

Course	
Term	
Week	
Date	
Chapter. Topic	7_5. Two Dimensional Lists

Two-Dimensional Lists

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Overview

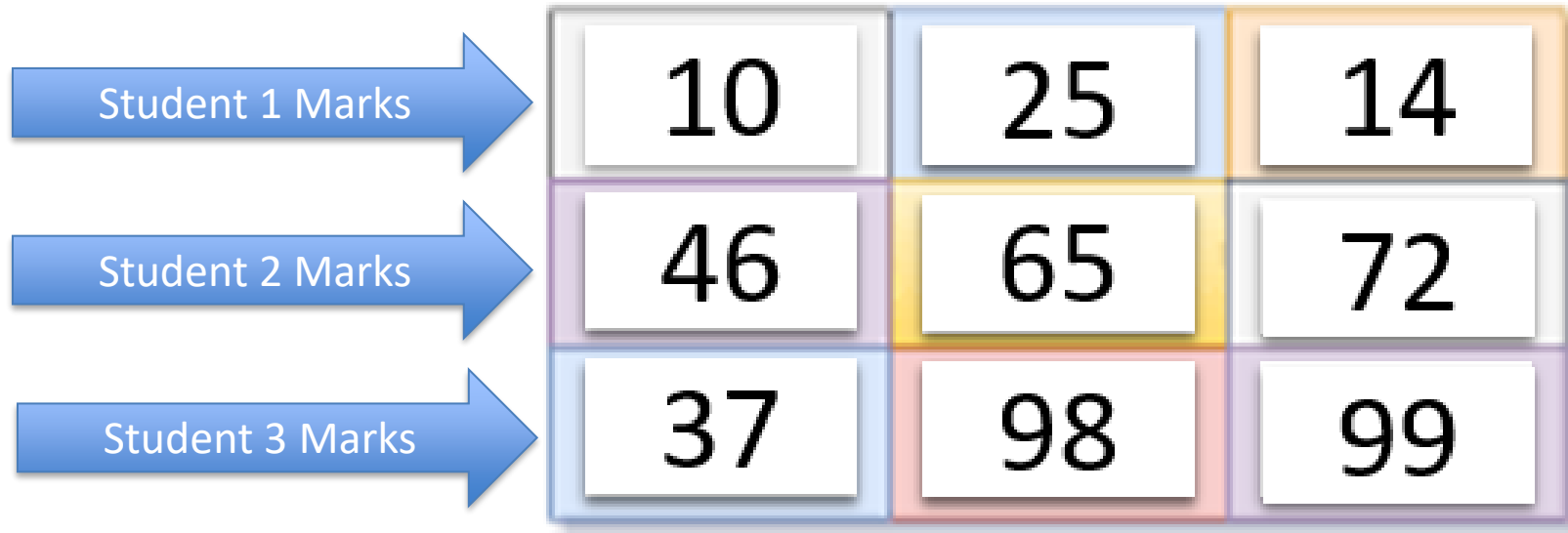
- Introduction
- 2-D Lists (List of Lists)
- Row-Major Traversal
- Column-Major Traversal

2-D Lists: An introduction

Student 1 Marks	10	25	14
Student 2 Marks	46	65	72
Student 3 Marks	37	98	99

- What is the average score (of all students and all tests)?
- What is the average score of each student?
- What is the average score of the class in test 1?
- How to represent this data in python? How to solve it in python?

2-D Lists = List of Lists



The diagram illustrates a 2-D list structure. On the left, three blue arrows point to a 3x3 grid of boxes. The first arrow is labeled 'Student 1 Marks' and points to the first row. The second arrow is labeled 'Student 2 Marks' and points to the second row. The third arrow is labeled 'Student 3 Marks' and points to the third row. The grid contains the following values:

10	25	14
46	65	72
37	98	99

List of Lists
aka 2-D list

```
py_marks = [ [10, 25, 24],  
              [26, 65, 72],  
              [37, 98, 99]  
            ]
```

2-D Lists = List of Lists

10	25	14
46	65	72
37	98	99

```
py_marks= [ [10, 25, 24], [26, 65, 72], [37, 98, 99] ]
```

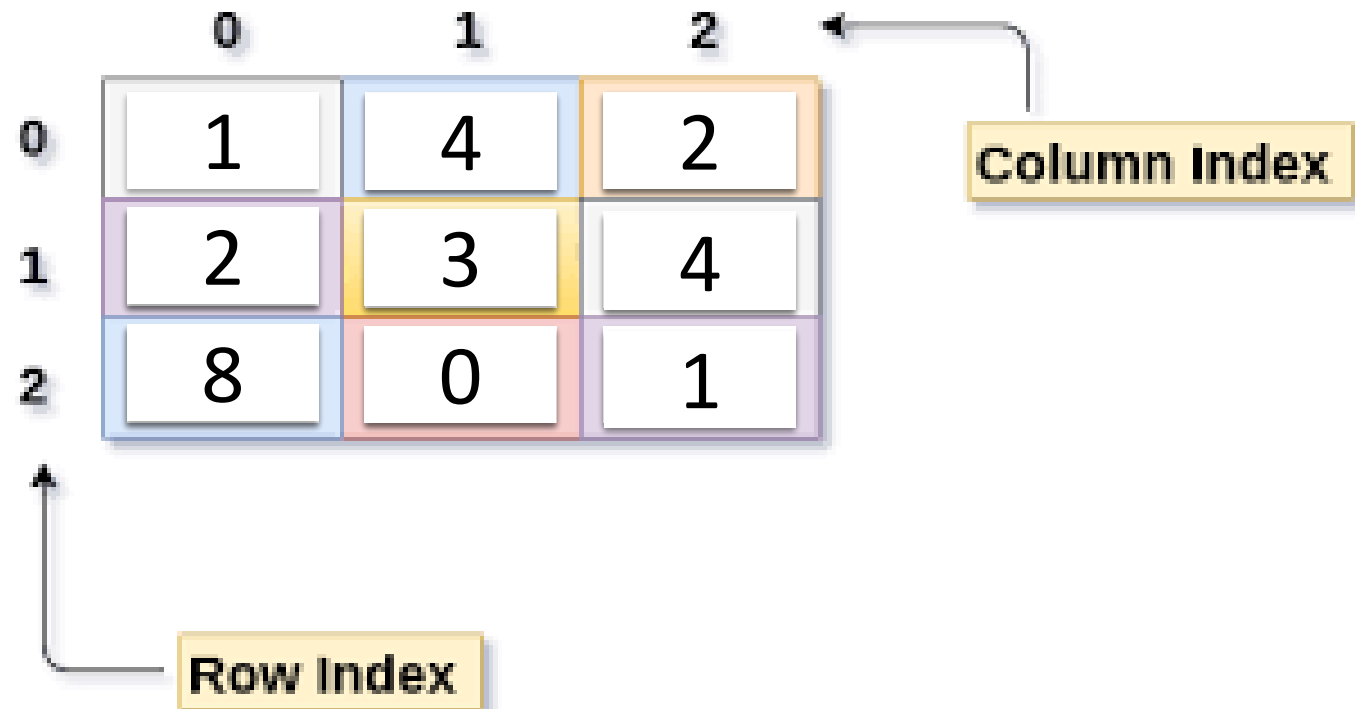


We can also write 2_D lists as a single line.
For simple lists, we can follow this approach.

2-D Lists = List of Lists

```
py_marks= [ [1, 4, 2], [2, 3, 4], [8, 0, 1] ]
```

```
Py_marks[1][2] = 4
```



2-D List = List of Lists

	0	1	2
0	10	25	14
1	46	65	72
2	37	98	99

Column Index

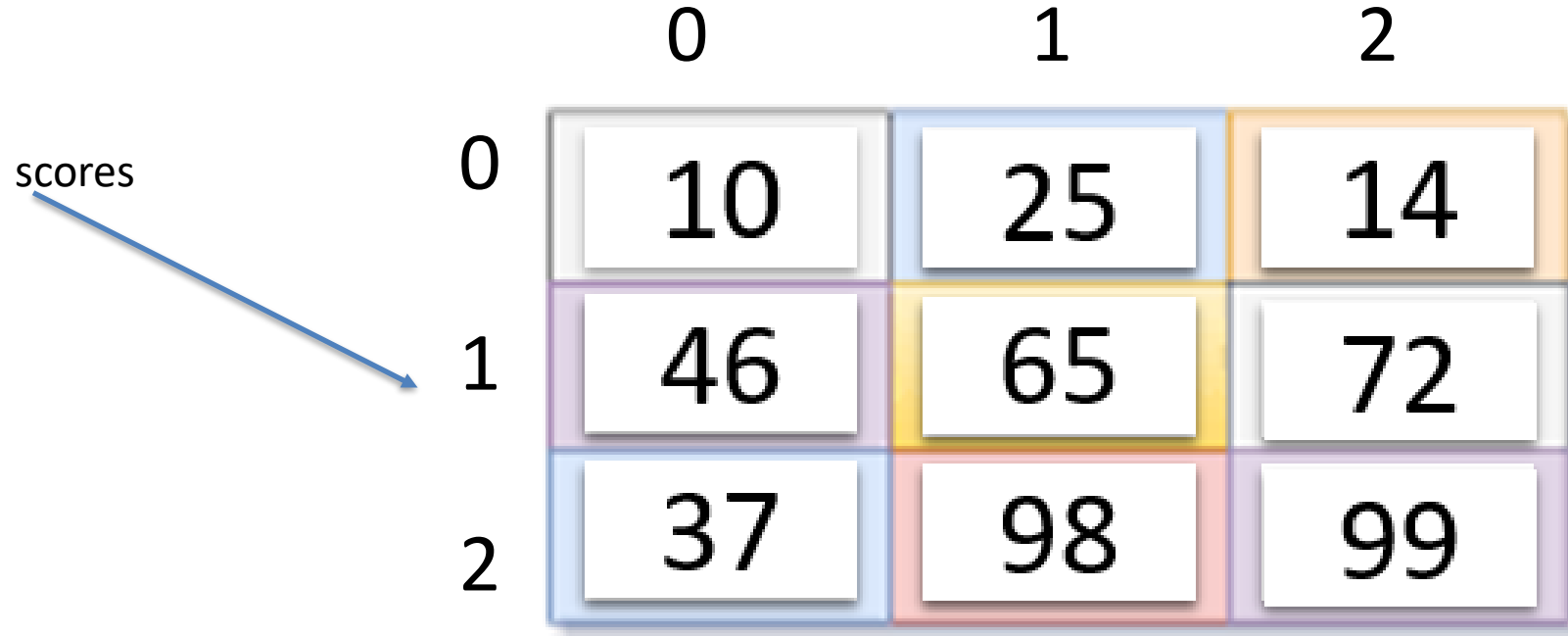
Row Index

	0	1	2
0	(0,0)	(0,1)	(0,2)
1	(1,0)	(1,1)	(1,2)
2	(2,0)	(2,1)	(2,2)

Column Index

Row Index

Subscript Notation for 2-dimensional lists



	Column 0	Column 1	Column 2
Row 0	<code>scores[0][0]</code>	<code>scores[0][1]</code>	<code>scores[0][2]</code>
Row 1	<code>scores[1][0]</code>	<code>scores[1][1]</code>	<code>scores[1][2]</code>
Row 2	<code>scores[2][0]</code>	<code>scores[2][1]</code>	<code>scores[2][2]</code>

Dimensions (width & height) can be different

	0	1	2	3
0	10	25	14	73
1	46	65	72	53
2	37	98	99	15

Consider this 2-Dimensional List (3x4)

- How many rows? _____
- How many columns? _____
- How many total elements? _____
- What is the length of the list? _____

Dimensions (width & height) can be different

	A	B	C	D	E	F	G	H	
8	[0][0]	[0][1]	[0][2]	[0][3]	[0][4]	[0][5]	[0][6]	[0][7]	8
7	[1][0]	[1][1]	[1][2]	[1][3]	[1][4]	[1][5]	[1][6]	[1][7]	7
6	[2][0]	[2][1]	[2][2]	[2][3]	[2][4]	[2][5]	[2][6]	[2][7]	6
5	[3][0]	[3][1]	[3][2]	[3][3]	[3][4]	[3][5]	[3][6]	[3][7]	5
4	[4][0]	[4][1]	[4][2]	[4][3]	[4][4]	[4][5]	[4][6]	[4][7]	4
3	[5][0]	[5][1]	[5][2]	[5][3]	[5][4]	[5][5]	[5][6]	[5][7]	3
2	[6][0]	[6][1]	[6][2]	[6][3]	[6][4]	[6][5]	[6][6]	[6][7]	2
1	[7][0]	[7][1]	[7][2]	[7][3]	[7][4]	[7][5]	[7][6]	[7][7]	1
	A	B	C	D	E	F	G	H	

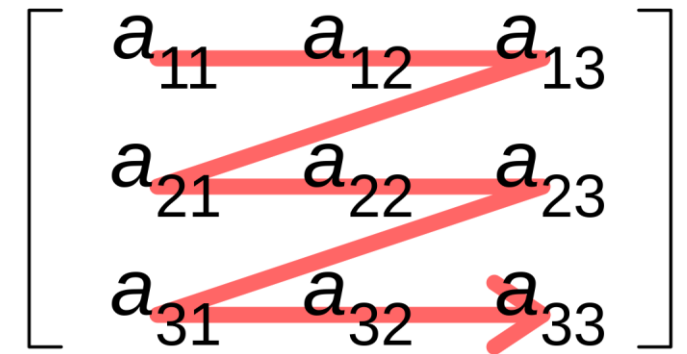
Row-Major Traversal

	0	1	2	3
0	10	25	14	73
1	46	65	72	53
2	37	98	99	15

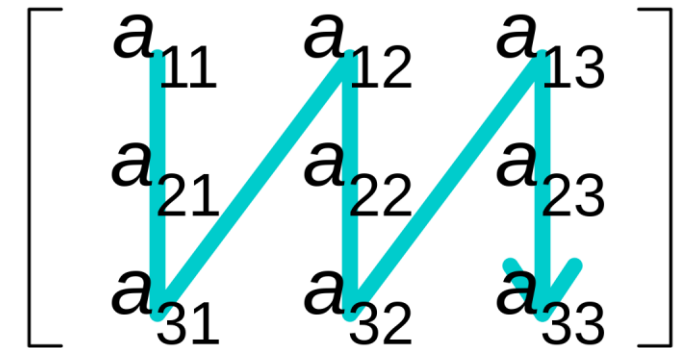
Left to right and top to bottom

10, 25, 14, 73, 46, 65, 72, 53, 37, 98, 99, 15

Row-major order



Column-major order

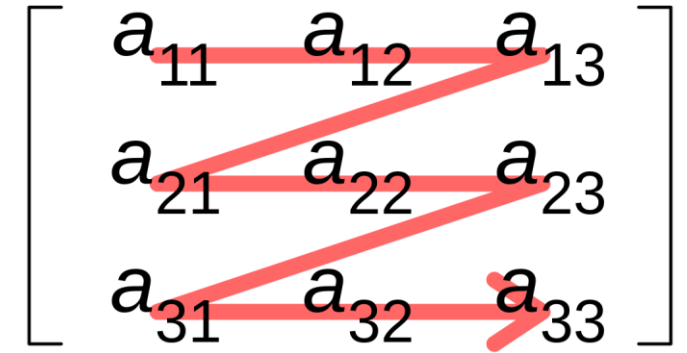


Column-Major Traversal

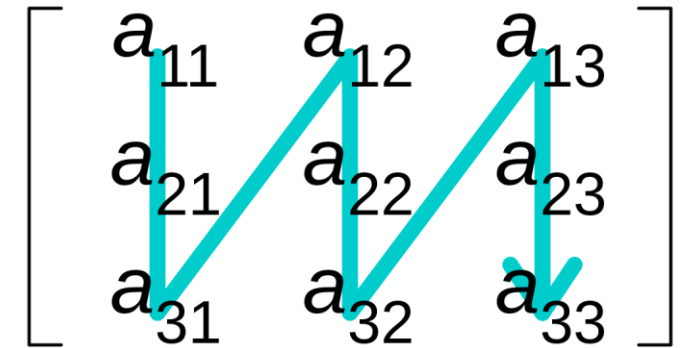
	0	1	2	3
0	10	25	14	73
1	46	65	72	53
2	37	98	99	15

10, 46, 37, 25, 65, 98, 14, 72, 99, 73, 53, 15

Row-major order



Column-major order



Summary

- Introduction
- 2-D Lists (List of Lists)
- Row-Major Traversal
- Column-Major Traversal

Thank You. धन्यवाद

PYTHON PROGRAMMING

by SIVA JASTHI