

JAVA means DURGA SOFT

Design Patterns

Core Level Design Patterns

11. DTO (Data Transfer Object) VO (Value Object)



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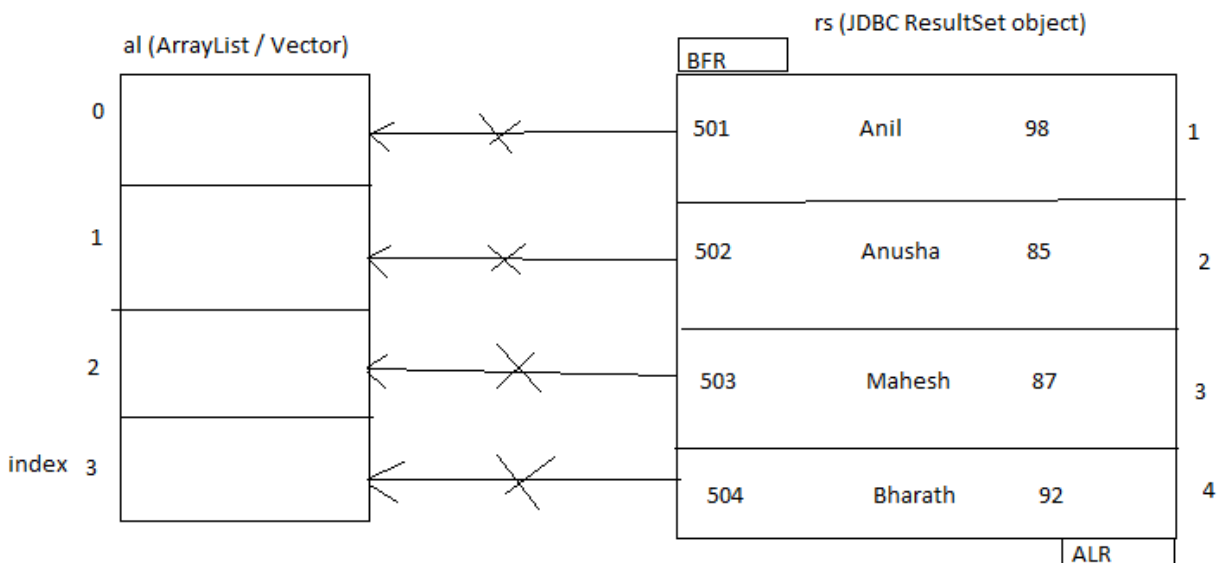
DTO (Data Transfer Object) / VO (Value Object)

Problem-1: we cannot send JDBC ResultSet object from one layer to another layer over the network because it is not a **Serializable** object.

To solve the above requirement copy JDBC ResultSet object data (depend upon your requirement) to any **collection** Framework data structure and send that data structure over the network. Since all collection framework data structures are by default Serializable objects.

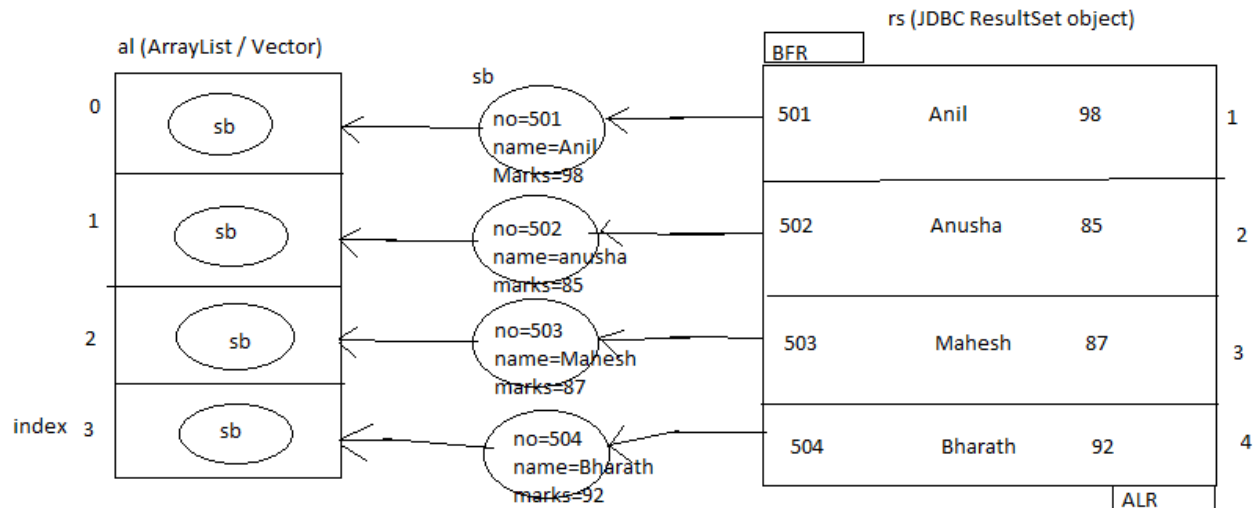
Note If you are just performing read operation on collection framework data structures then you can take any non-synchronized data structure like ArrayList. If you want to perform read, update, delete etc operations on collection framework data structures then use any synchronized data structure like Vector.

Problem-2: while transferring ResultSet object records to Set / List data structure elements the following problem will be raised i.e. we can't move each record of ResultSet object to each element of **ArrayList** object because each record of ResultSet object may contains multiple values where as each element of ArrayList can store only one Java object at a time.



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Solution: create user defined java class object having each record values and add that object to the elements of ArrayList. Here the class of that user defined object is called as **DTO/VO class** (It is generally a Java bean).



Def: Using a serializable class to act as data carrier, grouping related attributes, forming a composite value and working as a return type from remote business method. also known as Value object.

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Note the elements added to collection frame work data structure must be taken as Serializable objects in order to send that collection frame work data structure over the network.

Sample Code:

```
// StudentBean.java
```

```
class StudentBean implements java.io.Serializable
```

```
{
```

```
    private int sno;
```

```
    private String sname;
```

```
    private int smarks;
```

```
    //setter methods
```

```
    public void setSno(int sno)
```

```
    {
```

```
        this.sno=sno;
```

```
    }
```

```
    public void setName(String sname)
```

```
    {
```

```
        this.sname=sname;
```

```
    }
```

```
    public void setMarks(int smarks)
```

```
    {
```

```
        this.smarks=smarks;
```

```
    }
```

```
    // getter methods
```

```
    public int getSno()
```

```
{  
    return sno;  
}  
public int getSname()  
{  
    return sname;  
}  
public int getSmarks()  
{  
    return smarks;  
}  
}
```



Logic to transfer ResultSet object to ArrayList object by taking support of DTO/VO:

```
ResultSet rs=st.executeQuery("select * from student");  
ArrayList al=new ArrayList();  
while(rs.next())  
{  
    //read each record into DTO/VO class object
```



```
StudentBean sb=new StudentBean();  
sb.setSno(rs.getInt(1));  
sb.setSname(rs.getString(2));  
sb.setSmarks(rs.getInt(3));  
al.add(sb); // add DTO/VO class object to ArrayList elements  
}
```

Data Transfer Objects is useful when you want to transfer multiple data elements over a tier - which is better than making multiple calls to remote objects' getter methods when you receive only a single piece of data back each time (reducing application performance due to unnecessary network overhead). A single method call is used to send and retrieve the Data Transfer Object. When the client requests the enterprise bean for the business data, the enterprise bean can construct the Data Transfer Object, populate it with its attribute values, and pass it by value to the client. DTOs are often used in conjunction with data access objects to retrieve data from a database

- ❖ Since StudentBean class objects are used to transfer data from ResultSet object (one data structure) to ArrayList object (another data structure). So StudentBean class is called as **Data Transfer Object (DTO) class**.
- ❖ Since StudentBean class object is generating single value by combining multiple values of each record so we can call StudentBean class as **Value Object (VO) class**.

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