

DSP505: Programming Lab for Data Science and Artificial Intelligence

TPL616: Advanced Programming for DSAI

Lab-1: Practice Problems

Due Date: 9-Aug-2025

Question-1:

Given two Python lists, iterate over both lists simultaneously such that list1 should display items in original order and list2 in reverse order. Once the smaller list exhausts, the other list elements should be printed alone.

Input:

```
list1 = [10, 20, 30, 40]
list2 = [1, 10, 100, 200, 300, 400]
```

Output

```
10 400
20 300
30 200
40 100
10
1
```

Question-2:

Given a 2D board and a word, find if the word exists in the grid. The word can be present horizontally or vertically.

Example:

Input:

2D Board:

```
[
  ['A','B','C','E'],
  ['S','F','C','S'],
  ['A','D','E','E']
]
```

Word: FD

Output: True

Question-3:

You are given an $n \times n$ 2D matrix representing an image. Rotate the image by 90 degrees (clockwise) in-place.

Example:

Input:

```
matrix = [  
  [1,2,3],  
  [4,5,6],  
  [7,8,9]  
]
```

Output:

```
[  
  [7,4,1],  
  [8,5,2],  
  [9,6,3]]
```

Question-4:

Write a function to determine if a 9x9 Sudoku board is valid. Only the filled cells need to be validated according to Sudoku rules.

Input:

```
[  
  ["5","3",".",".","7",".",".",".","."],  
  ["6",".",".","1","9","5",".",".","."],  
  [".","9","8",".",".",".","6","."],  
  ["8",".",".","6",".",".","3","."],  
  ["4",".",".","8",".","3",".","1"],  
  ["7",".",".","2",".",".","6"],  
  [".","6",".",".","2","8","."],  
  [".",".","4","1","9",".","5"],  
  [".",".","8",".","7","9"]  
]
```

Output: True