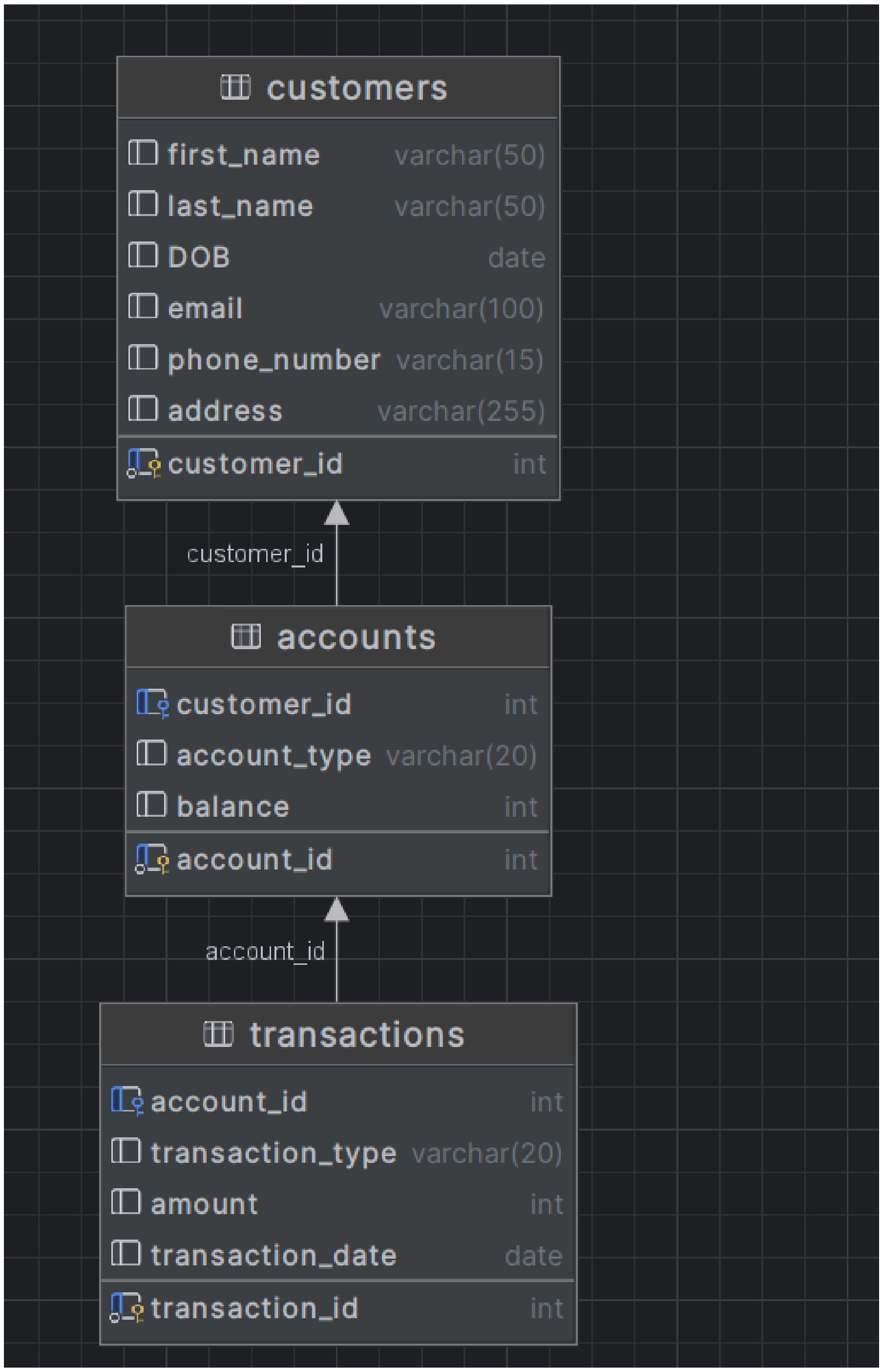
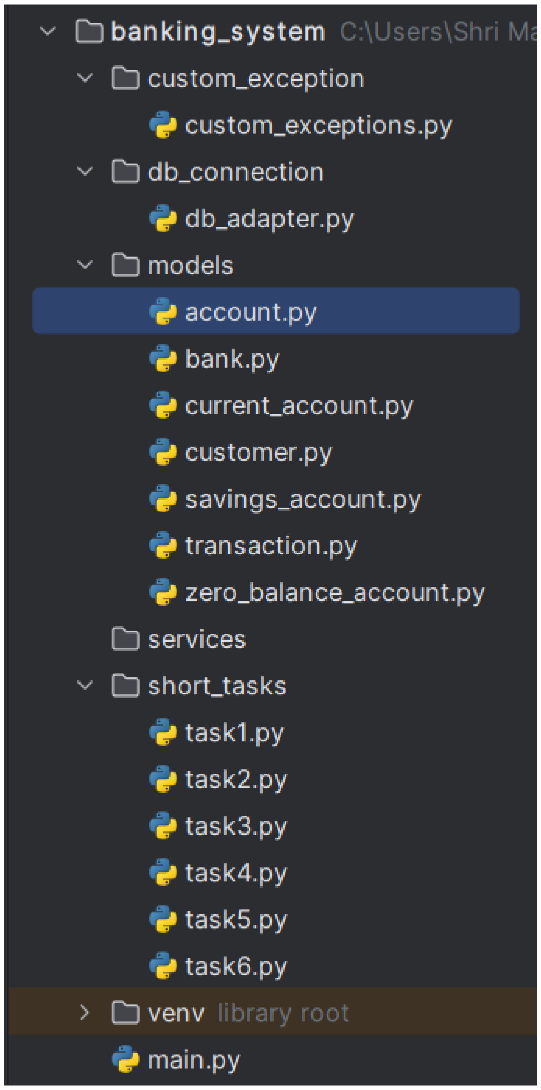
Banking System

Database Structure



File Structure



```
banking_system  C:\Users\Shri Ma
    custom_exception
        custom_exceptions.py
    db_connection
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    models
        account.py
        bank.py
        current_account.py
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    services
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    venv  library root
    main.py
```
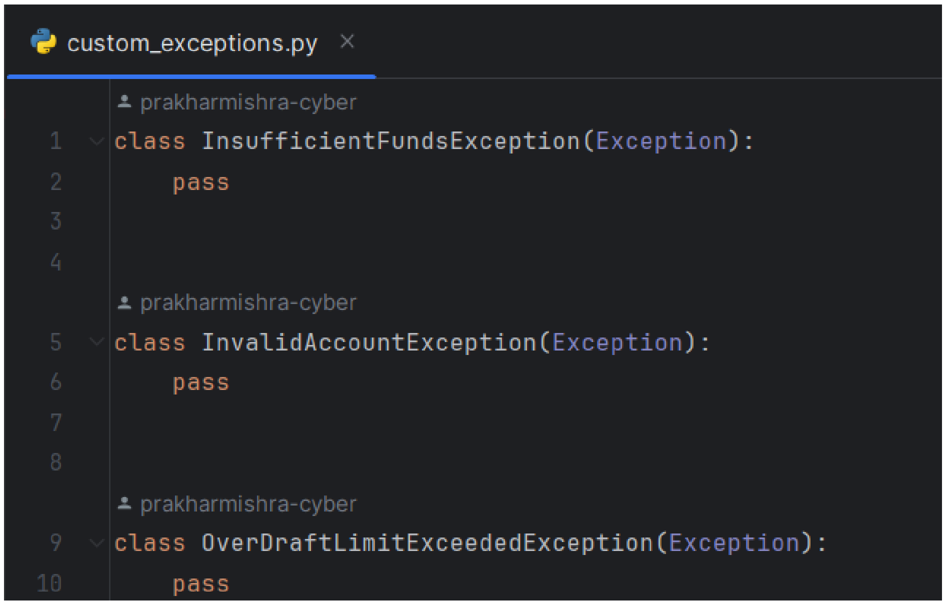
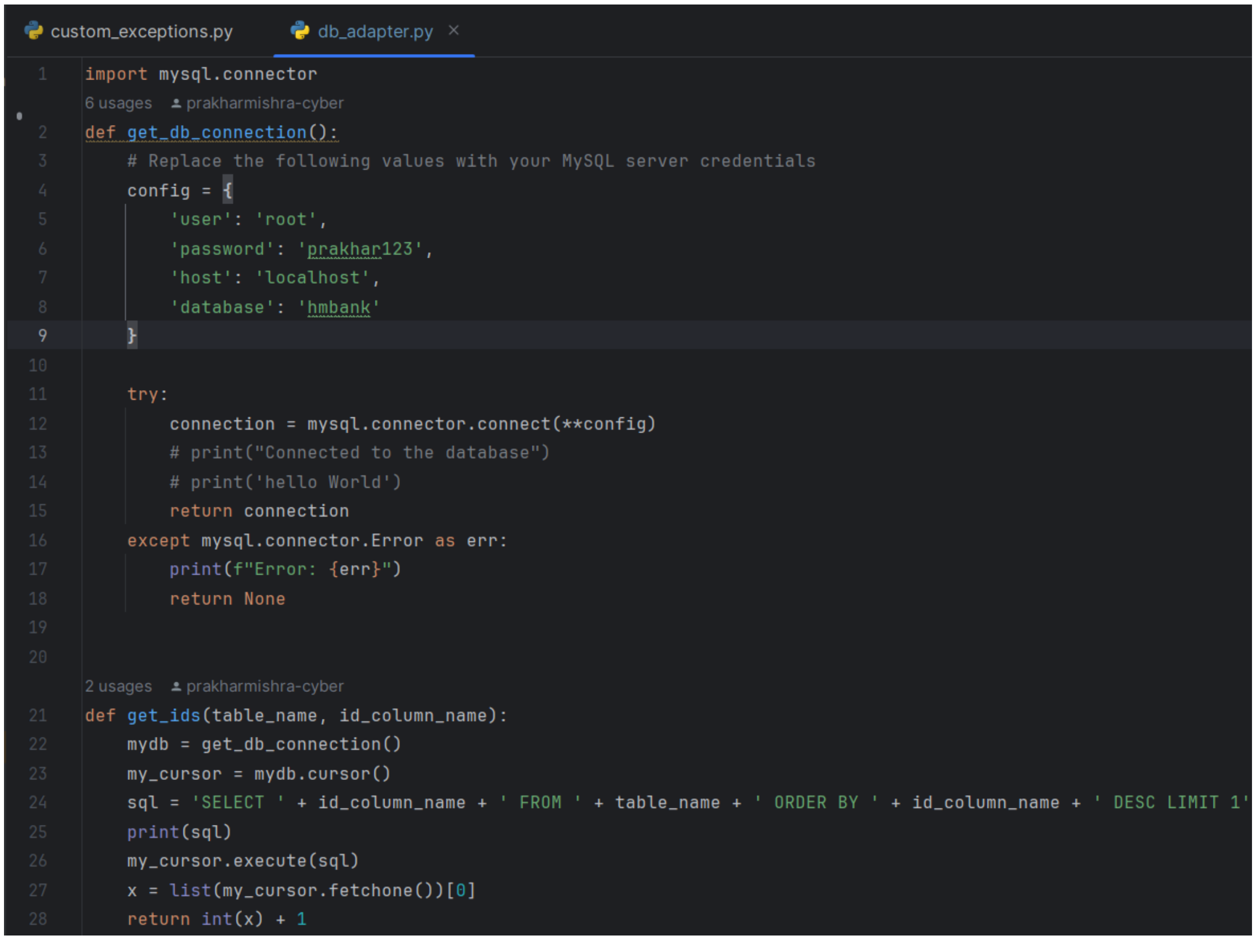


custom_exceptions.py

prakharmishra-cyber
```python
class InsufficientFundsException(Exception):
    pass


class InvalidAccountException(Exception):
    pass


class OverDraftLimitExceededException(Exception):
    pass
```


custom_exceptions.py db_adapter.py

```python
import mysql.connector
def get_db_connection():
    # Replace the following values with your MySQL server credentials
    config = {
        'user': 'root',
        'password': 'prakhar123',
        'host': 'localhost',
        'database': 'hmbank'
    }

    try:
        connection = mysql.connector.connect(**config)
        # print("Connected to the database")
        # print('hello World')
        return connection
    except mysql.connector.Error as err:
        print(f"Error: {err}")
        return None


def get_ids(table_name, id_column_name):
    mydb = get_db_connection()
    my_cursor = mydb.cursor()
    sql = 'SELECT ' + id_column_name + ' FROM ' + table_name + ' ORDER BY ' + id_column_name + ' DESC LIMIT 1'
    print(sql)
    my_cursor.execute(sql)
    x = list(my_cursor.fetchone())[0]
    return int(x) + 1
```

Account.py

```python
from db_connection.db_adapter import *


class Account:

   def __init__(self, account_id, customer_id, account_type, balance):
       self.connection = get_db_connection()
       self.__account_id = account_id
       self.__customer_id = customer_id
       self.__account_type = account_type
       self.__balance = balance

   def __str__(self):
       return f"Account ID: {self.__account_id}\n" \
              f"Customer ID: {self.__customer_id}\n" \
              f"Account Type: {self.__account_type}\n" \
              f"Balance: ${self.__balance:.2f}"

   def get_account_id(self):
       return self.__account_id

   def get_customer_id(self):
       return self.__customer_id

   def get_account_type(self):
       return self.__account_type

   def get_balance(self):
       return self.__balance

   def update_account_details(self, account_type=None, balance=None):
       my_cursor = self.connection.cursor()

       if account_type:
           sql = '''
           UPDATE Accounts SET account_type = %s WHERE account_id = %s
           '''
           para = (account_type, self.__account_id)
           my_cursor.execute(sql, para)
           self.connection.commit()
           self.__account_type = account_type
           print('Account Type updated successfully')

       if balance:
           sql = '''
           UPDATE Accounts SET balance = %s WHERE account_id = %s
           '''
           para = (balance, self.__account_id)
           my_cursor.execute(sql, para)
```

```
            self.connection.commit()
            self.__balance = balance
            print('Account Type updated successfully')

    def deposit(self, amount):
        try:
            my_cursor = self.connection.cursor()
            sql = '''
                     UPDATE Accounts SET balance = %s WHERE account_id = %s
                    '''
            para = (self.__balance + amount, self.__account_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__balance += amount
            print('Amount deposited successfully')
        except Exception as e:
            print(f'An error occurred: {e}')

    def withdraw(self, amount):
        if amount > self.__balance:
            print('Insufficient balance')
            return
        try:
            my_cursor = self.connection.cursor()
            sql = '''
                     UPDATE Accounts SET balance = %s WHERE account_id = %s
                    '''
            para = (self.__balance - amount, self.__account_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__balance -= amount
            print('Amount withdrawn successfully')
        except Exception as e:
            print(f'An error occurred: {e}')

    def calculate_interest(self):
        print(f'Amount after interest: ${self.__balance + (self.__balance * 0.45)}')
        return self.__balance + (self.__balance * 0.45)

    def print_account_info(self):
        print('Account ID:', self.__account_id)
        print('Account Type:', self.__account_type)
        print('Account Balance:', self.__balance)
```

Bank.py

```
from db_connection.db_adapter import *
```

```python
from models.account import Account
from models.savings_account import SavingsAccount
from models.current_account import CurrentAccount
from models.transaction import Transaction


class Bank:

    def __init__(self):
        self.connection = get_db_connection()

    def deposit(self, account_id, amount):
        my_cursor = self.connection.cursor()
        try:
            sql = '''
                UPDATE Accounts SET balance = balance + %s WHERE account_id = %s
            '''
            para = (amount, account_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            print('Amount deposited successfully')
        except Exception as e:
            print(f'An error occurred: {e}')

    def withdraw(self, account_id, amount):
        my_cursor = self.connection.cursor()
        try:
            sql = '''
                UPDATE Accounts SET balance = balance - %s WHERE account_id = %s
            '''
            para = (amount, account_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            print('Amount withdrawn successfully')
        except Exception as e:
            print(f'An error occurred: {e}')

    def get_account_by_id(self, account_id):
        try:
            my_cursor = self.connection.cursor()
            sql = '''
            SELECT * FROM Accounts WHERE account_id = %s
            '''
            para = (account_id,)
            my_cursor.execute(sql, para)
            x = Account(*list(my_cursor.fetchone()))
            return x
        except Exception as e:
            print(f'An error occurred: {e}')
    def calculate_interest(self, account_id):
        try:
            customer_account = self.get_account_by_id(account_id)
            value = customer_account.calculate_interest()
            customer_account.update_account_details(balance=value)
        except Exception as e:
            print(f'An error occurred: {e}')

    def create_customer_account(self, account):
        try:
            my_cursor = self.connection.cursor()
            sql = '''
                INSERT INTO Accounts(account_id, customer_id, account_type,
balance)
                VALUES (%s, %s, %s, %s)
            '''
            para = (account.get_account_id(), account.get_customer_id(),
account.get_account_type(), account.get_balance())
            my_cursor.execute(sql, para)
            self.connection.commit()
            print('Account created successfully')
        except Exception as e:
            print(f'An error occurred: {e}')

    def create_account(self):
        print("Choose the type of account:")
        print("1. Savings Account")
        print("2. Current Account")

        choice = input("Enter your choice (1 or 2): ")

        # account_id = input("Enter the account ID: ")
        customer_id = input("Enter the customer ID: ")
        initial_balance = float(input("Enter the initial balance: "))

        if choice == "1":
            interest_rate = float(input("Enter the interest rate for Savings
Account: "))
            account = SavingsAccount(get_ids('accounts', 'account_id'),
customer_id, initial_balance, interest_rate)
            self.create_customer_account(account)
        elif choice == "2":
            account = CurrentAccount(get_ids('accounts', 'account_id'),
customer_id, initial_balance)
            self.create_customer_account(account)
        else:
            print("Invalid choice. Please choose 1 or 2.")
            return
```

```python
        print("Account created successfully!")
        print("Account details:")
        account.print_account_info()

    def get_account_balance_by_id(self, account_id):
        try:
            customer_account = self.get_account_by_id(account_id)
            return customer_account.get_balance()
        except Exception as e:
            print(f'An error occurred: {e}')

    def get_account_details(self, account_id):
        try:
            customer_account = self.get_account_by_id(account_id)
            customer_account.print_account_info()
        except Exception as e:
            print(f'An error occurred: {e}')

    def transfer(self, sender_account_id, receiver_account_id, amount):
        try:
            sender_account = self.get_account_by_id(sender_account_id)
            receiver_account = self.get_account_by_id(receiver_account_id)

            if sender_account.get_balance()<amount:
                print('Insufficient balance in sender account')
            else:
                sender_account.withdraw(amount)
                receiver_account.deposit(amount)
                print('Transaction made successfully')

        except Exception as e:
            print(f'An error occurred: {e}')

    def get_transactions(self, account_id, start_date, end_date):
        try:
            my_cursor = self.connection.cursor()
            sql = '''
                SELECT * FROM Transactions WHERE account_id = %s AND
                transaction_date BETWEEN %s AND %s
            '''
            para = (account_id, start_date, end_date)
            my_cursor.execute(sql, para)
            x = [Transaction(*list(i)) for i in list(my_cursor.fetchall())]
            return x
        except Exception as e:
            print(f'An error occurred: {e}')

    def list_all_account(self):
        try:
            my_cursor = self.connection.cursor()
            sql = '''
                SELECT * FROM Accounts
            '''
            my_cursor.execute(sql)
            x = [Account(*list(i)) for i in list(my_cursor.fetchall())]
            return x
        except Exception as e:
            print(f'An error occurred: {e}')
```

Current_account.py

```
from db_connection.db_adapter import *
from models.account import Account


class CurrentAccount(Account):
    OVERDRAFT_LIMIT = 1000

    def __init__(self, account_id, customer_id, balance):
        super().__init__(account_id, customer_id, account_type="Current",
balance=balance)
        self.__overdraft_limit = self.OVERDRAFT_LIMIT

    def withdraw(self, amount):
        if amount > super().get_balance() + self.__overdraft_limit:
            print('Withdrawal amount exceeds available balance and overdraft
limit.')
            return

        try:
            my_cursor = super().connection.cursor()
            sql = '''
                UPDATE Accounts SET balance = %s WHERE account_id = %s
            '''
            para = (super().get_balance() - amount, super().get_account_id())
            my_cursor.execute(sql, para)
            super().connection.commit()
            super().update_account_details(balance=super().get_balance()-amount)
            print('Amount withdrawn successfully')
        except Exception as e:
            print(f'An error occurred: {e}')
```

Customer.py

```python
from db_connection.db_adapter import *


class Customer:

   def __init__(self, customer_id, first_name, last_name, dob, email,
phone_number, address):
       self.connection = get_db_connection()
       self.__customer_id = customer_id
       self.__first_name = first_name
       self.__last_name = last_name
       self.__dob = dob
       self.__email = email
       self.__phone_number = phone_number
       self.__address = address

   def get_customer_id(self):
       return self.__customer_id

   def get_first_name(self):
       return self.__first_name

   def get_last_name(self):
       return self.__last_name

   def get_customer_email(self):
       return self.__email

   def get_phone_number(self):
       return self.__phone_number

   def get_customer_address(self):
       return self.__address

   def update_student_info(self, first_name=None, last_name=None,
date_of_birth=None, email=None, phone_number=None, address=None):
       my_cursor = self.connection.cursor()

       if first_name:
           sql = '''
               UPDATE Customers SET first_name = %s WHERE customer_id = %s
           '''
           para = (first_name, self.__customer_id)
           my_cursor.execute(sql, para)
           self.connection.commit()
           self.__first_name = first_name
```

```
        if last_name:
            sql = '''
                UPDATE Customers SET last_name = %s WHERE customer_id = %s
            '''
            para = (last_name, self.__customer_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__last_name = last_name

        if date_of_birth:
            sql = '''
                UPDATE Customers SET DOB = %s WHERE customer_id = %s
            '''
            para = (date_of_birth, self.__customer_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__dob = date_of_birth

        if email:
            sql = '''
                UPDATE Customers SET email = %s WHERE customer_id = %s
            '''
            para = (email, self.__customer_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__email = email

        if phone_number:
            sql = '''
                UPDATE Customers SET phone_number = %s WHERE customer_id = %s
            '''
            para = (phone_number, self.__customer_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__phone_number = phone_number

        if address:
            sql = '''
                UPDATE Customers SET address = %s WHERE customer_id = %s
            '''
            para = (address, self.__customer_id)
            my_cursor.execute(sql, para)
            self.connection.commit()
            self.__address = address

        print('Student Details Updated Successfully')
```

Savings_account.py

```
from db_connection.db_adapter import *
from models.account import Account


class SavingsAccount(Account):
   def __init__(self, account_id, customer_id, balance, interest_rate):
       super().__init__(account_id, customer_id, account_type="Savings",
balance=balance)
       self.__interest_rate = interest_rate

   def calculate_interest(self):
       interest_amount = super().get_balance() * (self.__interest_rate / 100)
       print(f'Interest calculated for Savings Account:
${interest_amount:.2f}')
       return super().get_balance() + interest_amount
```

Transaction.py

```
from db_connection.db_adapter import *


class Transaction:

   def __init__(self, transaction_id, account_id, transaction_type, amount,
transaction_date):
       self.connection = get_db_connection()
       self.__transaction_id = transaction_id
       self.__account_id = account_id
       self.__transaction_type = transaction_type
       self.__amount = amount
       self.__transaction_date = transaction_date

   def __str__(self):
       return f"Transaction ID: {self.__transaction_id}\n" \
              f"Account ID: {self.__account_id}\n" \
              f"Transaction Type: {self.__transaction_type}\n" \
              f"Amount: ${self.__amount:.2f}\n" \
              f"Transaction Date: {self.__transaction_date}"

   def get_transaction_id(self):
       return self.__transaction_id

   def get_account_id(self):
       return self.__account_id

   def get_transaction_type(self):
       return self.__transaction_type
```

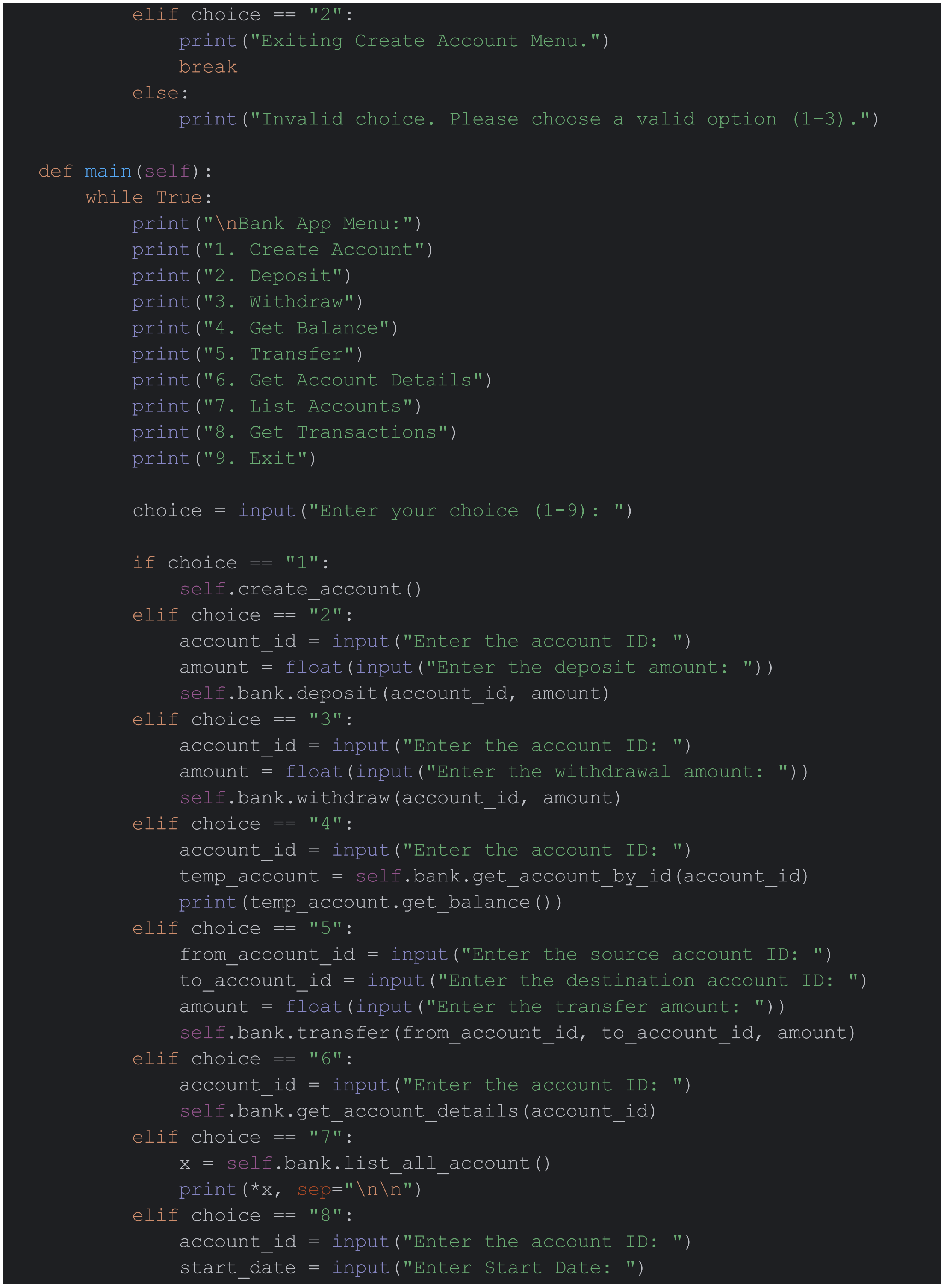
```
    def get_transaction_date(self):
        return self.__transaction_date

    def get_transaction_amount(self):
        return self.__amount

    def update_transaction_info(self, account_id=None, transaction_type=None,
transaction_amount=None,
                                transaction_date=None):

        my_cursor = self.connection.cursor()

        if account_id:
            try:
                sql = '''
                                UPDATE Transactions SET account_id = %s WHERE
transaction_id = %s
                            '''
                para = (account_id, self.__transaction_id)
                my_cursor.execute(sql, para)
                self.connection.commit()
                print('Account id updated successfully')
            except Exception as e:
                print(f'An error occurred: {e}')

        if transaction_type:
            try:
                sql = '''
                                UPDATE Transactions SET transaction_type = %s
WHERE transaction_id = %s
                            '''
                para = (transaction_type, self.__transaction_id)
                my_cursor.execute(sql, para)
                self.connection.commit()
                print('Transaction type updated successfully')
            except Exception as e:
                print(f'An error occurred: {e}')

        if transaction_amount:
            try:
                sql = '''
                                UPDATE Transactions SET amount = %s WHERE
transaction_id = %s
                            '''
                para = (transaction_amount, self.__transaction_id)
                my_cursor.execute(sql, para)
                self.connection.commit()
                print('Transaction Amount updated successfully')
            except Exception as e:
                print(f'An error occurred: {e}')

        if transaction_date:
            try:
                sql = '''
                                UPDATE Transactions SET transaction_date = %s
 WHERE transaction_id = %s
                            '''
                para = (transaction_date, self.__transaction_id)
                my_cursor.execute(sql, para)
                self.connection.commit()
                print('Transaction date updated successfully')
            except Exception as e:
                print(f'An error occurred: {e}')
```

Zero_banace.py

```
from db_connection.db_adapter import *
from models.account import Account


class ZeroBalanceAccount(Account):

   def __init__(self, account_id, customer_id, account_type):
       self.connection = get_db_connection()
       super().__init__(account_id, customer_id, account_type, 0)
```

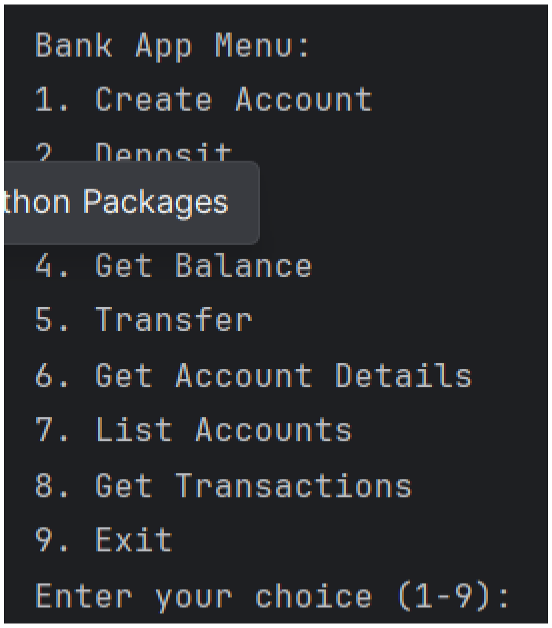
Main.py

```
from models.bank import Bank


class BankApp:
   def __init__(self):
       self.bank = Bank()

   def create_account(self):
       while True:
           print("\nCreate Account Menu:")
           print("1. Enter Account Details")
           print("2. Exit")

           choice = input("Enter your choice (1-3): ")

           if choice == "1":
               self.bank.create_account()
```

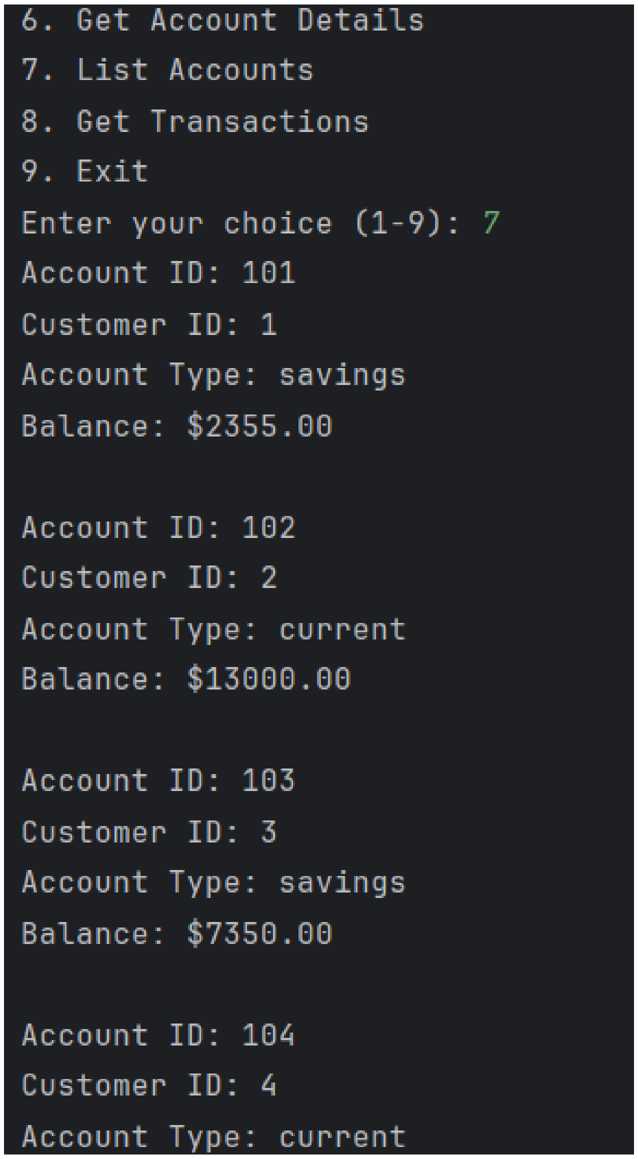


```python
            elif choice == "2":
                print("Exiting Create Account Menu.")
                break
            else:
                print("Invalid choice. Please choose a valid option (1-3).")

    def main(self):
        while True:
            print("\nBank App Menu:")
            print("1. Create Account")
            print("2. Deposit")
            print("3. Withdraw")
            print("4. Get Balance")
            print("5. Transfer")
            print("6. Get Account Details")
            print("7. List Accounts")
            print("8. Get Transactions")
            print("9. Exit")

            choice = input("Enter your choice (1-9): ")

            if choice == "1":
                self.create_account()
            elif choice == "2":
                account_id = input("Enter the account ID: ")
                amount = float(input("Enter the deposit amount: "))
                self.bank.deposit(account_id, amount)
            elif choice == "3":
                account_id = input("Enter the account ID: ")
                amount = float(input("Enter the withdrawal amount: "))
                self.bank.withdraw(account_id, amount)
            elif choice == "4":
                account_id = input("Enter the account ID: ")
                temp_account = self.bank.get_account_by_id(account_id)
                print(temp_account.get_balance())
            elif choice == "5":
                from_account_id = input("Enter the source account ID: ")
                to_account_id = input("Enter the destination account ID: ")
                amount = float(input("Enter the transfer amount: "))
                self.bank.transfer(from_account_id, to_account_id, amount)
            elif choice == "6":
                account_id = input("Enter the account ID: ")
                self.bank.get_account_details(account_id)
            elif choice == "7":
                x = self.bank.list_all_account()
                print(*x, sep="\n\n")
            elif choice == "8":
                account_id = input("Enter the account ID: ")
                start_date = input("Enter Start Date: ")
                end_date = input("Enter End Date: ")
                x = self.bank.get_transactions(account_id, start_date, end_date)
                print(*x, sep="\n\n")
            elif choice == "9":
                print("Exiting Bank App. Goodbye!")
                break
            else:
                print("Invalid choice. Please choose a valid option (1-9).")

if __name__ == "__main__":
    bank_app = BankApp()
    bank_app.main()
```

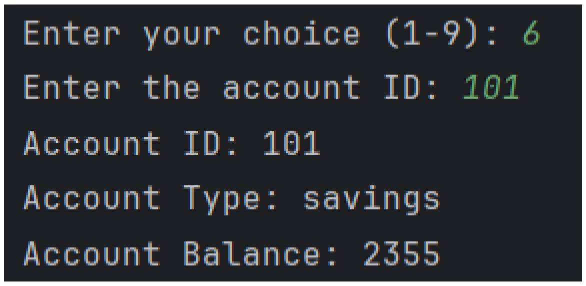
Output:



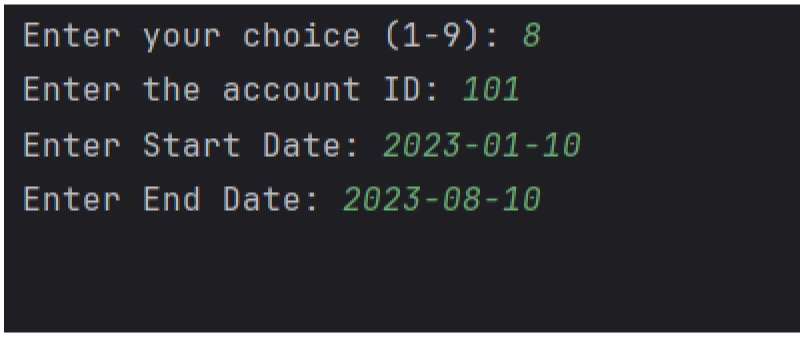
```
Bank App Menu:
1. Create Account
2. Deposit

4. Get Balance
5. Transfer
6. Get Account Details
7. List Accounts
8. Get Transactions
9. Exit
Enter your choice (1-9):
```

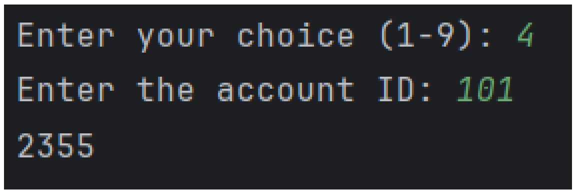


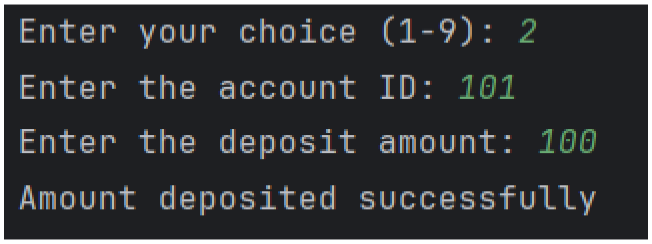
```
6. Get Account Details
7. List Accounts
8. Get Transactions
9. Exit
Enter your choice (1-9): 7
Account ID: 101
Customer ID: 1
Account Type: savings
Balance: $2355.00

Account ID: 102
Customer ID: 2
Account Type: current
Balance: $13000.00

Account ID: 103
Customer ID: 3
Account Type: savings
Balance: $7350.00

Account ID: 104
Customer ID: 4
Account Type: current
```

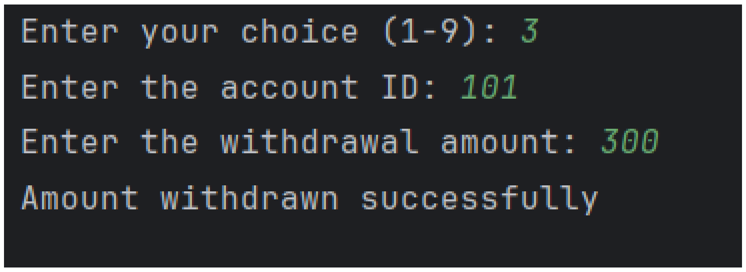


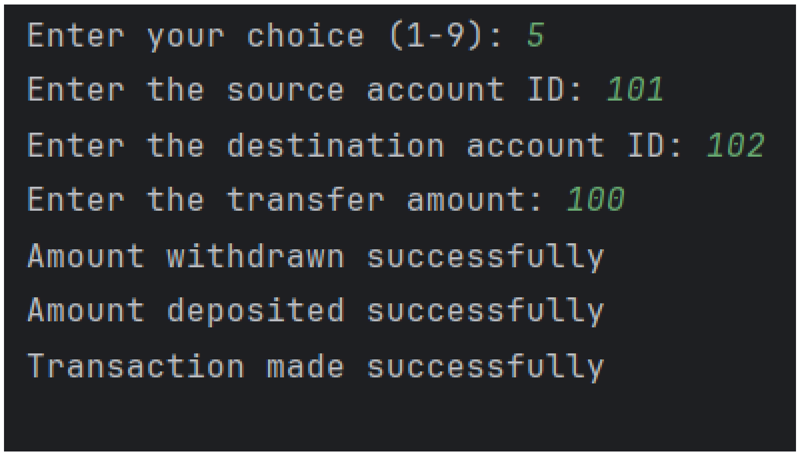
```
Enter your choice (1-9): 6
Enter the account ID: 101
Account ID: 101
Account Type: savings
Account Balance: 2355
```

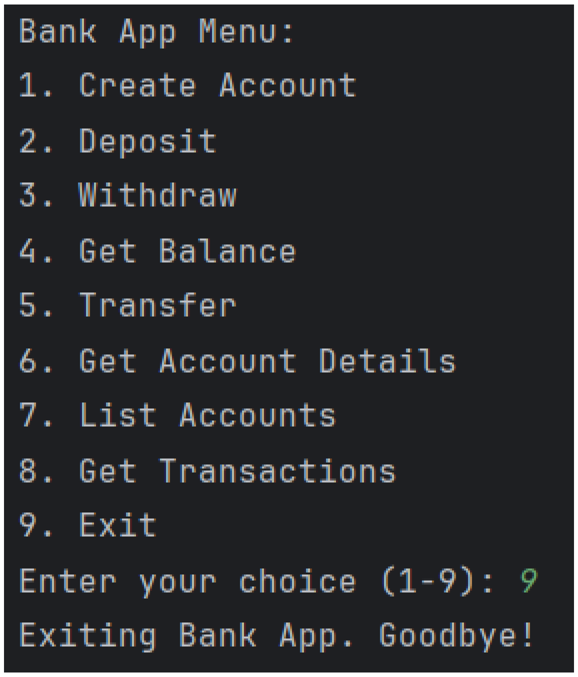

```
Enter your choice (1-9): 8
Enter the account ID: 101
Enter Start Date: 2023-01-10
Enter End Date: 2023-08-10
```


```
Enter your choice (1-9): 4
Enter the account ID: 101
2355
```


```
Enter your choice (1-9): 2
Enter the account ID: 101
Enter the deposit amount: 100
Amount deposited successfully
```


```
Enter your choice (1-9): 3
Enter the account ID: 101
Enter the withdrawal amount: 300
Amount withdrawn successfully
```


```
Enter your choice (1-9): 5
Enter the source account ID: 101
Enter the destination account ID: 102
Enter the transfer amount: 100
Amount withdrawn successfully
Amount deposited successfully
Transaction made successfully
```



```
Bank App Menu:
1. Create Account
2. Deposit
3. Withdraw
4. Get Balance
5. Transfer
6. Get Account Details
7. List Accounts
8. Get Transactions
9. Exit
Enter your choice (1-9): 9
Exiting Bank App. Goodbye!
```