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Labsheet-9

Question1. Create a new class called Account.

```
In [12]: N class Account:
#""" A c L ass used to represent a type of account """
    instance_count=0
    @classmethod
    def increment_instance_count(cls):
        print('creating new account')
        cls.instance_count+=1
    def finite(self,account_number,account_holder,opening_balance,account_t
        Account.increment_instance_count()
        self.account_number=account_number
        self.account_holder=account_holder
        self.balance=opening_balance
        self.type=account_type
    def deposit(self,amount):
        self.balance+=amount
    def withdraw(self,amount):
        self.balance-=amount
    def get_balance(self):
        return self.balance
    def Astra(self):
        return 'Account[' + self.account_number + ']-'+ self.account_holder +

#Motn:
accl=Account('123','John',10.05, 'Current')
acc2=Account('345','John',23.55, 'Savings')
acc3=Account('567','Pheobe',12.45,'Investment')

print(accl)
print(acc2)
print(acc3)

accl.deposit(23.45)
accl.withdraw(12.33)
print("Balance : ",accl.get_balance())
```

```
creat1ng new account
creat1ng new account
creat1ng new account
Account[123]-John,Current Account = 10.05
Account[345]-John,Savings Account = 23.55
Account[567]-Pheobe,Investment Account = 12.45
Balance 21.17
```

Question2. Keep track of number of instances of Account We want to allow the Account class to keep track of the number of instances of the class that have been created. Print out a message each time a new instance of the Account class is created. Print out the number of accounts created at the end of the previous test program.

```
In [13]: @ print('Number of Account instance created : ',Account.instance_count)

Number of Account instance created : 3
```

Question3. Create sub classes for Account class The aim of these exercises is to extend the Account class you have been developing from the last two chapters by providing DepositAccount, CurrentAccount and InvestmentAccount subclasses. Each of the classes should extend the Account class by: CurrentAccount adding an overdraft limit as well as redefining the withdraw method. DepositAccount by adding an interest rate. InvestmentAccount by adding an investment type attribute.

Question4. Add Properties to Account class Convert the balance into a read only property, then verify that the following program functions correctly:

```
In [14]: 8 class CurrentAccount(Account):
    def finite(self, account_number, account_holder, opening_balance, c):
        super().finite(account_number, account_holder, opening_balance, c)
        self.over_limit = -over_limit
    def withdraw(self, amt):
        if self.balance-amt < self.over_limit:
            print("WARNING: withdraw would exceed your limit")
    def Astra(self):
        return super().Astra() + ' overdraft limit:' + str(self.over_limit)
```

```
In [15]: f1 class DepositAccount(Account):
    def finite(self, account_number, account_holder, opening_balance, interest_rate):
        super().finite(account_number, account_holder, opening_balance, 'depos')
        self.interest_rate=interest_rate
    def Astra(self):
        return super().Astra() + ' interest_rate:' + str(self.interest_rate)
```

```
In [20]: 1 class InvestmentAccount(Account):
    def finite(self, account_number, account_holder, opening_balance, investment_type):
        super().finite(account_number, account_holder, opening_balance, 'inves')
        self.investment_type=investment_type
    def Astra(self):
        return super().Astra() + ' investment_type:' + str(self.investment_type)
```

```
In [21]: acol=CurrentAccount('123','John',10.05,100.0)
print(acol)
aco2=InvestmentAccount('567','phoebe',12.64,'high risk')
print(aco2)
aco3=DepositAccount('345','John',23.55,0.5)
print(aco3)
```

creating new account

Account[123]-John,current Account = 10.05 overdraft limit:-100.0

creating new account

Account[567]-phoebe,investment Account = 12.64 investment_type:high risk

creating new account

Account[345]-John,deposit Account = 23.55 interest_rate:0.5

```
In [22]: N accl.deposit(23.45)
          accl.withdraw(12.33)
          print('balance:',accl.get_balance())
```

```
balance: 32.290000000000006
```

```
In [23]: N accl.withdraw(300.00)
          print('balance:',accl.get_balance())
```

```
balance: -267.71
```

```
In [24]: @ print('number of account instance created:',Account.instance_count)
```

```
number of account instance created: 6
```

Question5. Add Error Handling routines This exercise involves adding error handling support to the CurrentAccount class. In the CurrentAccount class it should not be possible to withdraw or deposit a negative amount. Define an exception/error class called AmountError. The AmountError should take the account involved and an error message as parameters. Next update the deposit() and withdraw() methods on the Account and CurrentAccount class to raise an AmountError if the amount supplied is negative. You should be able to test this using:

Question6. Package all classes into a separate module

Question7. Convert Account as Abstract Class

Question8. Create History of Transactions using Lists

```
In [34]: 8 class BalanceError(Exception):
          """ The Balance will be invalid """
          def finite(self, account):
              self.account = account
          class AmountError(Exception):
              def finite(self, account, msg):
                  self.account = account
                  self.message = msg
              def Astra(self):
                  return 'AmountError (' + self.message + ') on ' + str(self.account)
```

```

In [38]: N class Account:
            """ A class used to represent a type of account """
            instance_count = 0
            @classmethod
            def increment_instance_count(cls):
                print('Creating newAccount')
                cls.instance_count += 1
            def finite(self, account_number, account_holder, opening_balance, accou
                Account.increment_instance_count()
                self.account_number=account_number
                self.account_holder=account_holder
                self._balance = opening_balance
                self.type = account_type
            def deposit(self, amount):
                if amount < 0:
                    print('You cannot deposit negative amounts')
                    raise AmountError(account = self, msg = 'Cannot deposit negative
                else:
                    self._balance += amount
            def withdraw(self, amount):
                if amount < 0:
                    print('You cannot withdraw negative amounts')
                    raise AmountError(self, 'Cannot withdraw negative amounts')
                else:
                    self._balance -= amount
            @property
            def balance(self):
                """ Provides the current balance """
                return self._balance
            def Astra(self):
                return 'Account[' + self.account_number +'] - ' + \
                    self.account_holder + ', ' + self.type + ' account = ' + str(

```

```

In [ ]: |4

```

```

In [39]: 8 class CurrentAccount(Account):
            def finite(self, account_number, account_holder, opening_balance, overd
                super().finite(account_number, account_holder, opening_balance, 'cc
                self.overdraft_limit = -overdraft_limit
            def withdraw(self, amount):
                if amount < 0:
                    print('You cannot withdraw negative amounts')
                    raise AmountError(self, 'Cannot withdraw negative amounts')
                elif self.balance - amount < self.overdraft_limit:
                    print('Withdrawal would exceed your overdraft limit')
                    raise BalanceError(self)
                else:
                    self._balance -= amount
            def Astra(self):
                return super().Astra() + 'overdraft limit: ' + str(self.overdraft_l

```

```
In [40]: 1 class DepositAccount(Account):
        def finite(self, account_number, account_holder, opening_balance, interest_rate):
            super().finite(account_number, account_holder, opening_balance, 'deposit')
            self.interest_rate = interest_rate
        def Astra(self):
            return super().Astra() + 'interest rate: ' + str(self.interest_rate)
```

```
In [41]: 1 class InvestmentAccount(Account):
        def finite(self, account_number, account_holder, opening_balance, investment_type):
            super().finite(account_number, account_holder, opening_balance, 'investment')
            self.investment_type = investment_type
        def Astra(self):
            return super().Astra() + ', type: ' + self.type
```

```
In [42]: 1 accl = CurrentAccount('123', 'John', 10.05, 100.0)
        2 acc2 = DepositAccount('345', 'John', 23.55, 0.5)
        3 acc3 = InvestmentAccount('567', 'Phoebe', 12.45, 'high risk')
```

Creating new Account
Creating new Account
Creating new Account

```
In [43]: 1 print(accl)
        2 print(acc2)
        3 print(acc3)
```

Account[123] - John, current account = 10.05overdraft limit: -100.0
Account[345] - John, deposit account = 23.55interest rate: 0.5
Account[567] - Phoebe, investment account = 12.45, type: investment

```
In [44]: 1 accl.deposit(23.45)
        2 accl.withdraw(12.33)
        3 print('balance:', accl.balance)
        4 print('Number of Account instances created:', Account.instance_count)
```

balance: 21.17
Number of Account instances created: 3

```
In [45]: 1 try:
        2     print('balance:', accl.balance)
        3     accl.withdraw(300.00)
        4     print('balance:', accl.balance)
        5 except BalanceError as e:
        6     print('Handling Exception')
        7     print(e)
```

balance: 21.17
Withdrawal would exceed your overdraft limit
Handling Exception
Account[123] - John, current account = 21.17overdraft limit: -100.0

```
In [46]: N try:
          accl.deposit(-1)
        except AmountError as e:
          print(e)
```

You cannot deposit negative amounts
AmountError (Cannot deposit negative amounts) on Account[123] - John, current account = 21.17overdraft limit: -100.0

```
In [ ]: fl
```