**Junior Developer (0 – 2 years)**

1. Write a program to implement queue using array. (implement methods -> peek (), insert (), remove ())

Answer: <https://github.com/punit81/JavaLearning/blob/master/src/LearnCollection/QueueUsingArray.java>

1. Write a program to check if two given String is Anagram of each other. Your function should return true if two Strings are Anagram, false otherwise. A string is said to be an anagram if it contains same characters and same length but in different order e.g. army and Mary are anagrams.

Answer: <https://github.com/punit81/JavaLearning/blob/master/src/LearnStrings/CheckAnagram.java>

1. Write a program to find the middle element of a linked list in one pass.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/MiddleElementLinkedList.java>

1. Write a SQL query to remove duplicates from a table without using temporary table.

Answer:

mysql> describe names;

+-------+-------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+-------+-------------+------+-----+---------+-------+

| name | varchar(20) | YES | | NULL | |

+-------+-------------+------+-----+---------+-------+

alter table names add id int auto\_increment key not null;

delete n2 from names as n1 join names as n2 on n1.name=n2.name where n1.id>n2.id;

alter table names drop column id;

1. Write a SQL query to find the 3rd highest salary from the table ‘Employee’.

|  |  |  |  |
| --- | --- | --- | --- |
| Emp Id | Name | DOB | Salary |
| 1001 | John | 26/09/1987 | $ 4500 |
| 1002 | Doe | 2/07/1983 | $ 7200 |
| 1003 | Martin | 26/09/1984 | $ 3450 |
| 1004 | Dave | 17/07/1987 | $ 5600 |
| 1005 | George | 28/09/1989 | $ 6100 |
| 1006 | Peter | 23/05/1988 | $ 4300 |
| 1007 | Richard | 14/12/1990 | $ 4500 |
| 1008 | James | 9/01/1986 | $ 3400 |
| 1009 | Noel | 22/04/1983 | $ 7200 |

Answer:

Case 1:

Since this salary table contains 2 entry of 7200 , 1 entry for 6100 and 1 entry for 5600 distinct salary inside nested query will count 7200 only once and thus 3rd highest salary would be 5600.

select salary from (select distinct(salary) as salary from employee order

by salary desc limit 3) as t1 order by salary asc limit 1;

Case 2:

If you want to consider 7200 as 1st and 2nd highest salary then third highest salary would be 6100 and thus in that case query would be:

select salary from (select salary as salary from employee order by salary

desc limit 3) as t1 order by salary asc limit 1;

1. Write a query to find employees and their respective managers from the below table.

|  |  |  |
| --- | --- | --- |
| Emp Id | Employee Name | Manager Id |
| 1001 | John | Null |
| 1002 | Doe | 1001 |
| 1003 | Martin | 1002 |
| 1004 | Dave | 1001 |
| 1005 | George | 1002 |

Answer:

Considering the name of the table as employeemanager:

select e1.empid as employeeid ,e1.employee\_name as employee\_name,e2.empid

as manager\_id,e2.employee\_name as manager\_name from employeemanager as e1 left

join employeemanager as e2 on e1.managerid=e2.empid;

1. Given a number ‘N’. Print ‘N’ terms of Fibonacci series in reverse order.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/FibonnaciReverse.java>

1. You are blindfolded and 10 coins are place in front of you on table. You can touch the coins, but can’t tell which way up they are by feel. You are told that there are 5 coins head up, and 5 coins tails up but not which ones are which. Can you make two piles of coins each with the same number of heads up? You can flip the coins any number of times.

Answer:

Divide the coins into 2 piles of 5 each. Flip all the coins of one of the pile. You will get equal number of heads up in each pile.

1. Write a program to find the sum of each digit in a number using recursion.

For example, if the number is 259, then the sum should be 2+5+9 = 16.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/SumDigitByRecursion.java>

1. Given array is already sorted, and it has duplicate elements. Write a program to remove duplicate elements and return new array without any duplicate elements. The array should contain only unique elements.

Answer: Using LinkedHashSet Approach: <https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/RemoveDuplicatesFromArray.java>

Without using any set simple using Array and ArrayList:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/RemoveDuplicatePart2.java>

**Senior Developer / Designer / Manager (2 – 7 years)**

1. Given two threads – OddThread & EvenThread. One thread is printing even numbers and the other thread is printing odd numbers.

Write a program to emulate the synchronization between the two threads so that the output should be in natural order (1,2,3,4,5....). Let’s assume the thread classes are already.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MultiThreading/MisysThreadingProblem.java>

1. Write a program to demonstrate singleton design pattern.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/SingletonPattern.java>

1. Given an array of positive numbers, find the maximum sum of a subsequence with the constraint that no 2 numbers in the sequence should be adjacent in the array. So, 3 2 7 10 should return 13 (sum of 3 and 10) or 3 2 5 10 7 should return 15 (sum of 3, 5 and 7).

Answer:

<https://github.com/punit81/JavaLearning/commit/aabb0767f554b5099f647d17d93348fe2936444b#diff-f3fc217313e73fd0a328e570b03c67d7a2df2f7a0dc816aa6c096bd04beba07b>

to accommodate negative numbers in array to. (Changes in my code)

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/FindMaxSum1.java>

1. Write a program to demonstrate deadlock and provide a solution to avoid the same.

Answer:

<https://github.com/punit81/JavaLearning/commit/3cccc7bf7d4f0e0c92dcd2e9cbf406a7a6a9e02c>

Solution using Inter-Thread Communication:

<https://github.com/punit81/JavaLearning/blob/master/src/MultiThreading/DeadLockSolution3.java>

1. Given the details of marks scored by students in form of a HashMap, where name of the student is the Key and marks scored is the Value. Write a program to sort the map according to the key values i.e. the names of the students in the alphabetical(lexicographical) order.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/SortHashMap.java>

1. Write a program to reverse a linked list without using additional storage space.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/ReverseALinkedList.java>

1. Write a program to search an element in a sorted array. Time complexity - O (log n).

Answer:

Binary search finds the element in a sorted array in O(log n):

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/BinarySearch.java>

1. Given a string, find the longest substrings without repeating characters. Iterate through the given string, find the longest maximum substrings.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/LongestSubstring.java>

1. Explain a situation where decorator design pattern can be used with the help of a program.

Answer:

Decorator pattern is used when we want to add dynamic flexible behavior to an existing class instead of straight static inheritance. Decorator pattern uses composition instead of inheritance to add flexibility.

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/DecoratorDesignPatternExample.java>

1. The cost of a stock, at an interval of one hour, on a day is given in an array. Find the maximum profit that you can make by finding the best buy and sell price. For example, if the given array is {400, 180, 310, 40, 535, 695}, the maximum profit can be earned by buying on 4th hour, selling on last hour.

Answer:

<https://github.com/punit81/JavaLearning/blob/master/src/MisysRemainingProblems/MaxProfit.java>

**Architect**

1. Explain horizontal and vertical scalability. And how do we achieve high availability?

Answer: Vertical Partitioning is upgrading the existing resource by increasing its power. Of Course at the time of maintainance availability would be low as Single system which is present will go down. Eg. Upgrading the ram of a server.

Horizontal scaling is by adding more resources to the existing resourses. Eg. Adding more servers. Here availability will be more as only the system which is being upgraded will be down while other’s will be up.

1. What is Sharding?

Answer: Breaking up of an existing large table into simpler small tables is called sharding.

These are classified into 2 types:

1. Vertical Sharding: eg. Table employee containing columns: employee id, name, age,address,state is broken up as table1 having columns as employee id,name,age and table2 having columns as employee id ,address,state.
2. Horizontal Sharding: Say there is a large table stored on a db having 10,000 entries then in horizontal sharding we break this table into smaller table say 2 table in which one tale has first 5000 records and second table has rest 5000 records.
3. What is ACID properties and when you can compromise and when you cannot?

Answer: ACID stands for:

A: Atomicity C: Consistency I:Isolation D:Durability. Explain further.

1. Explain general design principals while implementing a problem and its importance.

Answer: Problem Partitioning ,Modularity ,Abstraction Top down or bottom up approach.

1. When do you use asynchronous techniques and when it’s not applicable?
2. How do you make an application cloud compatible?
3. Explain the importance of Lambda expressions in java with an example?
4. How do you profile a java application?

Answer: Tell about JavaVisualVM

1. How do you design a DB schema and application for a multi-lingual application?
2. Explain micro services architecture pattern.

**P4**

1 question from first section.

2 questions from second section.

5 questions from third section.

**P3**

3 questions from first section.

3 questions from second section.

2 questions from third section.