

# UE20CS352 – OOAD

## Lab 9 and 10

Name: Vishwa Mehul Mehta

SRN: PES2UG20CS389

Sec: F

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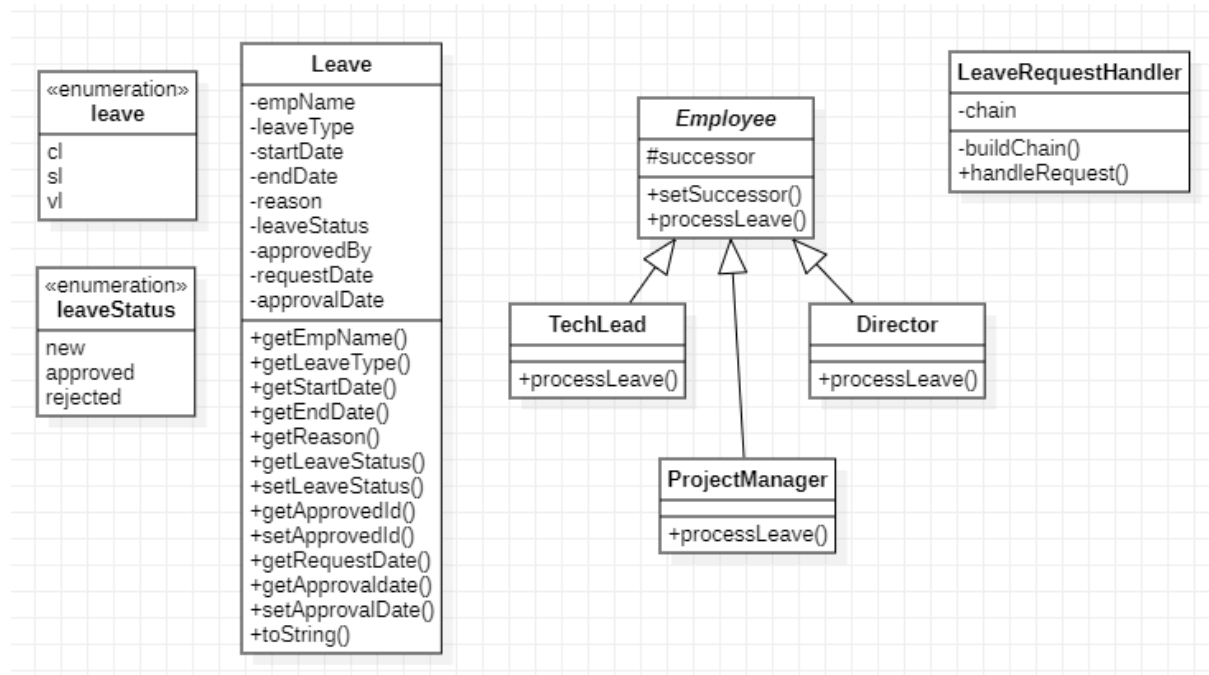
### 1. Problem Statement:

A Company's Leave Management System has the following features. An Employee(client) can apply for Casual Leave (CL), Sick Leave (SL) and Vacation Leave (VL). The roles in the hierarchy who are responsible for approving or rejecting the leave using the process specified are Director, Project Manager and Tech Lead. The Leave request contains the following details: empName, leaveStatus, approvedBy, requestDate and approvalDate. A CL and SL are for only one day. A VL will have a startDate and endDate. A CL will also need a reason to be specified. The Leave created by the client is assigned a "New" status. If the leave is SL, then it will be processed by Tech Lead, if it is CL, it will be processed by the Project Manager, and if it is VL, will be processed by the Director. The Leave when created is sent to Tech Lead for processing, if it is not SL, the Tech Lead will just pass the request to the next higher level. Similarly, Project Manager will process a CL request or forward the VL request to the next higher level. Once the request is processed, a message should be displayed on the console showing request details and approval details.

### 2. Design patterns used:

- Builder pattern
- Chain of Responsibility pattern

### 3. UML Class Model:



#### 4. Code:

```

import java.util.Date;

enum LeaveType {
    CL, SL, VL
}

enum LeaveStatus {
    NEW, APPROVED, REJECTED
}

class LeaveRequest {
    private String empName;
    private LeaveType leaveType;
    private LeaveStatus leaveStatus;
    private String approvedBy;
    private Date requestDate;
    private Date approvalDate;
    private Date startDate;
    private Date endDate;
    private String reason;

    public LeaveRequest(String empName, LeaveType leaveType) {
        this.empName = empName;
        this.leaveType = leaveType;
        this.leaveStatus = LeaveStatus.NEW;
        this.requestDate = new Date();
    }

    public String getEmpName() {
        return empName;
    }

    public LeaveType getLeaveType() {
        return leaveType;
    }

    public void setLeaveStatus(LeaveStatus leaveStatus) {
        this.leaveStatus = leaveStatus;
    }

    public void setApprovedBy(String approvedBy) {
        this.approvedBy = approvedBy;
    }
}

```

```

    public void setApprovalDate(Date approvalDate) {
        this.approvalDate = approvalDate;
    }

    public void setStartDate(Date startDate) {
        this.startDate = startDate;
    }

    public void setEndDate(Date endDate) {
        this.endDate = endDate;
    }

    public void setReason(String reason) {
        this.reason = reason;
    }

    @Override
    public String toString() {
        return "LeaveRequest: " +
            "empName=" + empName + '\'' +
            ", leaveType=" + leaveType +
            ", leaveStatus=" + leaveStatus +
            ", approvedBy=" + approvedBy + '\'' +
            ", requestDate=" + requestDate +
            ", approvalDate=" + approvalDate +
            ", startDate=" + startDate +
            ", endDate=" + endDate +
            ", reason=" + reason + '\'';
    }
}

abstract class Approver {
    protected Approver nextApprover;

    public void setNextApprover(Approver nextApprover) {
        this.nextApprover = nextApprover;
    }

    public abstract void processLeave(LeaveRequest request);
}

class TechLead extends Approver {

    @Override
    public void processLeave(LeaveRequest request) {
        if (request.getLeaveType() == LeaveType.SL) {
            request.setLeaveStatus(LeaveStatus.APPROVED);
            request.setApprovedBy("Tech Lead");
            request.setApprovalDate(new Date());
            System.out.println(request);
        } else if (nextApprover != null) {
            nextApprover.processLeave(request);
        }
    }
}

class ProjectManager extends Approver {

    @Override
    public void processLeave(LeaveRequest request) {
        if (request.getLeaveType() == LeaveType.CL) {
            request.setLeaveStatus(LeaveStatus.APPROVED);
            request.setApprovedBy("Project Manager");
            request.setApprovalDate(new Date());
            System.out.println(request);
        } else if (nextApprover != null) {
            nextApprover.processLeave(request);
        }
    }
}

class Director extends Approver {

```

```

@Override
public void processLeave(LeaveRequest request) {
    if (request.getLeaveType() == LeaveType.VL) {
        request.setLeaveStatus(LeaveStatus.APPROVED);
        request.setApprovedBy("Director");
        request.setApprovalDate(new Date());
        System.out.println(request);
    }
}

}

public class LeaveRequestHandler {

    public static void main(String[] args) {

        TechLead techLead = new TechLead();
        ProjectManager projectManager = new ProjectManager();
        Director director = new Director();

        techLead.setNextApprover(projectManager);
        projectManager.setNextApprover(director);
        Date enddate = new Date();
        Long milliseconds = 86400000L * 5L;
        Date updateddate = new Date(enddate.getTime() + milliseconds);

        LeaveRequest clRequest = new LeaveRequest("A", LeaveType.CL);
        clRequest.setReason("Picnic :)");
        techLead.processLeave(clRequest);

        LeaveRequest slRequest = new LeaveRequest("B", LeaveType.SL);
        techLead.processLeave(slRequest);

        LeaveRequest vlRequest = new LeaveRequest("C", LeaveType.VL);
        vlRequest.setStartDate(new Date());
        vlRequest.setEndDate(updateddate);
        techLead.processLeave(vlRequest);
    }
}

```

## 5. Screenshots:

```

[Running] cd "c:\Users\Lenovo\Desktop\" && javac LeaveRequestHandler.java && java LeaveRequestHandler
LeaveRequest: empName='A', leaveType=CL, leaveStatus=APPROVED, approvedBy='Project Manager', requestDate=Thu Apr 20 11:55:34 IST 2023, approvalDate=Thu Apr 20 11:55:34 IST 2023, startDate=null, endDate=null, reason='Picnic :)'
LeaveRequest: empName='B', leaveType=SL, leaveStatus=APPROVED, approvedBy='Tech Lead', requestDate=Thu Apr 20 11:55:34 IST 2023, approvalDate=Thu Apr 20 11:55:34 IST 2023, startDate=null, endDate=null, reason='null'
LeaveRequest: empName='C', leaveType=VL, leaveStatus=APPROVED, approvedBy='Director', requestDate=Thu Apr 20 11:55:34 IST 2023, approvalDate=Thu Apr 20 11:55:34 IST 2023, startDate=Thu Apr 20 11:55:34 IST 2023, endDate=Tue Apr 25 11:55:34 IST 2023, reason='null'
[Done] exited with code=0 in 1.212 seconds

```