CMPE 282

HW2

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Soln 1.

Dev Tools: Eclipse EE Luna 4.4.1 on Ubuntu 14.04
REST Client: HTML Page
REST Server: web/app component: servlet, Tomcat 7.0
REST Server (NoSQL) database component: MongoDB on Ubuntu

Soln 2.

Host 1: Ubuntu, 192.168.232.145, Ubuntu 14.04
Host 2: Ubuntu, 172.17.0.1, Ubuntu 14.04

Soln 3.

To deploy the Database Container (dbKeertikeyaGupta700):

To create the container for the MongoDB database, first we ran the Docker image for Mongo using the following command:

```
docker run –it mongo
```

This will download the Mongo Docker image as it is the first time we are running the image. This command creates a Mongo container with ID “b46db2d987eb”. The purpose to create this image was to allow some linking to the primary Mongo Container that we’ll be using in this asignement.

Next, we created our primary docker container as follows:

```
docker run –it --name=dbKeertiekyaGupta700 --link=b46db2d987eb:mongo mongo /bin/bash
```

In this container, we can run the mongo shell with the following command:

```
mongo $MONGO_PORT_TCP_27017_ADDR
```

For the Web container, we created our own Docker image from the Tomcat image. For this we made and used a Dockerfile whose contents are as follows:

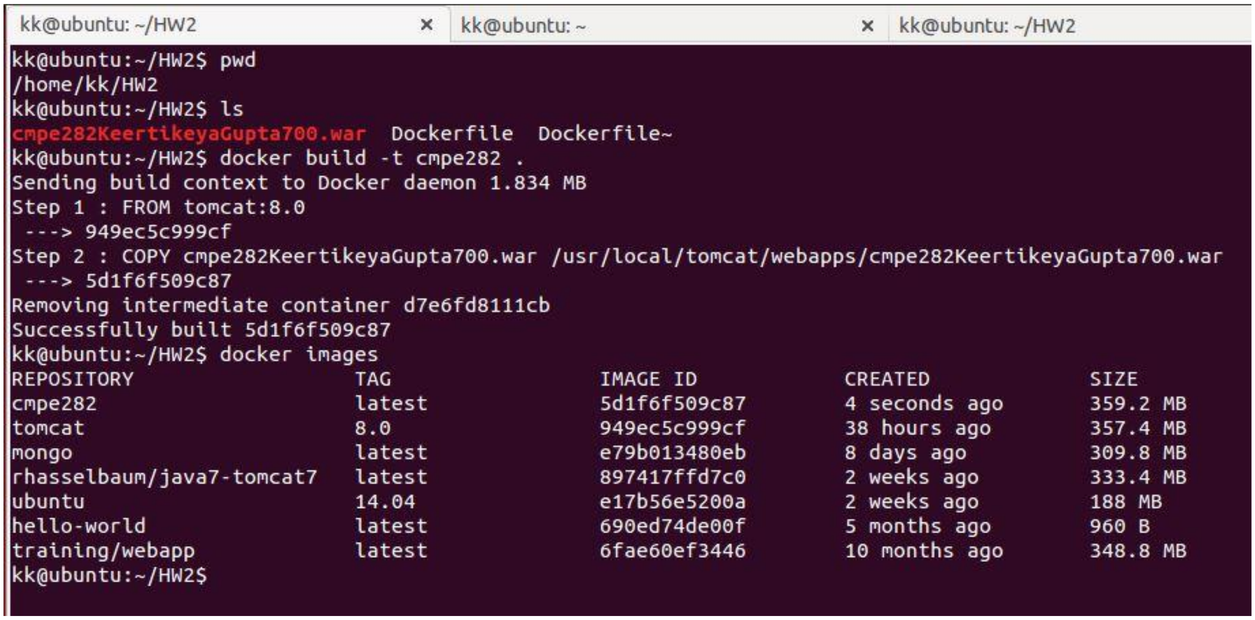
```
FROM tomcat:8.0

COPY cmpe282KeertikeyaGupta700.war
/usr/local/tomcat/webapps/cmpe282KeertikeyaGupta700.war
```

Here, cmpe282KeertikeyaGupta700.war is the .war file exported from the Eclipse project. This file contains the necessary web application archives that will be used by the container that we will be creating.

Now for the Docker image, we use build command:

docker build -t cmpe282 .

For this command to run, we must be in the directory where the Dockerfile is present. The "." At the end represents that we want to create the image in the present directory.



```
kk@ubuntu:~/HW2$ pwd
/home/kk/HW2
kk@ubuntu:~/HW2$ ls
cmpe282KeertikeyaGupta700.war  Dockerfile  Dockerfile~
kk@ubuntu:~/HW2$ docker build -t cmpe282 .
Sending build context to Docker daemon 1.834 MB
Step 1 : FROM tomcat:8.0
 ---> 949ec5c999cf
Step 2 : COPY cmpe282KeertikeyaGupta700.war /usr/local/tomcat/webapps/cmpe282KeertikeyaGupta700.war
 ---> 5d1f6f509c87
Removing intermediate container d7e6fd8111cb
Successfully built 5d1f6f509c87
kk@ubuntu:~/HW2$ docker images
REPOSITORY                   TAG                 IMAGE ID            CREATED             SIZE
cmpe282                      latest              5d1f6f509c87        4 seconds ago       359.2 MB
tomcat                       8.0                 949ec5c999cf        38 hours ago        357.4 MB
mongo                        latest              e79b013480eb        8 days ago          309.8 MB
rhasselbaum/java7-tomcat7    latest              897417ffd7c0        2 weeks ago         333.4 MB
ubuntu                       14.04               e17b56e5200a        2 weeks ago         188 MB
hello-world                  latest              690ed74de00f        5 months ago        960 B
training/webapp              latest              6fae60ef3446        10 months ago       348.8 MB
kk@ubuntu:~/HW2$
```

Once this image has been created, we can use it to create containers. We use the following command to create our web container:

docker run –itd --name=appKeertikeyaGupta700 --link= dbKeertiekyaGupta700:db cmpe282

This will create a new container called "appKeertiekyaGupta700" using th ecmpe282 image.

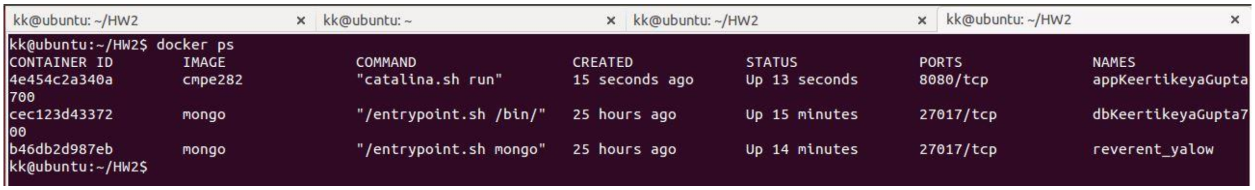
****Note:** we do not need to explicitly expose any ports because we are using the Tomcat image which already has port number 8080 exposed.

In the Servlet of our code, we need to update the MongoClient connect. Instead of using localhost, we have to specify the IP address of the DB container (172.17.0.3).

Also, we had to modify the HTML code for the Index.html file. We have changed the form submit action from "http://localhost:8080/DemoServlets/DemoServlet" to http://172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet

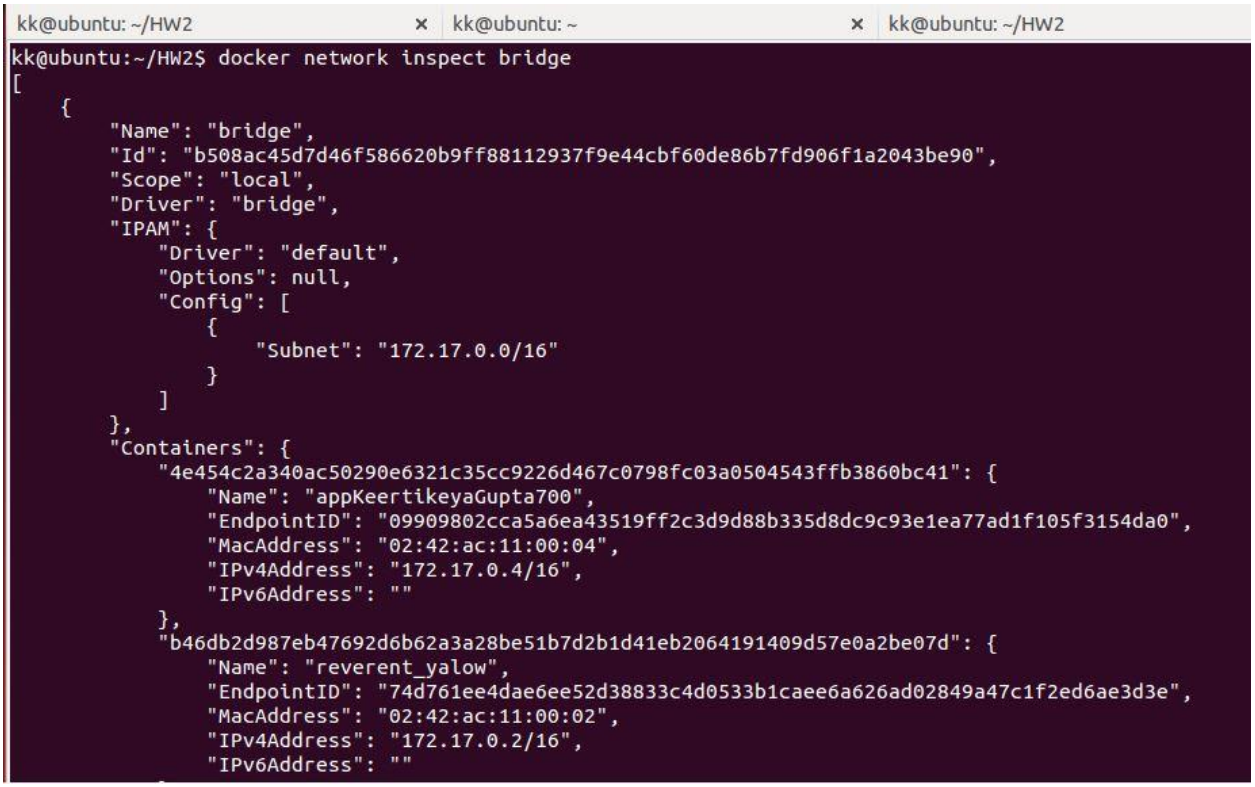
Soln 4.

docker ps command shows the list of running containers

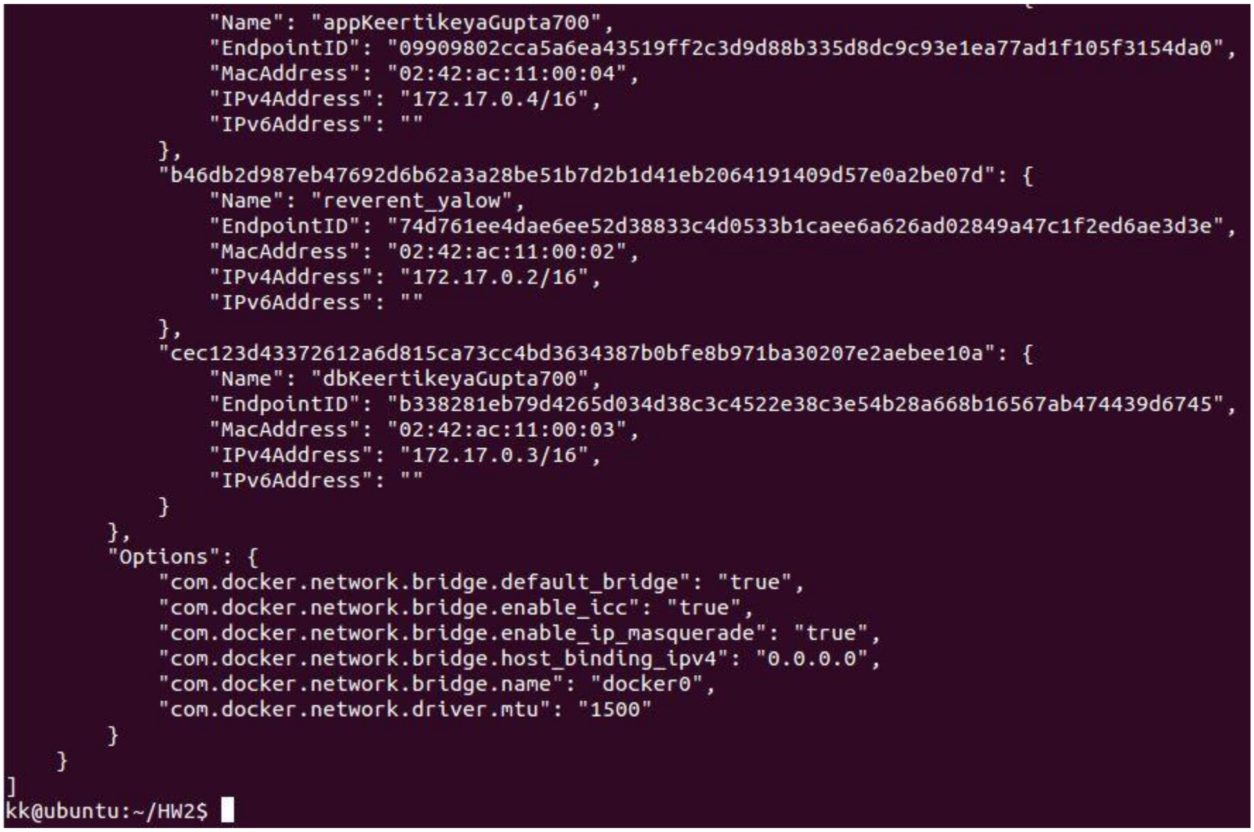


```
kk@ubuntu:~/HW2$ docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS               NAMES
4e454c2a340a        cmpe282             "catalina.sh run"        15 seconds ago      Up 13 seconds       8080/tcp            appKeertikeyaGupta
700
cec123d43372        mongo               "/entrypoint.sh /bin/"   25 hours ago        Up 15 minutes       27017/tcp           dbKeertikeyaGupta7
00
b46db2d987eb        mongo               "/entrypoint.sh mongo"   25 hours ago        Up 14 minutes       27017/tcp           reverent_yalow
kk@ubuntu:~/HW2$
```

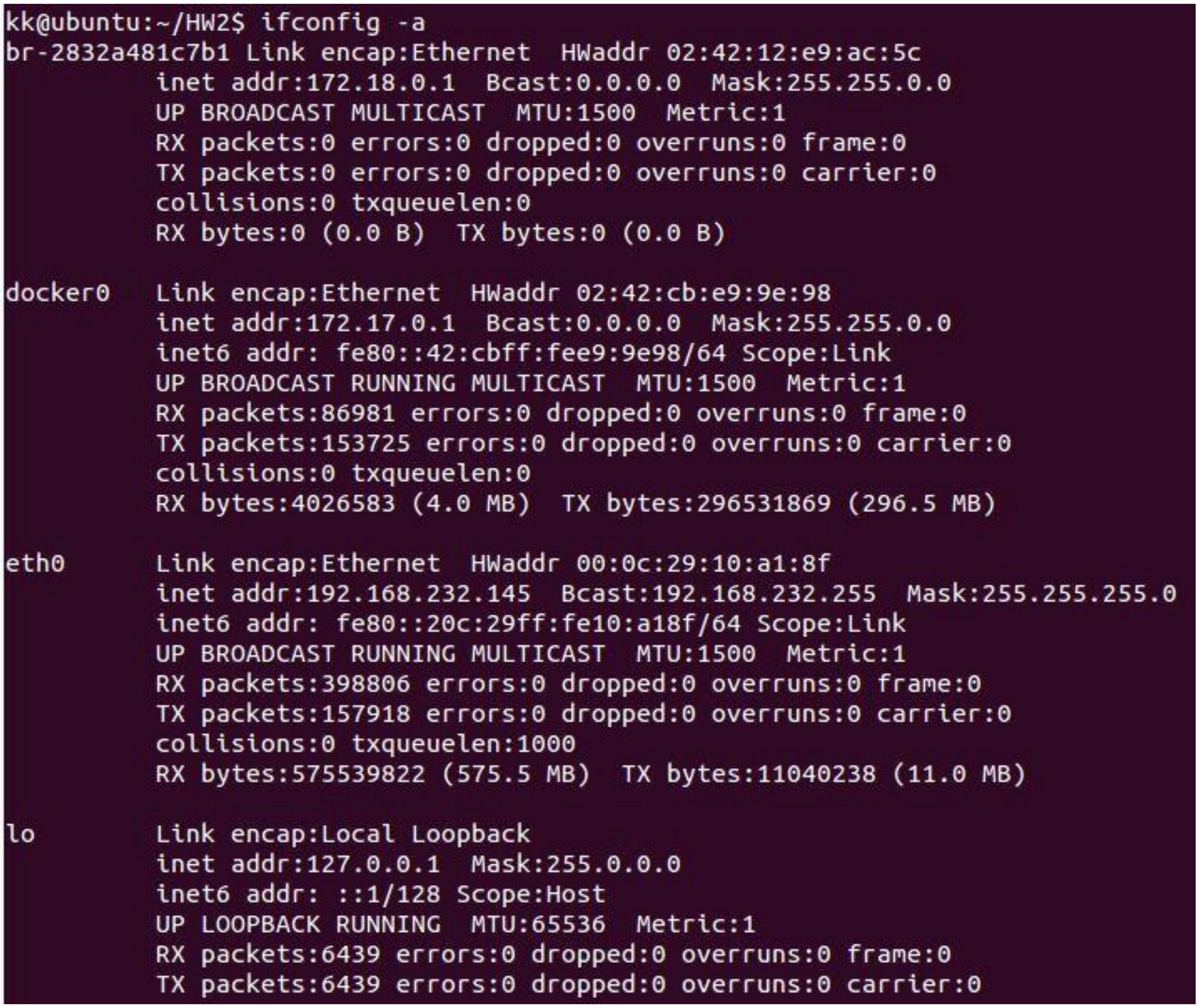
By default, when we create a new container, it always goes to the bridge network. The **docker network inspect bridge** shows the details of the bridge network:



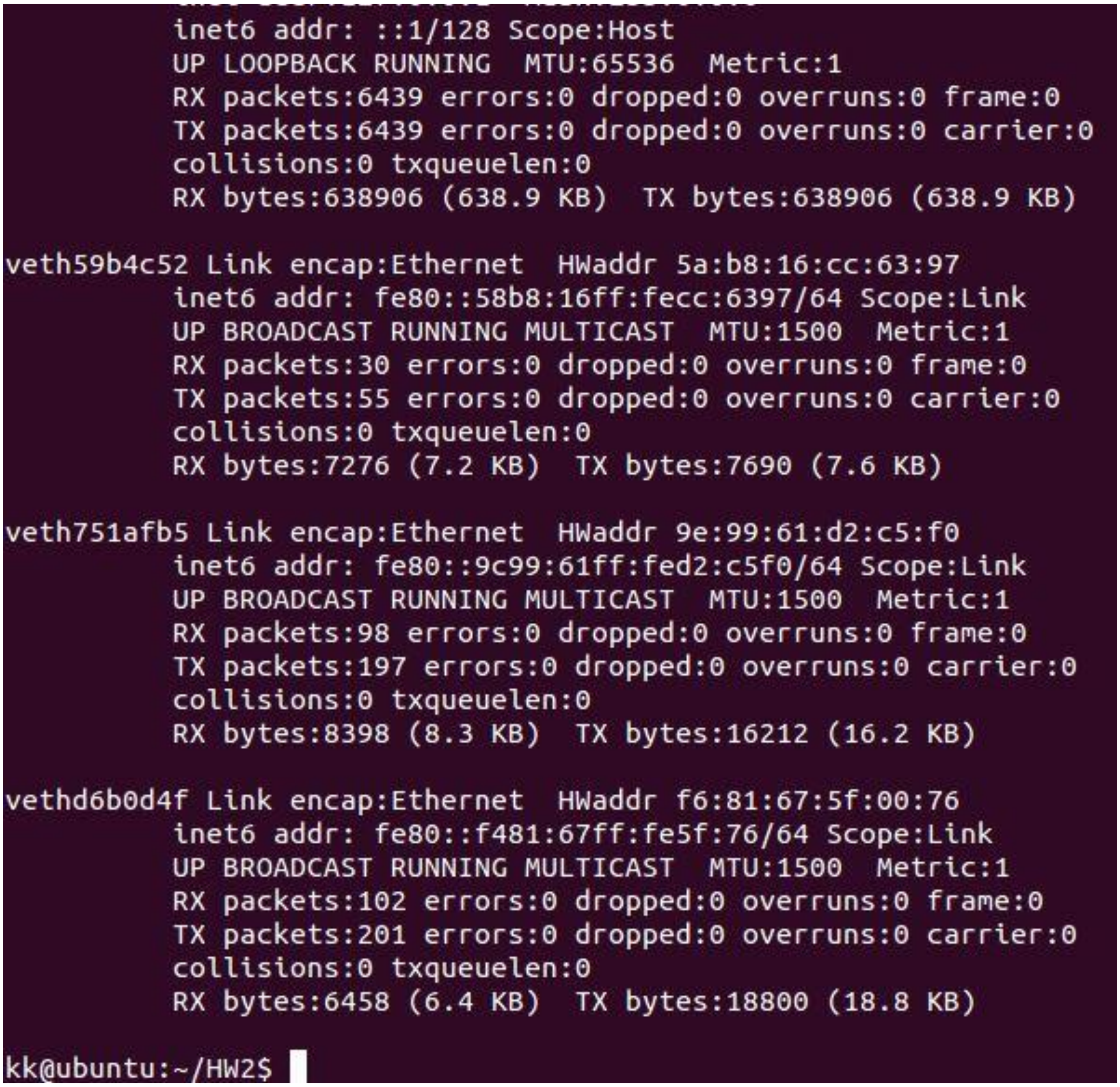
```
kk@ubuntu:~/HW2$ docker network inspect bridge
[
    {
        "Name": "bridge",
        "Id": "b508ac45d7d46f586620b9ff88112937f9e44cbf60de86b7fd906f1a2043be90",
        "Scope": "local",
        "Driver": "bridge",
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "172.17.0.0/16"
                }
            ]
        },
        "Containers": {
            "4e454c2a340ac50290e6321c35cc9226d467c0798fc03a0504543ffb3860bc41": {
                "Name": "appKeertikeyaGupta700",
                "EndpointID": "09909802cca5a6ea43519ff2c3d9d88b335d8dc9c93e1ea77ad1f105f3154da0",
                "MacAddress": "02:42:ac:11:00:04",
                "IPv4Address": "172.17.0.4/16",
                "IPv6Address": ""
            },
            "b46db2d987eb47692d6b62a3a28be51b7d2b1d41eb2064191409d57e0a2be07d": {
                "Name": "reverent_yalow",
                "EndpointID": "74d761ee4dae6ee52d38833c4d0533b1caee6a626ad02849a47c1f2ed6ae3d3e",
                "MacAddress": "02:42:ac:11:00:02",
                "IPv4Address": "172.17.0.2/16",
                "IPv6Address": ""
```



```
                "Name": "appKeertikeyaGupta700",
                "EndpointID": "09909802cca5a6ea43519ff2c3d9d88b335d8dc9c93e1ea77ad1f105f3154da0",
                "MacAddress": "02:42:ac:11:00:04",
                "IPv4Address": "172.17.0.4/16",
                "IPv6Address": ""
            },
            "b46db2d987eb47692d6b62a3a28be51b7d2b1d41eb2064191409d57e0a2be07d": {
                "Name": "reverent_yalow",
                "EndpointID": "74d761ee4dae6ee52d38833c4d0533b1caee6a626ad02849a47c1f2ed6ae3d3e",
                "MacAddress": "02:42:ac:11:00:02",
                "IPv4Address": "172.17.0.2/16",
                "IPv6Address": ""
            },
            "cec123d43372612a6d815ca73cc4bd3634387b0bfe8b971ba30207e2aebee10a": {
                "Name": "dbKeertikeyaGupta700",
                "EndpointID": "b338281eb79d4265d034d38c3c4522e38c3e54b28a668b16567ab474439d6745",
                "MacAddress": "02:42:ac:11:00:03",
                "IPv4Address": "172.17.0.3/16",
                "IPv6Address": ""
            }
        },
        "Options": {
            "com.docker.network.bridge.default_bridge": "true",
            "com.docker.network.bridge.enable_icc": "true",
            "com.docker.network.bridge.enable_ip_masquerade": "true",
            "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
            "com.docker.network.bridge.name": "docker0",
            "com.docker.network.driver.mtu": "1500"
        }
    }
]
kk@ubuntu:~/HW2$
```



```
kk@ubuntu:~/HW2$ ifconfig -a
br-2832a481c7b1 Link encap:Ethernet  HWaddr 02:42:12:e9:ac:5c
          inet addr:172.18.0.1  Bcast:0.0.0.0  Mask:255.255.0.0
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

docker0   Link encap:Ethernet  HWaddr 02:42:cb:e9:9e:98
          inet addr:172.17.0.1  Bcast:0.0.0.0  Mask:255.255.0.0
          inet6 addr: fe80::42:cbff:fee9:9e98/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:86981 errors:0 dropped:0 overruns:0 frame:0
          TX packets:153725 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:4026583 (4.0 MB)  TX bytes:296531869 (296.5 MB)

eth0      Link encap:Ethernet  HWaddr 00:0c:29:10:a1:8f
          inet addr:192.168.232.145  Bcast:192.168.232.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe10:a18f/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:398806 errors:0 dropped:0 overruns:0 frame:0
          TX packets:157918 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:575539822 (575.5 MB)  TX bytes:11040238 (11.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:6439 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6439 errors:0 dropped:0 overruns:0 carrier:0
```

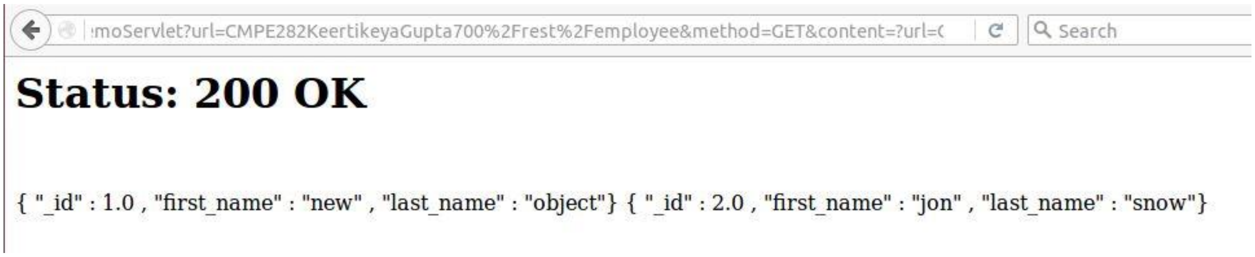


```
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:6439 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6439 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:638906 (638.9 KB)  TX bytes:638906 (638.9 KB)

veth59b4c52 Link encap:Ethernet  HWaddr 5a:b8:16:cc:63:97
          inet6 addr: fe80::58b8:16ff:fecc:6397/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:30 errors:0 dropped:0 overruns:0 frame:0
          TX packets:55 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:7276 (7.2 KB)  TX bytes:7690 (7.6 KB)

veth751afb5 Link encap:Ethernet  HWaddr 9e:99:61:d2:c5:f0
          inet6 addr: fe80::9c99:61ff:fed2:c5f0/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:98 errors:0 dropped:0 overruns:0 frame:0
          TX packets:197 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:8398 (8.3 KB)  TX bytes:16212 (16.2 KB)

vethd6b0d4f Link encap:Ethernet  HWaddr f6:81:67:5f:00:76
          inet6 addr: fe80::f481:67ff:fe5f:76/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:102 errors:0 dropped:0 overruns:0 frame:0
          TX packets:201 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:6458 (6.4 KB)  TX bytes:18800 (18.8 KB)

kk@ubuntu:~/HW2$ 
```

Soln 5.

Screenshots:

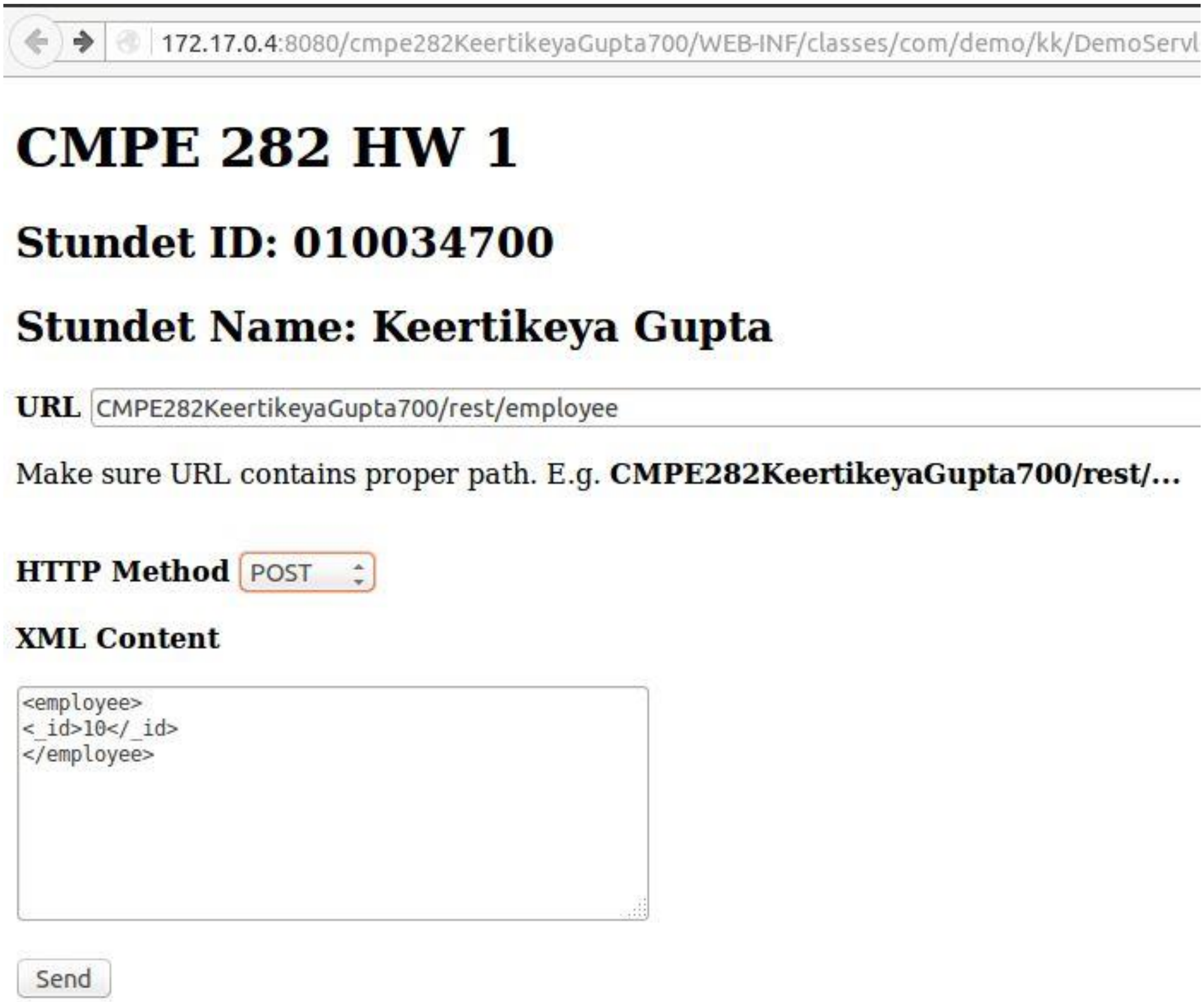
First, we had already added two documents in the database:


:moServlet?url=CMPE282KeertikeyaGupta700%2Frest%2Femployee&method=GET&content=?url=(
Search

Status: 200 OK

```
{ "_id" : 1.0 , "first_name" : "new" , "last_name" : "object"} { "_id" : 2.0 , "first_name" : "jon" , "last_name" : "snow"}
```

To create employee with ID = 10 with POST:


172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServl

CMPE 282 HW 1

Stundet ID: 010034700

Stundet Name: Keertikeya Gupta

URL CMPE282KeertikeyaGupta700/rest/employee

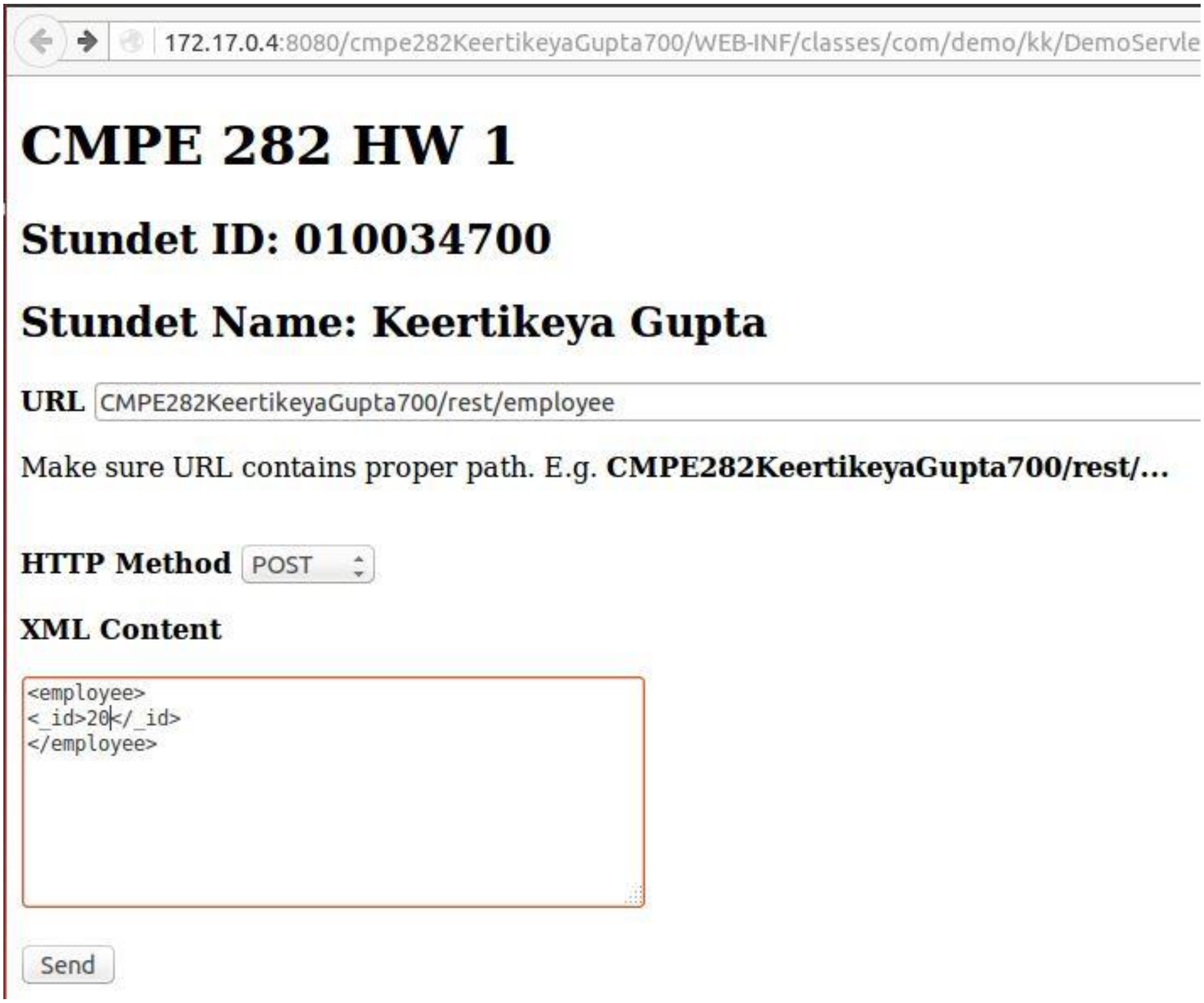
Make sure URL contains proper path. E.g. **CMPE282KeertikeyaGupta700/rest/...**

HTTP Method POST

XML Content

```
<employee>
<_id>10</_id>
</employee>
```

Creating employee with ID 20 using POST:



172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServle

CMPE 282 HW 1

Stundet ID: 010034700

Stundet Name: Keertikeya Gupta

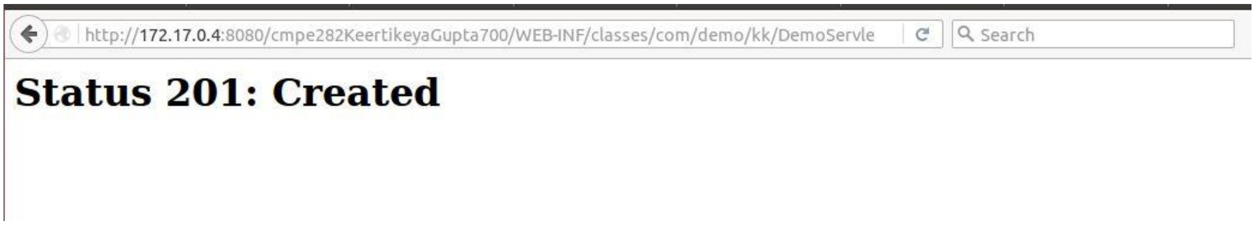
URL CMPE282KeertikeyaGupta700/rest/employee

Make sure URL contains proper path. E.g. **CMPE282KeertikeyaGupta700/rest/...**

HTTP Method POST

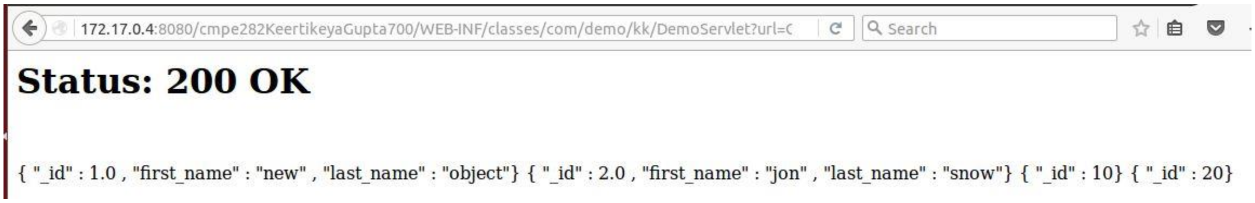
XML Content

```
<employee>
<_id>20</_id>
</employee>
```



http://172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServle
Search

Status 201: Created

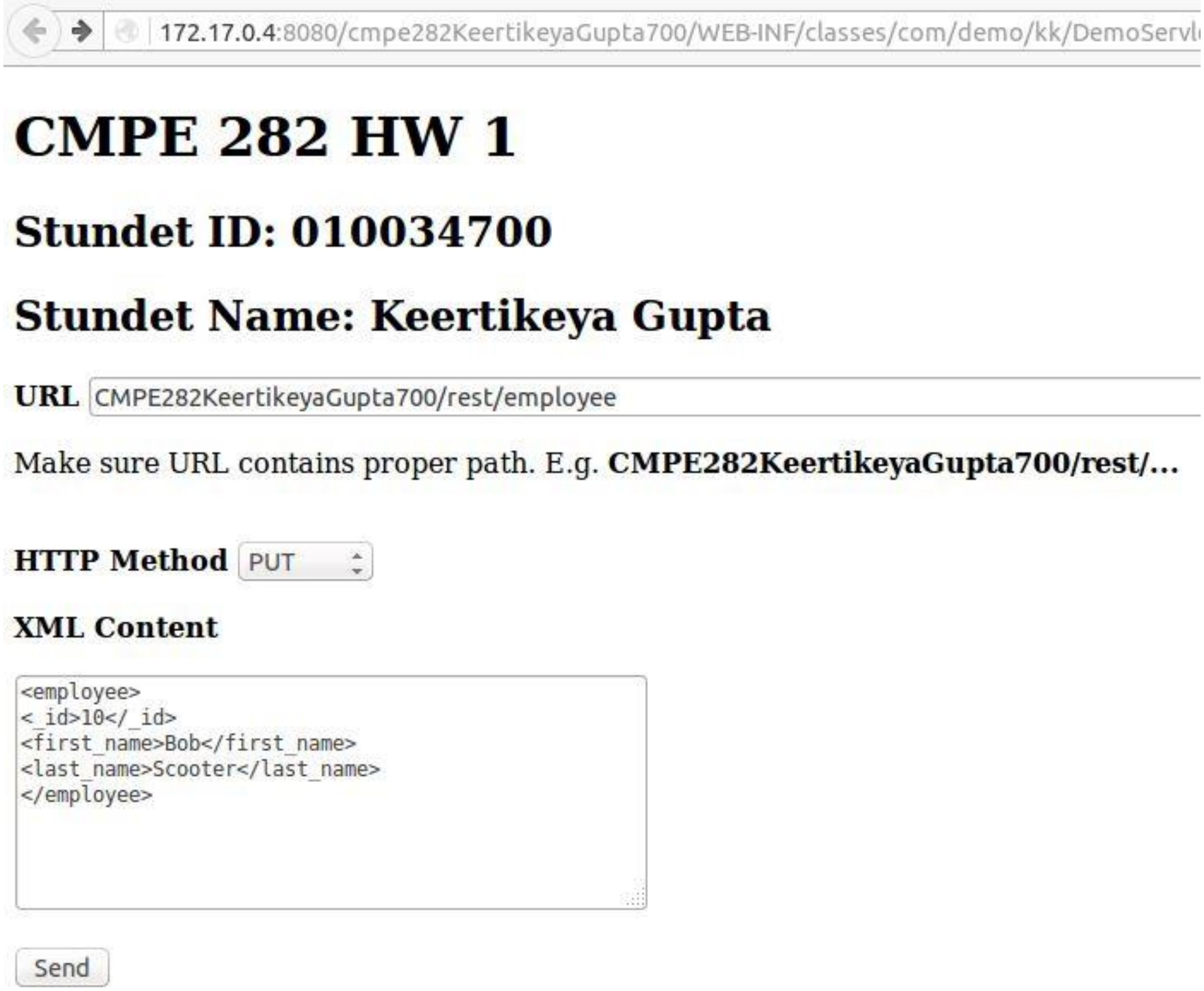


172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet?url=C
Search

Status: 200 OK

```
{ "_id" : 1.0 , "first_name" : "new" , "last_name" : "object"} { "_id" : 2.0 , "first_name" : "jon" , "last_name" : "snow"} { "_id" : 10} { "_id" : 20}
```

Using the PUT method to update the data of employee with ID=10



172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServl

CMPE 282 HW 1

Stundet ID: 010034700

Stundet Name: Keertikeya Gupta

URL CMPE282KeertikeyaGupta700/rest/employee

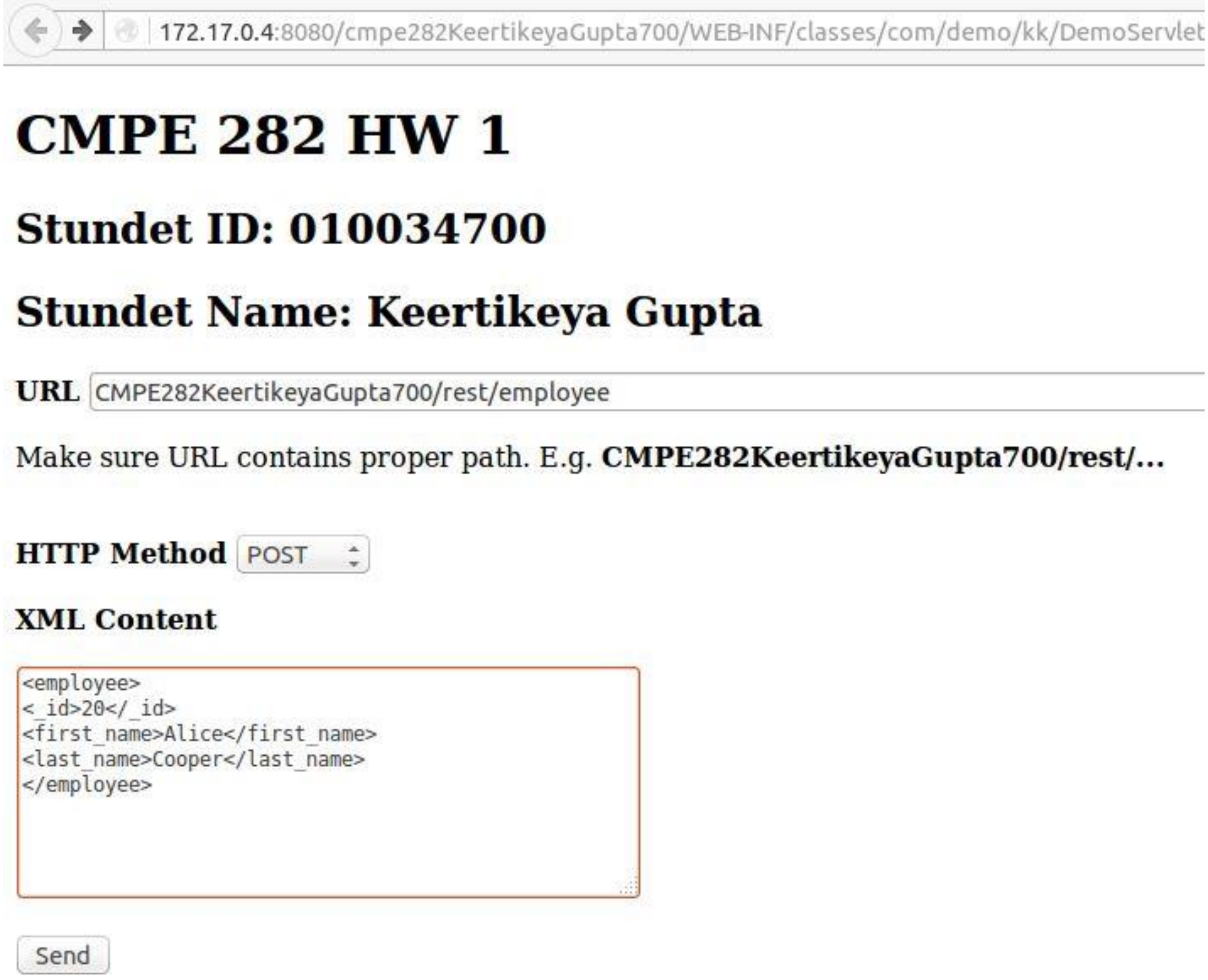
Make sure URL contains proper path. E.g. **CMPE282KeertikeyaGupta700/rest/...**

HTTP Method PUT

XML Content

```
<employee>
<_id>10</_id>
<first_name>Bob</first_name>
<last_name>Scooter</last_name>
</employee>
```

PUT method to update employee ID = 20



172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet

CMPE 282 HW 1

Stundet ID: 010034700

Stundet Name: Keertikeya Gupta

URL CMPE282KeertikeyaGupta700/rest/employee

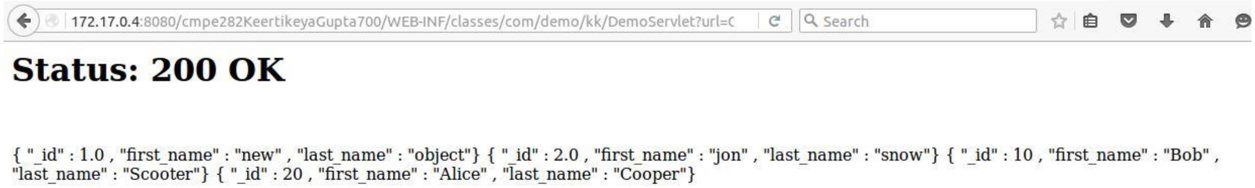
Make sure URL contains proper path. E.g. **CMPE282KeertikeyaGupta700/rest/...**

HTTP Method POST

XML Content

```
<employee>
<_id>20</_id>
<first_name>Alice</first_name>
<last_name>Cooper</last_name>
</employee>
```

Retrieving the updated data with GET:

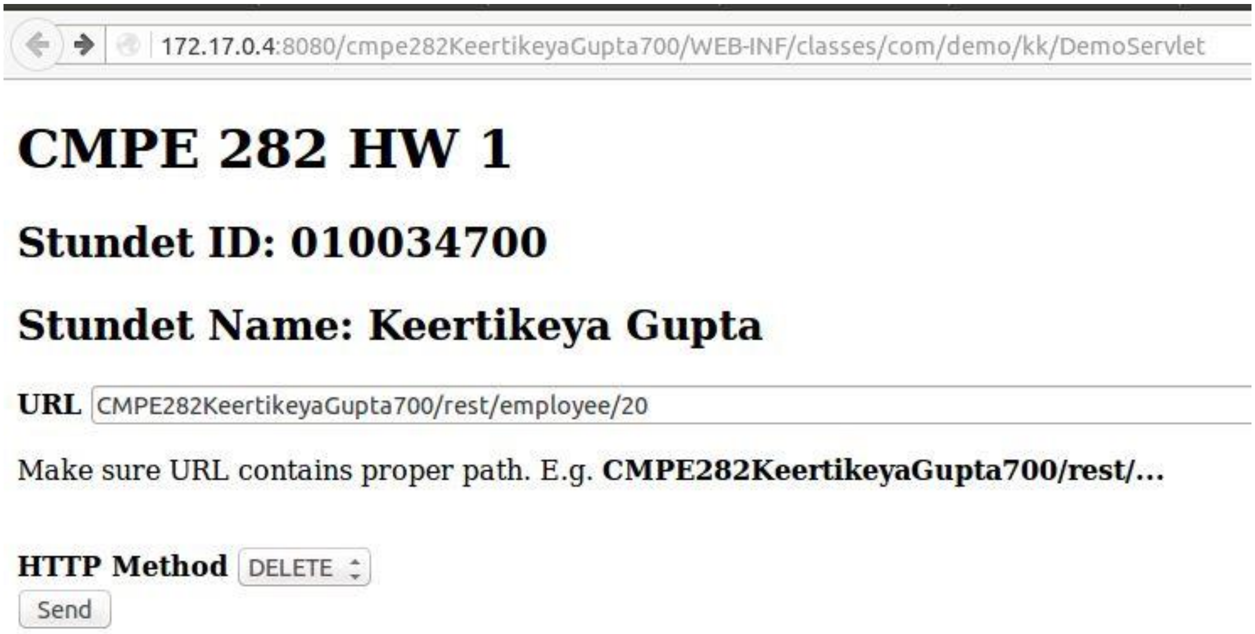


172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet?url=C

Status: 200 OK

```
{ "_id" : 1.0 , "first_name" : "new" , "last_name" : "object"} { "_id" : 2.0 , "first_name" : "jon" , "last_name" : "snow"} { "_id" : 10 , "first_name" : "Bob" ,
"last_name" : "Scooter"} { "_id" : 20 , "first_name" : "Alice" , "last_name" : "Cooper"}
```

Deleting the document for employee ID = 20:



172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet

CMPE 282 HW 1

Stundet ID: 010034700

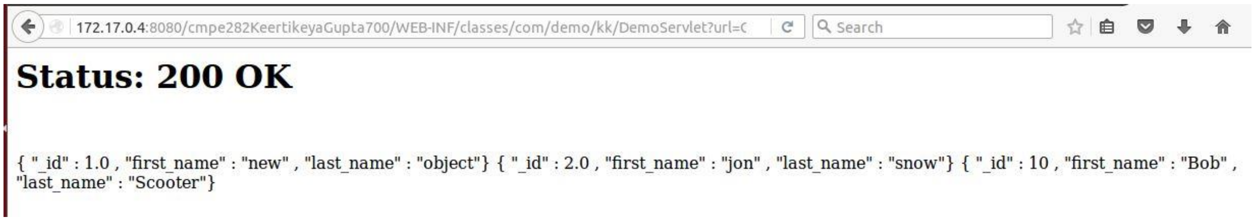
Stundet Name: Keertikeya Gupta

URL CMPE282KeertikeyaGupta700/rest/employee/20

Make sure URL contains proper path. E.g. **CMPE282KeertikeyaGupta700/rest/...**

HTTP Method DELETE

GET method to retrieve all data:



172.17.0.4:8080/cmpe282KeertikeyaGupta700/WEB-INF/classes/com/demo/kk/DemoServlet?url=C
Search

Status: 200 OK

```
{ "_id" : 1.0 , "first_name" : "new" , "last_name" : "object"} { "_id" : 2.0 , "first_name" : "jon" , "last_name" : "snow"} { "_id" : 10 , "first_name" : "Bob" ,
"last_name" : "Scooter"}
```