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| **Experiment No.** | 7A |

| **AIM:** | Implement a program to demonstrate abstract class. |
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| **Program 1** | |
| **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) |
| **PROGRAM:** | import java.util.\*;  abstract class Course{  Long UID; String name;  abstract void studentDetails();  long getUID(){ return UID; }  }  class Comps extends Course{  private String name; private long UID;private int year;  Comps(String name, long UID, int year){  this.name = name; this.UID = UID; this.year = year;  }  void studentDetails(){  System.out.printf("%-25s %-25s %-25s\n", name, UID, year);  }  public int getYear(){ return year; }  public long getUID(){ return UID; }    void sortComps(Comps arr[]){  int z=0;  for (int i = 0; i < arr.length; i++){  for (int k = i + 1; k < arr.length; k++){  if(arr[i].name.equals(arr[k].name)){  z++;  }  }  }  for (int i = 0; i < arr.length - 1; i++){  for (int j = 0; j < arr.length - i - 1; j++){  if (arr[j].year > arr[j + 1].year){  Comps temp = arr[j];  arr[j] = arr[j + 1];  arr[j + 1] = temp;  }  }  }  System.out.println(z + " case(s) with identical name(s) has/have been encountered!!");  }  }  class IT extends Course{  private String name; private long UID;private int year;  IT(String name, long UID, int year){  this.name = name; this.UID = UID; this.year = year;  }  void studentDetails(){  System.out.printf("%-25s %-25s %-25s\n", name, UID, year);  }  public int getYear(){ return year; }  public long getUID(){ return UID; }  void sortIT(IT arr[]){  for (int i = 0; i < arr.length - 1; i++){  for (int j = 0; j < arr.length - i - 1; j++){  if (arr[j].year > arr[j + 1].year){  IT temp = arr[j];  arr[j] = arr[j + 1];  arr[j + 1] = temp;  }  }  }  }    }  class t{  public static void main(String[] args){  Scanner sc = new Scanner(System.in);  int n1=0, n2=0, year=0, temp; Long UID=0L;  do{  System.out.print("Enter the number of Comps students : ");  n1 = sc.nextInt();  if(n1<=0){ System.out.println("Enter a valid input!!"); }  }  while(n1<=0);  Comps s1[] = new Comps[n1];  sc.nextLine();  for(int i=0; i<n1; i++){  System.out.print("Enter details of student " + (i+1) + " -\nName : ");  String name = sc.nextLine();  do{  System.out.print("UID : ");  UID = sc.nextLong();  temp = String.valueOf(Math.abs(UID)).length();  if(UID<=0 || temp!=10 || isDuplicateUID(s1, UID)){  System.out.println("Enter a valid 10 digit unique input!!");  }  }  while(UID<=0 || temp!=10 || isDuplicateUID(s1, UID));  do{  System.out.print("Year : ");  year = sc.nextInt();  if(year<=0 || year>4){ System.out.println("Enter a valid input!!"); }  }  while(year<=0 || year>4);  s1[i] = new Comps(name, UID, year);  sc.nextLine();  }    do{  System.out.print("Enter the number of IT students : ");  n2 = sc.nextInt();  if(n2<=0){ System.out.println("Enter a valid input!!"); }  }  while(n2<=0);  IT s2[] = new IT[n2];  sc.nextLine();  for(int i=0; i<n2; i++){  System.out.print("Enter details of student " + (i+1) + " -\nName : ");  String name = sc.nextLine();    do{  System.out.print("UID : ");  UID = sc.nextLong();  temp = String.valueOf(Math.abs(UID)).length();  if(UID<=0 || temp!=10 || isDuplicateUID(s1, UID) || isDuplicateUID(s2, UID)){  System.out.println("Enter a valid 10 digit unique input!!");  }  }  while(UID<=0 || temp!=10 || isDuplicateUID(s1, UID) || isDuplicateUID(s2, UID));  do{  System.out.print("Year : ");  year = sc.nextInt();  if(year<=0 || year>4){ System.out.println("Enter a valid input!!"); }  }  while(year<=0 || year>4);  s2[i] = new IT(name, UID, year);  sc.nextLine();  }    s1[0].sortComps(s1);  s2[0].sortIT(s2);  System.out.println("Details of Comps Students -");  System.out.printf("%-25s %-25s %-25s\n", "Name", "UID", "year");  for(int i=0; i<n1; i++){  s1[i].studentDetails();  }  System.out.println("Details of IT Students -");  System.out.printf("%-25s %-25s %-25s\n", "Name", "UID", "year");  for(int i=0; i<n2; i++){  s2[i].studentDetails();  }  }    static boolean isDuplicateUID(Course arr[], long UID) {  for (Course course : arr) {  if (course != null && course.getUID() == UID) {  return true;  }  }  return false;  }  } |
| **RESULT:** | |
| **CONCLUSION:** | Studied the implementation of abstract class to solve the given problem. |