Yifu (Jason) He - Hw1 - Report

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Contents

1 Source Code

Here is the source code:

```cpp
//
//  main.cpp
//  Practice
//
//  Created by Jason Ha on 9/7/19.
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//

#include <iostream>
#include <cmath>
using namespace std;
```

```cpp
int main () {
    cout <<"Welcome to Yifu (Jason) He's future calculation system!"<<endl
    <<"==================================================="<<endl
    // remind user of the range of options
    <<"1.calculate the future value of s sum of money."<<endl
    <<"2.calculate future value of an ordinary annuity."<<endl
    <<"3.calculate future value of an annuity due."<<endl
    <<"4.quit.\n";

    string option; // the choose of user
    double principal, interest, period; // 3 input variables
    while(true){
        cout <<"Choose your next step:"<<endl;
        cin >> option;
        // determine further step according to user's option
        if(option == "1"){
            cout << "Input the original principal: ";
            // use a while loop to make sure the format of input variable
            while(cin>>principal){
                if (principal >=0){break;}
                else{
                    cout << "Wrong input: input value should be possitive!\n";
                    cout << "reinput the number again!\n";
                }
            }
            cout << "Input the interest rate: ";
            // Ditto
            while(cin>>interest){
                if (interest >=0){break;}
                else{
                    cout << "Wrong input: input value should be possitive!\n";
                    cout << "reinput the number again!\n";
                }
            }

            cout << "Input the time period: ";
            //Ditto
            while(cin>>period){
                if (period >=0){break;}
                else{
                    cout << "Wrong input: input value should be possitive!\n";
                    cout << "reinput the number again!\n";
                }
            }

            double result;
```

```cpp
    // calculate the result and output it
    result = principal * pow((1 + interest),period);
    cout <<"future value: " << result<<endl;
    cout << "================================"<<endl;

}else if(option == "2"){
    cout << "Input the annuity: ";
    //Ditto
    while(cin>>principal){
        if (principal >=0){break;}
        else{
            cout << "Wrong input: input value should be possitive!\n";
            cout << "reinput the number again!\n";
        }
    }
    cout << "Input the interest rate: ";
    //Ditto
    while(cin>>interest){
        if (interest >=0){break;}
        else{
            cout << "Wrong input: input value should be possitive!\n";
            cout << "reinput the number again!\n";
        }
    }

    cout << "Input the time period: ";
    //Ditto
    while(cin>>period){
        if (period >=0){break;}
        else{
            cout << "Wrong input: input value should be possitive!\n";
            cout << "reinput the number again!\n";
        }
    }
    // calculate the result and output it
    double result;
    result = principal * (pow((1 + interest),period) - 1) / interest;
    cout <<"future value of an ordinary annuity: " << result<<endl;
    cout << "================================"<<endl;
}
else if(option =="3"){
    cout << "Input the annuity: ";
    //Ditto
    while(cin>>principal){
        if (principal >=0){break;}
        else{
```

```cpp
                cout << "Wrong input: input value should be possitive!\n";
                cout << "reinput the number again!\n";
            }
        }
        cout << "Input the interest rate: ";
        //Ditto
        while(cin>>interest){
            if (interest >=0){break;}
            else{
                cout << "Wrong input: input value should be possitive!\n";
                cout << "reinput the number again!\n";
            }
        }
        cout << "Input the time period: ";
        //Ditto
        while(cin>>period){
            if (period >=0){break;}
            else{
                cout << "Wrong input: input value should be possitive!\n";
                cout << "reinput the number again!\n";
            }
        }
        // calculate the result and output it
        double result;
        result = principal*(pow((1+interest),period)-1)/interest*(1+interest);
        cout <<"future value of an annuity due: " << result<<endl;
    }
    // option 4 to quite
    else if(option =="4"){
        cout <<"======================================"<<endl;
        cout <<"Thank you to use Yifu (Jason) He's future calculation system!\n";
        // use return statement to terminate the function
        return 0;
    }

        // if the option if beyond the range of 1~4, remind user again
    else{
        cout <<"Wrong Option: please choose your option among 1~4."<<endl
        <<"1.calculate the future value of s sum of money."<<endl
        <<"2.calculate future value of an ordinary annuity."<<endl
        <<"3.calculate future value of an annuity due."<<endl
        <<"4.quit.\n";
    }
    }
}
```

2 Comments

2.1 Input Error Handling

1.If the three variables, principal interest and time period were negative, the system will remind user of the input mistake. The while loop structure will keep running until the format of input is correct.
2. If the user choose the wrong option, the system will remind him again of the correct options and where they lead to.

2.2 Output

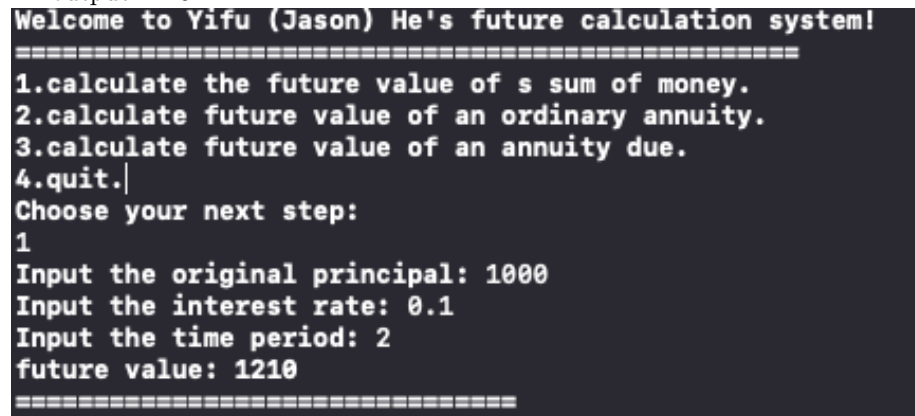If every input is correct, the result will be calculated and the output will remind the user which value it is.

2.3 Exit Mechanism

There is only one return statement in option 4, so if user don't choose option 4, the program will run forever.

3 Screen Shot of Test Case

3.1 Case 1:Option1

option:1; original principal:1000; interest rate: 0.1; time period: 2
output 1210

3.2 Case 2: Wrong Option

Option:5
Output: Wrong Option:please choose your option among 1 4.

```
================================
Choose your next step:
5
Wrong Option: please choose your option among 1~4.
1.calculate the future value of s sum of money.
2.calculate future value of an ordinary annuity.
3.calculate future value of an annuity due.
4.quit.
Choose your next step:
```

3.3 Case 3&4:Option2

option:2; original principal:1000; interest rate: 0.1; time period: 2
    output 2100
    option:2; original principal:1000; interest rate: 0.05; time period: 20
    output 33066

```
Choose your next step:
2
Input the annuity: 1000
Input the interest rate: 0.1
Input the time period: 2
future value of an ordinary annuity: 2100
==================================
Choose your next step:
2
Input the annuity: 1000
Input the interest rate: 0.05
Input the time period: 20
future value of an ordinary annuity: 33066
==================================
```

3.4 Case 5: negative variables

Output: Wrong input: input value should be possitive! reinput the number
again!

```
Choose your next step:
1
Input the original principal: -100
Wrong input: input value should be possitive!
reinput the number again!
1
Input the interest rate: -100
Wrong input: input value should be possitive!
reinput the number again!
0.2
Input the time period: -100
Wrong input: input value should be possitive!
reinput the number again!
3
future value: 1.728
```

3.5   Case 6: Exit

```
Choose your next step:
4
========================================
Thank you to use Yifu (Jason) He's future calculation system!
Program ended with exit code: 0
```