实验报告

东北林业大学

信息与计算机科学技术实验中心

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| 1. 实验目的 2. 掌握用计算机处理问题的思维方法和C++程序设计方法 3. 培养问题分析、算法设计、程序设计、程序调试的问题 |
| 二、实验环境  Codeblocks |
| 三、实验内容及结果  设计一个大学的类系统，包括Student（学生），Professor（教师），Staff（职员）。另有一类既作为学生又兼作助教的可作为派生类StudentStaff，它是由Student类和Staff类派生而来，另外定义一个父类DataRec作为上述类（子类）的基类。设计主程序，输入各类人员信息，并将数据存放在磁盘文件中。 |

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| 四、实验过程分析与讨论  实验过程中共建立五个类，分别为：Student（学生），Professor（教师），Staff（职员），StudentStaff（学生兼职），它是由Student类和Staff类派生而来，另外定义一个父类DataRec作为以上所有类的父类。    #include <iostream>  #include <fstream>  #include <vector>  #include <string>  using namespace std;  // 父类 DataRec  class DataRec {  public:  virtual void input() = 0;  virtual void save(ofstream &out) = 0;  virtual ~DataRec() {}  };  // 学生类 Student  class Student : virtual public DataRec {  protected:  string studentID;  string name;  int age;  public:  void input() override {  cout << "Enter student ID: ";  cin >> studentID;  cout << "Enter student name: ";  cin >> name;  cout << "Enter student age: ";  cin >> age;  }  void save(ofstream &out) override {  out << "Student" << endl;  out << "ID: " << studentID << endl;  out << "Name: " << name << endl;  out << "Age: " << age << endl;  }  };  // 教师类 Professor  class Professor : virtual public DataRec {  protected:  string employeeID;  string name;  string department;  public:  void input() override {  cout << "Enter professor employee ID: ";  cin >> employeeID;  cout << "Enter professor name: ";  cin >> name;  cout << "Enter department: ";  cin >> department;  }  void save(ofstream &out) override {  out << "Professor" << endl;  out << "Employee ID: " << employeeID << endl;  out << "Name: " << name << endl;  out << "Department: " << department << endl;  }  };  // 职员类 Staff  class Staff : virtual public DataRec {  protected:  string employeeID;  string name;  string position;  public:  void input() override {  cout << "Enter staff employee ID: ";  cin >> employeeID;  cout << "Enter staff name: ";  cin >> name;  cout << "Enter position: ";  cin >> position;  }  void save(ofstream &out) override {  out << "Staff" << endl;  out << "Employee ID: " << employeeID << endl;  out << "Name: " << name << endl;  out << "Position: " << position << endl;  }  };  // 学生助教类 StudentStaff  class StudentStaff : public Student, public Staff {  public:  void input() override {  cout << "Enter student-staff details: " << endl;  Student::input();  Staff::input();  }  void save(ofstream &out) override {  out << "StudentStaff" << endl;  Student::save(out);  Staff::save(out);  }  };  int main() {  vector<DataRec\*> records;  char choice;  do {  cout << "Choose the type of record to enter (s: Student, p: Professor, t: Staff, a: StudentStaff, q: Quit): ";  cin >> choice;  DataRec\* record = nullptr;  if (choice == 's') {  record = new Student();  } else if (choice == 'p') {  record = new Professor();  } else if (choice == 't') {  record = new Staff();  } else if (choice == 'a') {  record = new StudentStaff();  } else if (choice == 'q') {  break;  } else {  cout << "Invalid choice!" << endl;  continue;  }  record->input();  records.push\_back(record);  } while (choice != 'q');  ofstream outFile("university\_records.txt");  for (auto rec : records) {  rec->save(outFile);  outFile << "--------------------------" << endl;  }  outFile.close();  // 清理动态分配的内存  for (auto rec : records) {  delete rec;  }  cout << "Data saved to university\_records.txt" << endl;  return 0;  } |
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| 五、指导教师意见  指导教师签字：  年 月 日 |