

Graded Assignment - JAVA

You are part of a Development Team of an IT Solutions firm involved in developing a solution for Business Establishment. An application is being developed which involves the following:

The Details about the Projects against the list of Employees working in the respective Projects are supposed to be

- 1) Serialized & DeSerialized
- 2) This Process of Serialization vs DeSerialization is supposed to be implemented as Threads with Inter Thread Communication.

Since the Data that is Serialized and DeSerialized should be in Sync

Employee Details include

```
[EmployeeId - String  
EmployeeName - String  
EmployeePhone - String  
EmployeeAddress - String  
EmployeeSalary - int]
```

ProjectDetails Include

```
[  
projectCode - String  
projectName - String  
projectStrength - int  
]
```

The Data that is to be Serialized are Map of Objects Containing the Projects as a Keys and ArrayLists of Employees as Value of the Map
Structure of which is as follows

```
Map <Project,ArrayList<Employee>> map1 = new HashMap<>();  
map2, map3 and so on
```

In the Long run , continuously Objects will be serialized as Thread in communication-sync with another thread to DeSerialize this data

Which means as and when the Serialization takes place corresponding DeSerialized data is to be displayed to the various departments.

But here we can restrict it to 3 Map objects being Serialized and DeSerialized

You can initialize through Constructor(assumed to have been accepted)
And also the Project Details.

Question 1:

35%

Create a project which has the following functionalities

- 1) Serialize the above Said Map Objects
- 2) DeSerialize the above said Map Objects and display the same.

The Output when running the application for the below given sample data, should be as shown subsequently:

SampleData:

```
Project project1 = new Project("P1","Music Synthesizer",23);
Project project2 = new Project("P2","Vehicle Movement Tracker",13);
Project project3 = new Project("P3","Liquid Viscosity Finder",15);

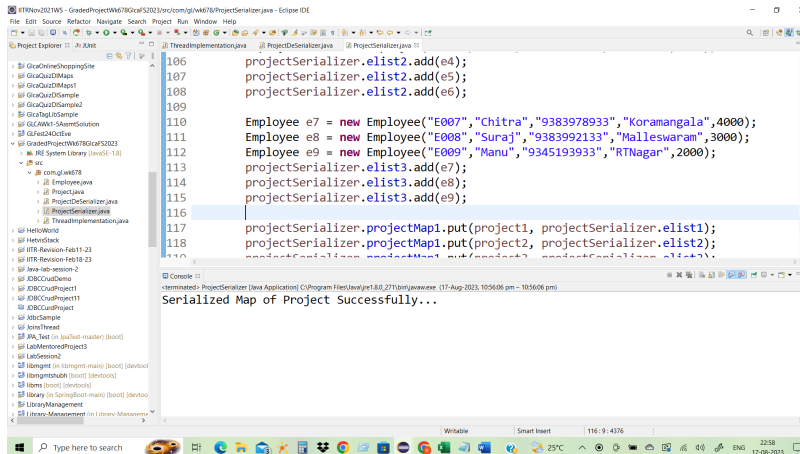
Employee e1 = new Employee("E001","Harsha","9383993933","RTNagar",1000);
Employee e2 = new Employee("E002","Harish","9354693933","Jayanagar",2000);
Employee e3 = new Employee("E003","Meenal","9383976833","Malleswaram",1500);
projectSerializer.elist1.add(e1);
projectSerializer.elist1.add(e2);
projectSerializer.elist1.add(e3);

Employee e4 = new Employee("E004","Sundar","9334593933","Vijayanagar",3000);
Employee e5 = new Employee("E005","Suman","9383678933","Indiranagar",2000);
Employee e6 = new Employee("E006","Suma","9385493933","KRPuram",1750);
projectSerializer.elist2.add(e4);
projectSerializer.elist2.add(e5);
projectSerializer.elist2.add(e6);

Employee e7 = new Employee("E007","Chitra","9383978933","Koramangala",4000);
Employee e8 = new Employee("E008","Suraj","9383992133","Malleswaram",3000);
Employee e9 = new Employee("E009","Manu","9345193933","RTNagar",2000);
projectSerializer.elist3.add(e7);
projectSerializer.elist3.add(e8);
projectSerializer.elist3.add(e9);

projectSerializer.projectMap1.put(project1, projectSerializer.elist1);
projectSerializer.projectMap1.put(project2, projectSerializer.elist2);
projectSerializer.projectMap1.put(project3, projectSerializer.elist3);
projectSerializer.serializeProjectDetails(projectSerializer.projectMap1);
```

OUTPUT: SerializeData



```

106 projectSerializer.elist2.add(e4);
107 projectSerializer.elist2.add(e5);
108 projectSerializer.elist2.add(e6);
109
110 Employee e7 = new Employee("E007", "Chitra", "9383978933", "Koramangala", 4000);
111 Employee e8 = new Employee("E008", "Suraj", "9383992133", "Malleswaram", 3000);
112 Employee e9 = new Employee("E009", "Manu", "9345193933", "RTNagar", 2000);
113 projectSerializer.elist3.add(e7);
114 projectSerializer.elist3.add(e8);
115 projectSerializer.elist3.add(e9);
116
117 projectSerializer.projectMap1.put(project1, projectSerializer.elist1);
118 projectSerializer.projectMap1.put(project2, projectSerializer.elist2);
119
Serialized Map of Project Successfully...
  
```

Output : DeSerializeData

DeSerialized Data :

The Project

Project [projectCode=P1, projectName=Music Synthesizer, projectStrength=23] Has the following Employees

Employees

[Employee [employeeId=E001, employeeName=Harsha, employeePhone=9383993933, employeeAddress=RTNagar, employeeSalary=1000], Employee [employeeId=E002, employeeName=Harish, employeePhone=9354693933, employeeAddress=Jayanagar, employeeSalary=2000], Employee [employeeId=E003, employeeName=Meenal, employeePhone=9383976833, employeeAddress=Malleswaram, employeeSalary=1500]]

DeSerialized Data :

The Project

Project [projectCode=P2, projectName=Vehicle Movement Tracker, projectStrength=13] Has the following Employees

Employees

[Employee [employeeId=E004, employeeName=Sundar, employeePhone=9334593933, employeeAddress=Vijayanagar, employeeSalary=3000], Employee [employeeId=E005, employeeName=Suman, employeePhone=9383678933, employeeAddress=Indiranagar, employeeSalary=2000], Employee [employeeId=E006, employeeName=Suma, employeePhone=9385493933, employeeAddress=KRPuram, employeeSalary=1750]]

DeSerialized Data :

The Project Project [projectCode=P3, projectName=Liquid Viscosity Finder, projectStrength=15] Has the following Employees

Employees

[Employee [employeeId=E007, employeeName=Chitra, employeePhone=9383978933, employeeAddress=Koramangala, employeeSalary=4000], Employee [employeeId=E008, employeeName=Suraj, employeePhone=9383992133, employeeAddress=Malleswaram, employeeSalary=3000], Employee [employeeId=E009, employeeName=Manu, employeePhone=9345193933, employeeAddress=RTNagar, employeeSalary=2000]]

Question 2:

40%

In the same Project Create another Class called InterThreadCom which should invoke these Serialization & DeSerialization processes as threads and they should be in sync which means, Inter thread Communication between the calls to Serialize and DeSerialize should be implemented.

The output when running the application for the sample data shown below should be as shown subsequently:

```
HashMap <Project,ArrayList <Employee>> hMap1 = new HashMap<>();
HashMap <Project,ArrayList <Employee>> hMap2 = new HashMap<>();
HashMap <Project,ArrayList <Employee>> hMap3 = new HashMap<>();

ArrayList <Employee> eList1 = new ArrayList<Employee>();
ArrayList <Employee> eList2 = new ArrayList<Employee>();
ArrayList <Employee> eList3 = new ArrayList<Employee>();
ArrayList <Employee> eList4 = new ArrayList<Employee>();
ArrayList <Employee> eList5 = new ArrayList<Employee>();
ArrayList <Employee> eList6 = new ArrayList<Employee>();

Employee e1 = new Employee("E001","Harsha","9383993933","RTNagar",1000);
Employee e2 = new Employee("E002","Harish","9354693933","Jayanagar",2000);
Employee e3 = new Employee("E003","Meenal","9383976833","Malleswaram",1500);
Employee e4 = new Employee("E004","Sundar","9334593933","Vijayanagar",3000);
Employee e5 = new Employee("E005","Suman","9383678933","Indiranagar",2000);
Employee e6 = new Employee("E006","Suma","9385493933","KRPuram",1750);
Employee e7 = new Employee("E007","Chitra","9383978933","Koramangala",4000);
Employee e8 = new Employee("E008","Suraj","9383992133","Malleswaram",3000);
Employee e9 = new Employee("E009","Manu","9345193933","RTNagar",2000);
Employee e10 = new Employee("E010","Kiran","9383975673","Koramangala",4000);
Employee e11 = new Employee("E011","Mrinal","9383992789","Malleswaram",3000);
Employee e12 = new Employee("E012","Mahesh","9345193763","RTNagar",2000);

eList1.add(e1);
eList1.add(e2);

eList2.add(e3);
eList2.add(e4);

eList3.add(e5);
eList3.add(e6);

eList4.add(e7);
eList4.add(e8);

eList5.add(e9);
eList5.add(e10);
```

```
eList6.add(e11);  
eList6.add(e12);
```

```
Project project1 = new Project("P1","Music Synthesizer",23);  
Project project2 = new Project("P2","Vehicle Movement Tracker",13);  
Project project3 = new Project("P3","Liquid Viscosity Finder",15);  
Project project4 = new Project("P4","InsuranceTool",23);  
Project project5 = new Project("P5","BankingTool",13);  
Project project6 = new Project("P6","PayrollTool",15);
```

```
hMap1.put(project1, eList1);  
hMap1.put(project2, eList2);  
hMap2.put(project3, eList3);  
hMap2.put(project4, eList4);  
hMap3.put(project5, eList5);  
hMap3.put(project6, eList6);
```

INVOKING SERIALIZATION/DESERIALIZATION:

```
Thread1 obj1=new Thread1(hMap1);  
producer p1=new producer(obj1);  
consumer c1=new consumer(obj1);
```

```
Thread1 obj2=new Thread1(hMap2);  
producer p2=new producer(obj2);  
consumer c2=new consumer(obj2);
```

```
Thread1 obj3=new Thread1(hMap3);  
producer p3=new producer(obj3);  
consumer c3=new consumer(obj3);
```

OUTPUT:

Serialize called by Producer

Serialized Data :

```
{Project [projectCode=P1, projectName=Music Synthesizer, projectStrength=23]=[Employee  
[employeeId=E001, employeeName=Harsha, employeePhone=9383993933,  
employeeAddress=RTNagar, employeeSalary=1000], Employee [employeeId=E002,  
employeeName=Harish, employeePhone=9354693933, employeeAddress=Jayanagar,  
employeeSalary=2000]],
```

```
Project [projectCode=P2, projectName=Vehicle Movement Tracker,  
projectStrength=13]=[Employee [employeeId=E003, employeeName=Meenal,  
employeePhone=9383976833, employeeAddress=Malleswaram, employeeSalary=1500],  
Employee [employeeId=E004, employeeName=Sundar, employeePhone=9334593933,  
employeeAddress=Vijayanagar, employeeSalary=3000]]}
```

DeSerialize Called by Consumer

DeSerialized Data{Project [projectCode=P1, projectName=Music Synthesizer, projectStrength=23]=[Employee [employeeId=E001, employeeName=Harsha, employeePhone=9383993933, employeeAddress=RTNagar, employeeSalary=1000], Employee [employeeId=E002, employeeName=Harish, employeePhone=9354693933, employeeAddress=Jayanagar, employeeSalary=2000]],

Project [projectCode=P2, projectName=Vehicle Movement Tracker, projectStrength=13]=[Employee [employeeId=E003, employeeName=Meenal, employeePhone=9383976833, employeeAddress=Malleswaram, employeeSalary=1500], Employee [employeeId=E004, employeeName=Sundar, employeePhone=9334593933, employeeAddress=Vijayanagar, employeeSalary=3000]]}

Serialize called by Producer

Serialized Data :{Project [projectCode=P4, projectName=InsuranceTool, projectStrength=23]=[Employee [employeeId=E007, employeeName=Chitra, employeePhone=9383978933, employeeAddress=Koramangala, employeeSalary=4000], Employee [employeeId=E008, employeeName=Suraj, employeePhone=9383992133, employeeAddress=Malleswaram, employeeSalary=3000]],

Project [projectCode=P3, projectName=Liquid Viscosity Finder, projectStrength=15]=[Employee [employeeId=E005, employeeName=Suman, employeePhone=9383678933, employeeAddress=Indiranagar, employeeSalary=2000], Employee [employeeId=E006, employeeName=Suma, employeePhone=9385493933, employeeAddress=KRPuram, employeeSalary=1750]]}

DeSerialize Called by Consumer

DeSerialized Data{Project [projectCode=P4, projectName=InsuranceTool, projectStrength=23]=[Employee [employeeId=E007, employeeName=Chitra, employeePhone=9383978933, employeeAddress=Koramangala, employeeSalary=4000], Employee [employeeId=E008, employeeName=Suraj, employeePhone=9383992133, employeeAddress=Malleswaram, employeeSalary=3000]],

Project [projectCode=P3, projectName=Liquid Viscosity Finder, projectStrength=15]=[Employee [employeeId=E005, employeeName=Suman, employeePhone=9383678933, employeeAddress=Indiranagar, employeeSalary=2000], Employee [employeeId=E006, employeeName=Suma, employeePhone=9385493933, employeeAddress=KRPuram, employeeSalary=1750]]}

Serialize called by Producer

Serialized Data :{Project [projectCode=P6, projectName=PayrollTool, projectStrength=15]=[Employee [employeeId=E011, employeeName=Mrinal, employeePhone=9383992789, employeeAddress=Malleswaram, employeeSalary=3000], Employee [employeeId=E012, employeeName=Mahesh, employeePhone=9345193763, employeeAddress=RTNagar, employeeSalary=2000]],

Project [projectCode=P5, projectName=BankingTool, projectStrength=13]=[Employee [employeeId=E009, employeeName=Manu, employeePhone=9345193933, employeeAddress=RTNagar, employeeSalary=2000], Employee [employeeId=E010, employeeName=Kiran, employeePhone=9383975673, employeeAddress=Koramangala, employeeSalary=4000]]}

DeSerialize Called by Consumer

DeSerialized Data{Project [projectCode=P6, projectName=PayrollTool, projectStrength=15]=[Employee [employeeId=E011, employeeName=Mrinal, employeePhone=9383992789, employeeAddress=Malleswaram, employeeSalary=3000], Employee [employeeId=E012, employeeName=Mahesh, employeePhone=9345193763, employeeAddress=RTNagar, employeeSalary=2000]],

Project [projectCode=P5, projectName=BankingTool, projectStrength=13]=[Employee [employeeId=E009, employeeName=Manu, employeePhone=9345193933, employeeAddress=RTNagar, employeeSalary=2000], Employee [employeeId=E010, employeeName=Kiran, employeePhone=9383975673, employeeAddress=Koramangala, employeeSalary=4000]]}

Question 3:

25%

Given an Array of Numbers 1 to 5, using Intermediate Operators,

Filter: retrieve all Odd numbers and Square these Numbers

Map: Find the SUM of these Numbers

For eg. Input : [1,2,3,4,5]

ODD NUMBERS : [1 , 3, 5]

SQUARES [1 , 9, 25]

SUM : 35

OUTPUT : 35