جامعة اليمامة
Al Yamamah University

COLLEGE OF ENGINEERING AND ARCHITECTURE
ACADEMIC YEAR 2022-2023
FALL SEMESTER

COURSE : CIS 104

Lab 9 Solution
ABSTRACT CLASSES

```
public abstract class Student {
	private String name;
	private String Id;
	private int totalMarks;

	public Student() {
		this.name = " ";
		this.Id   = " ";
		this.totalMarks = 0;
	}
	public Student(String name, String id, int totalMarks) {
		this.name = name;
		this.Id   = id;
		this.totalMarks = totalMarks;
	}
	public String getName() {
		return name;
	}
	public void setName(String name) {
		this.name = name;
	}
	public String getId() {
		return Id;
	}
	public void setId(String id) {
		Id = id;
	}
	public int getTotalMarks() {
		return totalMarks;
	}
	public void setTotalMarks(int totalMarks) {
		this.totalMarks = totalMarks;
	}
```

```
	@Override
	public String toString() {
		return "Student [name=" + name + ", Id=" + Id + ",
totalMarks=" + totalMarks + "]";
	}

	public void display()
	{
		System.out.println("The name is: " + name);
		System.out.println("The Id is: " + Id);
		System.out.println("The total marks is: " + totalMarks );
	}

	public abstract void computeGrade();

}



public class undergradStud extends Student {

	private boolean coop;

	public undergradStud()
	{
		super();
		coop= false;
	}

	public undergradStud(String name, String id, int totalMarks,
boolean coop)
	{
		super(name, id , totalMarks);
		this.coop= coop;
	}

	public boolean isCoop() {
		return coop;
	}

	public void setCoop(boolean coop) {
		this.coop = coop;
	}
```

```
	@Override
	public String toString() {
	return super.toString() + "undergradStud [coop=" + coop + "]";
	}

	public void display()
	{
		super.display();
		System.out.println("Coop " + coop);
	}

	public void computeGrade()
	{
		if(getTotalMarks() >= 60)
			System.out.println("Pass");
		else
			System.out.println("fail");
	}
}

public class postGradStud extends Student {
	private boolean teaching;

	public postGradStud()
	{
		super();
		teaching = false;
	}

public postGradStud(String name, String id, int totalMarks, boolean
teaching)
	{
		super(name, id , totalMarks);
		this.teaching=teaching ;
	}

	@Override
	public String toString() {
return super.toString() + "undergradStud [coop=" + teaching + "]";
	}

	public void display()
	{
		super.display();
		System.out.println("Coop " + teaching);
	}
```

```
	public void computeGrade()
	{
		if(getTotalMarks() >= 70)
			System.out.println("Pass");
		else
			System.out.println("fail");
	}
}

public class Test_Student {
	public static void main(String[] args) {

	   Student Arr[] = new Student[4];

	undergradStud un1 = new undergradStud("Ali","1111", 62, true);
	undergradStud un2 = new undergradStud("Naef", "2222",53, false);

	postGradStud grad1= new postGradStud("Bader", "3333", 78, true);
	postGradStud grad2= new postGradStud("Ahmad", "4444", 65, true );

		Arr[0] = un1;
		Arr[1] = un2;
		Arr[2] = grad1;
		Arr[3] = grad2;

		System.out.println("The results are: ");

		for(int i =0; i< Arr.length; i++)
		{
			Arr[i].computeGrade();
		}

		int count =0;

		for(int i =0; i< Arr.length; i++)
		{
			if(Arr[i] instanceof postGradStud)
			count++;
		}
System.out.println("The number of postgrad students is:" + count);

	}
	}
```