Get comfortable with the repo

Our starter repo is this - https://github.com/100xdevs-cohort-2/week-17-final-code

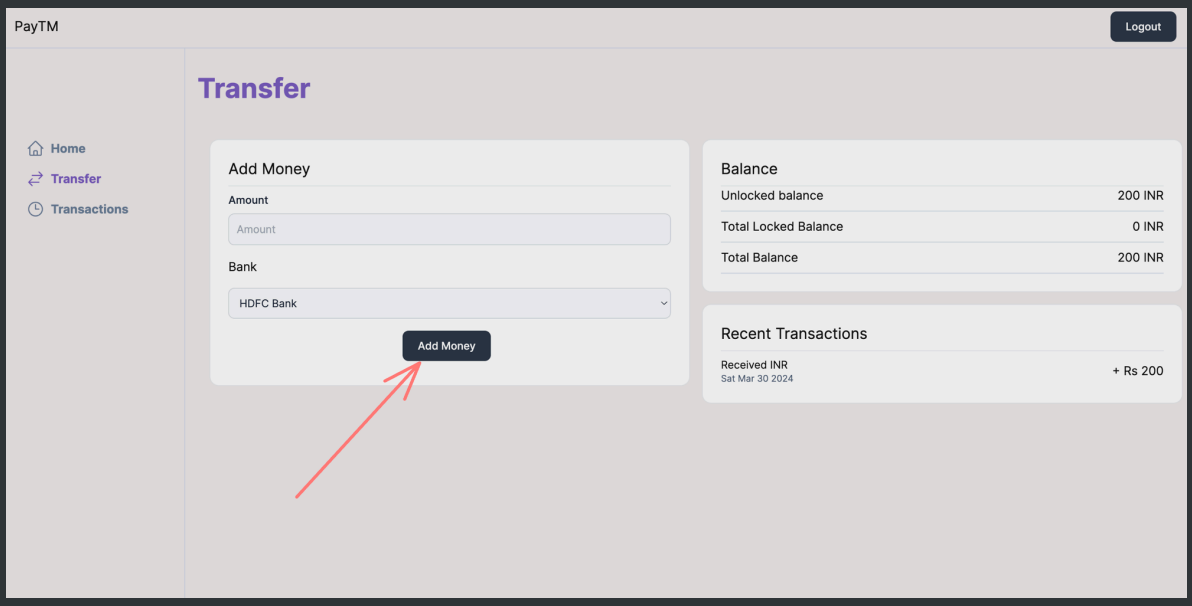
The repo has 3 issues, we'll be trying to fix them all today - https://github.com/100xdevs-cohort-2/week-17-final-code/issues

Finish onramps

Right now, we're able to see the `onramp` transactions that have been `seeded`.

We don't see any new ones though

Clicking on this button should initiate a new entry in the `onRampTransactions` table, that is eventually fulfilled by the `bank-webhook` module



Let's implement this feature via a `server action`

- Create a new action in `lib/actions/createOnrampTransaction.ts`

```
"use server";

import prisma from "@repo/db/client";
import { getServerSession } from "next-auth";
import { authOptions } from "../auth";

export async function createOnRampTransaction(provider: string, amount: number) {
    // Ideally the token should come from the banking provider (hdfc/axis)
    const session = await getServerSession(authOptions);
    if (!session?.user || !session.user?.id) {
        return {
            message: "Unauthenticated request"
        }
    }
    const token = (Math.random() * 1000).toString();
    await prisma.onRampTransaction.create({
        data: {
            provider,
```

```
            status: "Processing",
            startTime: new Date(),
            token: token,
            userId: Number(session?.user?.id),
            amount: amount * 100
        }
    });

    return {
        message: "Done"
    }
}
```

- Call the action when the button is pressed (`AddMoneyCard`)

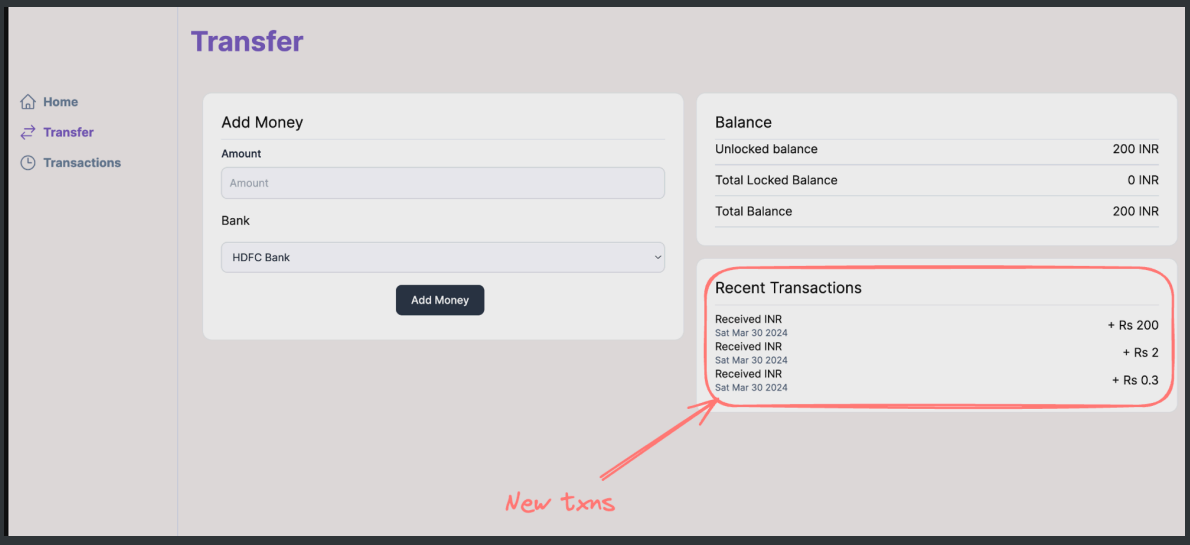
```
"use client"
import { Button } from "@repo/ui/button";
import { Card } from "@repo/ui/card";
import { Select } from "@repo/ui/select";
import { useState } from "react";
import { TextInput } from "@repo/ui/textinput";
import { createOnRampTransaction } from "../app/lib/actions/createOnrampTransaction"

const SUPPORTED_BANKS = [{
    name: "HDFC Bank",
    redirectUrl: "https://netbanking.hdfcbank.com"
}, {
    name: "Axis Bank",
    redirectUrl: "https://www.axisbank.com/"
}];

export const AddMoney = () => {
    const [redirectUrl, setRedirectUrl] = useState(SUPPORTED_BANKS[0]?.redirectUrl);
    const [provider, setProvider] = useState(SUPPORTED_BANKS[0]?.name || "");
    const [value, setValue] = useState(0)
    return <Card title="Add Money">
    <div className="w-full">
        <TextInput label={"Amount"} placeholder={"Amount"} onChange={(val) => {
            setValue(Number(val))
        }} />
        <div className="py-4 text-left">
            Bank
        </div>
        <Select onSelect={(value) => {
            setRedirectUrl(SUPPORTED_BANKS.find(x => x.name === value)?.redirectUrl
            setProvider(SUPPORTED_BANKS.find(x => x.name === value)?.name || "");
        }} options={SUPPORTED_BANKS.map(x => ({
            key: x.name,
            value: x.name
        }))} />
        <div className="flex justify-center pt-4">
            <Button onClick={async () => {
                await createOnRampTransaction(provider, value)
```

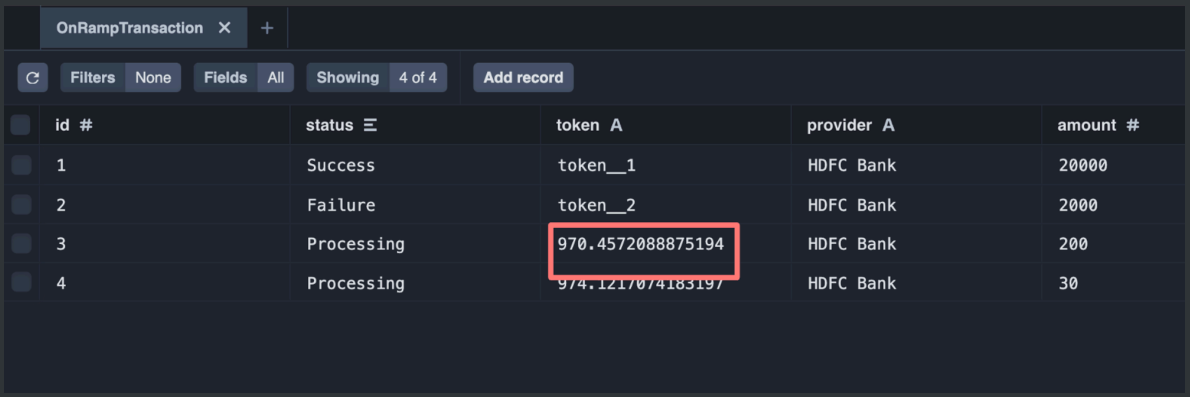
```
                window.location.href = redirectUrl || "";
            }}>
            Add Money
            </Button>
        </div>
    </div>
</Card>
}
```

Notice more balances getting added , but the balance will remain the same. This is because the bank hasn't yet approved the txn



Simulating the bank webhook

- cd `apps/bank-webhook`
- npm run dev (If it fails, try installing esbuild)
- In another terminal, get the `token` for one of the onRamp transactions by running `npx prisma studio` in `packages/db`



- Simulate a hdfcBank transaction
  POST http://localhost:3003/hdfcWebhook

```
{                                                    Copy
    "token": "970.4572088875194",
```

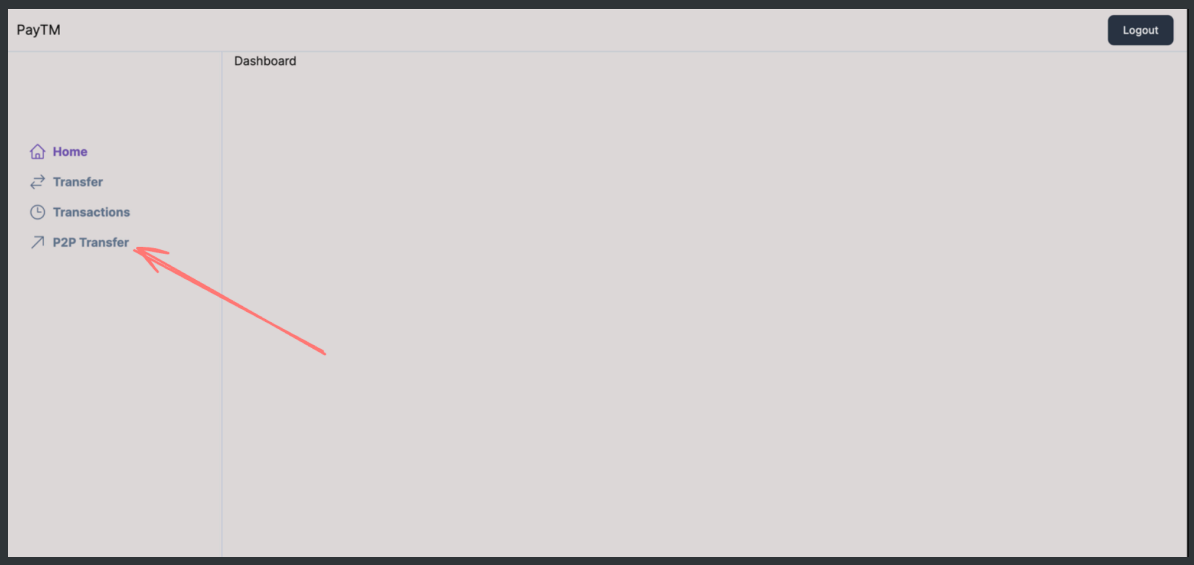
```
    "user_identifier": 1,
    "amount": "210"
}
```

Do you really need the amount/user id to come from the hdfc bank server? Or is the token enough?

Add transfers

Once money has been `onramped`, users should be allowed to transfer money to various wallets

Let's create a `P2P transfer` page



- Got to `user-app/app/(dashboard)/layout.tsx`

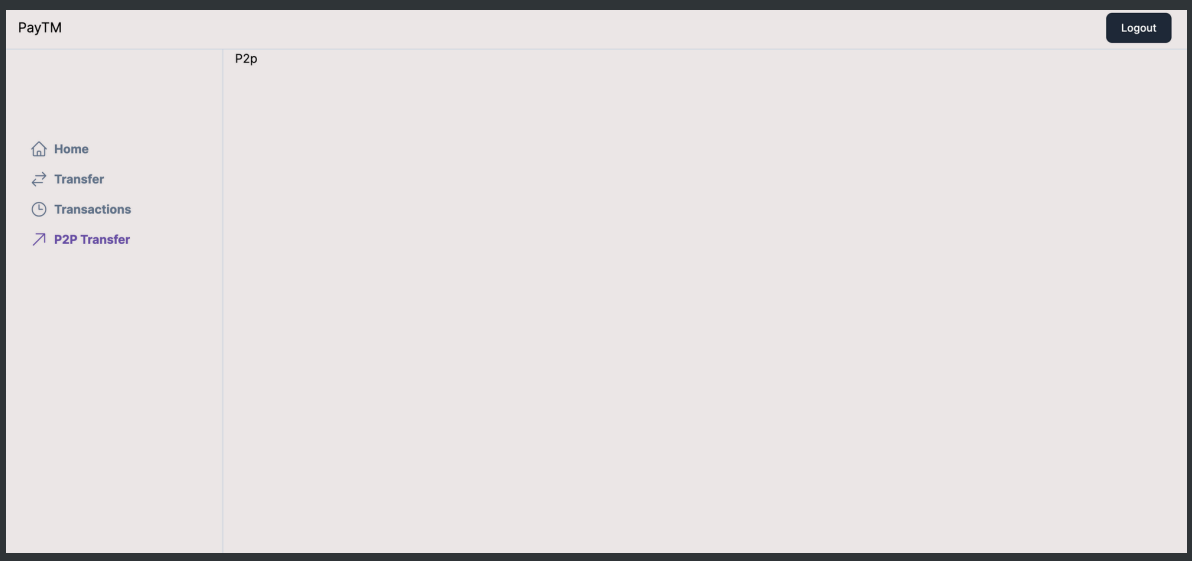
```
<SidebarItem href={"/p2p"} icon={<P2PTransferIcon />} title="P2P Transfer" />


function P2PTransferIcon() {
  return <svg xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 24 24" str
    <path stroke-linecap="round" stroke-linejoin="round" d="m4.5 19.5 15-15m0 0H8.25
  </svg>
}
```

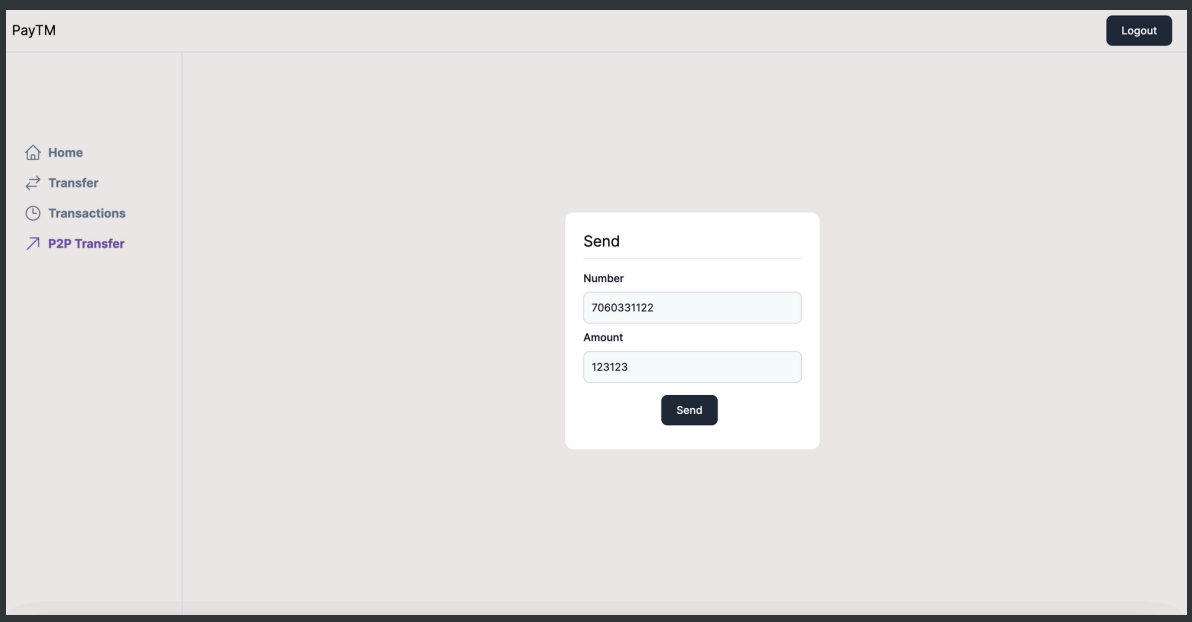
- Create a handler for /p2p page by creating `user-app/app/(dashboarD)/p2p/page.tsx`

```
export default function() {
    return <div>
```

```
            Dashboard
        </div>
    }
```



- Add a `SendCard` component that let's you put the number of a user and amount to send



`user-app/components/SendCard.tsx`

```
"use client"
import { Button } from "@repo/ui/button";
import { Card } from "@repo/ui/card";
import { Center } from "@repo/ui/center";
import { TextInput } from "@repo/ui/textinput";
import { useState } from "react";

export function SendCard() {
    const [number, setNumber] = useState("");
    const [amount, setAmount] = useState("");

    return <div className="h-[90vh]">
        <Center>
            <Card title="Send">
```

```
                <div className="min-w-72 pt-2">
                    <TextInput placeholder={"Number"} label="Number" onChange={(valu
                        setNumber(value)
                    }} />
                    <TextInput placeholder={"Amount"} label="Amount" onChange={(valu
                        setAmount(value)
                    }} />
                    <div className="pt-4 flex justify-center">
                        <Button onClick={() => {

                        }}>Send</Button>
                    </div>
                </div>
            </Card>
        </Center>
    </div>
}
```

user-app/app/(dashboard)/p2p/page.tsx

```
import { SendCard } from "../../../components/SendCard";

export default function() {
    return <div className="w-full">
        <SendCard />
    </div>
}
```

Copy

- Create a new action in `lib/actions/p2pTransfer.tsx`

```
"use server"
import { getServerSession } from "next-auth";
import { authOptions } from "../auth";
import prisma from "@repo/db/client";

export async function p2pTransfer(to: string, amount: number) {
    const session = await getServerSession(authOptions);
    const from = session?.user?.id;
    if (!from) {
        return {
            message: "Error while sending"
        }
    }
    const toUser = await prisma.user.findFirst({
        where: {
            number: to
        }
    });

    if (!toUser) {
```

Copy

```
            return {
                message: "User not found"
            }
        }
        await prisma.$transaction(async (tx) => {
            const fromBalance = await tx.balance.findUnique({
                where: { userId: Number(from) },
              });
              if (!fromBalance || fromBalance.amount < amount) {
                throw new Error('Insufficient funds');
              }

              await tx.balance.update({
                where: { userId: Number(from) },
                data: { amount: { decrement: amount } },
              });

              await tx.balance.update({
                where: { userId: toUser.id },
                data: { amount: { increment: amount } },
              });
        });
    }
```

- Update SendCard to call this action

```
"use client"
import { Button } from "@repo/ui/button";
import { Card } from "@repo/ui/card";
import { Center } from "@repo/ui/center";
import { TextInput } from "@repo/ui/textinput";
import { useState } from "react";
import { p2pTransfer } from "../app/lib/actions/p2pTransfer";

export function SendCard() {
    const [number, setNumber] = useState("");
    const [amount, setAmount] = useState("");

    return <div className="h-[90vh]">
        <Center>
            <Card title="Send">
                <div className="min-w-72 pt-2">
                    <TextInput placeholder={"Number"} label="Number" onChange={(valu
                        setNumber(value)
                    }} />
                    <TextInput placeholder={"Amount"} label="Amount" onChange={(valu
                        setAmount(value)
                    }} />
                    <div className="pt-4 flex justify-center">
                        <Button onClick={async () => {
                            await p2pTransfer(number, Number(amount) * 100)
```

```
                        }}>Send</Button>
                    </div>
                </div>
            </Card>
        </Center>
    </div>
}
```

Try sending money a few times and see if it works. You can inspect the DB by using `npx prisma studio` in `packages/db`

Problem with this approch.

Try simulating two request together by adding a 4s sleep timeout in the transaction

Copy

```
"use server"
import { getServerSession } from "next-auth";
import { authOptions } from "../auth";
import prisma from "@repo/db/client";

export async function p2pTransfer(to: string, amount: number) {
    const session = await getServerSession(authOptions);
    const from = session?.user?.id;
    if (!from) {
        return {
            message: "Error while sending"
        }
    }
    const toUser = await prisma.user.findFirst({
        where: {
            number: to
        }
    });

    if (!toUser) {
        return {
            message: "User not found"
        }
    }
    await prisma.$transaction(async (tx) => {
        const fromBalance = await tx.balance.findUnique({
            where: { userId: Number(from) },
          });
          if (!fromBalance || fromBalance.amount < amount) {
            throw new Error('Insufficient funds');
          }
          await new Promise(r => setTimeout(r, 4000));
          await tx.balance.update({
            where: { userId: Number(from) },
            data: { amount: { decrement: amount } },
```

```
            });

            await tx.balance.update({
              where: { userId: toUser.id },
              data: { amount: { increment: amount } },
            });
        });
    }
```

Send two requests in two tabs and see if you are able to receive negative balances?

Locking of rows

In postgres, a transaction ensure that either all the statements happen or none. It does not `lock` rows/ `revert` a transaction if something from this transaction got updated before the transaction committed (unlike MongoDB)

So we need to explicitly lock the `balance` row for the `sending` user so that only one transaction can access it at at time, and the other one waits until the first transaction has committed

Hint 1 - https://www.cockroachlabs.com/blog/select-for-update/

Hint 2 - https://www.prisma.io/docs/orm/prisma-client/queries/raw-database-access/raw-queries

▼ Solution

Copy

```
"use server"
import { getServerSession } from "next-auth";
import { authOptions } from "../auth";
import prisma from "@repo/db/client";

export async function p2pTransfer(to: string, amount: number) {
    const session = await getServerSession(authOptions);
    const from = session?.user?.id;
    if (!from) {
        return {
            message: "Error while sending"
        }
    }
    const toUser = await prisma.user.findFirst({
        where: {
            number: to
        }
    });

    if (!toUser) {
        return {
            message: "User not found"
        }
    }
```

```
    await prisma.$transaction(async (tx) => {
        await tx.$queryRaw`SELECT * FROM "Balance" WHERE "userId" =
```

Add P2P transactions table

Update `schema.prisma`

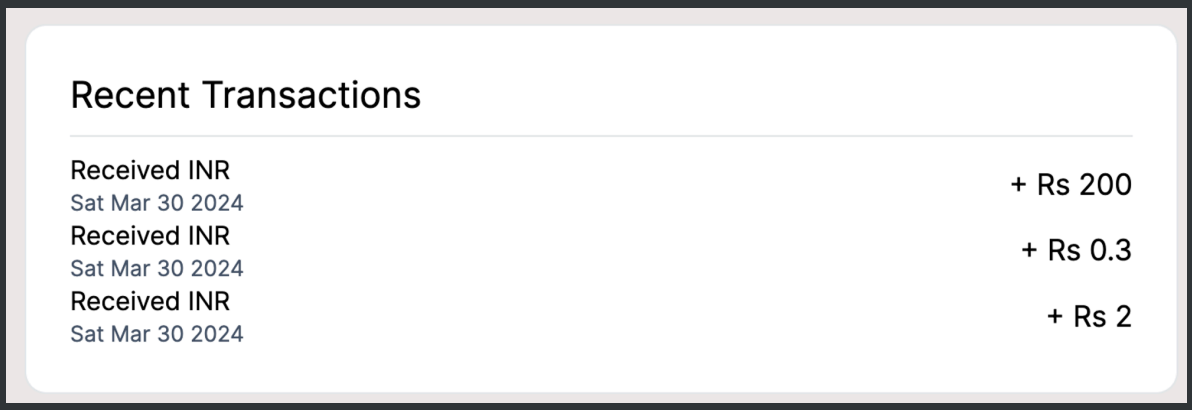
```
model User {
  id                Int                @id @default(autoincrement())
  email             String?            @unique
  name              String?
  number            String             @unique
  password          String
  OnRampTransaction OnRampTransaction[]
  Balance           Balance[]
  sentTransfers     p2pTransfer[]      @relation(name: "FromUserRelation")
  receivedTransfers p2pTransfer[]      @relation(name: "ToUserRelation")
}

model p2pTransfer {
  id         Int          @id @default(autoincrement())
  amount     Int
  timestamp  DateTime
  fromUserId Int
  fromUser   User         @relation(name: "FromUserRelation", fields: [fromUserId],
  toUserId   Int
  toUser     User         @relation(name: "ToUserRelation", fields: [toUserId], refe
}
```

- Run `npx prisma migrate dev --name added_p2p_txn`
- Regenerate client `npx prisma generate`
- Do a global build (npm run build) (it's fine if it fails
- Add entries to `p2pTransfer` whenever a transfer happens

Assignment: Add frontend for the p2p transactions

Can you add code that let's you see the users existing transactions?



Final code - https://github.com/100xdevs-cohort-2/week-18-live-1-final