CC LAB 2

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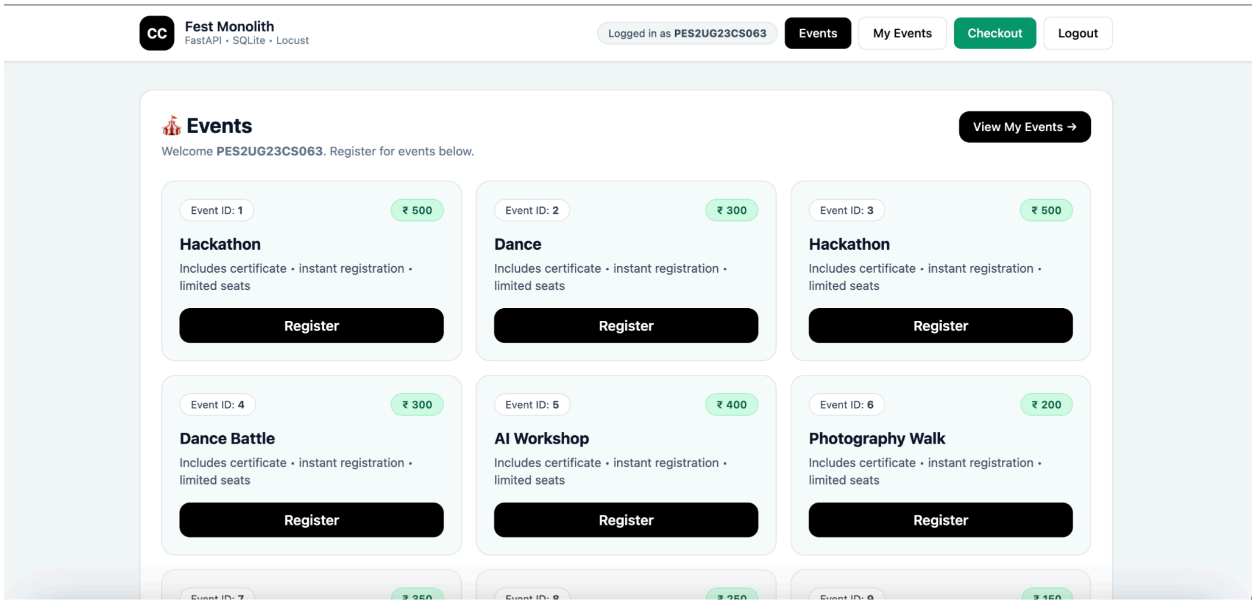
SECTION : A
SRN : PES2UG23CS063

ss1:



CC Fest Monolith
FastAPI • SQLite • Locust

Logged in as PES2UG23CS063 | Events | My Events | Checkout | Logout

🎪 Events

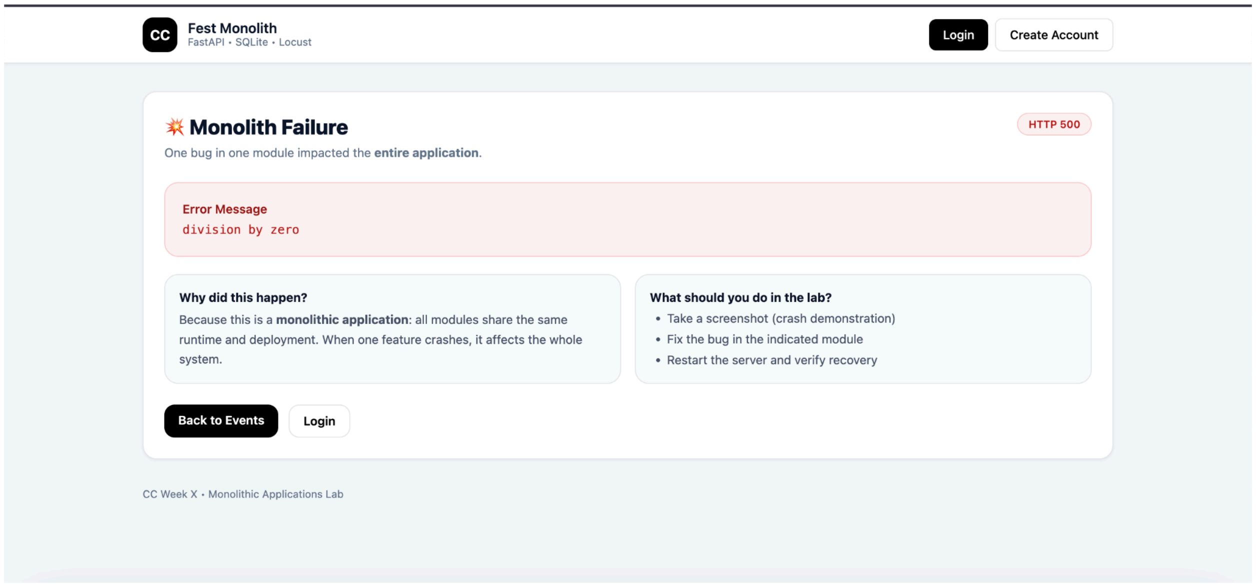
View My Events →

Welcome **PES2UG23CS063**. Register for events below.

Event ID	Price	Event	Details
1	₹ 500	Hackathon	Includes certificate • instant registration • limited seats
2	₹ 300	Dance	Includes certificate • instant registration • limited seats
3	₹ 500	Hackathon	Includes certificate • instant registration • limited seats
4	₹ 300	Dance Battle	Includes certificate • instant registration • limited seats
5	₹ 400	AI Workshop	Includes certificate • instant registration • limited seats
6	₹ 200	Photography Walk	Includes certificate • instant registration • limited seats

Register

ss2:



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Login | Create Account

💥 Monolith Failure

HTTP 500

One bug in one module impacted the **entire application**.

Error Message
```
division by zero
```

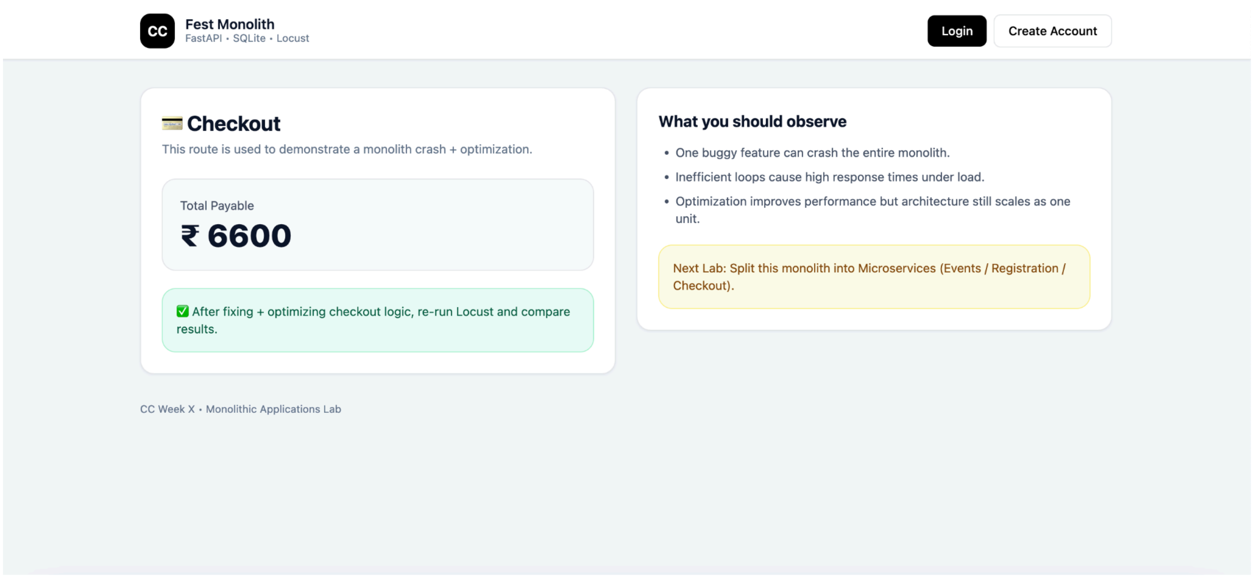
Why did this happen?
Because this is a **monolithic application**: all modules share the same runtime and deployment. When one feature crashes, it affects the whole system.

What should you do in the lab?
- Take a screenshot (crash demonstration)
- Fix the bug in the indicated module
- Restart the server and verify recovery

Back to Events | Login

CC Week X • Monolithic Applications Lab

ss3:



Fest Monolith
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Login | Create Account

💳 Checkout

This route is used to demonstrate a monolith crash + optimization.

Total Payable
₹ 6600

✅ After fixing + optimizing checkout logic, re-run Locust and compare results.

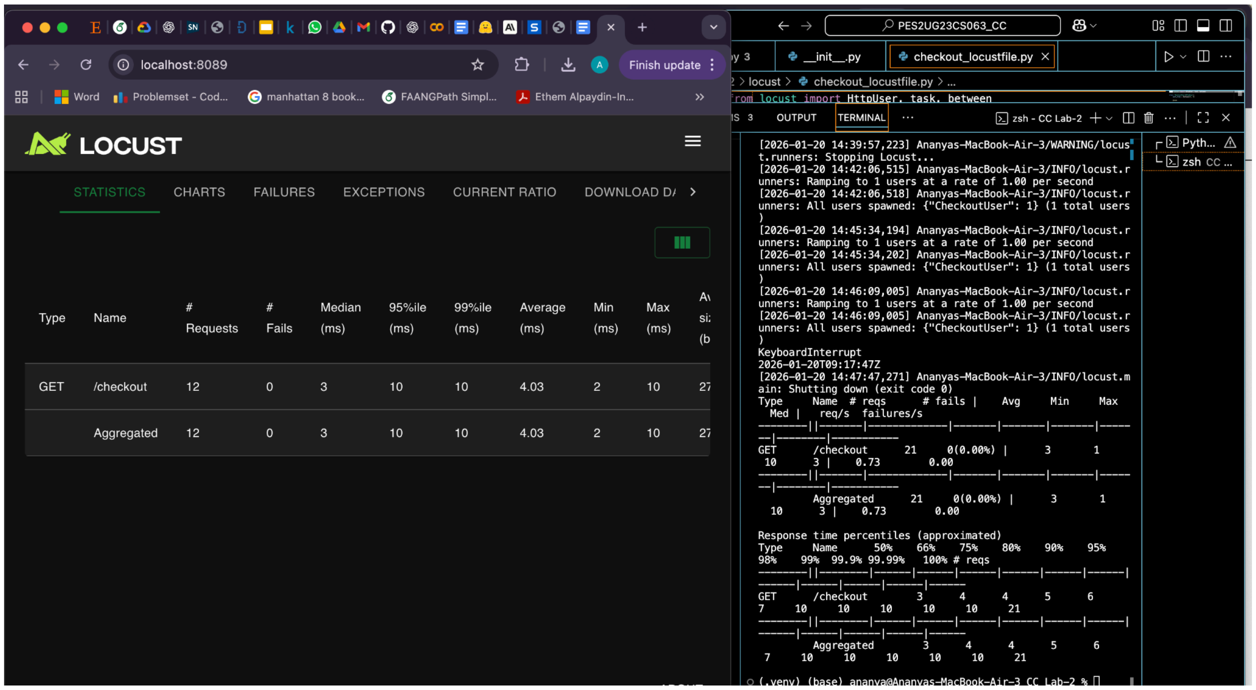
What you should observe

- One buggy feature can crash the entire monolith.
- Inefficient loops cause high response times under load.
- Optimization improves performance but architecture still scales as one unit.

Next Lab: Split this monolith into Microservices (Events / Registration / Checkout).

CC Week X • Monolithic Applications Lab

ss4:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	A\ si: (b
GET	/checkout	12	0	3	10	10	4.03	2	10	27
	Aggregated	12	0	3	10	10	4.03	2	10	27

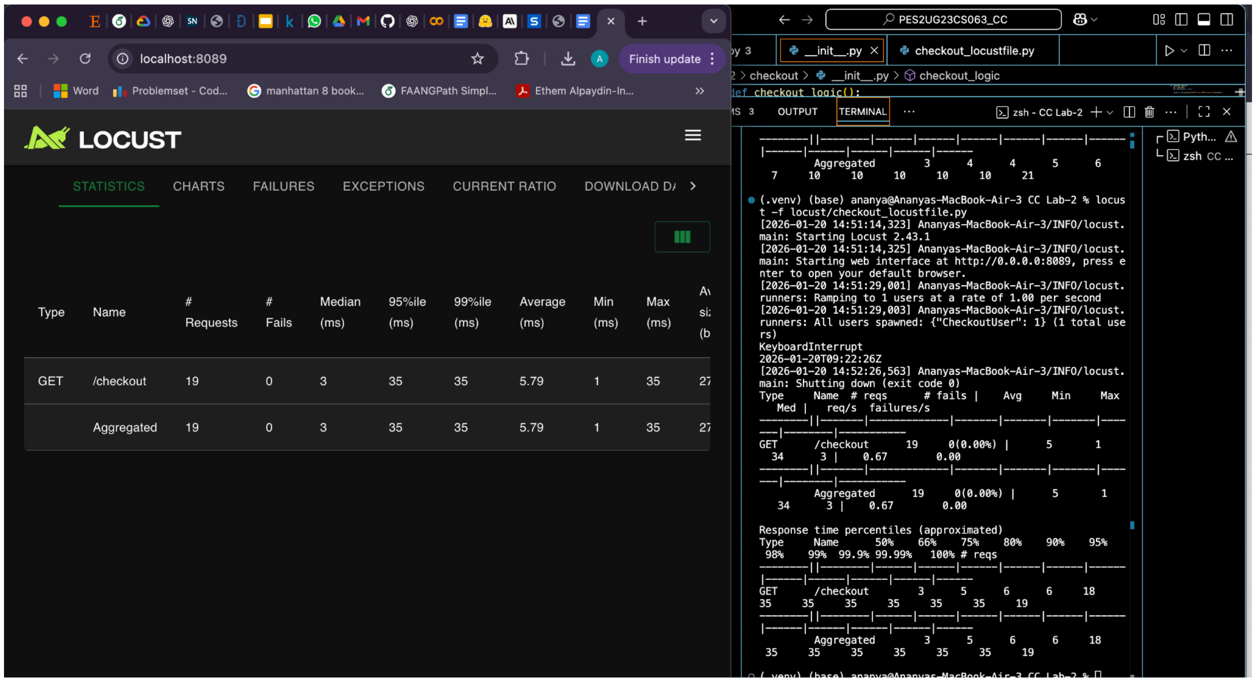
```
from locust import HttpUser, task, between
```

```
[2026-01-20 14:39:57,223] Ananyas-MacBook-Air-3/WARNING/locus
t.runners: Stopping Locust...
[2026-01-20 14:42:06,515] Ananyas-MacBook-Air-3/INFO/locust.r
unners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:42:06,518] Ananyas-MacBook-Air-3/INFO/locust.r
unners: All users spawned: {"CheckoutUser": 1} (1 total users
)
[2026-01-20 14:45:34,194] Ananyas-MacBook-Air-3/INFO/locust.r
unners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:45:34,202] Ananyas-MacBook-Air-3/INFO/locust.r
unners: All users spawned: {"CheckoutUser": 1} (1 total users
)
[2026-01-20 14:46:09,005] Ananyas-MacBook-Air-3/INFO/locust.r
unners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:46:09,005] Ananyas-MacBook-Air-3/INFO/locust.r
unners: All users spawned: {"CheckoutUser": 1} (1 total users
)
KeyboardInterrupt
2026-01-20T09:17:47Z
[2026-01-20 14:47:47,271] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max
  Med |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|-----
--|--------|-----------
GET      /checkout      21     0(0.00%) |      3       1
 10      3 |    0.73        0.00
--------||-------|-------------|-------|-------|-------|-----
--|--------|-----------
         Aggregated      21     0(0.00%) |      3       1
  10      3 |    0.73        0.00

Response time percentiles (approximated)
Type     Name       50%    66%    75%    80%    90%    95%
98%    99%  99.9% 99.99%   100% # reqs
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
GET      /checkout        3      4      4      5      6
7     10     10     10     10     10     21
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
         Aggregated        3      4      4      5      6
 7     10     10     10     10     10     21

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 %
```

ss5:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Av si (b
GET	/checkout	19	0	3	35	35	5.79	1	35	27
	Aggregated	19	0	3	35	35	5.79	1	35	27

```
def checkout_logic():
```

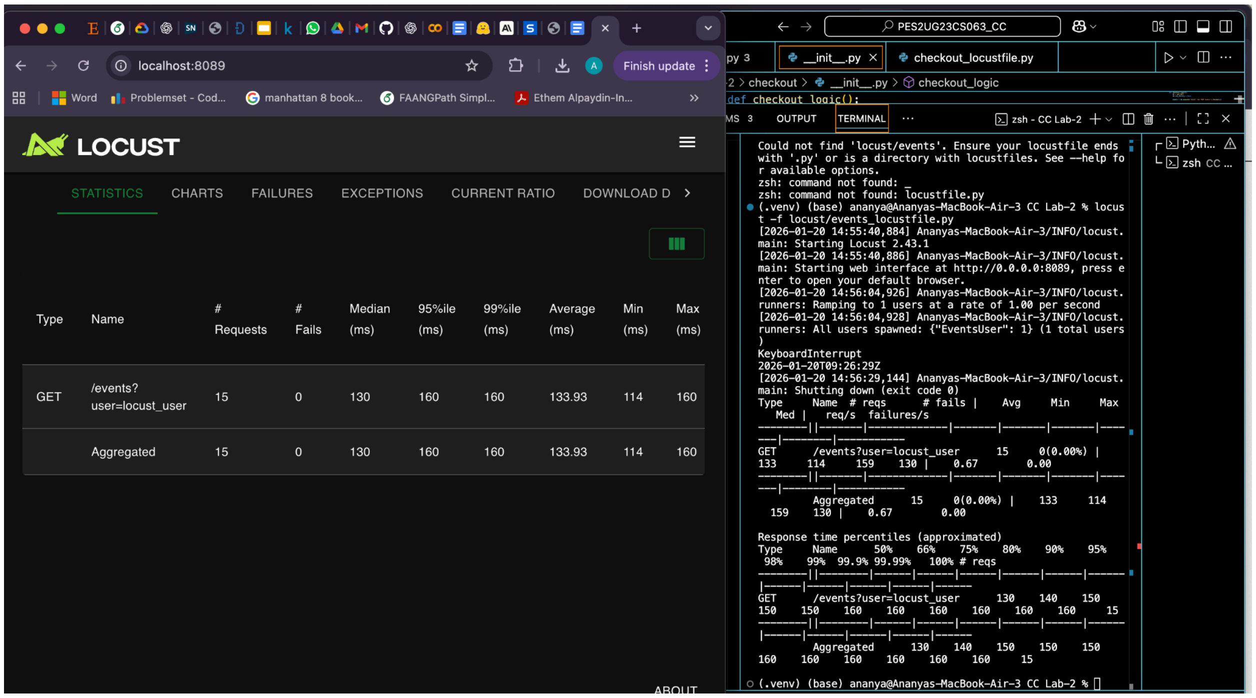
```
---------||---------|-------|-------|-------|-------|-------|-------
|-------|-------|-------|-------|-------
         Aggregated        3       4       4       5       6
  7     10      10      10      10      10      21

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % locus
t -f locust/checkout_locustfile.py
[2026-01-20 14:51:14,323] Ananyas-MacBook-Air-3/INFO/locust.
main: Starting Locust 2.43.1
[2026-01-20 14:51:14,325] Ananyas-MacBook-Air-3/INFO/locust.
main: Starting web interface at http://0.0.0.0:8089, press e
nter to open your default browser.
[2026-01-20 14:51:29,001] Ananyas-MacBook-Air-3/INFO/locust.
runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:51:29,003] Ananyas-MacBook-Air-3/INFO/locust.
runners: All users spawned: {"CheckoutUser": 1} (1 total use
rs)
KeyboardInterrupt
2026-01-20T09:22:26Z
[2026-01-20 14:52:26,563] Ananyas-MacBook-Air-3/INFO/locust.
main: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max
   Med |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|----
---|--------|-----------
GET      /checkout      19     0(0.00%) |      5       1
  34      3 |    0.67        0.00
--------||-------|-------------|-------|-------|-------|----
---|--------|-----------
         Aggregated      19     0(0.00%) |      5       1
   34      3 |    0.67        0.00

Response time percentiles (approximated)
Type     Name      50%    66%    75%    80%    90%    95%
 98%    99%  99.9% 99.99%   100% # reqs
--------||--------|------|------|------|------|------|------
|------|------|------|------|------
GET      /checkout        3      5      6      6     18
35     35     35     35     35     35     19
--------||--------|------|------|------|------|------|------
|------|------|------|------|------
         Aggregated        3      5      6      6     18
 35     35     35     35     35     35     19

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 %
```

Ss6 before optimisation:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)
GET	/events?user=locust_user	15	0	130	160	160	133.93	114	160
	Aggregated	15	0	130	160	160	133.93	114	160

```
def checkout_logic():
```

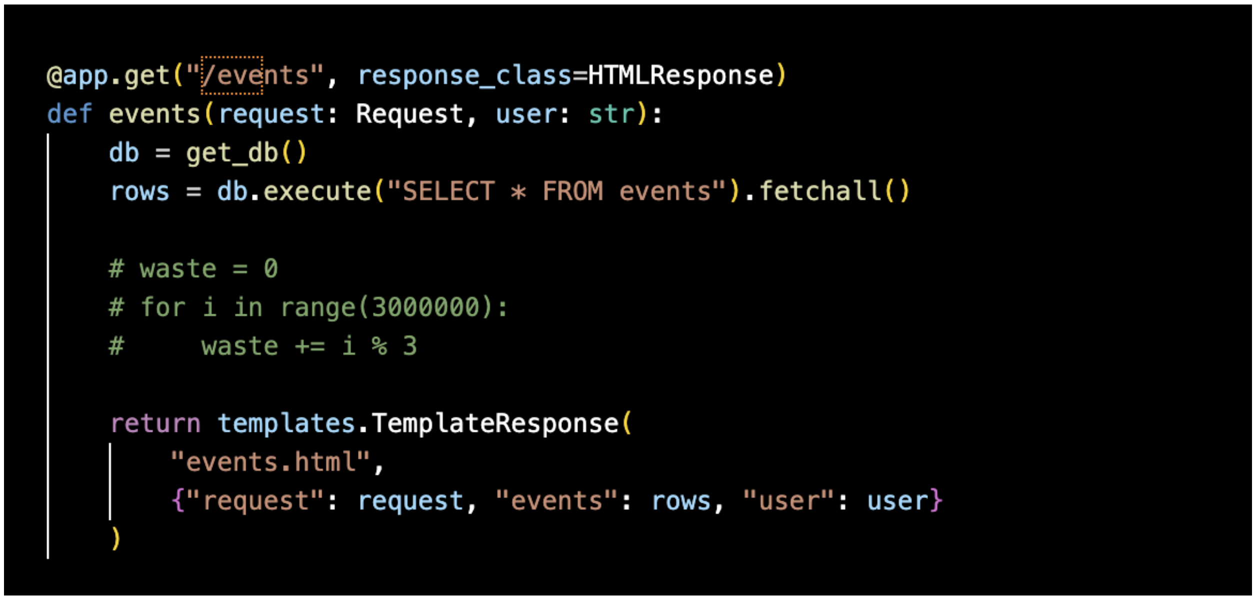
```
Could not find 'locust/events'. Ensure your locustfile ends
with '.py' or is a directory with locustfiles. See --help fo
r available options.
zsh: command not found: _
zsh: command not found: locustfile.py
(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % locus
t -f locust/events_locustfile.py
[2026-01-20 14:55:40,884] Ananyas-MacBook-Air-3/INFO/locust.
main: Starting Locust 2.43.1
[2026-01-20 14:55:40,886] Ananyas-MacBook-Air-3/INFO/locust.
main: Starting web interface at http://0.0.0.0:8089, press e
nter to open your default browser.
[2026-01-20 14:56:04,926] Ananyas-MacBook-Air-3/INFO/locust.
runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 14:56:04,928] Ananyas-MacBook-Air-3/INFO/locust.
runners: All users spawned: {"EventsUser": 1} (1 total users
)
KeyboardInterrupt
2026-01-20T09:26:29Z
[2026-01-20 14:56:29,144] Ananyas-MacBook-Air-3/INFO/locust.
main: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max
   Med |   req/s  failures/s
--------||-------|-------------|-------|-------|-------|----
---|--------|-----------
GET      /events?user=locust_user      15     0(0.00%) |
133     114     159    130 |    0.67        0.00
--------||-------|-------------|-------|-------|-------|----
---|--------|-----------
         Aggregated      15     0(0.00%) |    133     114
  159    130 |    0.67        0.00

Response time percentiles (approximated)
Type     Name      50%    66%    75%    80%    90%    95%
 98%    99%  99.9% 99.99%   100% # reqs
--------||--------|------|------|------|------|------|------
|------|------|------|------|------
GET      /events?user=locust_user      130    140    150
150    150    160    160    160    160    160    160     15
--------||--------|------|------|------|------|------|------
|------|------|------|------|------
         Aggregated      130    140    150    150    150
160    160    160    160    160    160     15

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 %
```

- The /events route contained an unnecessary computation loop (for i in range(3000000)) that did not contribute to the actual functionality of the endpoint. This loop performed redundant arithmetic operations, causing avoidable CPU usage and increased response time for every request.

- The redundant loop was removed since it did not affect the business logic of the route.
- Eliminating the unnecessary computation reduced processing overhead per request, leading to improved response time and better performance under load.

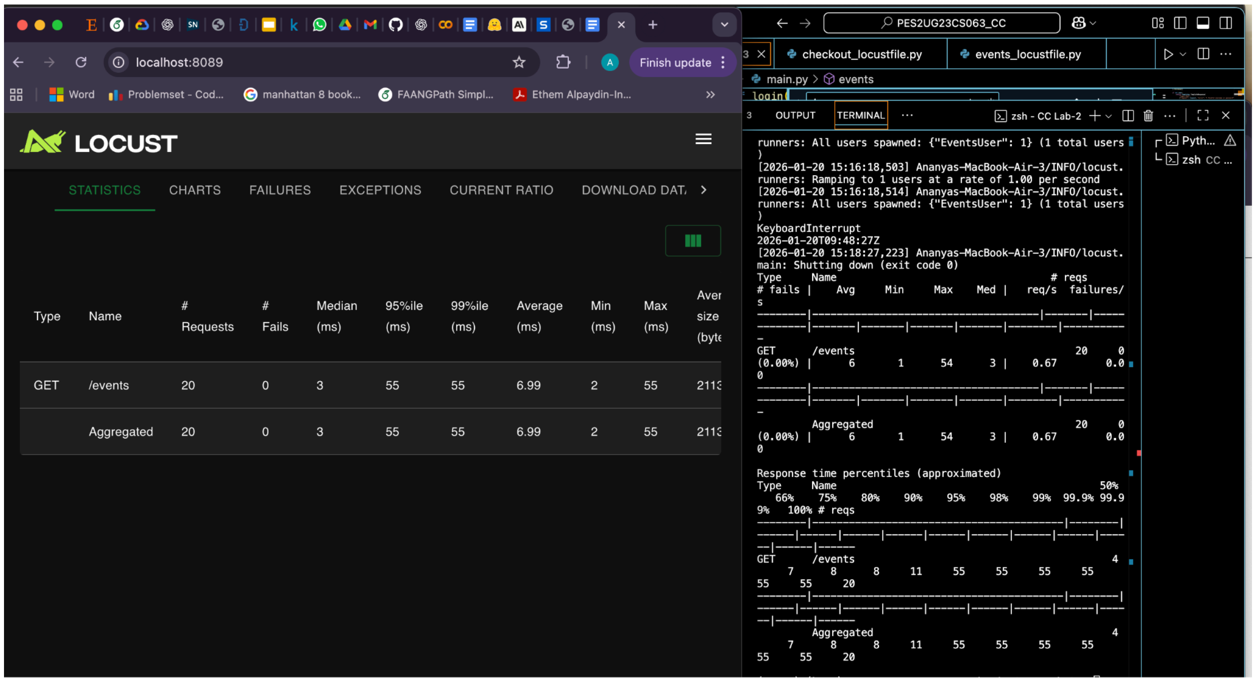


```python
@app.get("/events", response_class=HTMLResponse)
def events(request: Request, user: str):
    db = get_db()
    rows = db.execute("SELECT * FROM events").fetchall()

    # waste = 0
    # for i in range(3000000):
    #     waste += i % 3

    return templates.TemplateResponse(
        "events.html",
        {"request": request, "events": rows, "user": user}
    )
```

Ss6 after optimisation:

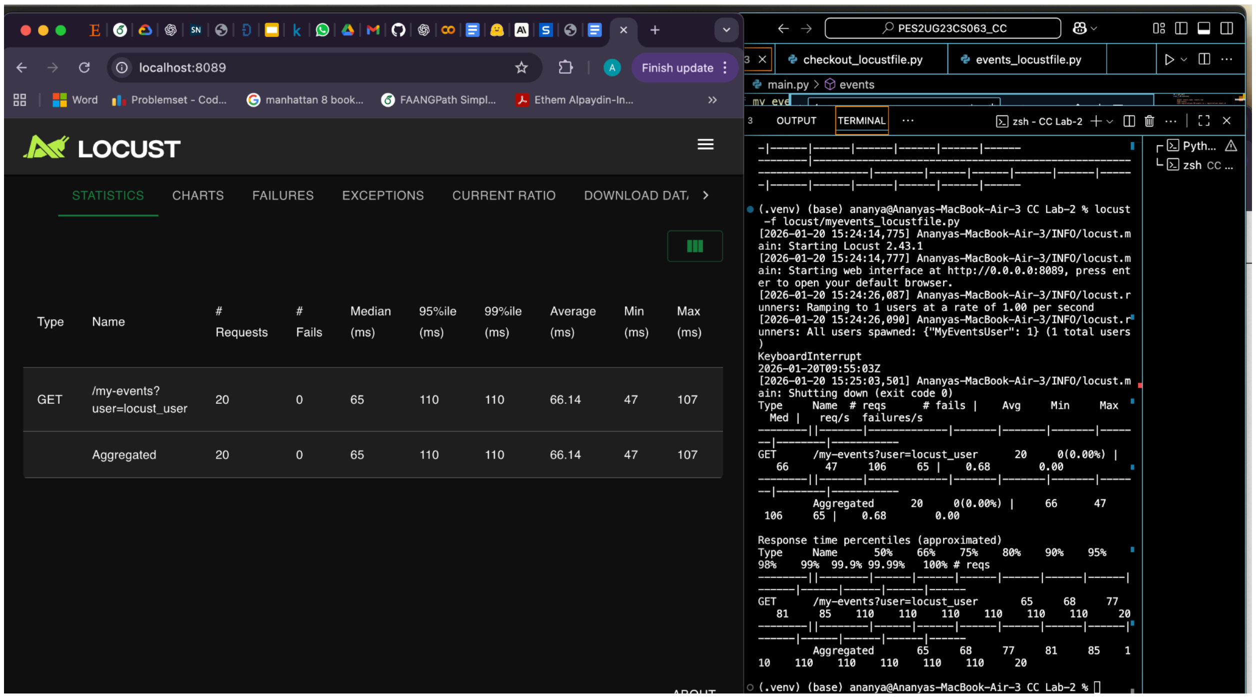


Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Aver size (byte
GET	/events	20	0	3	55	55	6.99	2	55	2113
	Aggregated	20	0	3	55	55	6.99	2	55	2113

```
runners: All users spawned: {"EventsUser": 1} (1 total users
)
[2026-01-20 15:16:18,503] Ananyas-MacBook-Air-3/INFO/locust.
runners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 15:16:18,514] Ananyas-MacBook-Air-3/INFO/locust.
runners: All users spawned: {"EventsUser": 1} (1 total users
)
KeyboardInterrupt
2026-01-20T09:48:27Z
[2026-01-20 15:18:27,223] Ananyas-MacBook-Air-3/INFO/locust.
main: Shutting down (exit code 0)
Type     Name                                  # reqs
# fails |    Avg     Min     Max     Med |   req/s  failures/
s
--------|-------------------------------------|-------|-----
--------|-------|-------|-------|-------|--------|----------
-
GET      /events                                   20      0
(0.00%) |      6       1      54       3 |    0.67       0.0
0
--------|-------------------------------------|-------|-----
--------|-------|-------|-------|-------|--------|----------
-
         Aggregated                                20      0
(0.00%) |      6       1      54       3 |    0.67       0.0
0

Response time percentiles (approximated)
Type     Name                                          50%
   66%    75%    80%    90%    95%    98%    99%  99.9% 99.9
9%   100% # reqs
--------|-----------------------------------------|--------|
-------|------|------|------|------|------|------|------|----
--|------|------
GET      /events                                         4
     7      8      8     11     55     55     55     55
55     55     20
--------|-----------------------------------------|--------|
-------|------|------|------|------|------|------|------|----
--|------|------
         Aggregated                                      4
     7      8      8     11     55     55     55     55
55     55     20
```

Ss7 before optimisation:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)
GET	/my-events?user=locust_user	20	0	65	110	110	66.14	47	107
	Aggregated	20	0	65	110	110	66.14	47	107

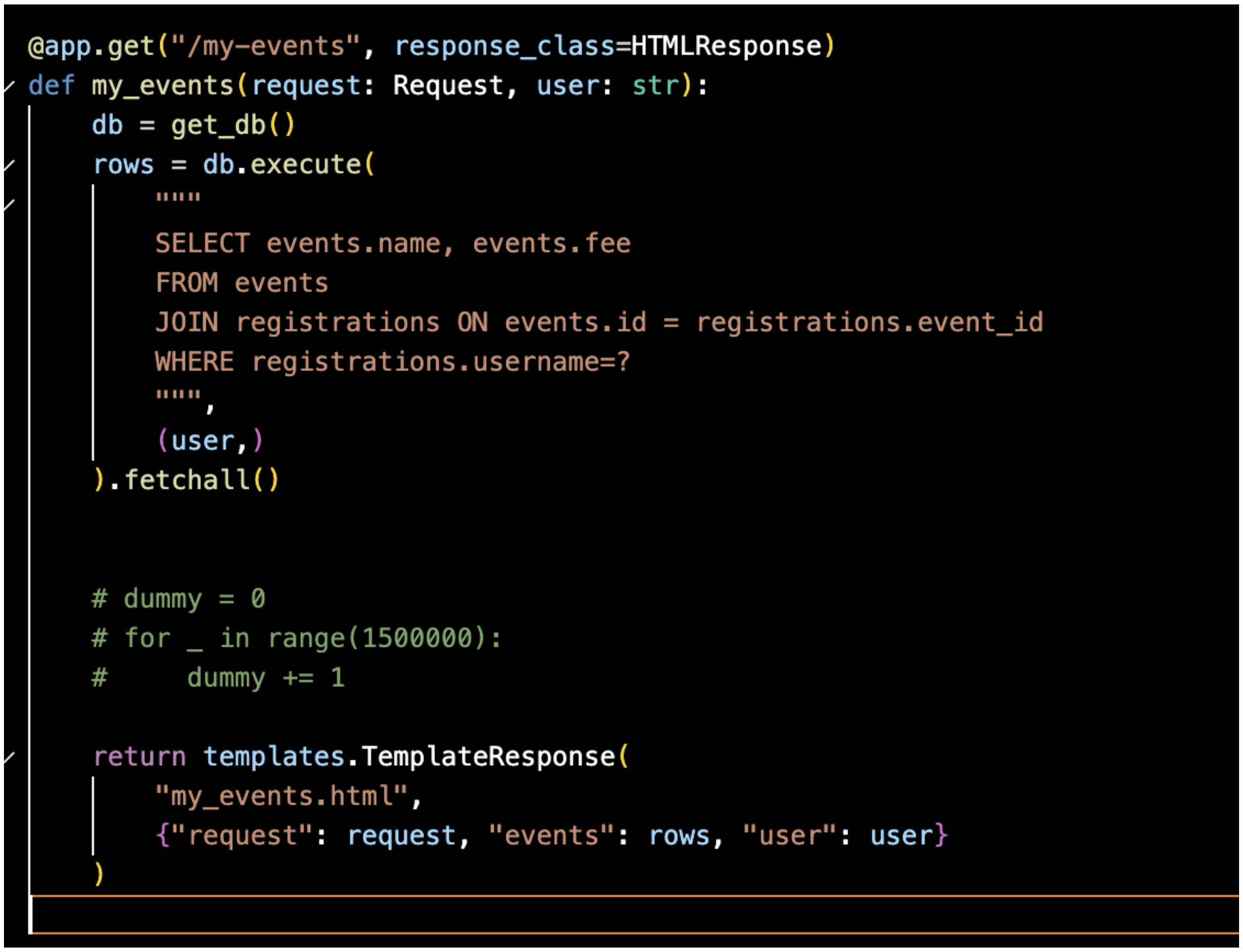
```
-|-------|-------|-------|-------|-------|-------
--------|-----------------------------------------------
-----------------|--------|-------|-------|-------|-------|-----
-|-------|-------|-------|-------|-------|-------

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % locust
 -f locust/myevents_locustfile.py
[2026-01-20 15:24:14,775] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Starting Locust 2.43.1
[2026-01-20 15:24:14,777] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Starting web interface at http://0.0.0.0:8089, press ent
er to open your default browser.
[2026-01-20 15:24:26,087] Ananyas-MacBook-Air-3/INFO/locust.r
unners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 15:24:26,090] Ananyas-MacBook-Air-3/INFO/locust.r
unners: All users spawned: {"MyEventsUser": 1} (1 total users
)
KeyboardInterrupt
2026-01-20T09:55:03Z
[2026-01-20 15:25:03,501] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max
  Med |   req/s  failures/s
--------||-------|------------|-------|-------|-------|-----
--|--------|-----------
GET      /my-events?user=locust_user      20     0(0.00%) |
   66      47     106     65 |    0.68        0.00
--------||-------|------------|-------|-------|-------|-----
--|--------|-----------
         Aggregated      20     0(0.00%) |     66      47
 106     65 |    0.68        0.00

Response time percentiles (approximated)
Type     Name       50%    66%    75%    80%    90%    95%
98%    99%  99.9% 99.99%   100% # reqs
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
GET      /my-events?user=locust_user       65     68     77
   81     85    110    110    110    110    110    110     20
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
         Aggregated        65     68     77     81     85    1
10    110    110    110    110    110     20

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % 
```

- The /my-events route contained an unnecessary loop that performed redundant iterations without contributing to the response data. This caused additional CPU overhead for every request.
- The redundant computation block was removed while keeping the database query and response logic unchanged.
- Removing unnecessary processing reduced execution time per request, improving response time and overall performance under load.

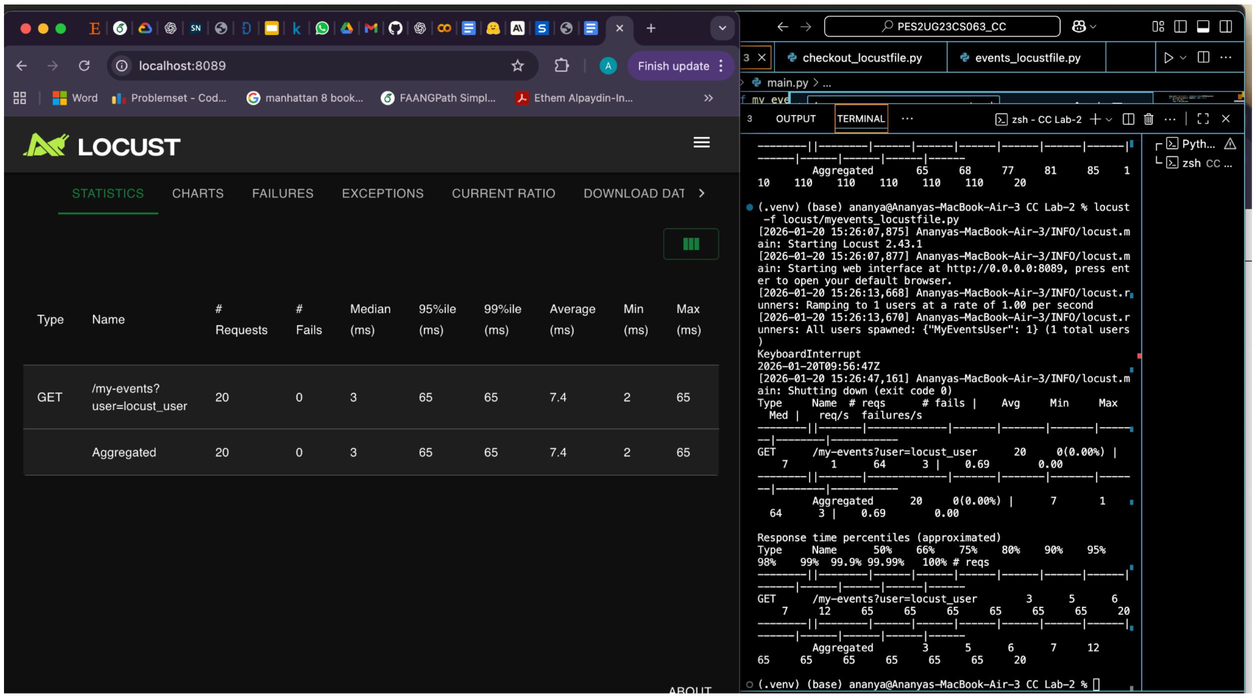


```python
@app.get("/my-events", response_class=HTMLResponse)
def my_events(request: Request, user: str):
    db = get_db()
    rows = db.execute(
        """
        SELECT events.name, events.fee
        FROM events
        JOIN registrations ON events.id = registrations.event_id
        WHERE registrations.username=?
        """,
        (user,)
    ).fetchall()


    # dummy = 0
    # for _ in range(1500000):
    #     dummy += 1

    return templates.TemplateResponse(
        "my_events.html",
        {"request": request, "events": rows, "user": user}
    )
```

Ss7 after optimisation:



Type	Name	# Requests	# Fails	Median (ms)	95%ile (ms)	99%ile (ms)	Average (ms)	Min (ms)	Max (ms)
GET	/my-events?user=locust_user	20	0	3	65	65	7.4	2	65
	Aggregated	20	0	3	65	65	7.4	2	65

```
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
         Aggregated       65     68     77     81     85     1
10    110    110    110    110    110    20

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % locust
 -f locust/myevents_locustfile.py
[2026-01-20 15:26:07,875] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Starting Locust 2.43.1
[2026-01-20 15:26:07,877] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Starting web interface at http://0.0.0.0:8089, press ent
er to open your default browser.
[2026-01-20 15:26:13,668] Ananyas-MacBook-Air-3/INFO/locust.r
unners: Ramping to 1 users at a rate of 1.00 per second
[2026-01-20 15:26:13,670] Ananyas-MacBook-Air-3/INFO/locust.r
unners: All users spawned: {"MyEventsUser": 1} (1 total users
)
KeyboardInterrupt
2026-01-20T09:56:47Z
[2026-01-20 15:26:47,161] Ananyas-MacBook-Air-3/INFO/locust.m
ain: Shutting down (exit code 0)
Type     Name  # reqs      # fails |    Avg     Min     Max
  Med |   req/s  failures/s
--------||-------|------------|-------|-------|-------|-----
--|---------|-----------
GET      /my-events?user=locust_user      20     0(0.00%) |
    7       1      64      3 |    0.69       0.00
--------||-------|------------|-------|-------|-------|-----
--|---------|-----------
         Aggregated      20     0(0.00%) |      7       1
  64      3 |   0.69       0.00

Response time percentiles (approximated)
Type     Name      50%    66%    75%    80%    90%    95%
98%    99%  99.9% 99.99%   100% # reqs
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
GET      /my-events?user=locust_user       3      5      6
    7     12     65     65     65     65     65     65     20
--------||--------|------|------|------|------|------|------|
------|------|------|------|------
         Aggregated        3      5      6      7     12
65     65     65     65     65     65     20

(.venv) (base) ananya@Ananyas-MacBook-Air-3 CC Lab-2 % 
```