广州大学学生实验报告

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**开课学院及实验室：**计算机科学与工程实验室电子楼412A室

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| **实验课程名称** | | 面向对象程序设计实验 | | **成绩** | |  | |
| **实验项目名称** | | 继承与多态性 | | **指导老师** | | 陶文正 | |

# 实验目的及要求

1. 掌握继承、基类和派生类的概念。
2. 掌握初始化基类成员的方法。
3. 掌握派生类对基类的继承。
4. 学习虚函数和纯虚函数的定义与使用方式。
5. 理解抽象类的概念，学习如何用指针指向其他的派生类，实现多态性。
6. 掌握抽象类的定义与使用方式，并注意指针的用法。
7. 学习如何使用虚函数、纯虚函数、抽象类和实现类的多态性。

# 实验设备及平台

1. 硬件环境：计算机
2. 软件环境：G++ 7.2.0, Visual Studio Code

# 实验内容及步骤

1. 定义派生类的实例

#include <string>

#include <iostream>

using namespace std;

class Student {

protected:

    string serial, name;

    int sex, year, month, day;

public:

    Student() = default;

    Student(string serial, string name, int sex, int year, int month, int day) {

        this->serial = serial;

        this->name = name;

        this->sex = sex;

        this->year = year;

        this->month = month;

        this->day = day;

    }

    void SetSerial(string serial) {

        this->serial = serial;

    }

    void SetName(string name) {

        this->name = name;

    }

    void SetSex(int sex) {

        this->sex = sex;

    }

    void SetYear(int year) {

        this->year = year;

    }

    void SetMonth(int month) {

        this->month = month;

    }

    void SetDay(int day) {

        this->day = day;

    }

    string GetSerial() {

        return serial;

    }

    string GetName() {

        return name;

    }

    int GetSex() {

        return sex;

    }

    int GetYear() {

        return year;

    }

    int GetMonth() {

        return month;

    }

    int GetDay() {

        return day;

    }

};

class StudentChild: public Student {

protected:

    int C, English;

public:

    StudentChild() = default;

    StudentChild(string serial, string name, int sex, int year, int month, int day, int C, int English)

    : Student(serial, name, sex, year, month, day) {

        this->C = C, this->English = English;

    }

   void SetC(int C) {

        this->C = C;

     }

    void SetEnglish(int English) {

        this->English = English;

    }

    int GetC() {

        return C;

    }

    int GetEnglish() {

        return English;

    }

    void List() {

        cout << "学号：" << serial << endl;

        cout << "姓名：" << name << endl;

        cout << "性别：" << (sex == 0 ? "女" : "男") << endl;

        cout << "出生日期：" << year << "年" << day << "月" << day << "日" << endl;

        cout << "C++：" << C << endl;

        cout << "英语：" << English << endl;

    }

};

template <typename T>

void input(T &t, const string hint)

{

    cout << hint; cin >> t;

}

int main() {

    int n;

    cout << "请输入学生人数：" << endl;

    cin >> n;

    StudentChild \*s = new StudentChild[n];

    for (int i=0; i<n; ++i) {

        cout << "正在输入第" << i+1 << "位学生" << endl;

        string serial, name;

        int sex, year, month, day, C, English;

        input(serial, string("学号："));

        input(name, string("姓名："));

        input(sex, string("性别（非零数字表示男性）："));

        cout << "出生年月日：" << endl;

        cin >> year >> month >> day;

        input(C, string("C语言成绩："));

        input(English, string("英语成绩："));

        s[i] = StudentChild(serial, name, sex, year, month, day, C, English);

    }

    cout << endl;

    cout << "下面列出已输入学生的信息：" << endl;

    for (int i=0; i<n; ++i) {

        if (i) cout << endl;

        cout << "第" << i+1 << "位学生" << endl;

        s[i].List();

    }

    delete[] s;

}

# 思考问题及课后练习

# 总结