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实验一：

1. **实验内容**：题目
2. **实验思路**

用Array List，实现了二维数组。为了排序二维数组，用Collections，Comparator, 定义了对名字，年龄，成绩的排序。在年龄的排序，为了实现倒数排序，在return值乘以-1. 用foreach局， 输出二维数组的每个元素。

**（3）实验源码**

**]]** import java.util.Arrays;  
import java.util.ArrayList;  
import java.util.List;  
import java.util.Comparator;  
import java.util.Collections;  
  
//TIP To <b>Run</b> code, press <shortcut actionId="Run"/> or  
// click the <icon src="AllIcons.Actions.Execute"/> icon in the gutter.  
public class Main {  
  
 static List<List<Object>> *AL* =  
 new ArrayList<>(  
 Arrays.*asList*(  
 Arrays.*asList*(1, "zhangSan", 28, 98),  
 Arrays.*asList*(2, "Lisi", 21, 100),  
 Arrays.*asList*(3, "KangKang", 27, 89),  
 Arrays.*asList*(4, "LiMing", 19, 92),  
 Arrays.*asList*(5, "WangGang", 22, 66),  
 Arrays.*asList*(6, "ZhaoXin", 24, 85),  
 Arrays.*asList*(7, "LiuWei", 20, 78),  
 Arrays.*asList*(8, "BaiZhanTang", 16, 99)  
  
 ));  
  
  
 static String[] *Name* =  
 {"ZhangSan", "Lisi", "KangKang", "LiMing", "WangGang", "ZhaoXin", "LiuWei", "BaiZhanTang"};  
  
  
 static Integer[] *Age* =  
 {28, 21, 27, 19, 22, 24, 20, 16};  
  
 static int[] *Grade* =  
 {98, 100, 89, 92, 66, 85, 78, 99};  
  
  
 static Comparator<List<Object>> *nameCompare* = new Comparator<List<Object>>() {  
 @Override  
 public int compare(List<Object> o1, List<Object> o2) {  
  
 String name1 = (String) o1.get(1);  
 String name2 = (String) o2.get(1);  
 return name1.compareTo(name2);  
 }  
 };  
  
 static Comparator<List<Object>> *ageCompare* = new Comparator<List<Object>>() {  
 @Override  
 public int compare(List<Object> o1, List<Object> o2) {  
  
 int name1 = (int) o1.get(2);  
 int name2 = (int) o2.get(2);  
 return -1 \* Integer.*compare*(name1, name2);  
 }  
 };  
  
 static Comparator<List<Object>> *gradeCompare* = new Comparator<List<Object>>() {  
 @Override  
 public int compare(List<Object> o1, List<Object> o2) {  
  
 int name1 = (int) o1.get(3);  
 int name2 = (int) o2.get(3);  
 return Integer.*compare*(name1, name2);  
 }  
 };  
  
  
 public static void main(String[] args){  
  
 Arrays.*sort*(*Name*);  
 System.*out*.println(Arrays.*toString*(*Name*));  
  
 Arrays.*sort*(*Age*, Collections.*reverseOrder*());  
 System.*out*.println(Arrays.*toString*(*Age*));  
  
 Arrays.*sort*(*Grade*);  
 System.*out*.println(Arrays.*toString*(*Grade*));  
  
  
 //Sort by Name  
 Collections.*sort*(*AL*,*nameCompare*);  
  
 for (List<Object> aL : *AL*){  
 System.*out*.println(aL);  
 }  
  
 System.*out*.println();  
  
 //Sort by Age, Descending  
 Collections.*sort*(*AL*, *ageCompare*);  
  
 for (List<Object> aL : *AL*){  
 System.*out*.println(aL);  
 }  
  
 System.*out*.println();  
  
  
 //Sort by Grade  
 Collections.*sort*(*AL*, *gradeCompare*);  
  
 for (List<Object> aL : *AL*){  
 System.*out*.println(aL);  
 }  
  
 System.*out*.println();  
  
  
 }  
  
}

**（4）实验心得**

通过本次实验，我学习了如何使用ArrayList来实现二维数组，并掌握了使用Collections和Comparator进行排序的方法。在排序过程中，我学会了如何定义自定义比较器，以满足不同的排序需求。此外，通过实验，我进一步加深了对Java集合框架的理解，为以后的编程实践提供了更多的工具和技巧。