Cloud Computing LAB 2

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SEC: I

Sem: 6

LAB 2 - MONOLITHIC ARCHITECTURE

PART 1: Setup & Run

```
PS C:\Users\sathw\OneDrive\Documents\cc> mkdir PES2UG23CS538


    Directory: C:\Users\sathw\OneDrive\Documents\cc


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        29-01-2026     14:16                PES2UG23CS538


PS C:\Users\sathw\OneDrive\Documents\cc> cd PES2UG23CS538
PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538>
```

```
    Directory: C:\Users\sathw\OneDrive\Documents\cc


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        29-01-2026     14:16                PES2UG23CS538


PS C:\Users\sathw\OneDrive\Documents\cc> cd PES2UG23CS538
PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538> python -m venv .venv
>> .\.venv\Scripts\activate
(.venv) PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538>
```

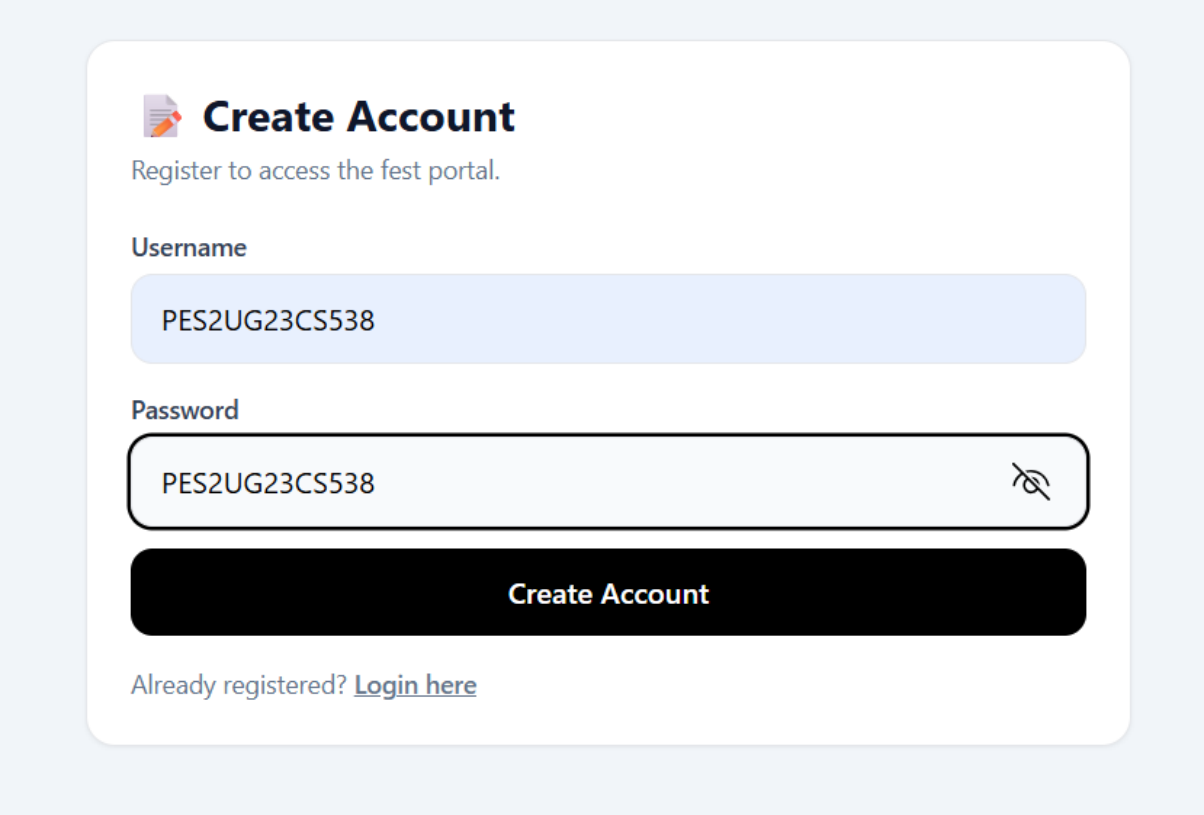
```
(.venv) PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538> python.exe -m pip
install --upgrade pip
Requirement already satisfied: pip in c:\users\sathw\onedrive\documents\cc\pes2ug
23cs538\.venv\lib\site-packages (24.0)
Collecting pip
  Using cached pip-25.3-py3-none-any.whl.metadata (4.7 kB)
Using cached pip-25.3-py3-none-any.whl (1.8 MB)
Installing collected packages: pip
  Attempting uninstall: pip
    Found existing installation: pip 24.0
    Uninstalling pip-24.0:
      Successfully uninstalled pip-24.0
```

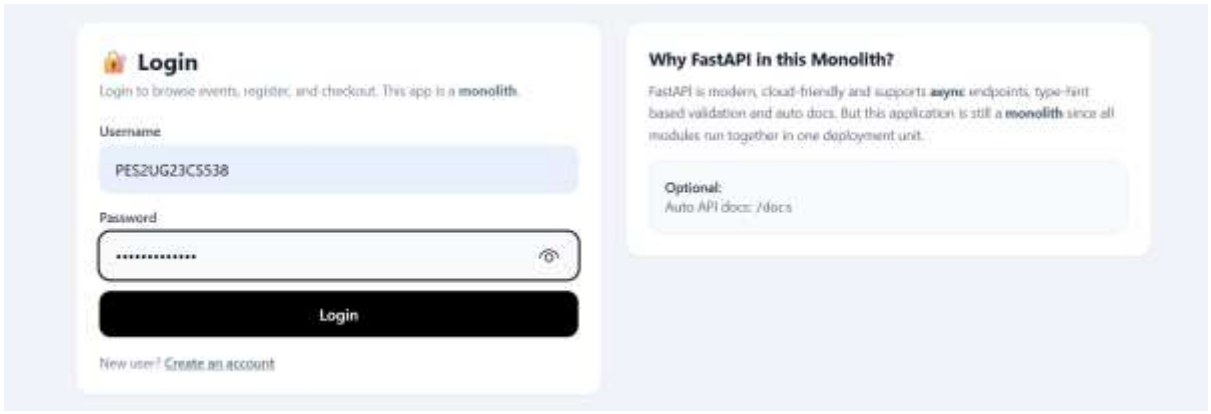
```
PS C:\Users\sathw\OneDrive\Documents\cc> cd C:\Users\sathw\OneDri
ve\Documents\cc\PES2UG23CS538\CC_Lab2; pip install -r requirement
s.txt
Collecting fastapi (from -r requirements.txt (line 2))
  Downloading fastapi-0.128.0-py3-none-any.whl.metadata (30 kB)
Collecting uvicorn (from -r requirements.txt (line 3))
  Downloading uvicorn-0.40.0-py3-none-any.whl.metadata (6.7 kB)
Requirement already satisfied: jinja2 in c:\users\sathw\appdata\l
ocal\packages\pythonsoftwarefoundation.python.3.11_qbz5n2kfra8p0\
localcache\local-packages\python311\site-packages (from -r requir
ements.txt (line 4)) (3.1.6)
Collecting python-multipart (from -r requirements.txt (line 5))
  Downloading python_multipart-0.0.22-py3-none-any.whl.metadata (
```

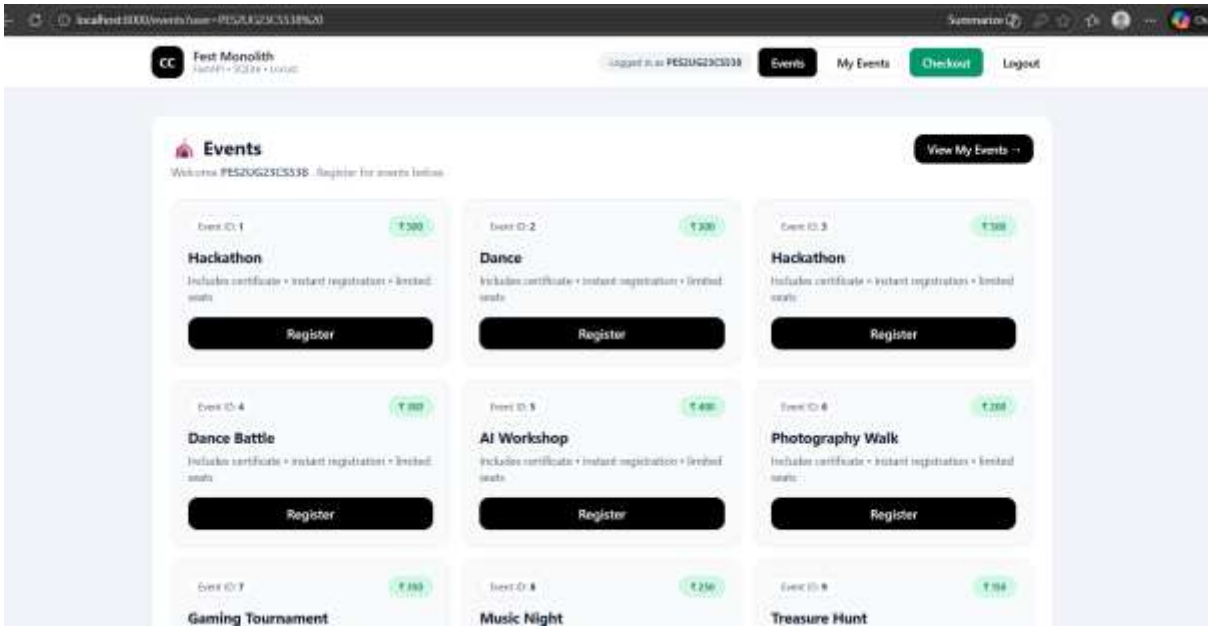
```
PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2> python inser
t_events.py
✅ Events inserted successfully!
PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2>
```

```
PS C:\Users\sathw\OneDrive\Documents\cc> Set-Location C:\Users\sathw\OneDri
ve\Documents\cc\PES2UG23CS538\CC_Lab2; python.exe -m uvicorn main:app --rel
oad
INFO:     Will watch for changes in these directories: ['C:\\Users\\sathw\\
OneDrive\\Documents\\cc\\PES2UG23CS538\\CC_Lab2']
INFO:     Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO:     Started reloader process [7624] using StatReload
INFO:     Started server process [22780]
INFO:     Waiting for application startup.
INFO:     Application startup complete.
```

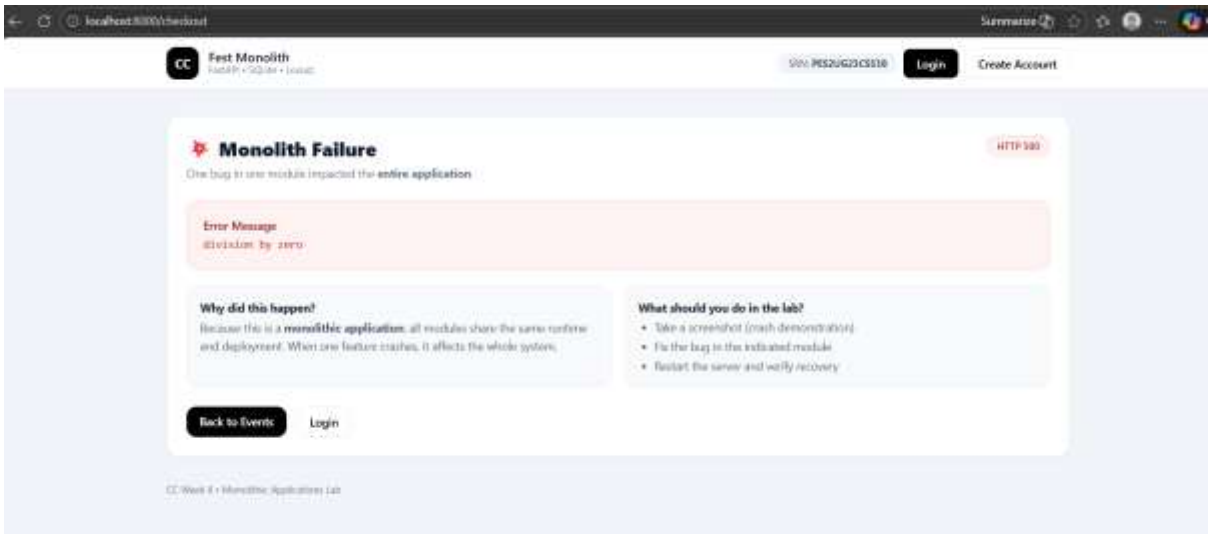
PART 2:Use the application




Login
Login to browse events, register, and checkout. This app is a monolith.
Username
PES2UG23CS538
Password
Login
New user? Create an account
Why FastAPI in this Monolith?
FastAPI is modern, cloud-friendly and supports async endpoints, type-hint based validation and auto docs. But this application is still a monolith since all modules run together in one deployment unit.
Optional:
Auto API docs: /docs

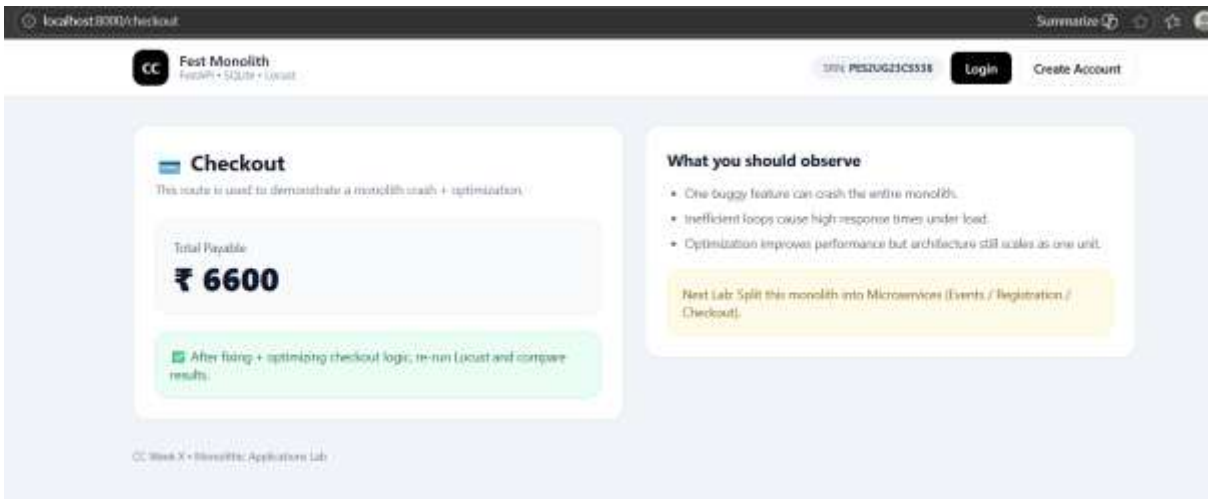

Fest Monolith
Events
My Events
Checkout
Logout
Events
View My Events →
Hackathon
Register
Dance
Register
Hackathon
Register
Dance Battle
Register
AI Workshop
Register
Photography Walk
Register
Gaming Tournament
Music Night
Treasure Hunt

PART 3: Observe Monolithic failure(crash)



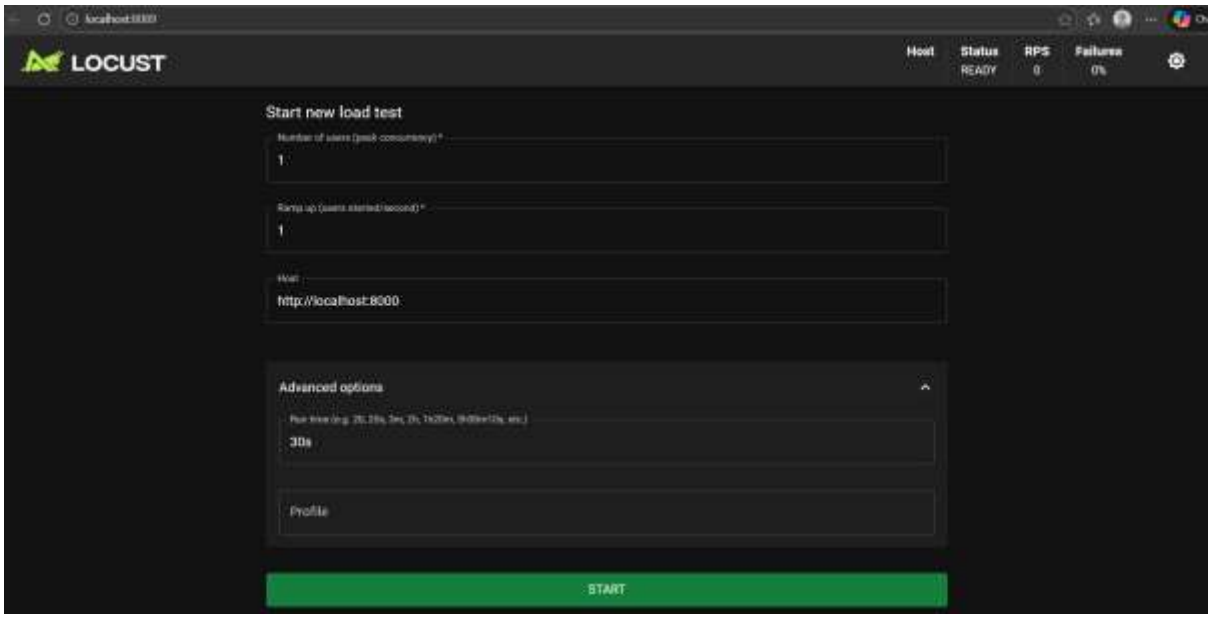

```
INFO:     127.0.0.1:9440 - "GET /checkout HTTP/1.1" 500 Internal Server Error
ERROR:    Exception in ASGI application
```

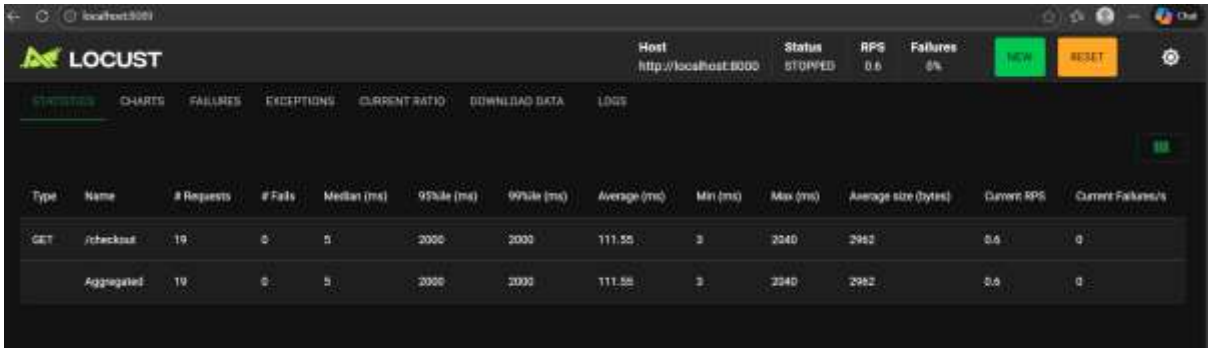
PART 4:Fix the bug




```
INFO:     127.0.0.1:4678 - "GET /checkout HTTP/1.1" 200 OK
```

PART 5:Load Testing using Locust



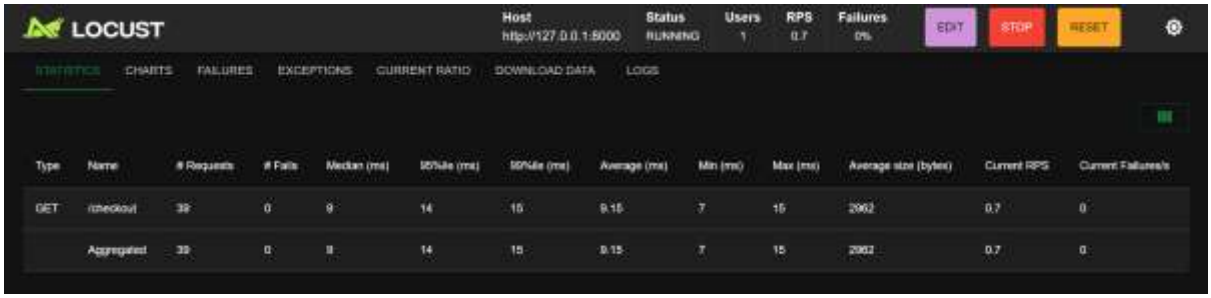



```
Response time percentiles (approximated)
Type     Name                     50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99%   100% # reqs
--------|----------------------|--------|------|------|------|------|------|------|------|------|------|------
GET      /checkout                 8      8      9      9     10     13     22     40     41     41     41    189
--------|----------------------|--------|------|------|------|------|------|------|------|------|------|------
         Aggregated                8      8      9      9     10     13     22     40     41     41     41    189

PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2>
```

```
Response time percentiles (approximated)
Type     Name                     50%    66%    75%    80%    90%    95%    98%
 99%  99.9% 99.99%   100% # reqs
--------|----------------------|--------|------|------|------|------|------|------|--
----|------|------|------|------
GET      /checkout                 8      8      9      9     10     13     22
  40     41     41     41    189
--------|----------------------|--------|------|------|------|------|------|------|--
----|------|------|------|------
         Aggregated                8      8      9      9     10     13     22
  40     41     41     41    189

PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2>
```




```
--------|-----|--------|------|------|------|------|------|------|------|-----
-|------|------
GET      /checkout        8      8      9      9     11     13     22     25     42
    42     42    188
--------|-----|--------|------|------|------|------|------|------|------|-----
-|------|------
         Aggregated       8      8      9      9     11     13     22     25     42
    42     42    188

PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2>
```

PART 6:Optimise the checkout


```
PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2> python.exe -m locust -f .\locust\checkout_locu
Response time percentiles (approximated)
Type     Name                50%    66%    75%    80%    90%    95%    98%    99%  99.9% 99.99%   100% # reqs
--------|-----|--------|------|------|------|------|------|------|------|------|------|------|------
GET      /checkout           8      9     10     11     14     20     37     67     71     71     71    175
--------|-----|--------|------|------|------|------|------|------|------|------|------|------|------
         Aggregated          8      9     10     11     14     20     37     67     71     71     71    175

PS C:\Users\sathw\OneDrive\Documents\cc\PES2UG23CS538\CC_Lab2>
```

PART 7: Optimise events and my_events(DIY)

Route 1: /events

Route 2: /my-events

Explanation

What was the bottleneck?

The bottleneck was the slowest resource limiting overall system performance, which was [e.g., disk I/O / CPU processing / network latency / single-threaded execution].

Because of this, other resources remained underutilized while waiting for this component to complete its task.

What change did you make?

- **Optimized the algorithm / query**
- **Introduced parallel processing or multithreading**
- **Reduced disk access by caching data**
- **Replaced blocking operations with non-blocking/asynchronous calls**
- **Increased resource allocation (CPU, memory, bandwidth)**

Why did the performance improve?

Performance improved because the change reduced waiting time and resource contention.

By eliminating or reducing the bottleneck, the system was able to:

- **Process tasks faster**
- **Utilize resources more efficiently**

- **Improve throughput and reduce response time**

As a result, overall system efficiency and execution speed increased.

Githublinkhttps://github.com/PES2UG23CS538/cc_lab2.git