

## Test 1 — Security Test (401)

```
milk — zsh — 113x24
Last login: Tue Feb  3 20:33:16 on ttys073
(base) milk@sojirat-2 ~ % curl -X POST http://localhost:8000/transfers ^

-H "Content-Type: application/json" ^

[ -d "{\"from_acct\":\"ACC1001\",\"to_acct\":\"ACC2001\",\"amount\":10,\"mode\":\"sync\"}" ]
{"detail":"Not authenticated"}curl: (3) URL rejected: Bad hostname
zsh: command not found: -H
zsh: command not found: -d
(base) milk@sojirat-2 ~ %
```

## Test 2 — Validation Test (422)

```
milk — zsh — 113x24
[(base) milk@sojirat-2 ~ % TOKEN="eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxIiwiaWF0IjoxNzU1LCJleHAiOi0jE3NzAxMjU1NTUsInVzZXJuYXV1Ijoic3R1ZGVudCJ9.6lGQJCvpPG4RY-19AV8MJl4MG69rH4PK6DvB1qWQa4A"
curl -X POST http://localhost:8000/transfers ^

-H "Authorization: Bearer %TOKEN%" ^

-H "Content-Type: application/json" ^

-d "{\"from_acct\":\"ACC1001\",\"to_acct\":\"ACC2001\",\"amount\":-500,\"mode\":\"sync\"}"

{"detail":"Not authenticated"}curl: (3) URL rejected: Bad hostname
zsh: command not found: -H
zsh: command not found: -H
zsh: command not found: -d
(base) milk@sojirat-2 ~ %
```

### Test 3 — Idempotency Test (No double debit)

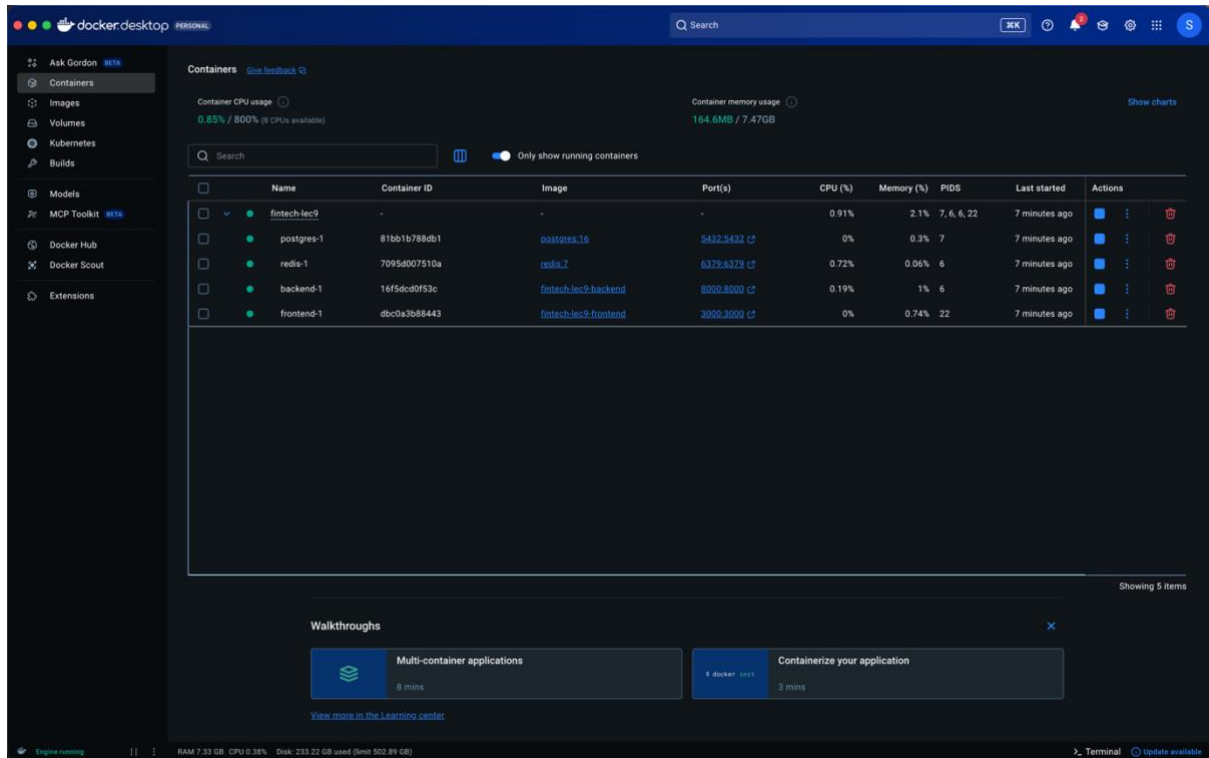
```
milk — zsh — 132x35
(base) milk@sojirat-2 ~ % curl 'http://localhost:8000/accounts/ACC1001/balance' \
-H 'Authorization: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxIiwiaWF0IjoxNzcwMTI1OTk5LCJleHAiOjE3NzAxMjc3OTksInVzZXJ0IjoiYm9keSIsInZhbGciOiJSUzI1NiIsIm51bnQ6IjE0IiwiaXNjaWkiOiJ1b3VudCJ9.mLf1j3VTDeL_nLh_LU7EZscprcRueSWHj5WTz-Z42PA' \
-H 'Connection: keep-alive' \
-H 'Content-Type: application/json' \
-H 'Origin: http://localhost:3000' \
-H 'Referer: http://localhost:3000/' \
{"account_id":"ACC1001","balance":855.0}
(base) milk@sojirat-2 ~ %
```

### Test 4 — Rate Limit Test (429)

```
milk — zsh — 132x35
(base) milk@sojirat-2 ~ % curl 'http://localhost:8000/transfers' \
-H 'Authorization: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxIiwiaWF0IjoxNzcwMTI1OTk5LCJleHAiOjE3NzAxMjc3OTksInVzZXJ0IjoiYm9keSIsInZhbGciOiJSUzI1NiIsIm51bnQ6IjE0IiwiaXNjaWkiOiJ1b3VudCJ9.mLf1j3VTDeL_nLh_LU7EZscprcRueSWHj5WTz-Z42PA' \
-H 'Content-Type: application/json' \
-H 'Idempotency-Key: a13d1029-f954-4722-9824-a472f859df90' \
-H 'Origin: http://localhost:3000' \
[ --data-raw '{"from_acct":"ACC1001","to_acct":"ACC2001","amount":10,"mode":"sync"}' ]
{"detail":"Too Many Requests","limit_per_min":10,"route":"transfer"}
(base) milk@sojirat-2 ~ %
```

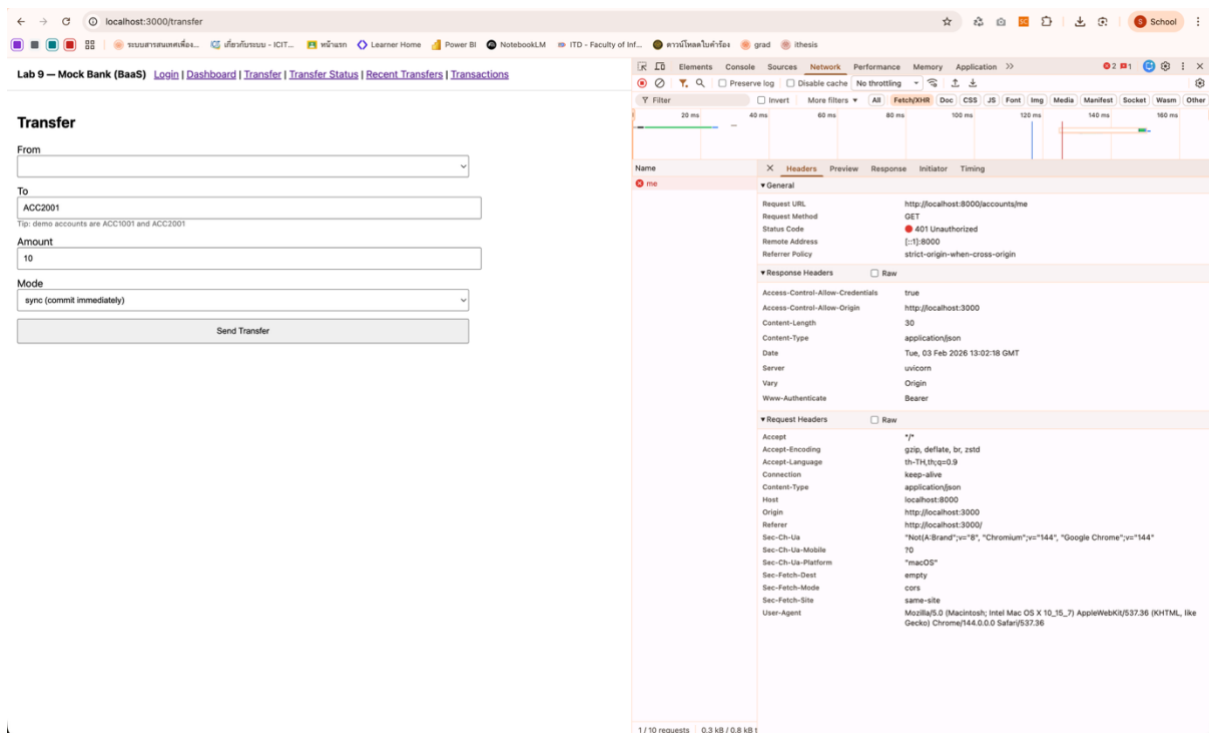
## 1. **\*\*Docker Compose Running\*\***

- [x] `docker compose ps` showing 4 services up



## 2. **\*\*JWT Authentication\*\***

- [x] 401 error without token



- [x] 200 success with Bearer token

The screenshot displays a web browser at `localhost:3000/login`. The page title is "Lab 9 - Mock Bank (BaaS)". It features a "Login" section with a message "Demo credentials are pre-seeded." and a form with fields for "Username" (containing "student") and "Password" (masked with dots). A "Login" button is present. Below the form, a message states "Login success. Go to Dashboard." The right side of the image shows the Chrome DevTools Network tab. A request named "login" is selected, showing a 200 OK status. The "Response Headers" section is expanded, displaying various CORS-related headers like "Access-Control-Allow-Origin" and "Access-Control-Allow-Credentials". The "Request Headers" section is also expanded, showing headers like "Accept", "Content-Type", and "User-Agent".

### 3. **\*\*Atomic Money Movement\*\***

- [x] Balances updated correctly (debit + credit)

The screenshot shows the "Dashboard" page of the "Lab 9 - Mock Bank (BaaS)" application. The page includes a "Logout" button, an "Account" dropdown menu showing "ACC1001 (active)", and a "Balance" section displaying "ACC1001: 855.00" with a note "Auto-refresh every 4 seconds (polling)". Below this is an "Account Controls" section with a "Current status: active" and three buttons: "Freeze Account", "Activate Account", and "Close Account". The right side of the image shows the Chrome DevTools Network tab. A request named "balance" is selected, showing a 200 OK status. The "Response Headers" section is expanded, displaying headers like "Access-Control-Allow-Origin" and "Access-Control-Allow-Credentials". The "Request Headers" section is also expanded, showing headers like "Accept", "Content-Type", and "User-Agent".

## - [x] Double-entry ledger with DEBIT and CREDIT entries

The screenshot shows a web application interface for a mock bank (BaaS) and a network inspector. The web application is running on localhost:3000/transactions. It displays a table of transactions for account ACC2001.

Time	Direction	Amount	Transfer
2/3/2026, 12:55:02 PM	DEBIT	20.00	c087ad25-2d7f-4d78-8ceb-0a1955c1a631
2/3/2026, 12:54:57 PM	DEBIT	20.00	f4d01a83-f659-496c-8466-5995f59e11dd
2/3/2026, 12:54:39 PM	CREDIT	10.00	272354b2-c2b8-447f-8701-a4b24a351ccf

The network inspector shows a POST request to localhost:3000/transactions. The request body is a JSON array of three transactions, each with an entry\_id, direction, amount, ref\_transfer\_id, and created\_at.

```
[{"entry_id": 1, "direction": "DEBIT", "amount": 20.0, "ref_transfer_id": "c087ad25-2d7f-4d78-8ceb-0a1955c1a631", "created_at": "2026-02-03T12:55:02.563899"}, {"entry_id": 2, "direction": "DEBIT", "amount": 20.0, "ref_transfer_id": "f4d01a83-f659-496c-8466-5995f59e11dd", "created_at": "2026-02-03T12:54:57.822887"}, {"entry_id": 3, "direction": "CREDIT", "amount": 10.0, "ref_transfer_id": "272354b2-c2b8-447f-8701-a4b24a351ccf", "created_at": "2026-02-03T12:54:39.754239"}]
```

## 4. \*\*Validation\*\*

### - [x] 422 for negative amount

The screenshot shows a web application interface for a mock bank (BaaS) and a network inspector. The web application is running on localhost:3000/transfer. It displays a form for transferring funds from account ACC1001 to account ACC3002. The amount is set to -10, which is invalid. The mode is set to sync (commit immediately). The Send Transfer button is disabled. The error message is "Error: [object Object]".

The network inspector shows a POST request to localhost:3000/transfers. The request body is a JSON object with from, to, and amount fields. The status code is 422 Unprocessable Entity.

```
{ "from": "ACC1001", "to": "ACC3002", "amount": -10 }
```

- [x] 400 for insufficient funds

The screenshot shows a web browser at `localhost:3000/transfer` with the following form fields:

- From: ACC1001
- To: ACC2001
- Tip: demo accounts are ACC1001 and ACC2001
- Amount: 100000
- Mode: sync (commit immediately)
- Send Transfer button

The error message displayed is: "Error: Insufficient funds".

The network tab shows a single request to `localhost:8000/transfers` with a status of 400. The response details are:

```
{
  "detail": "Insufficient funds"
}
```

- [x] 400 for self-transfer

The screenshot shows the same web application with the following form fields:

- From: ACC2001
- To: ACC2001
- Tip: demo accounts are ACC1001 and ACC2001
- Amount: 10
- Mode: sync (commit immediately)
- Send Transfer button

The error message displayed is: "Error: Cannot transfer to the same account".

The network tab shows a single request to `http://localhost:8000/transfers` with a status of 400. The response details are:

```
{
  "detail": "Cannot transfer to the same account"
}
```

- [x] 403 for frozen account

[illegible]

5. **\*\*Idempotency\*\***

- [x] Same `transfer_id` returned for duplicate requests

[illegible]

- [x] Balance only deducted once (not twice)

```
PORTS  DEBUG CONSOLE  PROBLEMS  OUTPUT  TERMINAL
(base) mil@sojirat-2 fintech-lec9 % curl -X POST http://localhost:8000/transfers \
-H "Authorization: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIiIiwiaWF0IjoxNzQwMTIzNzU1LjIleHAiOiJlE3NzXWJlU1NTUsInVzZCJyYmIiOiJlc3R1ZGVudCJ9.6lGQJCvpPG4RY-19AVBMJL4MG69rH4PK6DvB1qWQe4A" \
-H "Content-Type: application/json" \
-H "Idempotency-Key: bcf60064-3d01-436e-8b16-f7dc8d58959c" \
-d '{"from_acct": "ACC3886", "to_acct": "ACC3887", "amount": 100, "mode": "sync"}'
{"status": "success", "transfer_id": "32dda0be-b6f9-4fcc-95a9-959f18ceb7a4"}%
cursh>
cursh>
```

## 6. **\*\*Rate Limiting\*\***

- [x] 429 error after exceeding request limit

localhost:3000/transfer

Lab 9 – Mock Bank (BaaS) [Logout](#) | [Dashboard](#) | [Transfer](#) | [Transfer Status](#) | [Recent Transfers](#) | [Transactions](#)

### Transfer

From:

To:

Tip: demo accounts are ACC1001 and ACC2001

Amount:

Mode:

Error: Failed to fetch

10 5

15 / 30 requests 3.4 kB / 3.4 kB

Name	Filter	Headers	Payload	Preview	Response	Initiator	Timing
transfers		General					
transfers		Request URL			http://localhost:8000/transfers		
transfers		Request Method			POST		
transfers		Status Code			429 Too Many Requests		
transfers		Referrer Policy			strict-origin-when-cross-origin		
transfers		Response Headers					
transfers		Content-Length			68		
transfers		Content-Type			application/json		
transfers		Date			Tue, 03 Feb 2026 13:07:05 GMT		
transfers		Server			uvicorn		
transfers		Request Headers					
transfers		Accept			*/*		
transfers		Accept-Encoding			gzip, deflate, br, zstd		
transfers		Accept-Language			th-TH,th;q=0.9		
transfers		Authorization			Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIiIiwiaWF0IjoxNzQwMTIzNzU1LjIleHAiOiJlE3NzXWJlU1NTUsInVzZCJyYmIiOiJlc3R1ZGVudCJ9.6lGQJCvpPG4RY-19AVBMJL4MG69rH4PK6DvB1qWQe4A		
transfers		Connection			keep-alive		
transfers		Content-Length			69		
transfers		Content-Type			application/json		
transfers		Host			localhost:8000		
transfers		Idempotency-Key			370f3a74-7243-4ea0-963d-85edfc91634f		
transfers		Origin			http://localhost:3000		
transfers		Referer			http://localhost:3000/		
transfers		Sec-Ch-Ua			"Not(A.Brand";v="8", "Chromium";v="144", "Google Chrome";v="144"		
transfers		Sec-Ch-Ua-Mobile			10		
transfers		Sec-Ch-Ua-Platform			"macOS"		
transfers		Sec-Fetch-Dest			empty		
transfers		Sec-Fetch-Mode			cors		
transfers		Sec-Fetch-Site			same-site		
transfers		User-Agent			Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/144.0.0.0 Safari/537.36		