

Java Assessment Paper-1

Date: 17-03-2023

Max Marks: 40M

1. Write an Employee Class with the below members and Methods along with meaningful constructor.

10 Marks

Members:

- int empNo
- String name
- String designation
- double basicSalary
- double cTC

Methods:

- double calculateMonthlyPay(String month, int atnd)** : Considering monthly take home salary as basic salary + Additions like HRA,DA & TA –deductions like tax. Calculate HRA (15%), DA (12%) & TA (9%) with the given percentages of Basic Salary and consider them as additions and calculate the tax/TDS deduction by calling static method calculateTax(). Finally return the take home for the given attendance.

- void displayProfile()** : To display full information of Employee along with take-home salary. Display the pay slip with the details like take-home salary along with basic salary plus additions and deductions for the given month and attendance.

- static double calculateTax(double ctc)** : Static method to calculate the Tax deduction for the employee based on the below formula.

- For CTC below 3L -no tax

- For CTC 3L-5L -10% of CTC is tax

- For CTC 5L-10L -20% of cTC is tax

- for CTC above 10L-30% of CTC is tax

2.

What is the output of the following code :

3 Marks

```
class First{  
    public First(int f){  
        System.out.println(f);  
    }  
    public First(){  
        System.out.println("First");  
    }  
}  
  
class Second : First{  
    public Second(int k){  
        super(k);  
        System.out.println("Second");  
    }  
    public Second(){  
        System.out.println("Second");  
    }  
}
```

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```
this(300);  
System.out.println("Third");  
}  
}  
public class TestInhConstructorCalling{  
public static void main(String[] args){  
Second s=new Second();  
}  
}
```

3. Assuming three classes SavingsAccount, CurrentAccount and RecurringAccount are inherited from Account class overriding the withdraw(double amt) method of super class in the sub classes with different implementations. Also assume that we have 3 following new methods in the sub classes.

SavingsAccount -void callInterest()

CurrentAccount -void calODInterest()

RecurringAccount -void calMatArnount()

Write a generic BankTransaction class with processTransaction(..) method that can accept any of the above 3 sub class objects as an argument, call the withdraw() method and call further the new method of the respective passed object i.e the sub class object passed. Write a demo class with main() method to demonstrate the use of processTransation() method **10 Marks**

4. Explain Auto boxing and unboxing with examples.

5Marks

5.

What is the output of the following code :

3 Marks

```
Account a1=new Account(1001,"NKXGEN",100000);  
a1.deposit(50000);  
Account a2=a1;  
a2.withdraw(75000);  
System.out.println(a1.getBalance());
```

6. Explain the differences between Instance Members & Static Members. Show how to write static constructor

5 Marks

7. Explain the differences between StringBuffer and StringBuilder.

4 Marks

Assessment on PostgreSQL Database

-75 Marks

-6th Mar 2023

I. Consider the standard Emp and Dept tables to write the following queries.

1. Write a query to list the employees who have less experience than their managers but are earning more than their managers. 6 Marks
a. Write this query using self-join.
b. Write this query using CTE.

2. Write a query to list the employees by comparing their salary with the **Company Average salary, their dept avg salary**. Query should print these columns (empno, ename, job, sal, "Company AvgSal", "Dept AvgSal") 6 Marks
a. Write this query using inline Query.
b. Write this query using CTE.

3. A. List 3 conditions to manipulate through the view 6 Marks
B. List 3 reasons why we chose to write stored procedures

4. Write a query to list the employees and their managers hierarchically 4 Marks
5. Write a query to list highest paid employees (Deptno, empno, ename, salary) in each department. 4 Marks
6. Write a query to list all the departments. Show * symbol opposite to the department that has at least 5 employees with 2 years' experience. 4 Marks

II. Answer all the following Questions. You can use the choice for the first question.

1.A: Assuming that the below 2 tables: Accounts & Transactions and the below two stored functions are there in the database with meaningful data

Table : Accounts table (accno, name, op_date, currentbalance)

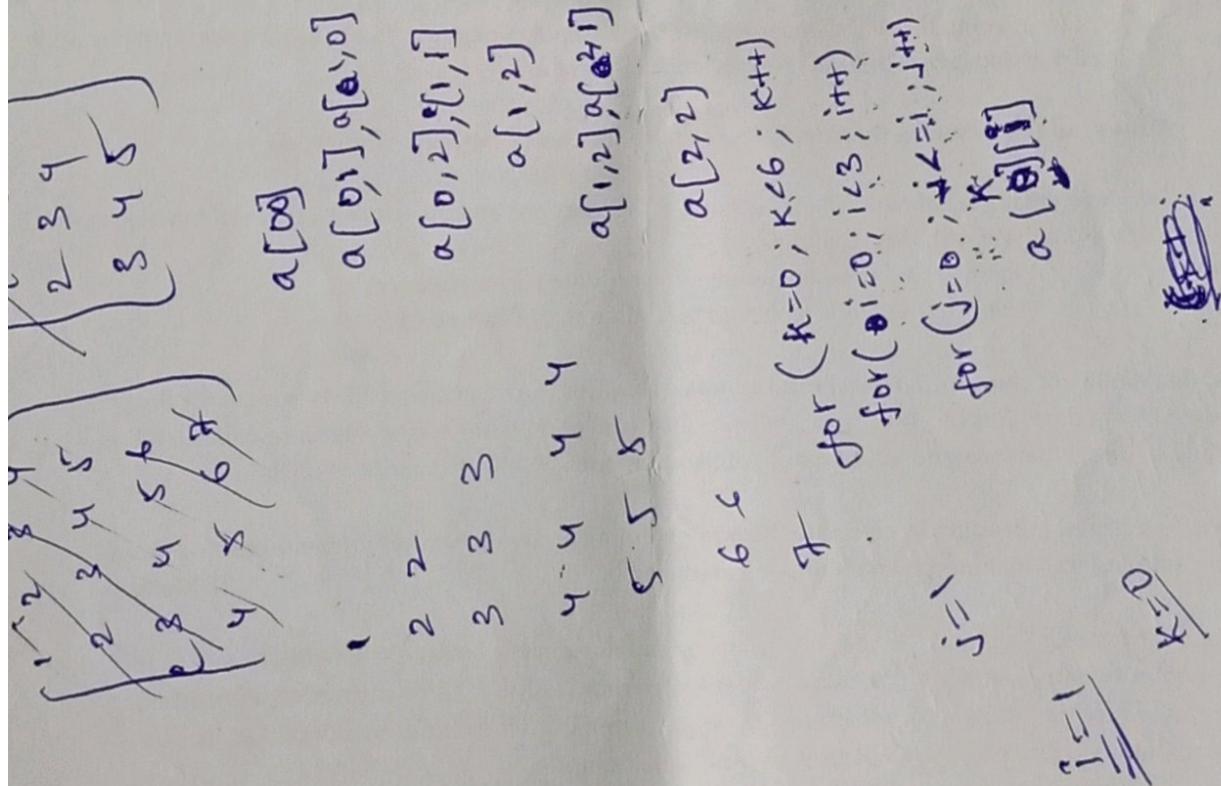
Table : Transactions table (accno, tr_date, tr_type, amount)

a. **GetMinBalance(ano int, od date) returns numeric** : Gives the min balance of the month for the given account and date. This function calls **GetOldBalance(ano int, od date)** to get reference balance for any date. b. **GetOldBalance(ano int, od date) returns numeric** : Gives the balance as on date.

Write a stored procedure to calculate the interest for all accounts for the last 6 months and deposit the accumulated int amount into the same accounts. 12 Marks

Consider Interest Rate as 4.5% and Min balance maintained in the account from 10th to end of the month as **Principal Amount**. If account is opened in a month after 10th of any month, interest not to be calculated for that month, rather interest to be calculated from the following month. Finally give the command to invoke this stored procedure from pshell console.

2. Explain the 3rd Normal Form rule and show your own tables that are there in 3rd normal form. Make sure that Many-to-Many relation is represented in the tables. **5 Marks**
3. Write a stored procedure that returns two out parameters to return the max balance maintained for the given account and the date on which max balance was created first time from the given date till today. **SpGetMaxBalance(ano int, olddate date, mxbal out numeric, mxbsd out date) 7 Marks**
4. A. What kind of locks are acquired on table when a user try to update first 20 records of a table where we have total of 30 records. B. What happens if other user try to update the last 20 records while the first transaction is still going on. C. Meanwhile if any other user try to select the full table data what kind of data would come to the user and explain the role of ISOLATION level here. **8 Marks**
5. Write the Sequence of SQL commands to demonstrate the activity mentioned in the above question
No 4. Give the steps clearly for both the user ends (one user who grants and the other user who uses the privileges). Also give the steps to grant select, insert, update and delete privileges and the revoke those privileges at the end of the operations. **8 Marks**
6. Write a database trigger to automate the balance update in accounts table whenever there is an insertion in transaction table. **5 Marks**



Assessment 1 on PostgreSQL Database

-45 Marks -24th Feb 2023

I. Consider the standard Emp and Dept tables to write the following queries.

1. Write the commands to apply foreign key on MGR column referring empno on the same table.
And add On Delete cascade option. 4Marks
 - a. Write this with Create table Column Level
 - b. Write this with Alter table Table Level
2. Write a query to list all the employees who are earning more than at least any one employee in 20th Department. Exclude the employees who are working as CLERKS. 3M
3. Write a query to list the departments that are having their average salary more than 30th dept avg salary. Exclude the departments that are having less than 2 employees. 4M
4. Write a select statement to list all the duplicated records. 3M
5. Write a query to list the departments that are having at least 2 clerks with a minimum of 10,000 salary. Exclude clerks who have joined in 2020. 3M

II. Write a query to list all accounts with these fields of information (accno, op_date, currentbalance, last trans date, last trans amount). Use the standard Accounts and Transaction tables given below. Don't assume your own columns to write the query. 4 M

Table : Accounts table (accno,name,op_date,currentbalance)

Table : Transactions table (accno,tr_date,tr_type,amount)

III. Consider the below product tables

Table : HSNCodes (hsncode ,gst) : This table stores hsn code wise GST percentage.

Table : Products (prod_id,name,description,hsncode,category) : This table stores all products info.

Table : ProductStock (prod_id,batchno,qty,unitprice,expdate) : This table stores the product stock.

Table : LocationWiseShippingCharges (state, charge) : This table stores state wise shipping charges.

Irrespective of no of products ordered, shipping charges are considered as fixed).

Table : Orders (order_id,order_date,customer_name,state,total) : This table stores all the Orders made by customer.

Table : OrderProducts (order_id,prod_id,batchno,qty,gst) : This table stores all the products ordered as part of an order. This is a child table of Orders.

1. Write a query to list the products (prod_id, name, batchno, qty, unitprice, expdate, gsttax).
Exclude the products that are expired already. And also exclude the products that are having gst more than 25% 4 Marks

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emp from emp > any select sw
deptno from emp where
select avg(sal) over emp
max

2. Write a query to list the orders (order_id, customer_name, order_date, total) that are having at least 5 products in their order. **4 Marks**
3. Write a query to list the products (prod_id, name, gst, average gst percentage value of all products). Exclude the product categories of 'Electronics' and 'Mobile'. **4 Marks**
4. Write a query to list the Orders (order_id, order_date, customer_name, total, highest order total on that day) **4 M**

IV. Answer all the following Questions.

1. Explain the importance of Atomicity of a transaction with a real time example. Explain the concept behind commit and rollback of transaction with DML statements like insert, update & Delete. **4 Marks**
2. Explain the isolation level with flow of steps and syntaxes. **4 Marks**

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=====Practical Part (55 Marks)=====

II. Answer all the following queries. Submit output screenshots along with source files in a zip or rar file with your name.

1. Create a GET call on the below API(with Keys) and show the output in a table form. You can use XHR or Promise or Fetch to implement this call. Provide POSTMAN Screenshots also. **10 Marks**
<https://hotels4.p.rapidapi.com/locations/v2/search> (Hotels API from RAPID API)

2. Create a HTML form with the following fields and validations. Use bootstrap to make the form mobile responsive. Validation should happen when cursor leaves the field. **10 Marks**

Name	(Mandatory field)	Aadhar	(Must be valid one)
Mobile	(Must be valid one)	DOB	(Must be valid one)
Email	(email must be valid)	Password	(Ensure standard pwd policy)
fb url	(url must be valid)	Confirm	(both pwd and confirm are same)

3. Create a POST call on the any public API that supports CORS from a HTML form through custom submit. Provide POSTMAN Screenshots with input payload also. **10 Marks**

4. Create HTML document with the links for the following to simulate the browser functionality using DOM API **10 Marks**

- a. Back -to go previous page
- b. Next -to go to next page
- c. Redirect -to redirect to NKXGEN (www.nkxgen.com)
- d. History -to show the history
- e. Reload -Reload or refresh the page

5. Create a HTML document to accept the registrations for a tour. As part of the tour registration form Accept the name, Email, mobile no, age and gender for each traveler. Assume that 900 INR is the fare for each passenger. There should be an option to add new passenger and delete the passenger with "+" and "-" options. Depending on the number of passengers added, form should show the total amount at the end. This form should be responsive. **10 Marks**

6. Write an arrow function that accepts the above JSON (as JSON String) which is created at theory Question No 4 and parse it and then display it in readable form (a table or list). **5 Marks**

Assessment on Web Programming Vitals -Marks 90

=====Theory Part (35 Marks)=====

-6th Sep 2022

I. Answer all the following questions.

1. What is Web API of the browser and how it is useful? And also explain the purpose of DOM. 4 Marks
2. Explain the difference between Callbacks, Promise & fetch w.r.to Ajax call handling. 5 Marks
3. Explain the differences between DTD & XSD. Write the DTD/XSD for the following XML (books.xml) covering the full schema. 5 Marks

```
<?xml version="1.0"?>
<books>
    <book id="bk101">
        <authors>
            <author>Gambardella </author>
            <author> Matthew </author>
        </authors>
        <title>XML Developer's Guide</title>
        <price>650</price>
        <publishdate>2000-10-01</publishdate>
    </book>
    <book id="bk102">
        <authors>
            <author>Rails </author>
            <author> Kim </author>
        </authors>
        <title>Midnight Rain </title>
        <price>225</price>
        <publishdate>2000-12-16</publishdate>
    </book>
    ....
</books>
```

4. Create the equivalent JSON for the above given XML File. 5 Marks
5. Explain the statement: "HTTP is a stateless protocol". What is the work around to make API calls in a secured way through the HTTP. Show with your own simple example. 5 Marks.
6. Explain any 5 DOM objects with at least one method in it along with syntax and purpose. 5 Marks
7. Explain the Ajax POST Call with jQuery example. Make sure that you are passing JSON payload as input and show how you are going to parse the output JSON and display it in readable form. 6 Marks

Note: Write the answers precisely covering the question asked and the marks given.

Jakarta EE Servlets, JSP & MVC Assessment -Max Marks 50

24th May 2023 -Theory Exam

- ✓ 1. Explain the step-by-step flow of MVC with DAO, including the Data Access Layer and Business Access Layer, with a suitable example. Please provide the skeleton of the classes, and there's no need for the actual code. Also, explain the purpose of each layer and what is typically implemented in them (12 marks).
- ✓ 2. Write a filter to implement authentication and authorization, and demonstrate the usage of protected pages with the filters. Verify login credentials against the database (8 marks).
3. Write a filter to track user IP addresses for specific servlets, and demonstrate how to block certain IPs (8 marks).
- ✓ 4. Explain the role of Request Dispatcher in servlets and highlight the differences between the sendRedirect() and forward() methods (6 marks). C
- ✓ 5. Write a simple JSP (or JSTL) to display tabular data from any table (6 marks).
6. Write an example that simulates a basic shopping cart. Write servlets for the following pages:-
Products Page (displaying products with "Add to Cart" option) and Cart Page (with add/remove options) (10 marks).



Jakarta EE Servlets, JSP & MVC Assessment -Max Marks 50

24th May 2023 -Practical

1. Demonstrate the following Operations with MVC, DAO & DAL & Business Logic Layers. Choose any table of your choice with at least 7 columns, out of which one date and one numeric column should be there.

- > CRUD Operations (ADD, Edit, Read & Delete) –each operation will be given marks
- > Use AJAX for responsiveness at client side
- > Make sure that you validate all user input
- > Use Filter for authentication purpose
- > Implement 404 error page for wrong url

Note: Clean code should be written with proper comments. 5Marks will be given for clean code.

Note: Your Table and columns used should not match with others.

Imp : Along with the code (full project folder), also submit output screenshots of all features in working condition.

Java Assessment -Part II

-Max Marks 90

(Exceptions & Threading, Collections (Except Concurrency), IO Streams & Reflection)-5th Apr 2023

1. Demonstrate thread synchronization mechanism (either using Synchronized method or synchronized block) by simulating a scenario where multiple customers say 5 customers try to deposit to the same account object simultaneously. Implement the customer's deposit operation through threads and simulate simultaneous deposits. And explain the usage of Join() method here. **10 Marks.**

2. Demonstrate the thread communication using the following scenario. Write a class : CharacterHolder that holds one character at a time with the methods :

char readChar() -reads the character *get*
char writeChar(char c) -writes the character *set*

Writer a Thread class : AlphabetGenerator that generates characters from A-Z and writes to the object of the CharacterHolder. Write another thread class : AlphabetReader to read the characters from the same object of the CharacterHolder where its is being written by AlphabetGenerator. Add thread communication logic to the above thread classes to make sure that every character generated by first thread is read by the second thread. **10 Marks**

3. Give the steps to create User defined Exception and demonstrate the user defined exception "InsufficientBalanceException" for the method "Transfer(..)" in the Account class.

Account Class (Members: Accno, Title, Balance)

Instance Methods :

void Deposit(double amt),
void Withdraw(double amt),

void Transfer(Account toa, double amt) -This method should transfer the given amount to the given account from the current account. If the balance is not sufficient it should throw user defined exception: InsufficientBalanceException

Also demonstrate the purpose of user defined exceptions and show how to handle this user defined exception. **10 Marks.**

4. Considering the following format of the file

26 Marks

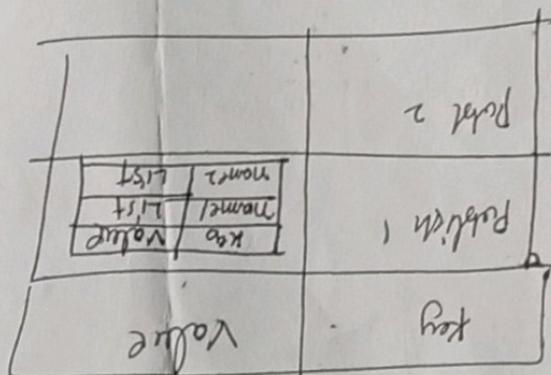
emp.txt

3434:mahesh:Test engineer:25000:10

4545:naresh:programmer:70000:20

4523:Rajesh:manager:50000:10

-
A/ Write Employee class to encapsulate the Employee details and read all employee records into ArrayList<Employee> collection. **8 M**



B. List all the employee details employee by employee in the below format with Salary wise sorting. 6 M

Emp No : 3434
 Emp Name : Mahesh
 Job : Test engineer
 Salary : 25000
 Dept No : 10

C. Display the following summary for the employee records from the above emp.txt file 6M

Total No of Employees	:	10
Sum of Salaries	:	640000
Min Salary	:	20000
Max Salary	:	90000
Avg Salary	:	64000

D. Serialize the ArrayList<Employee> collection to a file and demonstrate deserialization. 6M

6. Considering the existing Account class and its sub classes: SavingsAccount & CurrentAccount that you have with you, add the following member to Account class. 3 M

protected List<Transaction> transactions;

here create Transaction class to encapsulate(accno,trDate,trType & amount)

B. create a class: BankAccountUtilities with the following method. 8M

static void displayBalanceProfile(...argument...) -Write this method with suitable argument to accept list of either Account or SavingsAccount or CurrentAccount objects and display min balance, max balance(based on transactions that are there for each account) along with the accno for all the accounts that are passed as list argument to the method.

C. Create a class GenericTransaction that accepts a generic argument T with bounded generic to receive any class that is inherited from Account and with the following method 8M

void processTransaction(T act) -This should call deposit(..) and withdraw(..) methods on the received sub class objects of Account.

6. Create a HashMap to store publisher Wise books. Here store Publisher name as Key and store the author wise books published as value. Here value should be a nested Hashmap that stores Author name as Key and List<Book> as a value. You can write book class to encapsulate the details like ISBN No, title, Price, noofpages. Write a program to demonstrate the reading of the above created nested HashMap. 8 M

7. Write a program using reflection to list the methods of the built-in 'Collections' class in the following format. 7 M

<return type> <method name>(<argument type>,<arg type>...)

