

Implement the following concepts by constructing suitable classes in Java -

- a. Constructors
- b. Constructor Overloading
- c. Function Overloading
- d. Function Overriding
- e. Inheritance

Create a class Person -

Field - Name, Birthdate, Contact no and Mail id

Methods - Constructor, accept and display

Class Employee -

Inherits the Person class

Fields : Emp ID, grade, basic salary, Gross Salary, HRA (House Rent Allowance), TA (Traveling Allowance),

DA (Dearness Allowance)

Methods : Constructor, accept, display and gross-salary

Given:

Grade	Basic	TA
A	8000	2000
B	7000	1500
C	6000	1000
D	5000	500

Calculate Gross Salary :

Gross Salary = Basic + HRA (20% of Basic) + DA (50% Basic) + TA

e.g if Basic = 8000

TA = 2000

HRA = 20% of 8000 = 1600

DA = 50 % of 8000 = 4000

Gross = 8000 + 2000 + 1600 + 4000 = 15600

Optional : you can implement increment function in which you can change grade of an employee and recalculate salary with new grade

JAVA PROGRAM:

Person.java

```
package person;
```

```
import java.util.Scanner;
```

```
public class Person {
```

```
    protected String fullName;
```

```
    String birthDate;
```

```
    String contactNumber;
```

```
    String mailID;
```

```
    /**
```

```
    * Constructor overloading: Person() & Person(String fullName)
```

```
    */
```

```
    public Person(){
```

```
        fullName = null;
```

```
        birthDate = null;
```

```
        contactNumber = null;
```

```
        mailID = null;
```

```
    }
```

```
    public Person(String fullName){
```

```
        this.fullName = fullName;
```

```
    }
```

```
public void accept(Scanner sc){  
    System.out.print("Enter Date of Birth (dd/mm/yyyy): ");  
    birthDate = sc.nextLine();  
    System.out.print("Enter Contact Number: ");  
    contactNumber = sc.nextLine();  
    System.out.print("Enter mail ID: ");  
    mailID = sc.nextLine();  
}
```

```
public void display(){  
    System.out.println("Name: "+fullName);  
    System.out.println("Date of Birth (dd/mm/yyyy): "+birthDate);  
    System.out.println("Contact Number: "+contactNumber);  
    System.out.println("Mail ID: "+mailID);  
}  
}
```

Employee.java

```
package employee;
```

```
import java.util.Scanner;
```

```
import person.*;
```

```
/**
```

```
 * Single Inheritance
```

```
 * Parent class : Person
```

```
 * Child class : Employee
```

```
 */
```

```
public class Employee extends Person {
```

```
    static byte ID_counter = 0;
```

```
    public byte empID;
```

```
    char grade;
```

```
    double BS; //Basic Salary
```

```
    double GS; //Gross Salary
```

```
    double HRA; //House Rent Allowance
```

```
    double TA; //Traveling Allowance
```

```
    double DA; //Dearness Allowance
```

```
/**
```

```
 * Constructor overloading: Employee() & Employee(String fullname)
```

```
 */
```

```
    public Employee(){
```

```
super();

//Keeps track of no. of created employees to assign unique empID to each
ID_counter++;
empID = ID_counter;

grade = '\u0000';
BS = 0.0;
GS = 0.0;
HRA = 0.0;
TA = 0.0;
DA = 0.0;
}

public Employee(String fullname){
    super(fullname);
    ID_counter++;
    empID = ID_counter;
}

//.....
/**
 * Method Overloading: Employee class's accept(Scanner sc), accept(Scanner sc, boolean
flag) & accept()
 */
public void accept(Scanner sc){
    //Accepts Person details using accept(Scanner sc) method of Person super class
    super.accept(sc);
```

```
//Accepts grade & set BS & TS
this.accept(sc, true);

//Calculates & stores HRA, DA & GS
this.accept();

System.out.println("New Employee added. Your Employee ID: "+this.empID);
}
```

```
//Accepts grade & set BS & TS
public void accept(Scanner sc, boolean flag){

while(flag == true){

    System.out.print("Enter Grade: ");
    grade = sc.next().charAt(0);
    sc.nextLine(); //'\n'
    flag = false;

    switch(grade){
        case 'A': BS = 8000;
                TA = 2000;
                break;
        case 'B': BS = 7000;
                TA = 1500;
                break;
```

```
        case 'C': BS = 6000;
                TA = 1000;
                break;
        case 'D': BS = 5000;
                TA = 500;
                break;
        default: System.out.println("Invalid Grade. Try Again.");
                flag = true;
    }
}
}
```



```
//Calculates & stores HRA, DA & GS
public void accept(){
    HRA = 0.20 * BS;
    DA = 0.50 * BS;
    GS = BS + HRA + DA + TA;
}

//.....

//Displays all details of an employee
public void display(){

    //displays Person details using display() method of Person class
    super.display();
}
```

```
System.out.println("-----");

System.out.println("Employee ID: "+emplID);
System.out.println("Grade: "+grade);
System.out.println("Basic Salary: "+BS);
System.out.println("Gross Salary: "+GS);
System.out.println("House Rent Allowance: "+HRA);
System.out.println("Travelling Allowance: "+TA);
System.out.println("Dearness Allowance: "+DA);
}

//Displays name & gross salary
public void gross_salary() {
    System.out.println("Name: "+super.fullName);
    System.out.println("Gross Salary: "+GS);
}

//.....

//Increments grade of an Employee and displays updated details
public void increment(){
    int ascii_grade = grade; //implicit conv char => int

    if(grade != 'A'){
        ascii_grade--;
        grade = (char) ascii_grade;
        System.out.println("Grade incremented to "+grade);
```

```
switch(grade){
    case 'A': BS = 8000;
        TA = 2000;
        break;
    case 'B': BS = 7000;
        TA = 1500;
        break;
    case 'C': BS = 6000;
        TA = 1000;
        break;
    default: System.out.println("Invalid Case.");
}
this.accept();
System.out.println("**** UPDATED INFO ****");
this.display();
}else{
    System.out.println("Grade can't be incremented above A.");
}
}
}
```

Database.java

```
package database;
```

```
import employee.*;
```

```
import java.util.Scanner;
```

```
import java.util.ArrayList;
```

```
import java.util.Iterator;
```

```
public class Database{
```

```
    public static void main(String[] args){
```

```
        Scanner sc = new Scanner(System.in);
```

```
        ArrayList<Employee> E = new ArrayList<Employee>(10);
```

```
        Iterator<Employee> iter = null;
```

```
        Employee emp = null;
```

```
        byte ch;
```

```
        do{
```

```
            System.out.println("***** DATABASE OPERATIONS *****");
```

```
            System.out.println("(0) Exit");
```

```
            System.out.println("(1) New Employee");
```

```
            System.out.println("(2) Display Last Added Employee");
```

```
            System.out.println("(3) Display All Employees");
```

```
            System.out.println("(4) Display gross salary of an Employee");
```

```
            System.out.println("(5) Remove An Employee");
```

```
            System.out.println("(6) Increment Grade Of An Employee");
```

```
System.out.print("Enter your choice: ");
ch = Byte.parseByte(sc.nextLine());
System.out.println("_____");

switch(ch){
    case 0: System.out.println("**** PROGRAM ENDED ****");
        break;

    case 1: Database.accept(sc, emp, E); //New Employee
        break;

    case 2: Database.display(emp, E); //Display Last Added Employee
        break;

    case 3: Database.display(emp, E, iter); //Display All Employees
        break;

    case 4: Database.display(sc, emp, E, iter); //Display gross salary of an employee
        break;

    case 5: Database.remove(sc, emp, E, iter); //Remove an employee
        break;

    case 6: Database.increment(sc, emp, E, iter); //Increment grade of an employee
        break;
```

```

        default: System.out.println("Invalid choice.");
    }
    System.out.println("_____");

    }while(ch!=0);
    sc.close();
}
//.....

/**
 * Method Overriding:
 * - Person class's & Employee class's accept(Scanner sc) method
 * - Person class's & Employee class's display() method
 */

//.....

//New Employee
public static void accept(Scanner sc, Employee emp, ArrayList<Employee> E){
    System.out.print("Enter Name: ");
    String fullName = sc.nextLine();
    emp = new Employee(fullName);
    emp.accept(sc);
    E.add(emp);
}

//.....

```

```
/**
 * Method Overloading: Database class's display(Employee emp, ArrayList<Employee> E),
 * display(Employee emp, ArrayList<Employee> E, Iterator<Employee> iter) &
 * display(Scanner sc, Employee emp, ArrayList<Employee> E, Iterator<Employee> iter)
 * static methods
 */

//Display Last Added Employee
public static void display(Employee emp, ArrayList<Employee> E){
    if(E.isEmpty()){
        System.out.println("Database is empty.");
        return;
    }
    emp = E.get(E.size() - 1); //last added employee
    emp.display();
}

//Display All Employees
public static void display(Employee emp, ArrayList<Employee> E, Iterator<Employee>
iter){
    if(E.isEmpty()){
        System.out.println("Database is empty.");
        return;
    }
    System.out.println("***** EMPLOYEE DATABASE *****");
    iter = E.iterator();
    while(iter.hasNext()){
```

```
        emp = iter.next();
        emp.display();
        System.out.println("_____");
    }
}
```

//Display gross salary of an employee

```
public static void display(Scanner sc, Employee emp, ArrayList<Employee> E,
Iterator<Employee> iter) {
```

```
    System.out.print("Enter Employee ID to display gross salary: ");
    byte id = Byte.parseByte(sc.nextLine());
```

```
    iter = E.iterator();
    while(iter.hasNext()){
        emp = iter.next();
        if(emp.empID == id){
            emp.gross_salary();
            return;
        }
    }
    System.out.println("Employee Not Found.");
}
```

```
//.....
```

//Remove an employee

```
public static void remove(Scanner sc, Employee emp, ArrayList<Employee> E,
Iterator<Employee> iter){
```

```
    System.out.print("Enter Employee ID of employee to remove: ");
```

```
    byte id = Byte.parseByte(sc.nextLine());
```

```
    iter = E.iterator();
```

```
    while(iter.hasNext()){
```

```
        emp = iter.next();
```

```
        if(emp.empID == id){
```

```
            E.remove(emp);
```

```
            System.out.println("Removed Employee with ID "+id);
```

```
            return;
```

```
        }
```

```
    }
```

```
    System.out.println("Employee Not Found.");
```

```
}
```

```
//.....
```

```
//Increment grade of an employee
```

```
public static void increment(Scanner sc, Employee emp, ArrayList<Employee> E,
Iterator<Employee> iter){
```

```
    System.out.print("Enter Employee ID to increment grade: ");
```

```
    byte id = Byte.parseByte(sc.nextLine());
```

```
    iter = E.iterator();
```

```
while(iter.hasNext()){
    emp = iter.next();
    if(emp.empID == id){
        emp.increment();
        return;
    }
}
System.out.println("Employee Not Found.");
}

}
```

OUTPUT:

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 1

Enter Name: Suzy B.

Enter Date of Birth (dd/mm/yyyy): 09/09/2000

Enter Contact Number: 9797979797

Enter mail ID: suzy99@gmail.com

Enter Grade: A

New Employee added. Your Employee ID: 1

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 1

Enter Name: Jake W.

Enter Date of Birth (dd/mm/yyyy): 12/11/1996

Enter Contact Number: 9795949487

Enter mail ID: jake12@gmail.com

Enter Grade: B

New Employee added. Your Employee ID: 2

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 1

Enter Name: Jane P.

Enter Date of Birth (dd/mm/yyyy): 05/03/1997

Enter Contact Number: 9892929222

Enter mail ID: jane5@gmail.com

Enter Grade: D

New Employee added. Your Employee ID: 3

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 6

Enter Employee ID to increment grade: 3

Grade incremented to C

**** UPDATED INFO ****

Name: Jane P.

Date of Birth (dd/mm/yyyy): 05/03/1997

Contact Number: 9892929222

Mail ID: jane5@gmail.com

Employee ID: 3

Grade: C

Basic Salary: 6000.0

Gross Salary: 11200.0

House Rent Allowance: 1200.0

Travelling Allowance: 1000.0

Dearness Allowance: 3000.0

***** DATABASE OPERATIONS *****

(0) Exit

-
- (1) New Employee
 - (2) Display Last Added Employee
 - (3) Display All Employees
 - (4) Display gross salary of an Employee
 - (5) Remove An Employee
 - (6) Increment Grade Of An Employee

Enter your choice: 1

Enter Name: Lily R.

Enter Date of Birth (dd/mm/yyyy): 08/10/1998

Enter Contact Number: 9898393939

Enter mail ID: lily@gmail.com

Enter Grade: D

New Employee added. Your Employee ID: 4

***** DATABASE OPERATIONS *****

- (0) Exit
- (1) New Employee
- (2) Display Last Added Employee
- (3) Display All Employees
- (4) Display gross salary of an Employee
- (5) Remove An Employee
- (6) Increment Grade Of An Employee

Enter your choice: 4

Enter Employee ID to display gross salary: 1

Name: Suzy B.

Gross Salary: 15600.0

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 3

***** EMPLOYEE DATABASE *****

Name: Suzy B.

Date of Birth (dd/mm/yyyy): 09/09/2000

Contact Number: 9797979797

Mail ID: suzy99@gmail.com

Employee ID: 1

Grade: A

Basic Salary: 8000.0

Gross Salary: 15600.0

House Rent Allowance: 1600.0

Travelling Allowance: 2000.0

Dearness Allowance: 4000.0

Name: Jake W.

Date of Birth (dd/mm/yyyy): 12/11/1996

Contact Number: 9795949487

Mail ID: jake12@gmail.com

Employee ID: 2

Grade: B

Basic Salary: 7000.0

Gross Salary: 13400.0

House Rent Allowance: 1400.0

Travelling Allowance: 1500.0

Dearness Allowance: 3500.0

Name: Jane P.

Date of Birth (dd/mm/yyyy): 05/03/1997

Contact Number: 9892929222

Mail ID: jane5@gmail.com

Employee ID: 3

Grade: C

Basic Salary: 6000.0

Gross Salary: 11200.0

House Rent Allowance: 1200.0

Travelling Allowance: 1000.0

Dearness Allowance: 3000.0

Name: Lily R.

Date of Birth (dd/mm/yyyy): 08/10/1998

Contact Number: 9898393939

Mail ID: lily@gmail.com

Employee ID: 4

Grade: D

Basic Salary: 5000.0

Gross Salary: 9000.0

House Rent Allowance: 1000.0

Travelling Allowance: 500.0

Dearness Allowance: 2500.0

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 5

Enter Employee ID of employee to remove: 4

Removed Employee with ID 4

***** DATABASE OPERATIONS *****

(0) Exit

-
- (1) New Employee
 - (2) Display Last Added Employee
 - (3) Display All Employees
 - (4) Display gross salary of an Employee
 - (5) Remove An Employee
 - (6) Increment Grade Of An Employee

Enter your choice: 3

***** EMPLOYEE DATABASE *****

Name: Suzy B.

Date of Birth (dd/mm/yyyy): 09/09/2000

Contact Number: 9797979797

Mail ID: suzy99@gmail.com

Employee ID: 1

Grade: A

Basic Salary: 8000.0

Gross Salary: 15600.0

House Rent Allowance: 1600.0

Travelling Allowance: 2000.0

Dearness Allowance: 4000.0

Name: Jake W.

Date of Birth (dd/mm/yyyy): 12/11/1996

Contact Number: 9795949487

Mail ID: jake12@gmail.com

Employee ID: 2

Grade: B

Basic Salary: 7000.0

Gross Salary: 13400.0

House Rent Allowance: 1400.0

Travelling Allowance: 1500.0

Dearness Allowance: 3500.0

Name: Jane P.

Date of Birth (dd/mm/yyyy): 05/03/1997

Contact Number: 9892929222

Mail ID: jane5@gmail.com

Employee ID: 3

Grade: C

Basic Salary: 6000.0

Gross Salary: 11200.0

House Rent Allowance: 1200.0

Travelling Allowance: 1000.0

Dearness Allowance: 3000.0

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 2

Name: Jane P.

Date of Birth (dd/mm/yyyy): 05/03/1997

Contact Number: 9892929222

Mail ID: jane5@gmail.com

Employee ID: 3

Grade: C

Basic Salary: 6000.0

Gross Salary: 11200.0

House Rent Allowance: 1200.0

Travelling Allowance: 1000.0

Dearness Allowance: 3000.0

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 6

Enter Employee ID to increment grade: 1

Grade can't be incremented above A.

***** DATABASE OPERATIONS *****

(0) Exit

(1) New Employee

(2) Display Last Added Employee

(3) Display All Employees

(4) Display gross salary of an Employee

(5) Remove An Employee

(6) Increment Grade Of An Employee

Enter your choice: 0

**** PROGRAM ENDED ****
