Python Programming

Nested Lists Homework 1

Mostafa S. Ibrahim
Teaching, Training and Coaching since more than a decade!

Artificial Intelligence & Computer Vision Researcher
PhD from Simon Fraser University - Canada
Bachelor / Msc from Cairo University - Egypt
Ex-(Software Engineer / ICPC World Finalist)

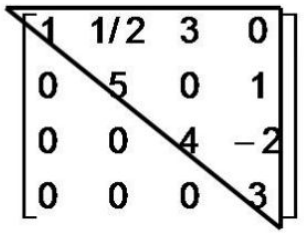
Problem #1: Swap 2 columns

- Read an integer matrix
  - By that I mean read a line: integer N, then N rows of integers (all will have same number of columns).
- Then read 2 indices of columns.
  - Swap the 2 columns together. Print as below
- Input:
  - 3
  - 8 16 9 52
  - 3 15 27 6
  - 14 25 2 10
  - 0 3 [swap col0 and col 1]
- Output
  - [[**52**, 16, 9, **8**], [6, 15, 27, 3], [10, 25, 2, 14]]

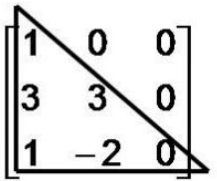
Problem #2: Triangular matrix

- Read an integer matrix (squared)
- Print the sum of the **lower** triangle matrix and the **upper** triangle.
- Input
  - 3
  - 8 16 9
  - 3 15 27
  - 14 25 29
- Output
  - 94 (8+15+29+3+25+14)
  - 104 (8+15+29+16+27+9)

Upper triangular matrix



Lower triangular matrix



Problem #3: Filter empty rows

- Read a list of list of integers. First line is # of rows (N), then N lines
- AFTER reading the list, filter out all empty rows using list comprehension
- Input
  - 5
  - 1 2 3
  -
  - 4 5
  -
  - 6
- Output (print the new list of lists
  - [[1, 2, 3], [4, 5], [6]]

Problem #4: Max value

- Read an integer matrix
- Find the (i, j) position of the maximum value in the matrix.
  - If there are several ones, find the **last occurance**
- Input:
  - 3
  - 1 5 1 10
  - 2 10 3 4
  - 1 10 **10** 7
- Output
  - Max value at position (2, 2) with value = 10

Problem #5: Special print

- Read an integer matrix. Print the following 4 values
  - The sum of the **last row** & the sum of the **last column**
  - The sum of the **left diagonal** & the sum of the **right diagonal**
- Input:
  - 3
  - 8 16 9 **52**
  - 3 15 **27** 6
  - 14 **25** 2 10
- Output
  - 51 68 [14+25+2+10 51 the last row 52+6+10 = 68 the last column
  - 25 104 [8+15+2=25 the left diagonal 52+27+25 = 104 the right diagonal]

Problem #6: Value in first column

- Read an integer matrix, then read a target integer value
- Find the first column that contains a given
  - If not available print: **Not found**
- Input:
  - 3
  - 8 16 9 52
  - 3 **15** 15 6
  - 14 25 2 10
  - 15
- Output
  - found in col 1

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."