

Programming with Python Assignment 4

For each program, name your program like LastnameFirstnameAsn4x.py (where x is either a, b, or c), and include a first line comment as: # Firstname Lastname Assignment4x (where x is A, B, or C)

Part a. Matrix Transpose (Lists)

Write a program that for a given matrix (hardcoded in the program as a list of lists), creates and displays its transpose. Given a matrix A, with elements a_{ij} , the transpose matrix B has elements where $b_{ji} = a_{ij}$. For example, given a matrix `[[1, 2, 3], [4, 5, 6]]`, the transpose is `[[1,4], [2,5],[3,6]]`. Assume the given matrix is rectangular, i.e., all rows have the same number of elements.

Your program should look similar to the example shown below.

```
matrix [[1, 2, 3], [4, 5, 6]]
transpose [[1, 4], [2, 5], [3, 6]]
```

Part b. Palindrome (Strings)

A Palindrome is a word or phrase that is the same forward and backward. These are palindromes:

```
dad
Madam, I'm Adam
```

Write a program to detect if a word or phrase is a palindrome. The program should:

1. prompt the user to enter a word or phrase
2. determine if the word or phrase is a palindrome
3. let the user know if their entry is or isn't a palindrome
4. continue asking the user for a word or phrase to check, until they provide an empty string (just hit at prompt)

Your program should ignore differences between upper and lower case, and also ignore spaces, commas, and apostrophes.

Your program should look similar to the example shown below.

```
Please enter a word or phrase, or to quit: dad
That's a palindrome
Please enter a word or phrase, or to quit: xyz
That's not a palindrome
Please enter a word or phrase, or to quit: Madam, I'm Adam
```

That's a palindrome

Please enter a word or phrase, or to quit:

Part c. Date Conversion (Lists and Strings)

Write a program that translates a date of form mm/dd/yyyy to the form: Month dd, yyyy. The program should prompt the user for a date of form mm/dd/yyyy, and create and display the second form. For example, if the user enters 03/22/2018, the program should construct and display the string: March 22, 2018.

To solve this problem, store the names of the months in a list of 12 strings.

Detect and report certain error conditions:

- user input was not of form mm/dd/yyyy
- user entered input like mm/dd/yyyy, but mm, dd, and/or yyyy were not numeric
for example 01/22/2019 is valid, but jan/22/2019 is invalid
- month (mm) was not a valid month
- day (dd) was not a valid day (you do not need to distinguish between leap and non-leap years)

Your program should look similar to the example shown below.

Please enter a date of form mm/dd/yyyy: 03/22/2018

March 22, 2018

OR

Please enter a date of form mm/dd/yyyy: 03/22

Invalid date format

OR

Please enter a date of form mm/dd/yyyy: 12/00/2019

Invalid day: 0

OR

Please enter a date of form mm/dd/yyyy: 04/31/2019

Invalid day for given month: 31