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| PROBLEM STATEMENT : | Write an abstract class Course with an abstract method studentDetails().

Create 2 classes Comps and IT which inherits class Course and implements studentDetails().

The studentDetails() method should print the name, UID, and year (FE, SE, TE) of students of that Course. These details have to be taken from the user. Write a program that asks user to choose a course and print the details of all students in that course in a sorted manner as per the year(FE,SE,TE) |
|---|---|
| THEORY: | **Abstraction in OOP:**
Abstraction is an important concept in Java programming that allows you to create complex systems by hiding unnecessary details and focusing on the essential features. It is one of the key principles of object-oriented programming (OOP) and helps in creating modular, maintainable, and scalable code.

In Java, abstraction is achieved through abstract classes and interfaces.

Abstract Classes:
An abstract class serves as a blueprint for other classes. It cannot be instantiated directly but can be extended by other classes. It can contain both abstract and non-abstract methods. The abstract methods declared in the abstract class are meant to be overridden by the subclasses. Abstract classes are defined using the abstract keyword.
Interfaces:
An interface defines a contract that the implementing classes must follow. It contains only abstract method declarations and constants. Any class that implements an interface must provide an implementation for all the methods defined in the interface. Interfaces are defined using the interface keyword.
In both cases, abstraction allows you to define common behavior and provide a level of indirection, making the code more flexible and extensible. It also helps in achieving code reusability and separation of concerns. |

	Remember, abstract classes and interfaces cannot be instantiated directly, but they serve as a foundation for creating concrete classes that implement the desired functionality.
PROGRAM:	

```java
import java.util.Scanner;
abstract class course{
    public abstract void studentDetails();
}
class Comps extends course {
    String UID, name, yearstr;
    public int year;

    Comps(String name, String UID, String year) {
        this.name = name;
        this.UID = UID;
        yearstr = year;
        if (yearstr.equals("FE")) {
            this.year = 1;
        } else if (yearstr.equals("SE")) {
            this.year = 2;
        } else {
            this.year = 3;
        }
    }

    @Override
    public void studentDetails() {
        System.out.println("The name of the student is: " +
name);
        System.out.println("His/her UID is: " + UID);
        System.out.println("He/she currently studies in " +
yearstr);
    }
}
class IT extends course{
    String UID,name,yearstr;
    public int year;
    IT(String name,String UID,String year){
        this.name=name;
        this.UID=UID;
        yearstr=year;
        if(yearstr.equals("FE")){
            this.year=1;
        }
        else if(yearstr.equals("SE")){
            this.year=2;
        }
        else{
            this.year=3;
        }
    }
    @Override
    public void studentDetails() {
```

```java
            System.out.println("The name of the student is:
"+name);
            System.out.println("His/her UID is: "+UID);
            System.out.println("He/she currently studies in
"+yearstr);
    }
}

public class studetails {
    public static void main(String[] args) {
        int nocomps,noit;
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter number of Comps and IT
students respectively");
        nocomps=sc.nextInt();
        noit=sc.nextInt();
        Comps[] compsarr=new Comps[nocomps];
        IT[] itarr=new IT[noit];
        sc.nextLine();
        String tempname,tempUID,tempyear;
        for(int i=0;i<nocomps;i++){
            System.out.println("Enter the name,UID and
year(FE,SE,TE) of comps student "+(i+1));
            tempname= sc.nextLine();
            tempUID=sc.nextLine();
            tempyear=sc.nextLine();
            compsarr[i]=new Comps(tempname,tempUID,tempyear);
        }
        for(int i=0;i<noit;i++){
            System.out.println("Enter the name,UID and
year(FE,SE,TE) of IT student "+(i+1));
            tempname= sc.nextLine();
            tempUID=sc.nextLine();
            tempyear=sc.nextLine();
            itarr[i]=new IT(tempname,tempUID,tempyear);
        }
        System.out.printf("Enter course name to print data
for: ");
        String course=sc.nextLine();
        if(course.equals("comps")){
            Comps temp;
            for(int i=1;i<nocomps;i++){
                int j=i;
                temp=compsarr[j];
                while(compsarr[j-1].year>temp.year){
                    compsarr[j]=compsarr[j-1];
                    j--;
                    if(j==0){
                        break;
                    }
                }
                compsarr[j]=temp;
            }
            for(int i=0;i<nocomps;i++){
                compsarr[i].studentDetails();
            }
```

```
            }
        else{
            IT temp;
            for(int i=1;i<noit;i++){
                int j=i;
                temp=itarr[j];
                while(itarr[j-1].year>temp.year){
                    itarr[j]=itarr[j-1];
                    j--;
                    if(j==0){
                        break;
                    }
                }
                itarr[j]=temp;
            }
            for(int i=0;i<noit;i++){
                itarr[i].studentDetails();
            }
        }

    }
}
```

```
Enter number of Comps and IT students respectively
4 3
Enter the name,UID and year(FE,SE,TE) of comps student 1
Shubhan singh
2022118
FE
Enter the name,UID and year(FE,SE,TE) of comps student 2
Student 2
2021115
SE
Enter the name,UID and year(FE,SE,TE) of comps student 3
student 3
2020111
TE
Enter the name,UID and year(FE,SE,TE) of comps student 4
student 4
2021311
SE
Enter the name,UID and year(FE,SE,TE) of IT student 1
Strudent5
2022456
FE
Enter the name,UID and year(FE,SE,TE) of IT student 2
student 6
2020156
TE
Enter the name,UID and year(FE,SE,TE) of IT student 3
```

RESULT:

```
Enter the name,UID and year(FE,SE,TE) of IT student 3
student 7
2020222
TE
Enter course name to print data for: comps
The name of the student is: Shubhan singh
His/her UID is: 2022118
He/she currently studies in FE
The name of the student is: Student 2
His/her UID is: 2021115
He/she currently studies in SE
The name of the student is: student 4
His/her UID is: 2021311
He/she currently studies in SE
The name of the student is: student 3
His/her UID is: 2020111
He/she currently studies in TE


Process finished with exit code 0
```