HW04

202255595 임영훈

-HW04_A_main

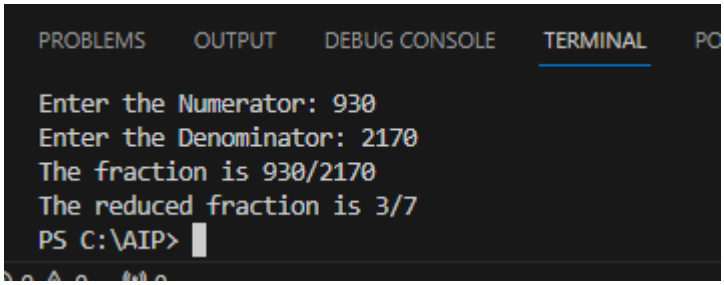
```python
from HW04_A_classes_임영훈 import *

def main():
    numerator = eval(input('Enter the Numerator: '))
    denominator = eval(input('Enter the Denominator: '))

    fraction = Fraction(numerator, denominator)
    fraction.print()

    reduced_fraction = IrreducibleFraction(numerator, denominator)
    reduced_fraction.print()

main()
```

-HW04_A_classes

```python
class Fraction():
    def __init__(self, numerator=0, denominator=1):
        self._numerator = numerator             #생성자를 이용해 filed를 초기화 해준다
        self._denominator = denominator

    def getNumerator(self):
        return self._numerator                  #numerator return

    def setNumerator(self, value):
        self._numerator = value                 #numerator를 value 값으로 바꾼다

    def getDenominator(self):
        return self._denominator                #denominator return

    def setDenominator(self, value):
        self._denominator = value               #denominator를 value 값을 바꾼다

    def print(self):                            #원하는 형식으로 출력
        print("The fraction is {}/{}".format(self._numerator, self._denominator))

```

```python

class IrreducibleFraction(Fraction):
    def __init__(self, numerator=0, denominator=1):
        #super()을 이용하여 numerator와 denominator를 초기화 한다
        super().__init__(numerator, denominator)
        gcd = self._GCD(numerator, denominator)     #두 수의 GCD를 구한다
        self._numerator /= gcd                      #gcd로 나눈수를 저장한다
        self._denominator /= gcd                    #gcd로 나눈수를 저장한다

    def _GCD(self, m, n):
        #유클리드 알고리즘을 이용하여 최대 공약수를 구하여 m에 저장한다
        if (n>m):
            temp = n
            n = m
            m = temp

        while (n > 0):
            m,n = n, m%n    #-------------유클리드 알고리즘-----------------

        return m    #GCD return

    def print(self):        #출력 형식에 맞게 출력한다
        print("The reduced fraction is {0:.0f}/{1:.0f}".format(self._numerator, self._denominator))

```

- HW04_A 실행 결과



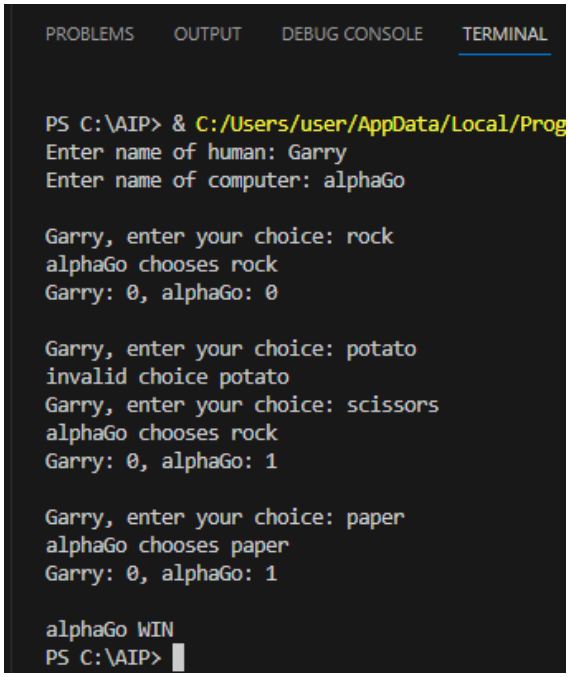
-HW04_B_main

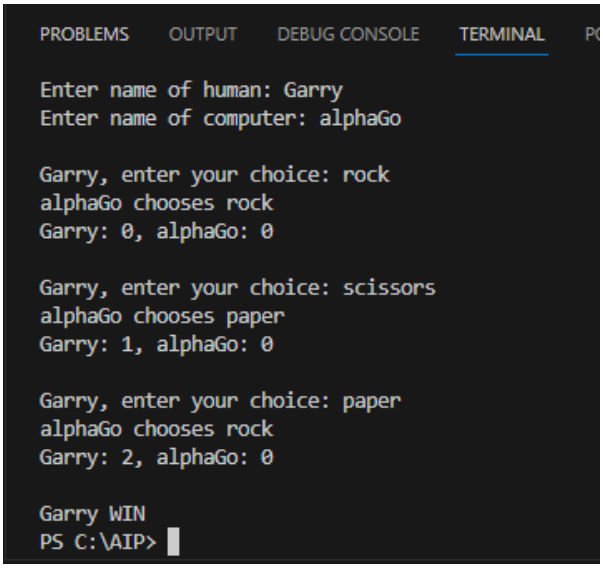
```python
from HW04_B_classes_임영훈 import *

def main():
    humanName = input("Enter name of human: ")          #human의 이름을 입력받음
    computerName = input("Enter name of computer: ")    #computer의 이름을 입력받음
    human = Human(humanName)                            #Human object를 만든다
    computer = Computer(computerName)                   #Computer object를 만든다

    for i in range(3):                                  #3번 반복한다
        print()
        playGame(human, computer)                       #가위바위보 한판을 한다
        #가위바위보 결과를 출력
        print("{}: {}, {}: {}".format(human.getName(), human.getScore(),\
                                      computer.getName(), computer.getScore()))
    print()
    if human.getScore() == computer.getScore():         #점수가 같으면 TIE 출력
        print("TIE")
    elif human.getScore() > computer.getScore():        #human의 점수가 더 높으면
        print(human.getName() + " WIN")                 #human이 이겼다고 출력
    else:                                               #computer의 점수가 더 높으면
        print(computer.getName() + " WIN")              #computer가 이겼다고 출력

def playGame(h, c):
    choiceH = h.makeChoice()
    choiceC = c.makeChoice()

    if choiceH == choiceC:
        pass
    elif judge(choiceH, choiceC):
        h.setScore(h.getScore() + 1)
    else:
        c.setScore(c.getScore() + 1)

def judge(choiceH, choiceC):
    if ((choiceH == 'rock' and choiceC == 'scissors') or
        (choiceH == 'paper' and choiceC == 'rock') or
        (choiceH == 'scissors' and choiceC == 'paper')):
        return True
    else:
        return False

main()
```

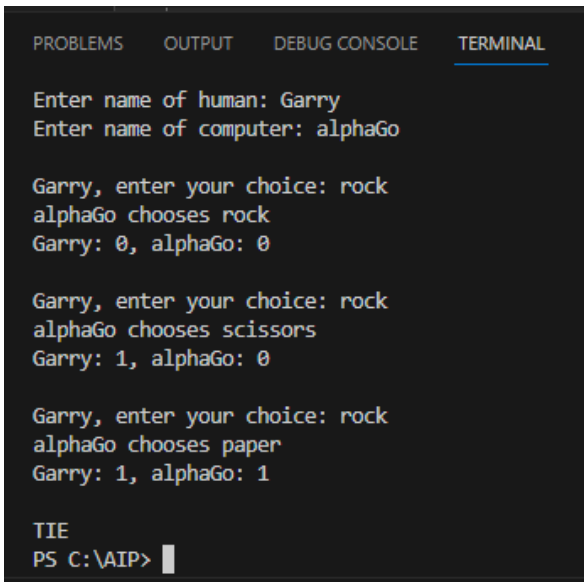
-HW04_B_classes

```python
import random
class Contestant:
    def __init__(self, name="", score=0):
        self._name = name                       #생성자를 이용하여 filed를 초기화
        self._score = score

    def getName(self):
        return self._name                       #name을 return

    def getScore(self):
        return self._score                      #score를 return

    def setScore(self,value):
        self._score = value                     #score를 value 값으로 바꿈

class Human(Contestant):
    def makeChoice(self):
        choice = input(self._name +", enter your choice: ") #사용자의 선택을 입력받음

        #사용자의 입력이 rock, scissors, paper가 아니면 계속 반복
        while choice != 'rock' and choice != 'scissors' and choice != 'paper' :
            print("invalid choice " + choice)                   #오류 메세지 출력
            choice = input(self._name +", enter your choice: ") #다시 입력받음

        return choice           #입력받은 choice를 return

class Computer(Contestant):
    def makeChoice(self):
        choice = random.randint(1,3)    #1에서 3까지 랜덤한 수 생성

        if choice == 1:         #1일경우
            choice = 'rock'     #computer의 선택이 rock이 됨
        elif choice == 2:       #2일경우
            choice = 'scissors' #computer의 선택이 scissors가 됨
        elif choice == 3:       #3일경우
            choice = 'paper'    #computer의 선택이 paper가 됨
        print(self._name + " chooses " + choice)    #computer의 choice 출력
        return choice           #computer의 랜덤 choice return

```

- HW04_B 실행 결과


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PS C:\AIP> & C:/Users/user/AppData/Local/Prog
Enter name of human: Garry
Enter name of computer: alphaGo
Garry, enter your choice: rock
alphaGo chooses rock
Garry: 0, alphaGo: 0
Garry, enter your choice: potato
invalid choice potato
Garry, enter your choice: scissors
alphaGo chooses rock
Garry: 0, alphaGo: 1
Garry, enter your choice: paper
alphaGo chooses paper
Garry: 0, alphaGo: 1
alphaGo WIN
PS C:\AIP>


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
Enter name of human: Garry
Enter name of computer: alphaGo
Garry, enter your choice: rock
alphaGo chooses rock
Garry: 0, alphaGo: 0
Garry, enter your choice: scissors
alphaGo chooses paper
Garry: 1, alphaGo: 0
Garry, enter your choice: paper
alphaGo chooses rock
Garry: 2, alphaGo: 0
Garry WIN
PS C:\AIP>


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
Enter name of human: Garry
Enter name of computer: alphaGo
Garry, enter your choice: rock
alphaGo chooses rock
Garry: 0, alphaGo: 0
Garry, enter your choice: rock
alphaGo chooses scissors
Garry: 1, alphaGo: 0
Garry, enter your choice: rock
alphaGo chooses paper
Garry: 1, alphaGo: 1
TIE
PS C:\AIP>