

MA1008 Introduction to Computational Thinking

Week 7 Programming: Composite data types - List, Tuple, and Dictionary

1. Write a program to read in a Python variable and print "Valid" if it is a valid Python variable and "Invalid" otherwise. Account for Python keywords. In the case of invalid, issue a message to inform the programmer why it is invalid.
2. A matrix can be represented in Python using a list of lists. The elements of the lists would be the row values, and the elements of the nested lists would be the column values. Write a program that takes the list `[[1, 2, 3], [4, 5, 6], [7, 8, 9]]` and prints it out as a 3x3 matrix. Also print its transpose.
3. Write a program that converts a date given in a string in the short format "dd/mm/yyyy" to a list containing the three fields, [dd, mm, yyyy].
4. Given a date in the short format "dd/mm/yyyy", print it in the long form "dd Month, yyyy" where "Month" is the month in word. For example, "1/1/2018" is printed as "1 January, 2018". Solve this problem using the result from Q3 and the Python dictionary you created for Q 4 in the Tutorial.
5. You can express a 3D vector as a tuple (x, y, z). Write a program that
 - i. sums two such vectors, and returns the result in a new vector.
 - ii. Find the dot product of two such vectors.
6. Write a program to read in a sentence of your choice and print every word in the sentence, one word per line. Provide two different solutions:
 - i. A word may contain digits and punctuations, including hyphens and brackets.
 - ii. A word must contain letters only.