

Report for assignment 2

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Exercise 1:

1. Problem statement

In exercise 1, a sub class should be derived from the base class. The sub class should have the function that to represent the mixed fraction. At the same time, all the operators defined for the Fraction class in the previous assignment should be overloaded so that the sub class have the same operation to fulfill the requirement. Also, the sub class should have a method to convert a fraction into the mixed fraction form.

2. Analysis

a) Inputs and outputs

Input: three different part of the mixed fraction including the front, the top and the bottom

Output: two different forms of the fraction

b) Basic operation

In class **iFraction**, it should contain:

```
iFraction add(iFraction a);  
iFraction sub(iFraction a);  
iFraction mul(iFraction a);  
iFraction div(iFraction a);  
iFraction com(iFraction a);
```

All these above, they are similar with the method in class Fraction. To overload all the operation in the Fraction class, all the algorithm should be suitable for the new form of the fraction. Therefore, all the mixed fraction can be changed into normal form, which only have the top and the bottom. The return value will only have the top and the bottom. After calling simplify() method, the fraction will be converted in to mixed fraction. Once the transform has completed, all the operation would be the same as the Fraction class.

c) iFraction convertF(Fraction a):

The **convertF** should be the friend function of class **Fraction** and **iFraction**.

d) void iFraction::simplify():

The simplification will be done and then convert the input into the mixed fraction.

e) void iFraction::output():

The output method is to print out the mixed fraction in the form of "front (top / bottom)".

3. Design

a) Five basic operation method:

```
iFraction add(iFraction a);  
iFraction sub(iFraction a);  
iFraction mul(iFraction a);  
iFraction div(iFraction a);  
iFraction com(iFraction a);
```

The input value consists of three parts including front, top and bottom. Each method above will transfer mixed fraction into normal form fraction and then do the operation. The return value will also only have the top and the bottom value.

b) void iFraction::simplify():

The simplification of the fraction is about to find the greatest common divisor and transform it into the simplest form. After the simplification, get the front by dividing the top with the bottom and convert it into the mixed fraction.

c) iFraction convertF(Fraction a):

This function should be the friend function of class Fraction and iFraction. Since the requirement is to convert the fraction into mixed fraction, the argument should be a object from class Fraction and the returned value should be a iFraction object. By obtaining the top and the bottom, use the same method to convert into mixed fraction.

4. Implementation

File name: Exercise 1 in "1929926"

5. Testing

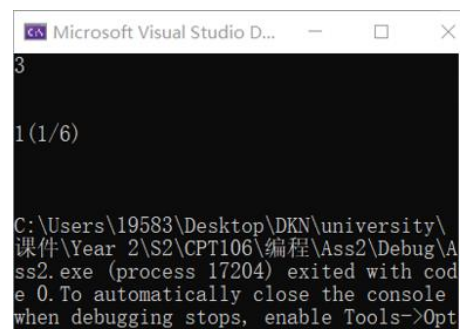
a) Addition

The source code:

```
iFraction a1(1, 1, 2);
iFraction a2(1, 1, 2);
(a1.add(a2)).output();
cout << endl << endl;

iFraction a3(1, -1, 3);
iFraction a4(0, 1, 2);
(a3.add(a4)).output();
cout << endl << endl;
```

The result:



```
Microsoft Visual Studio D...
3
1 (1/6)

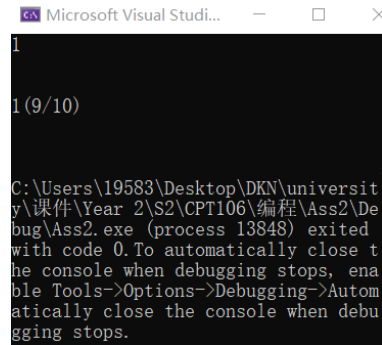
C:\Users\19583\Desktop\DKN\university\
课件\Year 2\S2\CPT106\编程\Ass2\Debug\A
ss2.exe (process 17204) exited with cod
e 0. To automatically close the console
when debugging stops, enable Tools->Opt
```

b) Subtract

The source code:

```
iFraction a5(2, 2, 4);  
iFraction a6(1, 1, 2);  
(a5.sub(a6)).output();  
cout << endl << endl;  
  
iFraction a7(2, 2, 5);  
iFraction a8(0, 1, 2);  
(a7.sub(a8)).output();  
cout << endl << endl;
```

The result:



Microsoft Visual Studio...
1
1 (9/10)

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y\课件\Year 2\S2\CPT106\编程\Ass2\De
bug\Ass2.exe (process 13848) exited
with code 0. To automatically close t
he console when debugging stops, ena
ble Tools->Options->Debugging->Autom
atically close the console when debu
gging stops.

c) Multiply

The source code:

```
iFraction a9(2, 2, 5);  
iFraction a10(0, 1, 2);  
(a9.mul(a10)).output();  
cout << endl << endl;  
  
iFraction a11(0, 2, 5);  
iFraction a12(0, 1, 2);  
(a11.mul(a12)).output();  
cout << endl << endl;
```

The result:



1 (1/5)

0 (1/5)

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y\课件\Year 2\S2\CPT106\编程\Ass2\De
bug\Ass2.exe (process 16968) exited
with code 0.

d) Divide

The source code:

```
iFraction a13(0, 4, 5);  
iFraction a14(0, 1, 2);  
(a13.div(a14)).output();  
cout << endl << endl;  
  
iFraction a15(0, 1, 1);  
iFraction a16(1, 1, 2);  
(a15.div(a16)).output();  
cout << endl << endl;
```

The result:



1 (3/5)

0 (2/3)

C:\Users\19583\Desktop\DKN\universit
y\课件\Year 2\S2\CPT106\编程\Ass2\De
bug\Ass2.exe (process 10720) exited
with code 0.

e) Comparison

The source code:

```
iFraction a17(0, 1, 2);  
iFraction a18(1, 1, 2);  
a17.com(a18);  
cout << endl << endl;  
  
iFraction a19(0, 2, 4);  
iFraction a20(0, 1, 2);  
a19.com(a20);  
cout << endl << endl;
```

The result:

```
1 (3/5)  
  
0 (2/3)  
  
C:\Users\19583\Desktop\DKN\universit  
y\课件\Year 2\S2\CPT106\编程\Ass2\De  
bug\Ass2.exe (process 10720) exited  
with code 0.
```

f) Conversion

The source code:

```
Fraction a21(13, 5);  
(convertF(a21)).output();
```

The result:

```
2 (3/5)  
  
C:\Users\19583\Desktop\DKN\universit  
y\课件\Year 2\S2\CPT106\编程\Ass2\De  
bug\Ass2.exe (process 17016) exited  
with code 0.
```

From these examples above, we can see that all the results meet the requirement of the question.

Exercise 2:

1. Problem statement

By using the source code, a game should be completed. In this game, player can choose 3 different jobs, which are swordsman, archer and mage and use different items to against three types of enemies.

2. Analysis

Including three different jobs, there 5 source files, 5 header files and one main file. Each source file should include corresponding header file. Also, three job header files should include "player.h".

a) **int main():**

Including some header files.

A random function will be used to make the enemy have a random job.

Variable enemy should be the pointer to make the programming more easier.

b) **swordsman():**

Including some header files.

Make a few modifications about the data in terms of AP, DP, HP and MP.

Rename the skill.

c) **archer():**

Including some header files.

Make a few modifications about the data in terms of AP, DP, HP and MP.

Rename the skill.

d) **mage():**

Including some header files.

Make a few modifications about the data in terms of AP, DP, HP and MP.

Rename the skill.

e) **Others:**

Rearrange the **showrole()** method to make it more easier to check the information.

3. Design

a) For the 7 blanks, they should be as followings:

1. `#ifndef _CONTAINER`

2. `numOfHeal--;`

3. `bag.set(bag.nOfHeal()+p.bag.nOfHeal(),bag.nOfMW()+p.bag.nOfMW());`

4. `void showinfo(player &p1, player &p2)`

5. `public player`

6. `delete human;`

7. `delete human;`

b) **int main():**

```
#include "swordsman.h"
#include "archer.h"
#include "mage.h"
```

If the enemy could be random, it will be easier to set the variable enemy to be a pointer. Also, the variable human and enemy should be initialized. Use random function to get a random integer and get the remainder of it divided by 3. Therefore, switch to three different types of enemy. However, variable enemy is a pointer so that it should be deleted with the variable human.

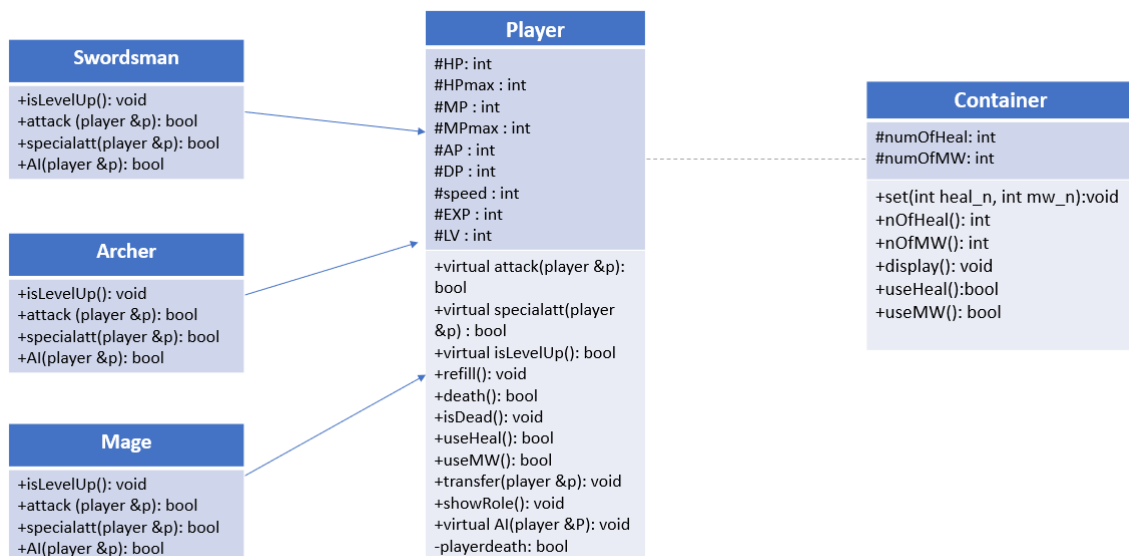
c) **Player.h:**

The original code of the enemy is defined as the swordsman so that no pointer method is used. However, in order to make enemy to have a random job, the variable enemy is set to be a pointer. However, **AI()** is method in three different job source files. Therefore, the declaration in the **player** header file is needed to get each **AI()** of three jobs. The declaration is demonstrated in the following:
virtual void AI(player &p)=0;

d) Other:

Considering the characteristics of each jobs, HP, MP, AP and DP will be different to each other. Also, it will be different when the player is level up.

e) The UML diagram



4. Implementation

File name: Exercise 2 in "1929926"

5. Testing

a) three enemy will be chosen randomly

The swordsman:

C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

```
#####
# Player          Duan          # Opponent      Warrior      #
# -----          # -----          #
# LV. 1           # LV. 1           #
# -----          # -----          #
# Job:   Swordsman # Job:   Swordsman #
# -----          # -----          #
# HP 150/150 | MP 75/ 75 # HP 150/150 | MP 75/ 75 #
# AP  25    | DP  25    # AP  25    | DP  25    #
# EXP  75    | speed 25  # EXP  75    | speed 25  #
#####
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
```

The archer:

C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

```
#####
# Player          Duan          # Opponent      Hunter      #
# -----          # -----          #
# LV. 1           # LV. 1           #
# -----          # -----          #
# Job:   Swordsman # Job:   Archer   #
# -----          # -----          #
# HP 150/150 | MP 75/ 75 # HP 140/140 | MP 85/ 85 #
# AP  25    | DP  25    # AP  30    | DP  23    #
# EXP  75    | speed 25  # EXP  74    | speed 35  #
#####
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
_
```


The mage:

C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

```
#####
# Player          Duan          # Opponent      Magician      #
#-----#-----#-----#
# LV. 1           # LV. 1           #
#-----#-----#-----#
# Job:   Swordsman   # Job:           Mage       #
#-----#-----#-----#
# HP 150/150 | MP 75/ 75   # HP 120/120 | MP 95/ 95   #
# AP  25    | DP  25    # AP  27    | DP  23    #
# EXP 75    | speed 25   # EXP 74    | speed 23   #
#-----#-----#-----#
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
```

b) Full function of swordsman class

C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

```
#####
# Player          Duan          # Opponent      Hunter      #
#-----#-----#-----#
# LV. 1           # LV. 1           #
#-----#-----#-----#
# Job:   Swordsman   # Job:           Archer    #
#-----#-----#-----#
# HP 150/150 | MP 75/ 75   # HP 140/140 | MP 85/ 85   #
# AP  25    | DP  25    # AP  30    | DP  23    #
# EXP 75    | speed 25   # EXP 74    | speed 35   #
#-----#-----#-----#
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
1
Duan uses bash, Hunter's HP decreases 10
Duan obtained 12 experience.
请按任意键继续. . .
Duan Level UP!
HP improved 8 points to 158
MP improved 2 points to 77
Speed improved 2 points to 27
AP improved 4 points to 29
DP improved 4 points to 29
请按任意键继续. . .
```

c) Full function of archer class

```
C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

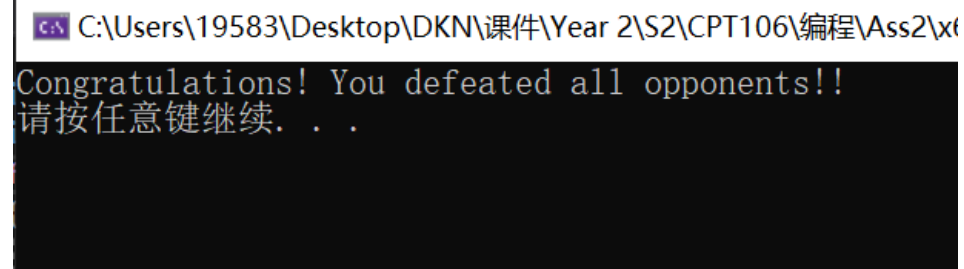
#####
# Player          Duan          # Opponent      Magician      #
# -----
# LV. 1           # LV. 1           #
# -----
# Job:            Archer        # Job:            Mage          #
# -----
# HP 140/140      MP 85/ 85      # HP 120/120    MP 95/ 95      #
# AP 30           DP 23      # AP 27         DP 23          #
# EXP 74          speed 35    # EXP 74        speed 23      #
#####
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
2
Duan uses shaped charge shooting, Magician's HP decreases 56
Duan obtained 84 experience.
请按任意键继续. . .
Duan Level UP!
HP improved 5 points to 145
MP improved 5 points to 90
Speed improved 4 points to 39
AP improved 4 points to 35
DP improved 4 points to 26
请按任意键继续. . .
```

d) Full function of mage class

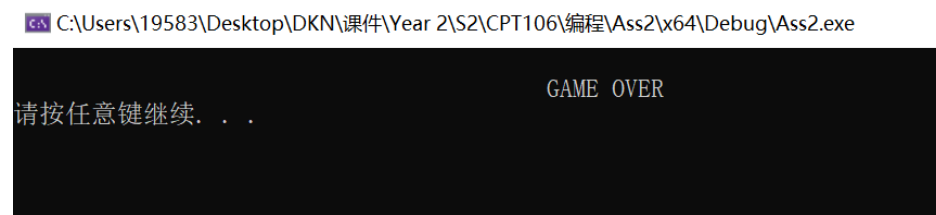
```
C:\Users\19583\Desktop\DKN\课件\Year 2\S2\CPT106\编程\Ass2\x64\Debug\Ass2.exe

#####
# Player          Duan          # Opponent      Hunter        #
# -----
# LV. 1           # LV. 1           #
# -----
# Job:            Mage          # Job:            Archer        #
# -----
# HP 120/120      MP 95/ 95      # HP 140/140    MP 85/ 85      #
# AP 27           DP 23      # AP 30         DP 23          #
# EXP 74          speed 23    # EXP 74        speed 35      #
#####
Your bag contains:
Heal (HP+100): 1
Magic Water (MP+80): 1
#####
Please give command:
1 Attack; 2 Special Attack; 3 Use Heal; 4 Use Magic Water; 0 Exit Game
2
Duan uses Explosion, Hunter's HP decreases 52
Duan obtained 78 experience.
请按任意键继续. . .
Duan Level UP!
HP improved 5 points to 125
MP improved 5 points to 100
Speed improved 4 points to 27
AP improved 4 points to 32
DP improved 4 points to 26
请按任意键继续. . .
```

e) Victory



f) Failure



From these examples above, we can see that all the results meet the requirement of the question.