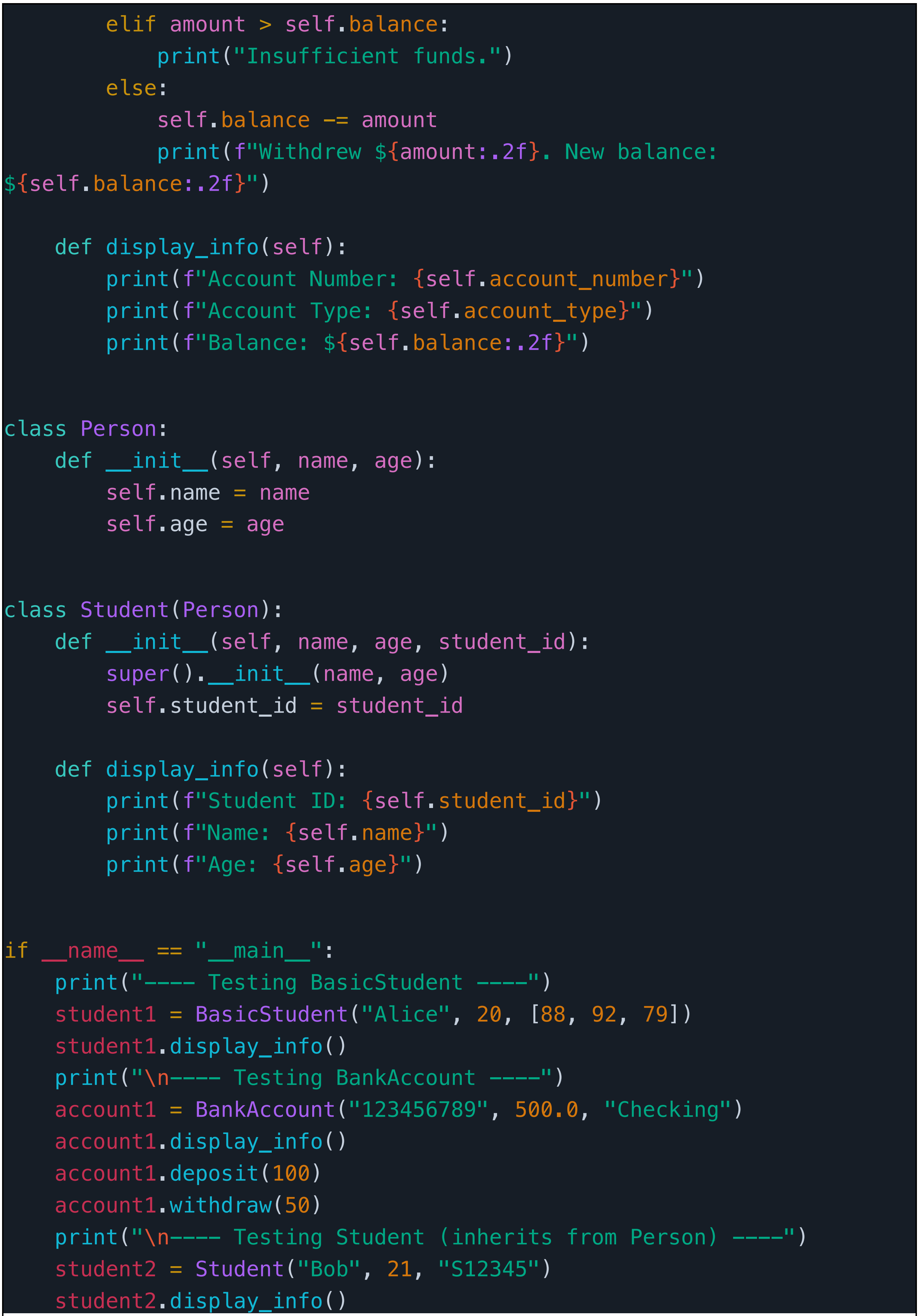
Assignment 4

4.1 Class

Aim: Create a student class with attributes for name, age, and grades, and methods to calculate the average grade and display student information.
Create a BankAccount class with attributes for account number, balance, and account type, and methods to deposit, withdraw, and display account information.
Create a Person superclass with attributes for name and age, and a Student subclass that inherits from Person and adds an attribute for student ID and a method to display student information.

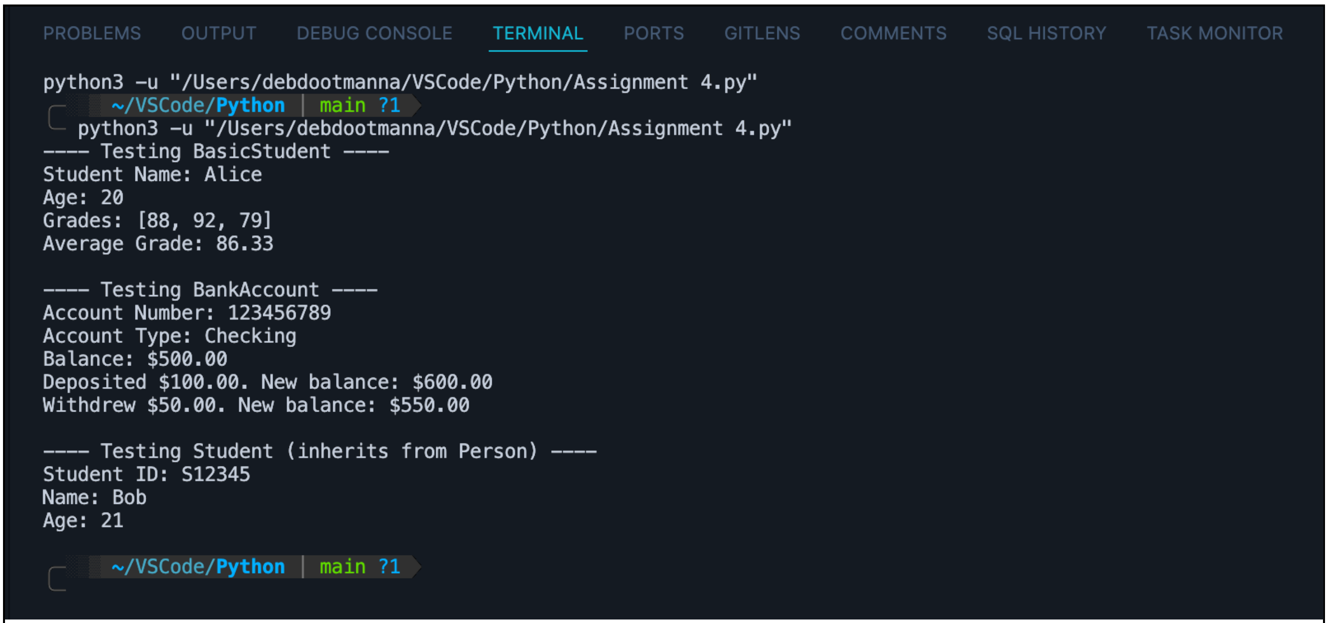
Code:

```python
class BasicStudent:
    def __init__(self, name, age, grades):
        self.name = name
        self.age = age
        self.grades = grades  # list of numeric grades

    def average_grade(self):
        if not self.grades:
            return 0
        return sum(self.grades) / len(self.grades)

    def display_info(self):
        print(f"Student Name: {self.name}")
        print(f"Age: {self.age}")
        print(f"Grades: {self.grades}")
        print(f"Average Grade: {self.average_grade():.2f}")


class BankAccount:
    def __init__(self, account_number, balance, account_type):
        self.account_number = account_number
        self.balance = balance
        self.account_type = account_type

    def deposit(self, amount):
        if amount > 0:
            self.balance += amount
            print(f"Deposited ${amount:.2f}. New balance: 
${self.balance:.2f}")
        else:
            print("Deposit amount must be positive.")

    def withdraw(self, amount):
        if amount <= 0:
            print("Withdrawal amount must be positive.")
```



```
        elif amount > self.balance:
            print("Insufficient funds.")
        else:
            self.balance -= amount
            print(f"Withdrew ${amount:.2f}. New balance:
${self.balance:.2f}")

    def display_info(self):
        print(f"Account Number: {self.account_number}")
        print(f"Account Type: {self.account_type}")
        print(f"Balance: ${self.balance:.2f}")


class Person:
    def __init__(self, name, age):
        self.name = name
        self.age = age


class Student(Person):
    def __init__(self, name, age, student_id):
        super().__init__(name, age)
        self.student_id = student_id

    def display_info(self):
        print(f"Student ID: {self.student_id}")
        print(f"Name: {self.name}")
        print(f"Age: {self.age}")


if __name__ == "__main__":
    print("---- Testing BasicStudent ----")
    student1 = BasicStudent("Alice", 20, [88, 92, 79])
    student1.display_info()
    print("\n---- Testing BankAccount ----")
    account1 = BankAccount("123456789", 500.0, "Checking")
    account1.display_info()
    account1.deposit(100)
    account1.withdraw(50)
    print("\n---- Testing Student (inherits from Person) ----")
    student2 = Student("Bob", 21, "S12345")
    student2.display_info()
```

Output Screenshot:



```
python3 -u "/Users/debdootmanna/VSCode/Python/Assignment 4.py"
  ~/VSCode/Python | main ?1
 python3 -u "/Users/debdootmanna/VSCode/Python/Assignment 4.py"
---- Testing BasicStudent ----
Student Name: Alice
Age: 20
Grades: [88, 92, 79]
Average Grade: 86.33

---- Testing BankAccount ----
Account Number: 123456789
Account Type: Checking
Balance: $500.00
Deposited $100.00. New balance: $600.00
Withdrew $50.00. New balance: $550.00

---- Testing Student (inherits from Person) ----
Student ID: S12345
Name: Bob
Age: 21

  ~/VSCode/Python | main ?1
```

Conclusion/Summary:

This assignment demonstrates the implementation and usage of object-oriented programming in Python by creating multiple classes with distinct responsibilities. The code includes:

A BasicStudent class that calculates and displays a student's average grade.
A BankAccount class that manages account transactions such as deposits and withdrawals, displaying the account details.
A Person superclass and a Student subclass to illustrate inheritance, where the Student class extends functionality by including a student ID attribute.
Together, these classes showcase principles such as encapsulation and inheritance, laying a solid foundation for more complex class interactions in future projects.

Student Signature & Date	**Marks:**	**Evaluator Signature & Date**