maven-dependency-tree-3.0.1.jar (97 KB at 130 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/org/ow2/asm/asm-util/7.0-beta/asm-util-7.0-beta.jar (43 KB at 154 KB/s)
Downloaded from central https://repo.maven.apache.org/maven2/com/google/guava/guava/19.0/guava-19.0.jar (2.2 MB at 6.5 MB/s)
[INFO] Replacing main artifact with repackaged archive
[INFO] BUILD SUCCESS
[INFO] Total time: 28.875 s
[INFO] Finished at: 2024-02-29T06:02:13Z
[INFO]
rohan_radadiya007@cloudshell:~/SOF3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $

```

After building the BinaryCalculatorWebapp application to generate the WAR file.

The screenshot shows the Google Cloud Artifact Registry interface. The top navigation bar includes 'Google Cloud', 'My First Project', and a search bar. The main content area displays the 'Repository Details' for the 'sofe3980u' repository. The repository is located at 'northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u'. The format is 'Docker' and the type is 'Standard'. Below the details, there is a 'Release Notes' section and a 'Filter' dropdown. A terminal window is open at the bottom, showing the build process for the 'BinaryCalculatorWebapp' application. The terminal output includes commands like 'mvn package' and 'docker push', along with the resulting image digest and size.

Pushing into the sofe3980u repo in the Artifact registry

```

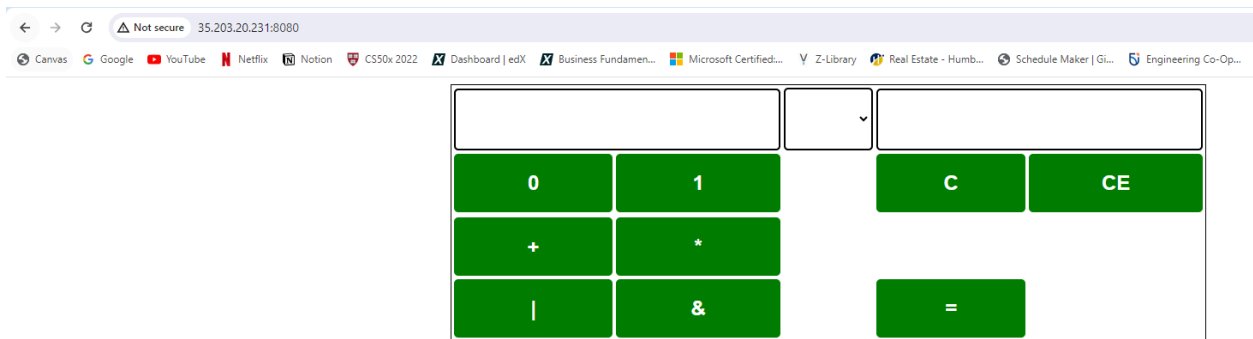
[2/2] COPY target/*.war app.war
--> exporting to image
--> exporting layers
--> writing image sha256:10a499978b3d5912e4d33a3d8b1166f68a376c73f2e276a9ed6ec1194b
Using default tag latest
The push refers to repository [northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator]
10a499978b3d5912e4d33a3d8b1166f68a376c73f2e276a9ed6ec1194b: Pushed
632a51b41892: Pushed
6da7507c1b9: Pushed
507583d3181: Pushed
4b96d262ca0: Pushed
d4fcd45c3e3a: Pushed
latest digest: sha256:db796680bb40cb13c904fed9ed4327b5c97d462da1b15179f08644c4d7a size: 1579
rohan_radadiya007@cloudshell:~/SOF3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $
deployment.apps/binarycalculator-deployment created
rohan_radadiya007@cloudshell:~/SOF3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $ kubectl expose deployment binarycalculator-deployment --image northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator --port=8080
service/binarycalculator-service exposed

```

```

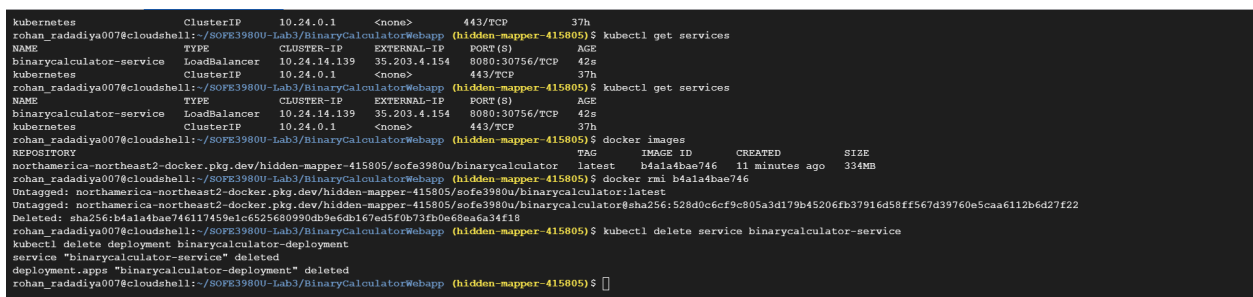
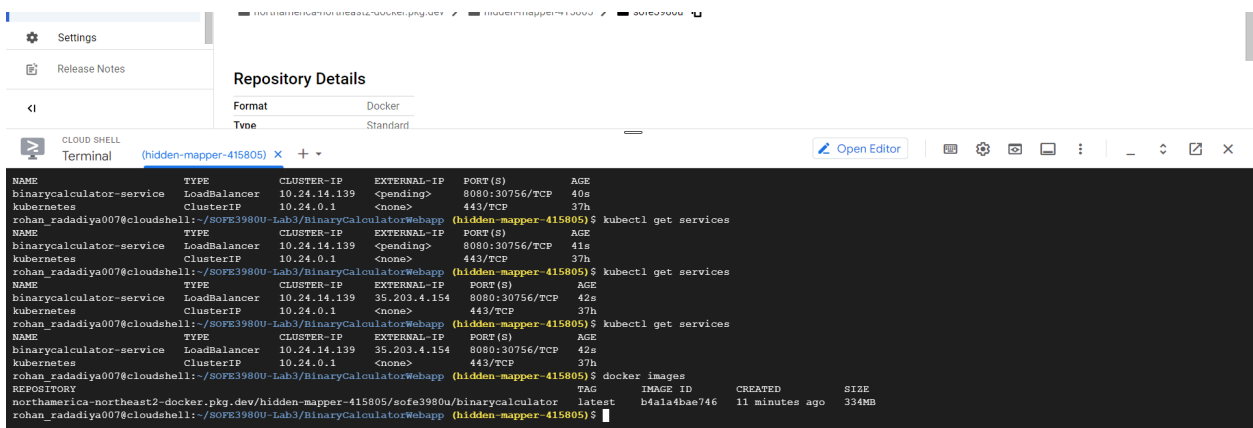
binarycalculator-service 10.24.0.1 <none> 443/TCP
NAME  TYPE  CLUSTER-IP  EXTERNAL-IP  PORT(S)  AGE
binarycalculator-service  LoadBalancer  10.24.0.1  10.24.0.1  8080:30054/TCP  50m
NAME  TYPE  CLUSTER-IP  EXTERNAL-IP  PORT(S)  AGE
binarycalculator-service  LoadBalancer  10.24.0.1  10.24.0.1  8080:30054/TCP  3m2s
NAME  TYPE  CLUSTER-IP  EXTERNAL-IP  PORT(S)  AGE
binarycalculator-service  LoadBalancer  10.24.0.1  10.24.0.1  8080:30054/TCP  52m

```



Getting the associated IP and running the application at port 8080

Design:



The related files are shown to be deleted in the image above.

```

CLOUD SHELL
Terminal (hidden-mapper-415805) X +
Open Editor

rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.ontariotechu.sofe3980U:BinaryCalculatorWebapp >-----
[INFO] Building BinaryCalculatorWebapp Maven Webapp 1.0.0
[INFO] from pom.xml
[INFO]
[INFO] -----[ war ]-----
[INFO]
[INFO] --- clean:3.1.0:clean (default-clean) @ BinaryCalculatorWebapp ---
[INFO] Deleting /home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/target
[INFO]
[INFO] --- resources:3.1.0:resources (default-resources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO] Copying 4 resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ BinaryCalculatorWebapp ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 8 source files to /home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/target/classes
[INFO]
[INFO] --- resources:3.1.0:testResources (default-testResources) @ BinaryCalculatorWebapp ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/src/test/resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ BinaryCalculatorWebapp ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 4 source files to /home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/target/test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ BinaryCalculatorWebapp ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----

```

```

CLOUD SHELL
Terminal (hidden-mapper-415805) X +
Open Editor

[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.57 s - in com.ontariotechu.sofe3980U.BinaryControllerTest
2024-03-01 19:39:15.463 INFO 2815 --- [ Thread-8] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
2024-03-01 19:39:15.466 INFO 2815 --- [ Thread-4] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
2024-03-01 19:39:15.469 INFO 2815 --- [ Thread-6] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
2024-03-01 19:39:15.472 INFO 2815 --- [ Thread-2] o.s.s.concurrent.ThreadPoolTaskExecutor : Shutting down ExecutorService 'applicationTaskExecutor'
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 13, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- war:3.2.2:war (default-war) @ BinaryCalculatorWebapp ---
[INFO] Packaging webapp
[INFO] Assembling webapp [BinaryCalculatorWebapp] in [/home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/target/BinaryCalculatorWebapp]
[INFO] Processing war project
[INFO] Copying webapp resources [/home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/src/main/webapp]
[INFO] Webapp assembled in [92 msecs]
[INFO] Building war: /home/rohan_radadiya007/SOFE3980U-Lab3/BinaryCalculatorWebapp/target/BinaryCalculatorWebapp.war
[INFO]
[INFO] --- spring-boot:3.1.3:REPACKAGE (repackage) @ BinaryCalculatorWebapp ---
[INFO] Replacing main artifact with repackaged archive
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 11.996 s
[INFO] Finished at: 2024-03-01T19:39:17Z
[INFO]
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ docker build -t northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator .
[+] Building 1.2s (7/7) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 147B
=> [internal] load metadata for docker.io/library/eclipse-temurin:17-jdk-alpine

```

View after running mvn clean package

```

=> CACHED [1/2] FROM docker.io/library/eclipse-temurin:17-jdk-alpine@sha256:854b05154ed3e25ca017137463c9d84b425350d51d958a2b264094622914731f
=> [2/2] COPY target/*.war app.war
=> exporting to image
=> exporting layers
=> writing image sha256:e767b6c4d4b338ec070119b1440d525c9e7480639cc6545bacbf797a86695fe
=> naming to northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ docker push northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator
Using default tag: latest
The push refers to repository [northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator]
a1ce4acb39c2: Pushed
632a51b11892: Layer already exists
dada7507c1b9: Layer already exists
bc7d58301881: Layer already exists
4b96d262cac0: Layer already exists
d4fc045c9e3a: Layer already exists
latest: digest: sha256:c236825736c3ae8474f48a6815a37892079b1eda7667bca2109710e57fd33950 size: 1579
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ kubectl create deployment binarycalculator-deployment --image northamerica-northeast2-docker.pkg.dev/hidden-mapper-415805/sofe3980u/binarycalculator --port=8080
deployment.apps/binarycalculator-deployment created
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ kubectl expose deployment binarycalculator-deployment --type=LoadBalancer --name=binarycalculator-svc
service/binarycalculator-svc exposed
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ kubectl get services
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
binarycalculator-svc                LoadBalancer        10.24.12.43      <pending>         8080:32445/TCP   8s
kubernetes                           ClusterIP            10.24.0.1        <none>            443/TCP          38h
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ kubectl get services
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
binarycalculator-svc                LoadBalancer        10.24.12.43      <pending>         8080:32445/TCP   10s
kubernetes                           ClusterIP            10.24.0.1        <none>            443/TCP          38h
rohan_radadiya007@cloudshell:~/SOFE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805)$ kubectl get services
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
binarycalculator-svc                LoadBalancer        10.24.12.43      <pending>         8080:32445/TCP   16s

```

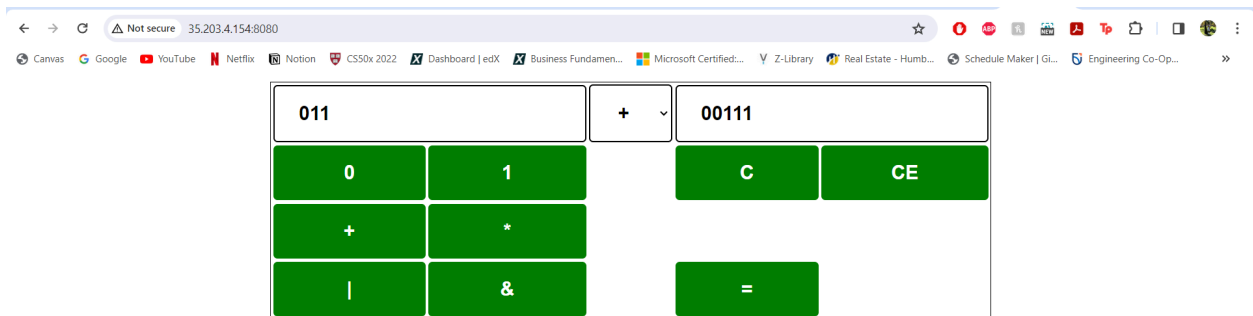
```

binarycalculator-service LoadBalancer 10.24.12.43 <pending> 8080:32445/TCP 25s
kubernetes ClusterIP 10.24.0.1 <none> 443/TCP 38h
rohan_radadiya007@cloudshell:~/SOPE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
binarycalculator-service LoadBalancer 10.24.12.43 <pending> 8080:32445/TCP 25s
kubernetes ClusterIP 10.24.0.1 <none> 443/TCP 38h
rohan_radadiya007@cloudshell:~/SOPE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
binarycalculator-service LoadBalancer 10.24.12.43 <pending> 8080:32445/TCP 36s
kubernetes ClusterIP 10.24.0.1 <none> 443/TCP 38h
rohan_radadiya007@cloudshell:~/SOPE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
binarycalculator-service LoadBalancer 10.24.12.43 35.203.4.154 8080:32445/TCP 40s
kubernetes ClusterIP 10.24.0.1 <none> 443/TCP 38h
rohan_radadiya007@cloudshell:~/SOPE3980U-Lab3/BinaryCalculatorWebapp (hidden-mapper-415805) $

```

View of rest of the terminal screen is portrayed above:

Testing the calculator now:



011 + 00111=1010

[New operation](#) [Continue calculation](#)

← → ↻ ⚠ Not secure 35.203.4.154:8080 ☆

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10100		*	1111	
0	1		C	CE
+	*			
	&		=	

--

10100 * 1111=100101100

[New operation](#) [Continue calculation](#)

← → ↻ ⚠ Not secure 35.203.4.154:8080 ☆

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111000			111	
0	1		C	CE
+	*			
	&		=	

111000 | 111=111111

[New operation](#) [Continue calculation](#)

← → ↻ ⚠ Not secure 35.203.4.154:8080 ☆

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110000		&	1101	
0	1		C	CE
+	*			
	&		=	

110000 & 1101=0

[New operation](#) [Continue calculation](#)

The (+), (*), (|), and (&) operations are portrayed above, working as required.

Discussion:

1. Briefly summarize what you have learned about docker and Kubernetes including the used terminologies and their descriptions.

To start off, various things were learned about docker and Kubernetes including the terminologies and their descriptions. For example, it is very crucial to run the correct commands with the required syntax, as every punctuation and grammar has the ability to cause an error and also change the wanted result. Also, the correct IP addresses also may not be reached, and because of that, the website being worked with will not be able to function as wanted.

2. What are the advantages and disadvantages of using docker images?

There are various advantages and disadvantages of using docker images. For example, some of the advantages are that there is a high amount of portability and consistency of using docker images. This is because it is very easy to move the application between various environments. Also, the use of docker images increase consistency because of the fact that even when moving through different environments, the application has the ability to run consistently. A disadvantage of using docker images is that it may be difficult to learn and understand, and there is also a high amount of CPU and resource usage when working with docker images.