Coding assessment Questions

General Instructions

Read Carefully:

- **Ensure that you thoroughly read each question and its requirements.**
- **If any part of a question is unclear, do not hesitate to ask for clarification.**

Total of 4 Questions:

1. **React/JavaScript Question (Choose 1 out of 4):**
   - ○ **From the provided React and JavaScript category, select one question.**
   - ○ **This question is designed to assess your proficiency in React and JavaScript, including state management, component design, and logic building.**
2. **Debugging Questions (2 Questions):**
   - ○ **You are required to solve 2 debugging questions.**
   - ○ **These questions will test your ability to identify and fix errors in code.**
3. **Languages Question (Choose 1 out of 3, Python, SQL):**
   - ○ **From the languages category (options include C, Python, or SQL), choose one question.**
   - ○ **This question is aimed at evaluating your coding logic and problem-solving skills in a specific programming language.**

React & Javascript Questions (any 1 out of 4):

Question 1: UI with Reverse Text

Prompt:
Write an HTML and JavaScript code snippet that includes:

- **One text box for input**
- **One label to display output**
- **One button to trigger the action**

**Write a JavaScript program that, when the button is clicked, reverses all the words entered in the text box (i.e. each word’s characters are reversed) and displays the result in the label.
Validation: The input must not contain any numbers. If numbers are detected, display an appropriate error message.**

Question 2: Drag & Drop To-Do List Application

Prompt:
Using React, implement a to-do list application that incorporates drag-and-drop functionality. Your solution should use React hooks for state management. The application should allow a user to:

- **Existing Data**
- **Reorder tasks via drag-and-drop**

Provide your React code snippet along with a brief explanation of your design and logical approach.

Question 3: Fibonacci Sequence Generator with Memoization

Prompt:
Write a JavaScript function that calculates the nth Fibonacci number using memoization. This optimization should cache previously computed values to improve performance for large n.
Provide your code snippet along with an explanation of how memoization is implemented and its benefits for recursive algorithms.

Question 4: Sorting Algorithm Implementation (Bubble Sort)

Prompt:
Implement the bubble sort algorithm in JavaScript. The function should accept an array of numbers and return a new array sorted in ascending order.
Provide your code snippet along with a brief explanation of how bubble sort works and any optimizations you may have implemented (e.g., early termination if no swaps occur).

Debugging Questions (Both are compulsory):

Debugging Question 1:

Review the following JavaScript code snippet intended to calculate the sum of an array. Identify and correct the errors in the code.

```
 function sumArray(arr) {
   let sum = 0;
   for (let i = 0; i <= arr.length; i++) {
     sum = sum + arr[i];
   }
   return sum;
}
const numbers = [1,2,3,4,5];
console.log(sumarray(numbers));
```

Debugging Question 2:
Question:
Review the following JavaScript code snippet intended to filter out even numbers from an array. Identify and correct the errors in the code.

```
function filterEvens(arr) {
  let evens = [];
  arr.foreach(function(item) {
    if(item % 2 = 0) {
      evens.push(item);
    }
  });
  return evens;
}
var myNumbers = [1,2,3,4,5,6,7,8];
console.log(filterEven(myNumbers));
```

Additional Coding Questions (Choose Any 1 Out of 3)

Coding Question 1 (Python)

Write a Python function that takes a string as input and returns the first non-repeating character. If all characters repeat, return `None`.

Example:

- **Input:** `"swiss"`
- **Output:** `"w"`

Coding Question 2: C – In-Place String Reversal

Prompt:
Write a C function that reverses a given null-terminated string in place. The function should modify the original string.

Example:

- **Input:** `"hello"`
- **Output:** `"olleh"`

Coding Question 4: SQL

Prompt:
Write a SQL query to retrieve the second highest salary from an `Employees` table, which has columns: `id`, `name`, and `salary`.

Example:

- **If the highest salary is 100000 and the next highest is 90000, your query should return 90000.**