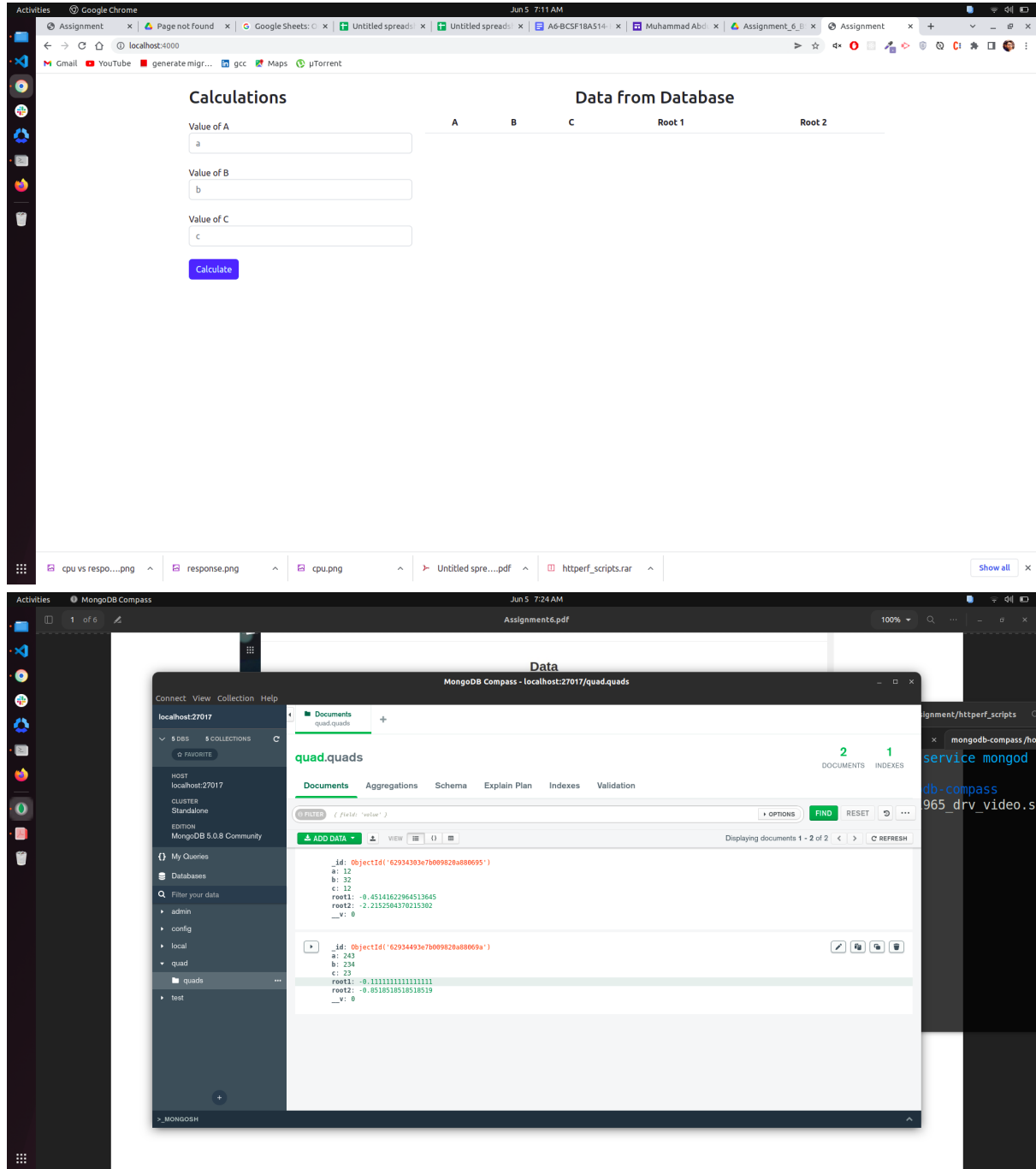


Assignment 06: Hosting and Load Balancing a Web Application

Using Docker Containers

Milestone 01: Develop a Quadratic Solver Web Application



Index.js

```
let express = require("express");
let app = express();
```

```
let path = require('path');
let mongoose = require("mongoose");
let Quad = require("./Quad")

require("./Quad");

mongoose.connect('mongodb://localhost/quad', {
  useNewUrlParser: true,
  useUnifiedTopology: true,
}).then((result) => app.listen(4000, () => {
  console.log('Listening');
})).catch((err) => console.log(err))

app.get('/', (req, res) => {
  res.sendFile(path.join(__dirname+'/index.html'))
})

async function solve(a,b,c){
  let root1, root2;
  let discriminant = (b * b) - (4 * a * c);
  console.log(discriminant);
  if (discriminant != 0) {
    root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
    root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
  }
  else if (discriminant == 0) {
    root1 = root2 = -b / (2 * a);
  }
  console.log(root1, root2);

  let quad = new Quad({
    a: a,
    b: b,
    c: c,
    root1: root1,
    root2: root2
  });

  await quad.save();
}

app.get('/calc', (req, res) => {
```

```

    solve(+req.query.a, +req.query.b, +req.query.c);
    res.redirect('/');
  })

app.get('/all', (req, res) => {
  Quad.find({}, (err, data) => {
    res.send(data);
  })
})
})

```

Quad.js

```

const mongoose = require('mongoose');
const Schema = mongoose.Schema

const QuadSchema = new Schema({
  a: Number,
  b: Number,
  c: Number,
  root1: Number,
  root2: Number
})

const Quad = mongoose.model('Quad', QuadSchema)
module.exports = Quad

```

Milestone 02: Host your Web Application and MongoDB in the Docker Containers

The screenshot shows a terminal window with the command `docker ps` executed, listing several Docker containers. Below the terminal, a web application interface is visible, displaying a table with columns for 'Calculations' and 'Data from Database'.

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
fc1b0f8035f3	nginx	"/docker-entrypoint.s..."	9 minutes ago	Up 9 minutes	80/tcp	stupe
3ee6cfbe86c1	server	"/docker-entrypoint.s..."	35 minutes ago	Up 35 minutes	0.0.0.0:4001->4000/tcp, :::4001->4000/tcp	compe
ab155e44e830	server	"/docker-entrypoint.s..."	35 minutes ago	Up 35 minutes	0.0.0.0:4000->4000/tcp, :::4000->4000/tcp	cleve
ecd1176a76ae	mongo	"/docker-entrypoint.s..."	49 minutes ago	Up 49 minutes	27017/tcp	nosta
c2ddc177b603	mongo	"/docker-entrypoint.s..."	49 minutes ago	Up 49 minutes	27017/tcp	ecsta

The web application interface shows a table with columns for 'Calculations' and 'Data from Database'. The 'Calculations' column contains values like '1', '2', '3', '4', '5', '6', '7', '8', '9', '10'. The 'Data from Database' column contains values like '1', '2', '3', '4', '5', '6', '7', '8', '9', '10'.

Activities Google Chrome Jun 5 5:34 AM

Assignment x Untitled document - Google x +

localhost:4000

Gmail YouTube generate migr... gcc Maps uTorrent

Calculations

Value of A

Value of B

Value of C

Calculate

Data from Database

A	B	C	Root 1	Root 2
1	2	-34	4.916079783099616	-6.916079783099616

Activities Google Chrome Jun 5 5:35 AM

Assignment x Untitled document - Google x +

localhost:4000

Gmail YouTube generate migr... gcc Maps uTorrent

Calculations

Value of A

Value of B

Value of C

Calculate

Data from Database

A	B	C	Root 1	Root 2
1	2	-34	4.916079783099616	-6.916079783099616
1	3	-23	3.524937810560445	-6.524937810560445

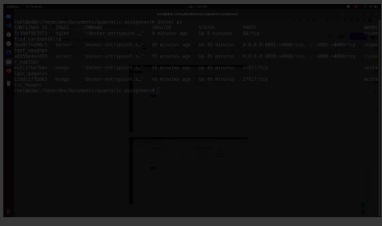
Milestone 03: Deploy Nginx as a Proxy Server in a Docker Container

Activities Terminal Jun 5 6:04 AM root@adam: /home/dev/Documents/quadratic-assignment

docs.google.com/document/dq/185Pw...
Gmail YouTube generate migr... gcc Maps pTorrent

```
http {  
    include /etc/nginx/mime.types;  
    default_type application/octet-stream;  
  
    log_format main '$remote_addr - $remote_user [$time local] "$request" '  
        '$status $body_bytes_sent "$http_referer" '  
        '"$http_user_agent" "$http_x_forwarded_for";  
  
    access_log /var/log/nginx/access.log main;  
  
    sendfile on;  
    #tcp_nopush on;  
  
    keepalive_timeout 65;  
  
    #gzip on;  
  
    #include /etc/nginx/conf.d/*.conf;  
  
    upstream temp {  
        server 172.17.0.2:4000;  
        server 172.17.0.3:4000;  
    }  
  
    server {  
        location / {  
            proxy_pass http://temp;  
        }  
    }  
}
```

root@fc1b0f8035f3:/etc/nginx#



Activities Google Chrome Jun 5 6:00 AM

WhatsApp x Untitled document - Google x Assignment x +

← → ↻ ⚙ Not secure | 172.17.0.6 ▶ ☆ 🔍 📄 📁 📌 📎 📧 📧 📧

Gmail YouTube generate migr... gcc Maps µTorrent

Calculations

Value of A

Value of B

Value of C

Calculate

Data from Database

A	B	C	Root 1	Root 2
1	2	-34	4.916079783099616	-6.916079783099616
1	3	-23	3.524937810560445	-6.524937810560445

Activities Google Chrome Jun 5 6:02 AM

WhatsApp x Untitled document - Google x Assignment x +

← → ↻ ⚙ Not secure | 172.17.0.6 ▶ ☆ 🔍 📄 📁 📌 📎 📧 📧 📧

Gmail YouTube generate migr... gcc Maps µTorrent

Calculations

Value of A

Value of B

Value of C

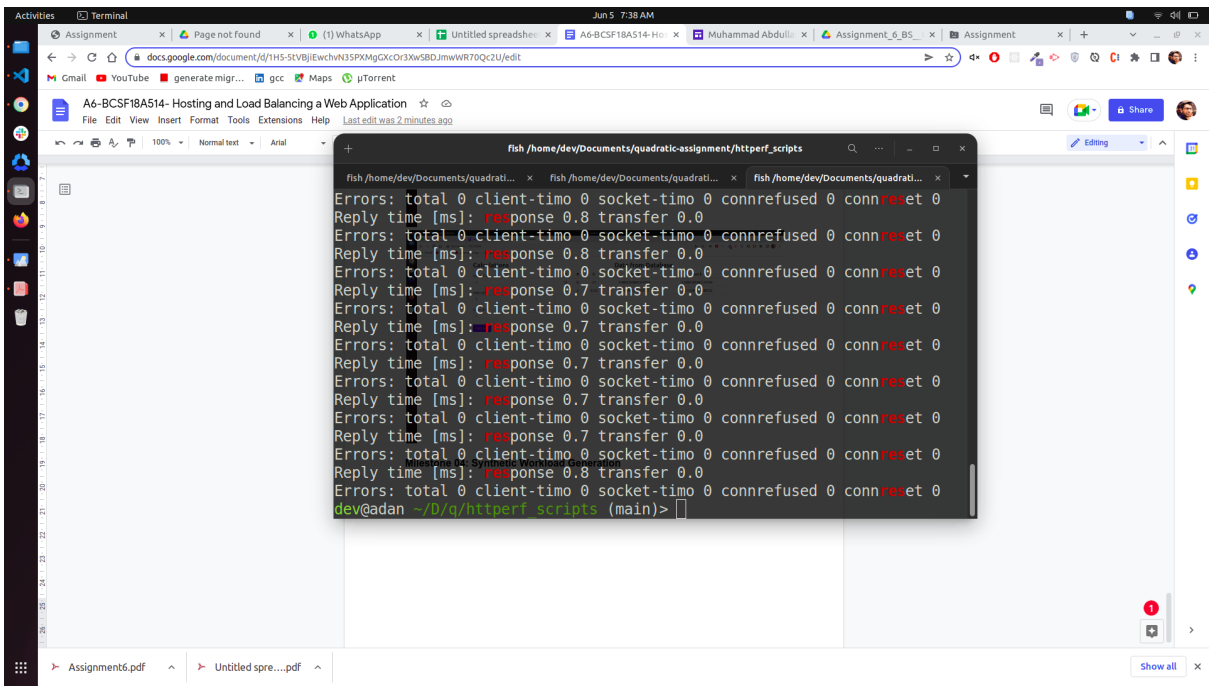
Calculate

Data from Database

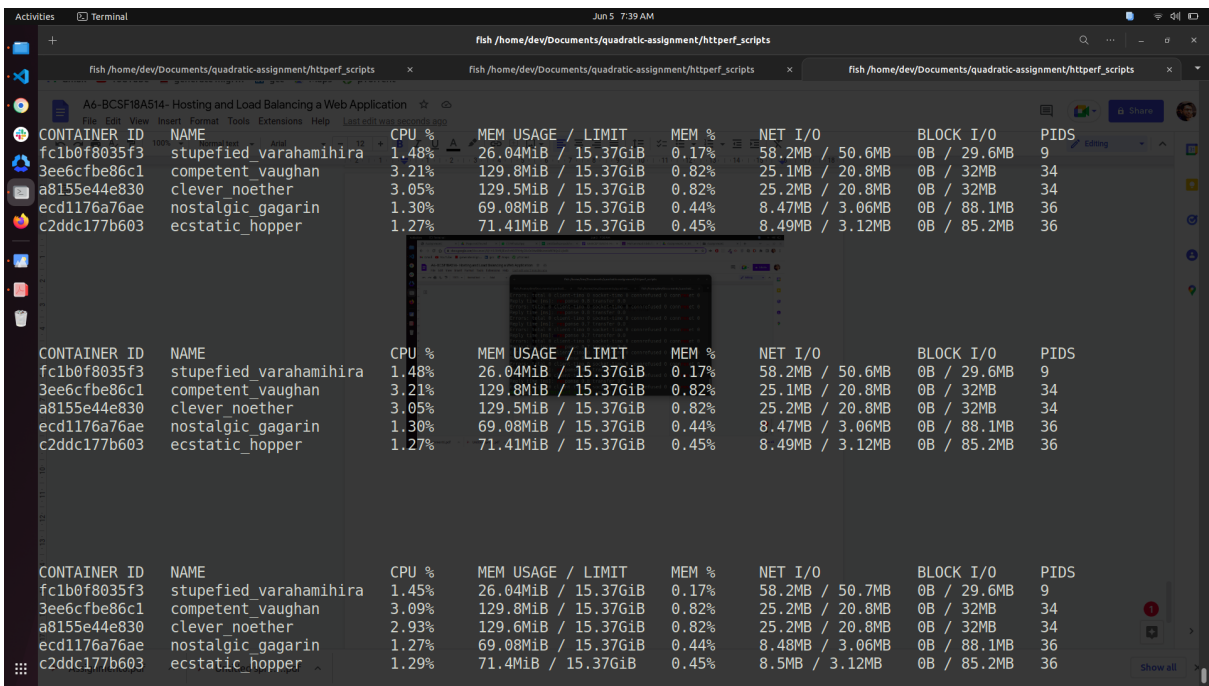
A	B	C	Root 1	Root 2
32	32	-23	0.4842509842514764	-1.4842509842514764
23	3	-2323	9.984869837577227	-10.115304620185922

Milestone 04: Synthetic Workload Generation

Response time



CPU usage



Graphs

