MCQs

1. **How can we make our APIs secure? (Medium) (crs-be-nodejs)**
    a. To rate limit APIs
    b. Add an extra layer of authentication
    c. Introduce privilege based access to avoid unnecessary data access
    d. All of these (correct)

2. **How do you select all the columns from a table named "Persons"?**
    a. SELECT * FROM Persons (correct)
    b. SELECT Persons
    c. SELECT [all] FROM Persons
    d. SELECT *.Persons

3. **Suppose we use JWT in our e-commerce app(which can run on multiple devices) and a user adds some product to a cart(we store cart details in a database) using a desktop website and if he wants to later checkout using a mobile app, what will happen? (Easy) (crs-be-nodejs)**
    a. The user won't be able to do it as the JWT token will be different for app and website
    b. It won't affect, users will be able to checkout smoothly, as the JWT task is only to authorize the user and since the user would have to login into both the env, it doesn't matter where he/she adds the product to the cart and where he/she checkouts if the user is authenticated and authorized. (correct)
    c. None of these
    d. All of these

4. **Which of the following module is required to create a web server? (easy) (crs-be-nodejs)**
    a. net module
    b. http module (correct)
    c. net module
    d. url module

5. **Which of the following are the DDL queries? (easy) (crs-be-databases-api)**
    a. DROP table
    b. ALTER table
    c. TRUNCATE table
    d. All of the above (correct)

6. **Which of the following function arguments are available to Express.js Route handlers?**
    a. req - the request object
    b. res - the response object
    c. next
    d. All of the above (correct)

7. **Which of the following is not a valid aggregation function in MySQL? (Medium)(crs-be-databases-api)**
    a. SUM()
    b. PRODUCT() (correct)
    c. AVG()
    d. FIRST()

8. **How can we access the params from the request object? (Medium) (crs-be-nodejs)**
    a. request.parameters
    b. request.arguments
    c. request.params (correct)
    d. request.param

9. **What HTTP verb should be used for just returning the header? (Medium) (crs-be-nodejs)**
    a. HEAD (correct)
    b. POST
    c. GET
    d. TRACE

10. **In which join all the rows from the left table appear in the output irrespective of the content of the other table?**
    a. RIGHT JOIN
    b. LEFT JOIN (correct)
    c. INNER JOIN
    d. OUTER JOIN

11. **JWT token should be passed to the server through? (Medium) (crs-be-programming)**
    a. Cookies
    b. Query params
    c. Headers
    d. Only a and b (correct)

12. **What are the essential user account functionalities that one must integrate in their app? (Medium)(crs-be-nodejs)**
    a. Login
    b. SignUp
    c. Logout
    d. All of the above (correct)

13. **Sequelize supports which of the following dialect? (crs-be-databases-api)**
    a. mysql
    b. sqllite
    c. postgresql
    d. All of the above (correct)

14. Which of the following method creates http server?

a. createServer() (correct)
b. putServer()
c. setServer()
d. getServer()

15. Suppose we want to send json response to the client, which method will we use? (Medium)(crs-be-nodejs)

a. response.send()
b. response.json() (correct)
c. response.sendStatus()
d. response.text()

16. Why do we need to pass a callback to the app.listen(port,callback) function? (Medium) (crs-be-nodejs)

a. To perform some operations on startup
b. It is optional to pass and can be ignored (correct)
c. It is a syntax and we need to follow
d. None of these

17. What are operations that we must perform when user logouts? (Medium)(crs-be-nodejs)

a. Clear local storage from browser
b. Invalidate JWT token
c. Both a and b (correct)
d. None of the above

18. Which of the following is not a benefit of using modules in Express?

a. It provides a means of dividing up tasks.
b. It provides a means of reuse of program code.
c. It provides a means of reducing the size of the program. (correct)
d. It provides a means of testing individual parts of the program.

19. What does DQL stands for in MySQL? (easy) (crs-be-databases-api)

a. Data Query Language (correct)
b. Data Query Lessons
c. Digest Query Language
d. Digest Query Lessons

20. What does MVC help us to achieve? (Medium) (crs-be-nodejs)

a. It provides us to define a solid distinction between database, APIs, and view(UI)
b. It helps to make code cleaner, readable, manageable, and easily debuggable.
c. It supports rapid and parallel development
d. All of these (correct)

21. Suppose your eCommerce app runs on multiple devices, and the user adds a product into the cart using the app's website, and suppose he later wants to check out the product in the mobile app, how can it be handled through the backend? (Medium) (crs-be-nodejs)

a. Cannot be done
b. Store the data in browser's local storage
c. Store the user cart details in the database and retrieve it later on any device (correct)
d. Can't say

22. MySQL is which type of database? (easy) (crs-be-database-api)

a. SQL (correct)
b. NoSQL
c. Both a and b
d. None of the above

23. Which of the following is not true about middlewares in nodeJS? (Medium) (crs-be-nodejs)

a. Middlewares can return the response by terminating the request flow in between.
b. Middleware functions have access to the request and response object in the request-response cycle.
c. Middlewares are always invoked in the order in which they are added.
d. None of the above (correct)

24. What are the properties of the Primary Key in MySQL? (easy) (crs-be-databases-api)

a. Unique Value
b. Non-Null
c. Only one primary key per table
d. All of the above (correct)

25. In the model-view-controller (MVC) architecture, the model defines the? (Easy) (crs-be-nodejs)

a. Presentation layer
b. Interface layer
c. Business-logic layer
d. Data-access layer (correct)

26. JWT is used for? (easy) (crs-be-nodejs)

a. Authentication
b. Authorization
c. Both a and b (correct)
d. None of the above

27. Why should we encrypt the password before storing it into database? (Medium) (crs-be-nodejs)

a. To make the system secure and avoid data leak incase system security is compromised (correct)
b. Because it is a current market trend
c. Both a and b
d. None of the above

28. What is the correct SQL query to return the first 10 results? (Medium) (crs-be-database-api)

a. Select * from product size 10;
b. Select * from product limit 10; (correct)
c. Select * from product count 10;
d. None of these

29. What does REST stands for? (easy) (crs-be-nodejs)

a. Representational State Transfer (correct)
b. Represent State Token
c. Represent State Transfer
d. Representational State Token

30. What is the correct query to update columns? (Difficult) (crs-be-database-api)

a. UPDATE column1 = value1, column2 = value2, ...
   IN table_name
   WHERE condition
b. Select from table_name
   WHERE condition
   SET column1 = value1, column2 = value2, ...
c. Select from table_name
   SET column1 = value1, column2 = value2, ...
   WHERE condition
d. UPDATE table_name
   SET column1 = value1, column2 = value2, ...
   WHERE condition (correct)

DSA Problems

1. Wealthy Customer

Problem Statement

You are given an m x n integer grid accounts where accounts[i][j] is the amount of money the i^{th} customer has in the j^{th} bank. Return the wealth that the richest customer has.

A customer's wealth is the amount of money they have in all their bank accounts. The richest customer is the customer that has the maximum wealth.

Constraint

- m == accounts.length
- n == accounts[i].length
- 1 <= m, n <= 50
- 1 <= accounts[i][j] <= 100

Input Format

- The first line of input consists of a m and n as integer value
- The m lines of input consists n space separated integers

Output Format

- Return the wealth customer position (starting from 1)

Sample Input 1

2 3
1 1 4
2 2 3

Sample Output 1

2

Explanation of Sample 1

1st customer has wealth = 1 + 1 + 4 = 6
2nd customer has wealth = 2 + 2 + 3 = 7
The 2nd customer is the richest with a wealth of 7.

Sample Input 2

3 2
1 5
5 3
3 7

Sample Output 2

3

Explanation of Sample 2

1st customer has wealth = 6
2nd customer has wealth = 8

3rd customer has wealth = 10
The 3rd customer is the richest with a wealth of 10.

Sample Input 3
2 3
1 2 3
3 2 1
Sample Output 3
1
Explanation of Sample 3
1st customer has wealth = 1 + 2 + 3 = 6
2nd customer has wealth = 3 + 2 + 1 = 6
Both customers are considered the richest with a wealth of 6 each, so return 1 (return the latest i.e. minimum position).

Solution:

```
let [m, n] = readline().split(" ").map(x => parseInt(x));
let accounts = [];
for(let i = 0; i < m; i++){
    let arr = readline().split(" ").map(x => parseInt(x)).slice(0, n);
    accounts.push(arr);
}

function wealthyCustomer(accounts, m, n)
{
    let maxWealthSoFar = 0;
    let wealthyCustomer = -1;
    for (let i = 0; i < accounts.length; i++) {
        let currCustomerWealth = 0;
        for (let money of accounts[i]) {
            currCustomerWealth += money;
        }
        if(maxWealthSoFar < currCustomerWealth){
            wealthyCustomer = i + 1;
            maxWealthSoFar = currCustomerWealth;
        }
    }
    return wealthyCustomer;
}

console.log(wealthyCustomer(accounts, m, n))
```

Template:

```
let [m, n] = readline().split(" ").map(x => parseInt(x));
let accounts = [];
for(let i = 0; i < m; i++){
    let arr = readline().split(" ").map(x => parseInt(x)).slice(0, n);
    accounts.push(arr);
}

function wealthyCustomer(accounts, m, n)
{
    //write your logic here
}

console.log(wealthyCustomer(accounts, m, n))
```

Problem2. Power of Four

Problem Statement

Given an integer n, return true if it is a power of four. Otherwise, return false.
An integer n is a power of four, if there exists an integer x such that n == 4^x.

Constraint

• $-2^{31} <= n <= 2^{31} - 1$

Input Format

• First line contains an integer n

Output Format

• Print “true” if n is power of four else print “false”

Sample Input 1

4

Sample Output 1

true

Explanation of Sample 1

$4^1 = 4$, hence true

Sample Input 2

5

Sample Output 2

false

Explanation of Sample 2

$4^1 < 5 < 4^2$, as for any x 4^x != 5, print false

Sample Input 3

16

Sample Output 3
true
Explanation of Sample 3
$4^2 = 16$, hence print true

Sample Input 4
1
Sample Output 4
true
Explanation of Sample 4
Since $4^0 = 1$, print true

JS Template:

```
let n = parseInt(readline());

function isPowerOfFour(n){
    //write your logic here, return the output
}

console.log(isPowerOfFour(n));
```

JS Solution:

```
let n = parseInt(readline());

function isPowerOfFour(n){
    if(n == 1) return true;
    if(n == 0 || n%4 != 0) return false;
    return isPowerOfFour(n/4);
}

console.log(isPowerOfFour(n));
```

3. Perfect Square

Problem Statement
Given a positive integer n, write a function which returns True if n is a perfect square else False.

Follow up: Do not use any built-in library function such as sqrt.
Hint: You can use binary search here
Constraint
• $1 <= n <= 2^{31} - 1$

Input Format
• The input consists of a positive integer n
Output Format
• Print “true” if n is perfect square else print “false”

Sample Input 1
4
Sample Output 1
true
Explanation of Sample 1
Square root of 4 is 2, hence 4 is a perfect square

Sample Input 2
17
Sample Output 2
false
Explanation of Sample 2
17 does not have valid integer square root

Sample Input 3
16
Sample Output 3
true
Explanation of Sample 3
16 is perfect square i.e. 4 * 4 = 16

Solution:

```
let n = parseInt(readline());

function isPerfectSquare(num) {
  if (num < 2) {
    return true;
  }

  let left = 2, right = Math.floor(num / 2), x, guessSquared;
  while (left <= right) {
    x = Math.floor(left + (right - left) / 2);
    guessSquared = x * x;
    if (guessSquared == num) {
      return true;
    }
    if (guessSquared > num) {
      right = x - 1;
    } else {
```

```
        left = x + 1;
      }
    }
    return false;
}


console.log(isPerfectSquare(n));
```

Template:

```
let n = parseInt(readline());

function isPerfectSquare(num) {
  //write your logic here, return the output
}

console.log(isPerfectSquare(n));


function isPerfectSquare(num) {
  //write your logic here
}
```

Feature:

Question 1: Book Rental Application
You can build a book rentals application that will allow to perform the following actions.
Create a User and Admin account
CRUD operations with books: Create new book listing, Edit a book listing, Delete a book listing
Show users if a book is available to rent or not

Book info should contain-
Isbn number(It is property of book which is unique for each book), Name, Author, PublishedOn, AddedOn

Apis should be as follows for CRUD on books
GET /book/list -> returns all books
POST /book/create -> add new book
POST/book?delete=true (should accept one of the 3 query params -> delete, rent, return) -> should delete/Rent/Return book
GET /rented/{userId} -> return all books rented by user

Question 2: Enhancement
User should not be able to rent more than 2 books at a time
Admin should not be able to add duplicate books

Round3: Optimization
Add validations on user roles i.e. there should be strict checks on user roles -> Renter and Admin. Renter should not be able to perform any updated books i.e only admin should be able to add, delete, add update (rented, return) on books. To add this kind of validation you are expected to add a middleware which will check for user role and the operation user is performing and will proceed only if user has the permissions else return an error

GET /book/list -> User, Admin
POST /book/create -> Admin
POST/book?delete=true (should accept one of the 3 query params -> delete, rent, return) -> Admin
GET /rented/{userId} -> User, Admin

Boilerplate code:
https://github.com/VJ28/boilerplate_code