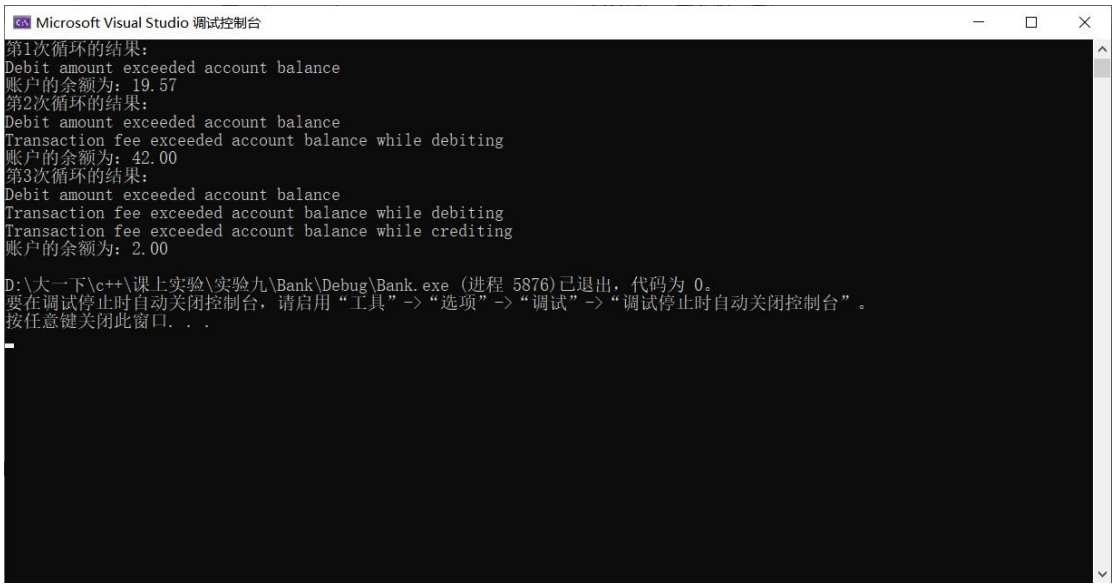
实验报告

1. Bank

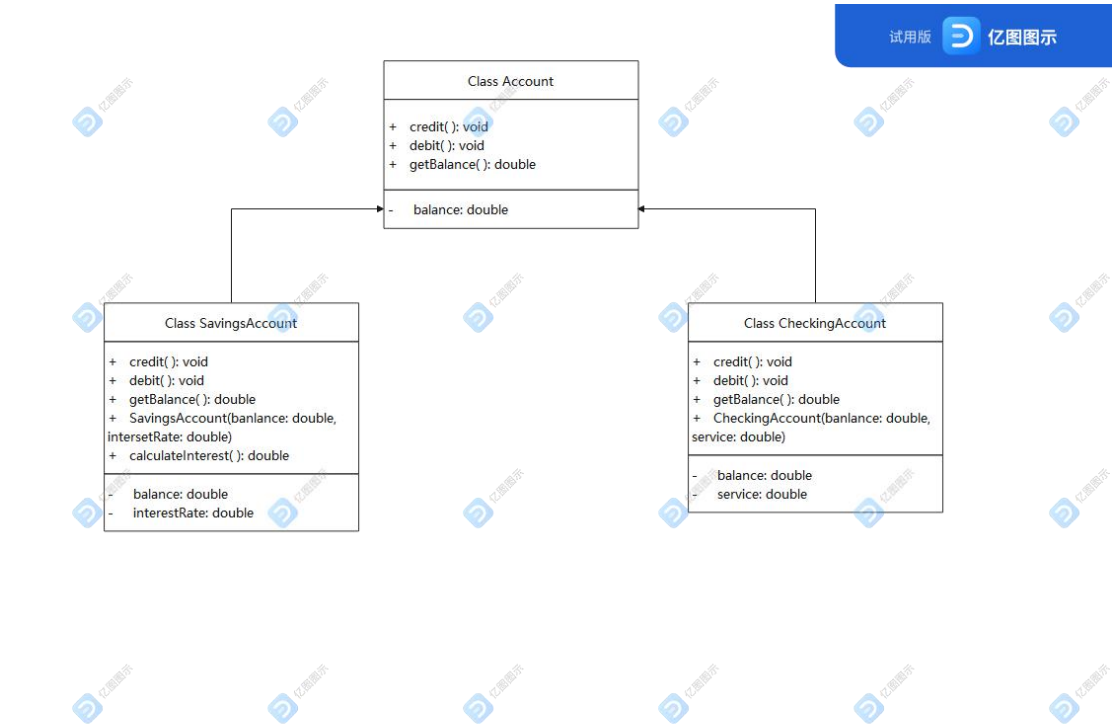
```
#include<iostream>
#include<iomanip>
using namespace std;
class Account {
public:
    virtual void credit(int money) {

    }
    virtual void debit(int money) {

    }
    virtual double getBalance() {
        return this->balance;
    }
private:
    double balance = 0.0;
};
class SavingsAccount :public Account {
public:
    double getBalance() {
        return this->balance;
    }
    void credit(int money) {
        this->balance += money;
        //this->balance += this->interestRate * this->balance;
        //cout << this->balance << endl;
    }
    void debit(int money) {
        if (this->balance < money)
        {
            cout << "Debit amount exceeded account balance" << endl;
        }
        else
        {
            this->balance -= money;
            //this->balance += this->balance * this->interestRate;
            //cout << "取出后" << this->balance << endl;
```

```
        }
    }
    SavingsAccount(double banlance, double intersetRate) {
        //cout << banlance << endl;
        this->interestRate = intersetRate / 100;
        //cout << this->interestRate << endl;
        this->balance = banlance;
        //cout << this->balance << endl;
    }
    double calculateInterest() {
        this->balance += this->balance * this->interestRate;
        return this->balance * this->interestRate;
    }
private:
    double interestRate = 0.0;
    double balance = 0.0;
};
class CheckingAccount :public Account {
public:
    CheckingAccount(int balance, int service) {
        this->balance = balance;
        this->service = service;
    }
    void credit(int money) {
        if ((this->balance) - this->service >= 0)
        {
            this->balance -= this->service;
            this->balance += money;
        }
        else {
            cout << "Transaction fee exceeded account balance while crediting" << endl;
        }
    }
    void debit(int money) {
        if ((this->balance) - money >= 0)
        {
            if (this->balance-money-this->service>=0)
            {
                this->balance -= this->service;
                this->balance -= money;
            }
            else
            {
                cout << "Transaction fee exceeded account balance while debiting" << endl;
```

```
            }

            //cout << "leave money: " << this->balance << endl;
        }
        else {
            cout << "Debit amount exceeded account balance" << endl;
        }
    }
    double getBalance() {
        return this->balance;
    }
private:
    double balance = 0.0;
    double service = 0.0;
};
int main() {
    Account* accounts[3];
    accounts[0] = new SavingsAccount(100, 3);   //余额 100 元，利息 3%
    accounts[1] = new CheckingAccount(100, 5);  //余额 100 元，交易费 5 元
    accounts[2] = new CheckingAccount(50, 5);   //余额 50 元，交易费 5 元

    for (int i = 0; i < 3; i++) {
        cout << "第" << i + 1 << "次循环的结果：" << endl;
        accounts[i]->debit(200);   //借款 200 元
        accounts[i]->debit(40);
        accounts[i]->credit(50);   //存款 50 元
        accounts[i]->debit(49);
        accounts[i]->debit(43);
        accounts[i]->credit(1);
        //将 Account 指针强制转换为 SavingAccount 指针
        SavingsAccount* derivedPtr =
            dynamic_cast<SavingsAccount*>(accounts[i]);
        if (derivedPtr != NULL)   //如果类型兼容，转换成功
            derivedPtr->credit(derivedPtr->calculateInterest());
        cout << fixed << setprecision(2);   //使用定点数格式，2 位小数部分
        cout << "账户的余额为：" << accounts[i]->getBalance() << endl;
    }
}
```



类图：



2. Park

```
#include<iostream>
#include<string>
using namespace std;
class Park;
class Automobile {
public:
    virtual void enter(Park* park) {
```

```
    }
    virtual void leave(Park* park) {

    }
    virtual  string getNumber() {
        return this->name;
    }
    virtual int getMoney() {
        return this->money;
    }
protected:
    virtual void pay(Park& park) = 0;
private:
    string name;
    int money;
};
class Park {
public:
    Park(int N) {
        this->spaces = new Automobile * [N];
        for (int i = 0; i < N; i++)
        {
            this->spaces[i] = NULL;
        }
        this->Max = N;
    }
    void showInfo() {
        cout << "停车场目前停放了" << this->num << "辆汽车：";
        if (this->num != 0) {
            for (int i = 0; i < this->num; i++)
            {
                cout << this->spaces[i]->getNumber() << ",";
            }
        }
        cout << "共收入" << sumMoney << "元停车费" << endl;
    }
    void enter(Automobile* SomeCar) {
        if (this->num < this->Max)
        {
            for (int i = 0; i < this->Max; i++) {
                if (this->spaces[i] == NULL)
                {
                    this->spaces[i] = SomeCar;
```

```
                    this->num++;
                    break;
                }
            }
            cout << SomeCar->getNumber() << "进入停车场，分配停车位" << endl;
        }
        else {
            cout << "无法为" << SomeCar->getNumber() << "分配停车位" << endl;
        }
    }
    void leave(Automobile* SomeCar) {
        cout << SomeCar->getNumber() << "离开停车场，缴纳停车费" << SomeCar->getMoney()
<< "元" << endl;
        for (int i = 0; i < this->Max; i++)
        {
            if (this->spaces[i] == SomeCar) {
                this->spaces[i] = NULL;
                this->num--;
            }
        }
        sumMoney += SomeCar->getMoney();
    }
    void reclaimSpace(Automobile* Somecar) {
        for (int i = 0; i < this->Max; i++)
        {
            if (this->spaces[i] == Somecar) {
                this->spaces[i] = NULL;
                this->num--;
            }
        }
    }
    void getpaid(int money) {
        this->sumMoney += money;
    }
    ~Park() {
        delete[] this->spaces;
    }
private:
    Automobile** spaces;
    int num = 0;
    int Max;
    int sumMoney = 0;
};
class Truck :public Automobile {
```

```
public:
    Truck(string name, int weight) {
        this->name = name;
        this->weight = weight;
    }
    void enter(Park* park) {
        park->enter(this);
    }
    void leave(Park* park) {
        park->reclaimSpace(this);    // 让停车场收回停车位
        pay(*park);
        //park->leave(this);
    }
    string getNumber() {
        return this->name;
    }
    int getMoney() {
        return this->money;
    }
protected:
    void pay(Park& park) {
        park.getpaid(3);
        cout << this->getNumber() << "离开停车场，缴纳停车费" << this->getMoney() << "
元" << endl;
    }
private:
    string name;
    int money = 3;
    int weight = 0;
};
class Car :public Automobile {
public:
    Car(string name, string type) {
        this->name = name;
        this->type = type;
    }
    void enter(Park* park) {
        park->enter(this);
    }
    void leave(Park* park) {
        park->reclaimSpace(this);    // 让停车场收回停车位
        pay(*park);
        //park->leave(this);
    }
```

```
    string getNumber() {
        return this->name;
    }
    int getMoney() {
        return this->money;
    }
protected:
    void pay(Park& park) {
        park.getpaid(1);
        cout << this->getNumber() << "离开停车场，缴纳停车费" << this->getMoney() << "
元" << endl;
    }
private:
    string name;
    int money = 1;
    string type;
};
class Bus :public Automobile {
public:
    Bus(string name, int people) {
        this->name = name;
        this->people = people;
    }
    void enter(Park* park) {
        park->enter(this);
    }
    void leave(Park* park) {
        park->reclaimSpace(this);    // 让停车场收回停车位
        pay(*park);
        //park->leave(this);
    }
    string getNumber() {
        return this->name;
    }
    int getMoney() {
        return this->money;
    }
protected:
    void pay(Park& park) {
        park.getpaid(2);
        cout << this->getNumber() << "离开停车场，缴纳停车费" << this->getMoney() << "
元" << endl;
    }
private:
```

```
    string name;
    int money = 2;
    int people = 0;
};
void main() {
    int N = 0;
    cout << "请输入停车位数量：";
    cin >> N;// 输入停车位数量，此处输入 2

    Park park(N);// 创建一个停车场对象

    Automobile* auto1 = new Car("鲁 B-12345", "奥迪 A6");  // 创建轿车对象
    Automobile* auto2 = new Truck("鲁 B-23456", 15);       // 创建卡车对象
    Automobile* auto3 = new Bus("鲁 B-34567", 50);         // 公交车对象
    Automobile* auto4 = new Car("鲁 B-45678", "宝马 320");// 创建轿车对象

    auto1->enter(&park);   // car 进入停车场，分配停车位
    auto2->enter(&park);   // truck 进入停车场，分配车位
    auto1->leave(&park);   // car 离开停车场，缴纳停车费
    auto3->enter(&park);   // bus 进入停车场，分配车位

    /* 显示当前停放的车辆的车牌号码，以及当前的全部停车费收入*/
    park.showInfo();

    auto4->enter(&park);       // car 进入停车场，分配停车位
    // car 进入停车场，分配停车位。因为没有空余停车位，所以无法分配

    auto3->leave(&park);  // bus 离开停车场，缴纳停车费
    auto2->leave(&park);  // truck 离开停车场，缴纳停车费

    /* 显示当前停放的车辆的车牌号码，以及当前的全部停车费收入*/
    park.showInfo();

    //return 0;
}
```

```
Microsoft Visual Studio 调试控制台
请输入停车位数量：2
鲁B-12345进入停车场，分配停车位
鲁B-23456进入停车场，分配停车位
鲁B-12345离开停车场，缴纳停车费1元
鲁B-34567进入停车场，分配停车位
停车场目前停放了2辆汽车：鲁B-34567,鲁B-23456,共收入1元停车费
无法为鲁B-45678分配停车位
鲁B-34567离开停车场，缴纳停车费2元
鲁B-23456离开停车场，缴纳停车费3元
停车场目前停放了0辆汽车：共收入6元停车费

D:\大一下\c++\课上实验\实验九\Park\Debug\Park.exe (进程 31320)已退出，代码为 0。
要在调试停止时自动关闭控制台，请启用“工具”->“选项”->“调试”->“调试停止时自动关闭控制台”。
按任意键关闭此窗口. . .
```