OODP workshop 10

Student Class

1. Think about a class named Employee in payroll system of an organisation.

Ans: We will think of a payroll system which have an Employee class with Attribute member variables and Behaviour Methods. We will put this code in Employee.java file.

2. What are the different attributes that an Employee class can have?

Ans: Attributes of the Employee class:

a) name: Stringb) employeeId: int

c) dateOfBirth: LocalDate

d) address: String

e) phoneNumber: String

f) email: String

g) department: Stringh) designation: String

i) dateOfJoining: LocalDate

j) salary: double

k) paymentMethod: PaymentMethod

1) bankDetails: BankDetails

m) leaveBalance: int

n) employeeType: EmployeeType

o) taxRate: double

3. What are the methods that an Employee class can have? Ans:

Methods of the Employee class:

- a) Constructors: Default, parameterized with essential attributes, parameterized with most attributes.
- b) Getters and Setters for each attribute.
- c) calculateSalary()
- d) applyLeave(int daysToApply)
- e) updatePersonalInfo(String address, String phoneNumber, String email)
- f) changeDepartment(String newDepartment)
- g) promoteEmployee(String newDesignation, double newSalary)
- h) terminateEmployee(LocalDate terminationDate)
- i) generatePayslip()
- j) calculateTaxDeduction()
- k) updateBankDetails(BankDetails newBankDetails)
- requestLeave(int daysToRequest)
- m) printEmployeeDetails()
- n) calculateNetPay()

- 4. How many constructors this class can have?
- Ans: There are three constructors: default, parameterized with essential attributes, parameterized with most attributes.
- 5. How many getters and setters this class can have?
 Ans: Each attribute has a getter and a setter. With 15 attributes, there will be 15 getters and 15 setters, making a total of 30 getter and setter methods.
- 6. What a toString() method will display in this class?

 Ans:

```
@Override
public String toString() {
  return "Employee{" +
       "name="" + name + "\" +
       ", employeeId=" + employeeId +
       ", dateOfBirth=" + dateOfBirth +
       ", address="" + address + "\" +
       ", phoneNumber="" + phoneNumber + '\" +
       ", email="" + email + "\" +
       ", department="" + department + "\" +
       ", designation="" + designation + "\" +
       ", dateOfJoining=" + dateOfJoining +
       ", salary=" + salary +
       ", paymentMethod=" + paymentMethod +
       ", bankDetails=" + bankDetails +
       ", leaveBalance=" + leaveBalance +
       ", employeeType=" + employeeType +
       ", taxRate=" + taxRate +
       '}';
}
```

Open Eclipse, and develop this class on the basis of information you have written in answers above.

```
👄 eclipse-workspace - EmployeePayroll/src/EmployeePayrollPack/Employee.java - Eclipse IDE
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                                         3 import java.time.LocalDate;
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   ∨ Ø src
                                          5 public class Employee {

→ # EmployeePay

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                                                      private int employeeId;
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                                                      private LocalDate dateOfBirth;
            > 

CasualEm
                                                      private String address;
            > 

Employee
                                                      private String phoneNumber;
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            > 🗗 Employee
                                                      private String email;
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            > D FulltimeEr
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                                                      private String department;
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                                                      private String designation;
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                                                      private LocalDate dateOfJoining;
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                                                      private double salary;
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                                                      private PaymentMethod paymentMethod;
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                                                      private BankDetails bankDetails;
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                                                      private int leaveBalance;
                                        18
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                                        19
                                                      private EmployeeType employeeType;
                                                                                                                                                                                                                                      # EmployeePayrollPack
                                        20
                                                     private double taxRate:
                                                                                                                                                                                                                                   ∨ Θ Employee
                                        21
                                                                                                                                                                                                                                          name : String
                                                      // Default constructor
                                        22
                                        23⊜
                                                      public Employee() {
                                                                                                                                                                                                                                           employeeld : int
                                        24

    dateOfBirth : Local

                                        25

    address : String

                                                      // Parameterized constructor with essential attributes
                                        26
                                                                                                                                                                                                                                           phoneNumber : St
                                        27⊚
                                                      public Employee(String name, int employeeId, String department, String designati
                                                              this.name = name;

    email : String

                                        28
                                                               this.employeeId = employeeId;
                                        29
                                                                                                                                                                                                                                           department : String
                                                               this.department = department;
                                        30

    designation : String

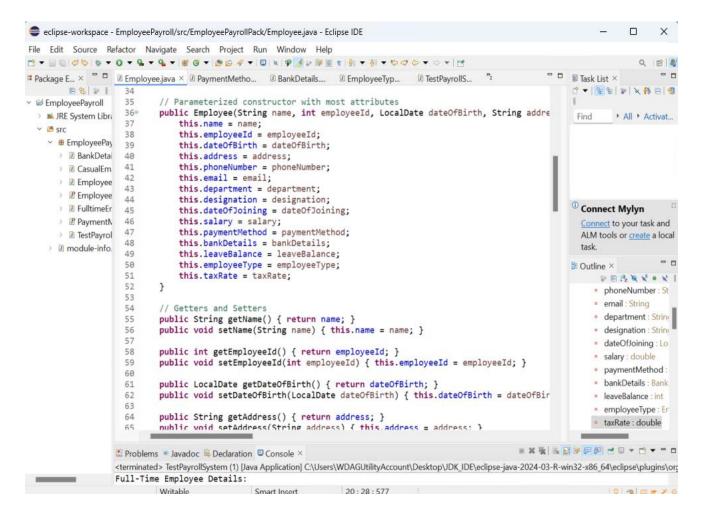
                                                               this.designation = designation;
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                                                                    public String getPhoneNumber() { return phoneNumber; }
                                                                                                                                                                                                                                                                                           67

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                                                                    public void setPhoneNumber(String phoneNumber) { this.phoneNumber = phoneNumber;
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                                                                    public String getEmail() { return email; }
     v @ src
                                                                    public void setEmail(String email) { this.email = email; }

→ 

■ EmployeePay

    BankDetai

                                                                    public String getDepartment() { return department; }
                                                                    public void setDepartment(String department) { this.department = department; }
                CasualEm
                Employee
                                                                    public String getDesignation() { return designation; }
                                                  76
                > Employee
                                                                     public void setDesignation(String designation) { this.designation = designation;
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→ PaymentN

                                                                     public LocalDate getDateOfJoining() { return dateOfJoining; }
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                                                                     public void setDateOfJoining(LocalDate dateOfJoining) { this.dateOfJoining = dat
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                ALM tools or create a local
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           module-info.
                                                                     public double getSalary() { return salary; }
                                                  83
                                                                     public void setSalary(double salary) { this.salary = salary; }
                                                  84
                                                                                                                                                                                                                                                                                                     PERKON
                                                                     public PaymentMethod getPaymentMethod() { return paymentMethod; }
                                                                                                                                                                                                                                                                                                       designation : String
                                                                    public void setPaymentMethod(PaymentMethod paymentMethod) { this.paymentMethod =
                                                  86

    dateOfJoining : Lo

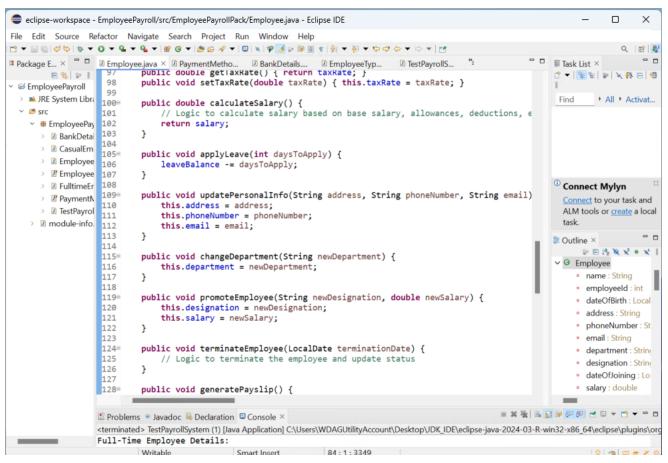
                                                  87
                                                                     public BankDetails getBankDetails() { return bankDetails; }

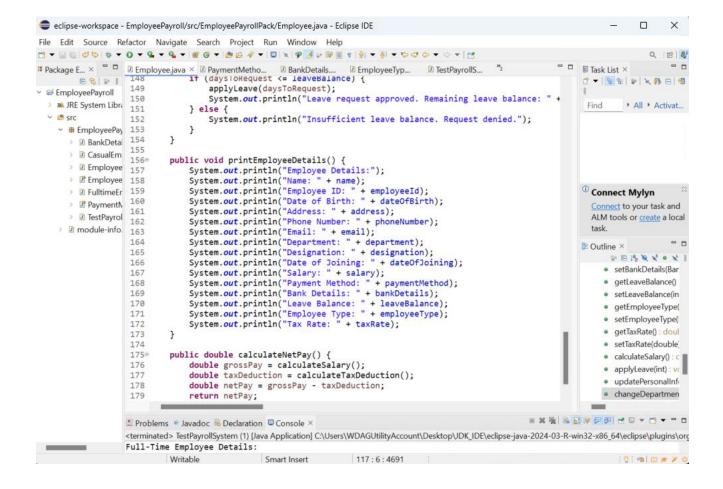
    salary : double

                                                  88
                                                                    public void setBankDetails(BankDetails bankDetails) { this.bankDetails = bankDet
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                                                                                                                                                                                                                                                                                                       paymentMethod :
                                                  99
                                                                                                                                                                                                                                                                                                      bankDetails : Bank
                                                  91
                                                                     public int getLeaveBalance() { return leaveBalance; }
                                                                                                                                                                                                                                                                                                      leaveBalance : int.
                                                  92
                                                                    public void setLeaveBalance(int leaveBalance) { this.leaveBalance = leaveBalance
                                                                                                                                                                                                                                                                                                       employeeType : Er
                                                  94
                                                                     public EmployeeType getEmployeeType() { return employeeType; }
                                                                                                                                                                                                                                                                                                      taxRate : double
                                                  95
                                                                    public void setEmployeeType(EmployeeType employeeType) { this.employeeType = employeeType | This.employeeType = employeeType | This.employeeType | This.employeeType | EmployeeType | This.employeeType |
                                                                                                                                                                                                                                                                                                     e Employee()
                                                  96

 Employee(String, ir

                                                                     public double getTaxRate() { return taxRate; }
                                                  97
                                                                                                                                                                                                                                                                                                     o Employee(String, ii
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                                                                     nublic void setTaxRate(double taxRate) { this.taxRate = taxRate: }
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FulltimeEmployee Class

Consider FulltimeEmployee class as a sub class of Employee

- 1. What is the additional attribute that a FulltimeEmplloyee class can have? Ans: benefits: String
- 2. Discuss the different types of constructor that this class can have and how will you use "Super" keyword?

Ans: Constructors and usage of super:

- a) Default constructor.
- b) Constructor with essential attributes.
- c) Constructor with all attributes including the additional one.
- 3. Write getter and setter for additional attributes and override the toString() method of Employee class which will display the all details of that particular FulltimeEmployee.

```
ans: // Getter and Setter for bonus
public double getBonus() {
    return bonus;
}
public void setBonus(double bonus) {
    this.bonus = bonus;
}
```

```
@Override
public void printEmployeeDetails() {
    super.printEmployeeDetails();
    System.out.println("Bonus: " + bonus);
}
```

```
👄 eclipse-workspace - EmployeePayroll/src/EmployeePayrollPack/FulltimeEmployee.java - Eclipse IDE
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                                                                                                                                                                            - 0
           | 1 package EmployeePayrollPack;
| 2 public class FulltimeEmployee extends Employee {
| ystem Library | 3 private double bonus; |
                                                                                                                                                    0 - | E = | > | X | N | | 1 | 1 | 1

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EmployeePayroll

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  > M JRE System Library 3
                                // Default constructo
    public FulltimeEmployee() {
                                  super();
                              }
// Parameterized constructor with essential attributes
       CasualEmple 8
       Employee.ja 96
                               public FulltimeEmployee(String name, int employeeId, String department, String designation, doubt
                                   super(name, employeeId, department, designation, salary);
this.bonus = bonus;
       EmployeeTy 11
       FulltimeEmp 12
                                // Parameterized constructor with most attributes
                                                                                                                                                   Connect Mylyn
       PaymentMe 13
                               public FulltimeEmployee(String name, int employeeId, java.time.LocalDate dateOfBirth, String add
super(name, employeeId, dateOfBirth, address, phoneNumber, email, department, designation, designation)
       > @ TestPayrollSy 148
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                                                                                                                                                     tools or create a local task.
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                                // Getter and Setter for bonus
                                                                                                                                                             PERKYONI
                               public double getBonus() {

■ EmployeePayrollPack

                       20
                                    return bonus:
                                                                                                                                                   ∨ ⊕ FulltimeEmployee
                               public void setBonus(double bonus) {
                                                                                                                                                         bonus : double
                       22
                       23
24
                                                                                                                                                        FulltimeEmployee()

    FulltimeEmployee(String,

    FulltimeEmployee(String, i

                                    super.printEmployeeDetails();
super.printEmployeeDetails();
                               public void printEmployeeDetails() {

    getBonus() : double

                                    System.out.println("Bonus:

    setBonus(double) : void

                       28
                       29
30 }
31
                                                                                                                                                        • printEmployeeDetails(): v

■ Problems 
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                      Full-Time Employee Details:
                                                             Smart Insert 17 : 6 : 1123
```

CasualEmployee Class

Consider CasualEmployee class as a sub class of Employee

1. What is the additional attribute that a CasualEmployee class can have?

Ans: hourlyRate: double

2. Discuss the different types of constructor that this class can have and how will you use "Super" keyword?

Ans:

- a) Default constructor.
- b) Constructor with essential attributes.
- c) Constructor with all attributes including the additional one.

3. Write getter and setter for additional attributes and override the toString() method of Employee class which will display the all details of that particular CasualEmployee.

```
👄 eclipse-workspace - EmployeePayroll/src/EmployeePayrollPack/CasualEmployee.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
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                      1 package EmployeePayrollPack;
          B & | . .
                      2 public class CasualEmployee extends Employee {

    EmployeePayroll

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                            private double hourlyRate;
  JRE System Library
                            // Default constructor
 v 😬 src
                            public CasualEmployee() {

→ 

■ EmployeePayrc

                                super();
      BankDetails.
                            // Parameterized constructor with essential attributes
                      8
        CasualEmple
                            public CasualEmployee(String name, int employeeId, String department, String designation, double
      Employee.ja
                                super(name, employeeId, department, designation, salary);

→ EmployeeTy

                                this.hourlyRate = hourlyRate;

→ FulltimeEmp

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                                                                                                                                     <sup>①</sup> Co
                            // Parameterized constructor with most attributes
      > PaymentMe
                            public CasualEmployee(String name, int employeeId, java.time.LocalDate dateOfBirth, String addre
      > In TestPayrollSy
                                                                                                                                      Co
                                super(name, employeeId, dateOfBirth, address, phoneNumber, email, department, designation, of
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   module-info.ja
                                this.hourlyRate = hourlyRate;
                     16
                     17
                                                                                                                                     E Out
                     18
                            // Getter and Setter for hourlyRate
                     198
                            public double getHourlyRate() {
                     20
                                return hourlyRate;
                                                                                                                                     > 0
                     21
                            public void setHourlyRate(double hourlyRate) {
                     228
                     23
                                this.hourlyRate = hourlyRate;
                     24
                     25⊜
                            @Override
                     26
                            public void printEmployeeDetails() {
                     27
                                super.printEmployeeDetails();
                     28
                                System.out.println("Hourly Rate: " + hourlyRate);
                     29
                    30 }
                     31

    Problems 
    ■ Javadoc 
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                    <terminated> TestPayrollSystem (1) [Java Application] C:\Users\WDAGUtilityAccount\Desktop\JDK JDE\eclipse-java-2024-03-R-win32-x86_64\eclipse\plugins
                    Full-Time Employee Details:
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```

Create a test class and test all classes by creating their objects and by calling their toString() method.

```
Edit Source Refactor Navigate Search Project Run Window Help
age Explorer × DEmployee.java DEmplo
                                                    FulltimeEmployee fullTimeEmp = new FulltimeEmployee("John Doe", 1, "IT", "Developer", 70000, 5000);
mployeePayroll
                                                       fullTimeEmp.setDateOfBirth(LocalDate.of(1990, 5, 15));
JRE System Library Java
                                     8
                                                        fullTimeEmp.setAddress("123 Main St");
                                                        fullTimeEmp.setPhoneNumber("555-1234");
# EmployeePayrollPack 10
                                                        fullTimeEmp.setEmail("john.doe@example.com");
  BankDetails.java
                                                        fullTimeEmp.setDateOfJoining(LocalDate.of(2020, 1, 10));
                                                        fullTimeEmp.setPaymentMethod(PaymentMethod.BANK_TRANSFER);

    CasualEmployee.ja

                                                        fullTimeEmp.setBankDetails(new BankDetails("Bank ABC", "1234567890", "Main Branch"));
  Employee.java
                                                        fullTimeEmp.setLeaveBalance(15);

→ EmployeeType.jav

                                   15
                                                        fullTimeEmp.setEmployeeType(EmployeeType.FULLTIME);
  FulltimeEmployee
                                                        fullTimeEmp.setTaxRate(0.2);
                                                        // Creating a casual employee
  PaymentMethod.j
                                                        CasualEmployee casualEmp = new CasualEmployee("Jane Smith", 2, "HR", "Recruiter", 40000, 30);
   I TestPayrollSystem
                                                        casualEmp.setDateOfBirth(LocalDate.of(1985, 8, 20));

☑ module-info.java

                                    20
                                                        casualEmp.setAddress("456 Elm St");
                                    21
                                                        casualEmp.setPhoneNumber("555-5678");
                                   22
23
24
                                                        casualEmp.setEmail("jane.smith@example.com");
                                                        casualEmp.setDateOfJoining(LocalDate.of(2021, 2, 15));
                                                        casualEmp.setPaymentMethod(PaymentMethod.CHEQUE);
                                    25
                                                        casualEmp.setBankDetails(new BankDetails("Bank XYZ", "0987654321", "Secondary Branch"));
                                   26
27
                                                        casualEmp.setLeaveBalance(10);
                                                        casualEmp.setEmployeeType(EmployeeType.PARTTIME);
                                                        casualEmp.setTaxRate(0.15);
                                    28
                                    29
                                                        // Printing details of the full-time employee
                                    30
                                                        System.out.println("Full-Time Employee Details:");
                                    31
                                                        fullTimeEmp.printEmployeeDetails();
                                    32
                                                        System.out.println();
                                    33
                                                        // Printing details of the casual employee
                                    34
                                                        System.out.println("Casual Employee Details:");
                                    35
                                                        casualEmp.printEmployeeDetails();
                                    36
                                                        System.out.println();
                                    37
                                                        // Test calculateNetPay method
                                   38
                                                        System.out.println("Net Pay for Full-Time Employee: " + fullTimeEmp.calculateNetPay());
                                   39
                                                        System.out.println("Net Pay for Casual Employee: " + casualEmp.calculateNetPay());
                                   🖺 Problems 🍭 Javadoc 🔒 Declaration 📮 Console 🗵
```

Create a rough class diagram for above scenario.

Ans:

```
- name: String
- employeeId: int
- dateOfBirth:
   LocalDate
- address: String
- phoneNumber: String
- email: String
- department: String
- designation: String
- dateOfJoining: LocalDate
- salary: double
```

- paymentMethod: PaymentMethod
- bankDetails: BankDetails
- leaveBalance: int
- employeeType: |EmployeeType
- taxRate: double
- + Employee()
- + Employee(String, int, String, String, double)
- + Employee(String, int, LocalDate, String, String, String, String, LocalDate, double, PaymentMethod, BankDetails, int, EmployeeType, double)
- + String getName()
- + void setName(String)
- + int getEmployeeId()
- + void setEmployeeId(int)
- + LocalDate getDateOfBirth()
- + void setDateOfBirth(LocalDate)
- + String getAddress()
- + void setAddress(String)
- + String getPhoneNumber()
- + void setPhoneNumber(String)
- + String getEmail()
- + void setEmail(String)
- + String getDepartment()
- + void setDepartment(String)
- + String getDesignation()
- + void setDesignation(String)
- + LocalDate getDateOfJoining()
- + void setDateOfJoining(LocalDate)
- + double getSalary()
- + void setSalary(double)
- + PaymentMethod getPaymentMethod()
- + void
- setPaymentMethod(PaymentMethod)
- + BankDetails getBankDetails()
- + void setBankDetails(BankDetails)
- + int getLeaveBalance()
- + void setLeaveBalance(int)
- + EmployeeType getEmployeeType()
- + void
- setEmployeeType(EmployeeType)
- + double getTaxRate()

- + void setTaxRate(double)
- + double calculateSalary()
- + void applyLeave(int)
- + void updatePersonalInfo(String, String, String)
- + void changeDepartment(String)
- + void promoteEmployee(String, double)
- + void terminateEmployee(LocalDate)
- + void generatePayslip()
- + double calculateTaxDeduction()
- + void updateBankDetails(BankDetails)
- + void requestLeave(int)
- + void printEmployeeDetails()
- + double calculateNetPay()

CasualEmployee

- double hourlyRate
- + CasualEmployee()
- + CasualEmployee(String, int, String, String, double, double)
- + CasualEmployee(String, int, LocalDate, String, String, String, String, String, LocalDate, double, PaymentMethod, BankDetails, int, EmployeeType, double, double)
- + double getHourlyRate()
- + void setHourlyRate(double)
- + void printEmployeeDetails()

BankDetails

- String bankName
- String accountNumber
- String branch

FulltimeEmployee

- double bonus
- + FulltimeEmployee()
- + FulltimeEmployee(String, int, String, String, double, double)
- + FulltimeEmployee(String, int, LocalDate, String, String, String, String, LocalDate, double, PaymentMethod, BankDetails, int, EmployeeType, double, double)
- + double getBonus()
- + void setBonus(double)
- + void printEmployeeDetails()

PaymentMethod

Constants

- BANK_TRANSFER
- CASH
- CHEQUE
- MOBILE_PAYMENT

- + BankDetails(String, String, String)
- + String getBankName()
- + void setBankName(String)
- + String getAccountNumber()
- + void setAccountNumber(String)
- + String getBranch()
- + void setBranch(String)
- + String toString()

TestPayrol	llSystem
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+ main(String[] args)

EmployeeType
Constants
- FULLTIME
- PARTTIME

- CONTRACT