NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
PROGRAM: SOFTWARE ENGINEERING

SOFTWARE CONSTRUCTION AND DEVELOPMENT LAB

LAB TASK 08

SUBMITTED BY:

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A DEPARTMENT OF COMPUTER SCIENCE

Issues find Using flake8:

- Number of errors and warnings, especially focusing on naming conventions (For Example: class and function names in snake_case)

- Naming issues for classes, methods, or variables

- Line length exceeding the recommended limit

- Unused imports

You can see the issues in python code when I first used flake8 command on python file below:

```
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ flake8 scrypt.py
scrypt.py:1:1: F401 'math' imported but unused
scrypt.py:1:1: F401 'sys' imported but unused
scrypt.py:1:14: E401 multiple imports on one line
scrypt.py:2:1: E302 expected 2 blank lines, found 0
scrypt.py:2:8: N801 class name 'account' should use CapWords convention
scrypt.py:7:5: E301 expected 1 blank line, found 0
scrypt.py:10:5: E301 expected 1 blank line, found 0
scrypt.py:16:1: E302 expected 2 blank lines, found 0
scrypt.py:16:8: N801 class name 'saving' should use CapWords convention
scrypt.py:20:5: E301 expected 1 blank line, found 0
scrypt.py:24:1: E302 expected 2 blank lines, found 0
scrypt.py:27:5: E301 expected 1 blank line, found 0
scrypt.py:32:1: E302 expected 2 blank lines, found 0
scrypt.py:32:6: N802 function name 'Transaction_history' should be lowercase
scrypt.py:37:1: E305 expected 2 blank lines after class or function definition, found 0
scrypt.py:43:15: W292 no newline at end of file
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$
```

Issues find Using pylint:

- Naming conventions

- Missing or improper docstrings

- logical errors (Example: incorrect method names or misuse of inheritance).

- inefficient patterns

```
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ pylint scrypt.py
************* Module scrypt
scrypt.py:43:0: C0304: Final newline missing (missing-final-newline)
scrypt.py:1:0: C0114: Missing module docstring (missing-module-docstring)
scrypt.py:1:0: C0410: Multiple imports on one line (random, math, datetime, sys) (multiple-imports)
scrypt.py:2:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:2:0: C0103: Class name "account" doesn't conform to PascalCase naming style (invalid-name)
scrypt.py:6:8: C0103: Attribute name "acctType" doesn't conform to snake_case naming style (invalid-name)
scrypt.py:7:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:10:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:16:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:16:0: C0103: Class name "saving" doesn't conform to PascalCase naming style (invalid-name)
scrypt.py:20:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:24:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:25:4: W0246: Useless parent or super() delegation in method '__init__' (useless-parent-delegation)
scrypt.py:27:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:31:8: E1101: Super of 'Current' has no 'Withdraw' member (no-member)
scrypt.py:32:0: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:32:0: C0103: Function name "Transaction_history" doesn't conform to snake_case naming style (invalid-name)
scrypt.py:33:4: W0621: Redefining name 'history' from outer scope (line 42) (redefined-outer-name)
scrypt.py:1:0: W0611: Unused import math (unused-import)
scrypt.py:1:0: W0611: Unused import sys (unused-import)

------------------------------------------------------------
Your code has been rated at 4.42/10 (previous run: 4.42/10, +0.00)
```

Applying Black:

I'll apply Black to standardize the code style. The key changes from Black should be:

- Consistent indentation and line breaks.
- Standardized quotation marks.

```
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ black scrypt.py
reformatted scrypt.py

All done! ✨ 🍰 ✨
1 file reformatted.
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$
```

Re-running Flake8 and Pylint After Black:

FLAKE8:

```
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ flake8 scrypt.py
scrypt.py:1:1: F401 'math' imported but unused
scrypt.py:1:1: F401 'sys' imported but unused
scrypt.py:1:14: E401 multiple imports on one line
scrypt.py:4:8: N801 class name 'account' should use CapWords convention
scrypt.py:22:8: N801 class name 'saving' should use CapWords convention
scrypt.py:44:6: N802 function name 'Transaction_history' should be lowercase
scrypt.py:57:15: W292 no newline at end of file
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$
```

PYLINT:

```
scrypt.py:57:0: C0304: Final newline missing (missing-final-newline)
scrypt.py:1:0: C0114: Missing module docstring (missing-module-docstring)
scrypt.py:1:0: C0410: Multiple imports on one line (random, math, datetime, sys) (multiple-imports)
scrypt.py:4:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:4:0: C0103: Class name "account" doesn't conform to PascalCase naming style (invalid-name)
scrypt.py:8:8: C0103: Attribute name "acctType" doesn't conform to snake_case naming style (invalid-name)
scrypt.py:10:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:14:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:22:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:22:0: C0103: Class name "saving" doesn't conform to PascalCase naming style (invalid-name)
scrypt.py:27:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:33:0: C0115: Missing class docstring (missing-class-docstring)
scrypt.py:34:4: W0246: Useless parent or super() delegation in method '__init__' (useless-parent-delegation)
scrypt.py:37:4: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:41:8: E1101: Super of 'Current' has no 'Withdraw' member (no-member)
scrypt.py:44:0: C0116: Missing function or method docstring (missing-function-docstring)
scrypt.py:44:0: C0103: Function name "Transaction_history" doesn't conform to snake_case naming style (inva
scrypt.py:45:4: W0621: Redefining name 'history' from outer scope (line 56) (redefined-outer-name)
scrypt.py:1:0: W0611: Unused import math (unused-import)
scrypt.py:1:0: W0611: Unused import sys (unused-import)


------------------------------------------------------------------
Your code has been rated at 4.42/10 (previous run: 4.42/10, +0.00)
```

STILL THERE WERE ISSUES LEFT BUT IN (*FLAKE8*) AFTER Running BLACK A NUMBER OF ISSUES WERE SOLVED WHILE THERE IS NO EFFECTS OBSERVED IN (*PYLINT)* NUMBER OF ISSUES.

Manual Refactoring and Final Code Review:

Improvements To Be Made:

- Proper naming conventions.
- Removed unused imports (math, sys).
- Corrected logical issues in CurrentAccount.withdraw by properly calling super().withdraw(amount).

RESULTS OF PYLINT AND FLAKE8 AFTER REFACTORING THE CODE:

```
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ pylint scrypt.py

------------------------------------------------------------
Your code has been rated at 10.00/10 (previous run: 9.32/10, +0.68)

(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ flake8 scrypt.py
(.venv) amei-302@amei302-HP-EliteBook-840-G3:/media/amei-302/New Volume/SEMESTER V/SCD LAB/LAB_TASK_08/Lab_Task_8$ []
```

Detailed Explanation of Changes: (the refactored .py file is attached in gcr sir)

1. **Adding Docstring**:

   - **Initial Issue**: Pylint flagged the code as missing a module docstring, a module docstring is essential for documenting the modules functionality

   - **Solution**: A concise docstring was added at the top of the module to describe the codes purpose, which improves readability and provides context for other developers

2. **Naming Conventions**:

   - **Initial Issue**: The initial code had non-standard naming conventions (e.g., account, fun1, fun2, Transaction_history) Pylint and Flake8 enforce PEP 8 naming conventions to ensure consistency

   - **Solution**: Renamed classes, methods, and functions following PEP 8 standards:

- account to Account
- saving to SavingAccount
- fun1 to deposit
- fun2 to withdraw
- Transaction_history to generate_transaction_history

- **Result**: Improved code readability and consistency with PEP 8 guidelines

3. **Removing Unused Imports**:

   - **Initial Issue**: The initial code imported math and sys, though neither was used, this redundancy can increase the memory

   - **Solution**: Removed math and sys, keeping only relevant imports (random and datetime) Flake8 often flags unused imports as it's good practice to keep code concise

4. **Useless Parent Delegation in CurrentAccount.__init__**:

   - **Initial Issue**: The CurrentAccount class had an __init__ method that simply called super().__init__, creating redundant delegation

   - **Solution**: Removed CurrentAccount.__init__, as the superclass Account already initializes the necessary attributes

   - **Result**: Reduced redundancy and improved readability

5. **Correcting Typo in Method Call**:

   - **Initial Issue**: In CurrentAccount, the method super().Withdraw(amount) was incorrect due to capitalization, as the correct method is withdraw

   - **Solution**: Corrected the call to super().withdraw(amount)

   - **Result**: This fixes a runtime error, ensuring the withdraw functionality works as expected in CurrentAccount

6. **Renaming Transaction_history and history**:

   - **Initial Issue**: The Transaction_history function and history variable shared a name, creating ambiguity in the code

   - **Solution**: Renamed Transaction_history to generate_transaction_history and history to transaction_history

   - **Result**: Avoided namespace conflicts, which is especially important for readability and when debugging larger programs

7. **Adding Class and Method Docstrings**:

    - **Initial Issue**: The initial code was missing docstrings for its classes and methods, which Pylint checks for

    - **Solution**: Added meaningful docstrings to the Account, SavingAccount, and CurrentAccount classes, as well as to each method

    - **Result**: Enhanced documentation, making the code easier to understand and maintain

Final Result After Refactoring

The final refactored code is now according to Pylint and Flake8 standards, eliminating:

- Naming convention errors.
- Unnecessary imports.
- Redundant initializer methods.
- Namespace conflicts.
- Missing docstrings.