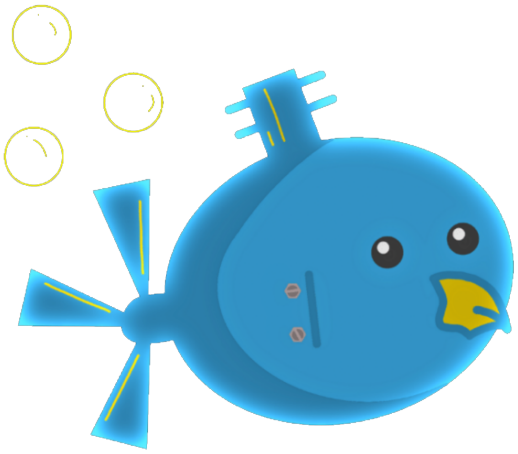
CALIFORNIA STATE UNIVERSITY, LOS ANGELES

Module Level Outcome: *Computer Systems/Architectures: Hardware/Operating Systems/Networking/Database*



ROBOSUB

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Contents

1 Question 7

Problem: https://leetcode.com/problems/unique-paths/

1.1 Pseudocode

Algorithm 1 Unique Paths

procedure UNIQUEPATHS(m, n)
    $hold[n]$
    $count \leftarrow 1$
    for $j \leftarrow 0$ to n **do**
        $hold[j] \leftarrow 1$
    end for
    while $count < m$ **do**
        for $i \leftarrow 1$ to n **do**
            $hold[i] \leftarrow hold[i] + hold[i-1]$
        end for
        $count \leftarrow count + 1$
    end while
    return $hold[n-1]$
end procedure

1.2 Code

1.2.1 Java

```java
class Solution {
    public int uniquePaths(int m, int n) {
        int[] hold = new int[n];
        int count = 1;

        for(int j = 0; j < n; j++){
            hold[j] = 1;
        }

        while(count < m){
            for(int i = 1; i < n; i++){
                hold[i] = hold[i] + hold[i-1];
            }

            count++;
        }

        return hold[n-1];
    }
}
```

1.2.2 JavaScript

```javascript
const uniquePaths = (m, n) => {
const grid = new Array(m).fill(null).map(() => new Array(n).fill(1));

for (let row = 1; row < m; row++) {
    for (let col = 1; col < n; col++) {
        grid[row][col] = grid[row - 1][col] + grid[row][col - 1];
    }
}

return grid[m - 1][n - 1];
}
```

2 Question 8

Problem: https://leetcode.com/problems/word-search/

2.1 Pseudocode

Algorithm 2 Word Search

```
1: procedure EXIST(board, word)
2:     if !board or !word then
3:         return false
4:     end if
5:     rows ← board.length
6:     cols ← board[0].length
7:     procedure DFS(row, col, index)
8:         if row < 0 or row >= rows or col < 0 or col >= cols or board[row][col] ≠
   word[index] then
9:             return false
10:        end if
11:        if index = word.length − 1 then
12:            return true
13:        end if
14:        temp ← board[row][col]
15:        board[row][col] ← "/"
16:        directions ← [[−1, 0], [1, 0], [0, −1], [0, 1]]
17:        for [dx, dy] ← directions do
18:            if dfs(row + dx, col + dy, index + 1) then
19:                return true
20:            end if
21:        end for
22:        board[row][col] ← temp
23:        return false
24:    end procedure
25:    for row ← 0 to rows do
26:        for col ← 0 to cols do
27:            if dfs(row, col, 0) then
28:                return true
29:            end if
30:        end for
31:    end for
32:    return false
33: end procedure
```

2.2 Code

2.2.1 JavaScript

```
const exist = (board, word) => {
    if (!board || !word) return false;
    const rows = board.length;
    const cols = board[0].length;

    const dfs = (row, col, index) => {
        if (
            row < 0 || row >= rows ||
            col < 0 || col >= cols ||
            board[row][col] !== word[index]
        ) {
            return false;
        }
        if (index === word.length - 1) return true;

        const temp = board[row][col];
        board[row][col] = "/";
        const directions = [[-1, 0], [1, 0], [0, -1], [0, 1]];

        for (const [dx, dy] of directions) {
            if (dfs(row + dx, col + dy, index + 1)) return true;
        }

        board[row][col] = temp;
        return false;
    }

    for (let row = 0; row < rows; row++) {
        for (let col = 0; col < cols; col++) {
            if (dfs(row, col, 0)) return true;
        }
    }
    return false;
}
```