

Matrix (2D Array) Traversal

For each of the following create a function that takes a dynamic 2D array (assorted sizes of matrix) and returns a 1D array containing the output (items) from the given traversal. The best approach would be to create separate files for each of the numbered challenges and import these into a central main.py file for testing.

Sample matrix...

```
[ ['👉', '🍎', '😄', '🐲'],  
  ['😡', '🍷', '🍩', '🚲'],  
  ['🚗', '🦄', '🚂', '🌴'],  
  ['🎲', '🔪', '🚶', '🍷'] ]
```

Challenges

1. Row-wise Traversal:

a. Forward: Iterate through each row from left to right.

```
[ '👉', '🍎', '😄', '🐲', '😡', '🍷', '🍩', '🚲', '🚗', '🦄', '🚂', '🌴', '🎲', '🔪', '🚶', '🍷' ]
```

b. Reverse: Iterate through each row from right to left.

```
[ '🐲', '😄', '🍎', '👉', '🚲', '🍩', '🍷', '😡', '🌴', '🚂', '🦄', '🚗', '🍷', '🚶', '🔪', '🎲' ]
```

2. Column-wise Traversal:

a. Forward: Iterate through each column from top-left to bottom-right.

```
[ '👉', '😡', '🚗', '🎲', '🍎', '🍷', '🦄', '🔪', '😄', '🍩', '🚂', '🚶', '🐲', '🚲', '🌴', '🍷' ]
```

b. Reverse: Iterate through each column from bottom-left to top-right.

```
[ '🎲', '🚗', '😡', '👉', '🔪', '🦄', '🍷', '🍎', '🚶', '🚂', '🍩', '😄', '🍷', '🌴', '🚲', '🐲' ]
```

3. Diagonal Traversal:

a. Primary:

i. Forward: Top-left to bottom-right.

```
[ '👉', '🍷', '🚂', '🍷' ]
```

ii. Reverse: Bottom-right to top-left.

```
[ '🍷', '🚂', '🍷', '👉' ]
```

b. Secondary:

i. Forward: Top-right to bottom-left.

```
[ '🐲', '🍩', '🦄', '🎲' ]
```

ii. Reverse: Bottom-left to top-right.

```
[ '🎲', '🦄', '🍩', '🐲' ]
```

4. Spiral Traversal:

a. Forward: Move in a clockwise spiral pattern from the top-left.

```
[ '👉', '🍎', '😄', '🐲', '🚲', '🌴', '🍷', '🚶', '🔪', '🎲', '🚗', '😡', '🍷', '🍩', '🚂', '🦄' ]
```

b. Reverse: Move in an anti-clockwise spiral pattern from the top-left.

```
[ '👉', '😡', '🚗', '🎲', '🔪', '🚶', '🍷', '🌴', '🚲', '🐲', '😄', '🍆', '🍷', '🦄', '🚂', '🍩' ]
```

5. Zigzag Traversal:

a. Row First: Traverse rows left to right, then right to left, and repeat.

```
[ '👉', '😡', '🍆', '😄', '🍷', '🚗', '🎲', '🦄', '🍩', '🐲', '🚲', '🔪', '🚶', '🌴', '🍷' ]
```

b. Column First: Traverse rows right to left, then left to right, and repeat.

```
[ '👉', '🍆', '😡', '🚗', '🍷', '😄', '🐲', '🍩', '🦄', '🎲', '🔪', '🚲', '🌴', '🚶', '🍷' ]
```

6. Snake Traversal:

- a. Forward: Traverse rows left to right, then right to left, and move to the next row.

['🍌', '🍎', '😄', '🐸', '🚲', '🍩', '🍷', '👹', '🚗', '🦂', '🚂', '🌴', '🍷', '🚶', '🔪', '🏠']

- b. Reverse: Traverse rows right to left, then left to right, and move to the next row.

['🐸', '😄', '🍌', '🍎', '🚶', '👹', '🍷', '🍩', '🚲', '🌴', '🚂', '🦂', '🚗', '🏠', '🔪', '🚶', '🍷', '🍌']

- c. Down: Traverse columns top to bottom, then right to left, and move to the next row.

['🍌', '👹', '🚗', '🏠', '🔪', '🦂', '🍷', '🍩', '🍌', '😄', '🍩', '🚂', '🚶', '🍷', '🌴', '🚲', '🐸']

- d. Up: Traverse columns bottom to top, then top to bottom, and move to the next column.

['🏠', '🚗', '👹', '🍌', '🚶', '🍌', '🍷', '🦂', '🔪', '🚶', '🚂', '🍩', '😄', '🐸', '🚲', '🌴', '🍷']

7. Boundary Traversal:

- a. Top:

- i. Forward: Left to right.

['🍌', '🍌', '🍌', '😄', '🐸']

- ii. Reverse: Right to left.

['🐸', '😄', '🍌', '🍌', '🍌']

- b. Right:

- i. Forward: Top to bottom.

['🐸', '🚲', '🌴', '🍷']

- ii. Reverse: Bottom to top.

['🍷', '🌴', '🚲', '🐸']

- c. Bottom:

- i. Forward: Left to right.

['🏠', '🔪', '🚶', '🍷']

- ii. Reverse: Right to left.

['🍷', '🚶', '🔪', '🏠']

- d. Left:

- i. Forward: Top to bottom.

['🍌', '👹', '🚗', '🏠']

- ii. Reverse: Bottom to top.

['🏠', '🚗', '👹', '🍌']

- e. Full:

- i. Forward: From top-left corner clockwise.

['🍌', '🍌', '🍌', '😄', '🐸', '🚲', '🌴', '🍷', '🚶', '🔪', '🏠', '🚗', '👹']

- ii. Reverse: From top-left corner anticlockwise.

['🍌', '👹', '🚗', '🏠', '🔪', '🚶', '🍷', '🚶', '🍷', '🌴', '🚲', '🐸', '😄', '🍌']