CS4710 - Programming project 1. (20 points)

Warm-up exercises

Due Sept. 26, 10am

1. Write a Python program to find the first repeated character in a given string.

   Ex. Input string: badabe, output: a

2. Write a Python program to print the vowels, a,e,i,o,u, occurring in a given text and their total number.

3. Write a Python program to concatenate two given strings after removing the first two characters of each string.

4. A permutation *p* of *n* symbols is an ordered list of *n* symbols (no repetitions). For example, p=cefdab is a permutation of length 6 on the symbols a,b,c,d,e,f. Write a Python program that reads a string representing a permutation on n symbols and prints the index (position) of each character in the string.

   Ex. Input string=cdaefb ; output: pos(a) = 3; pos(b) = 6; pos(c) = 1; pos(d) = 2; pos(e)= 4; pos(f)= 5.

5. Write a Python program that reads a list representing a permutation on a given set of characters (for instance a,b,c,d,e,f) and prints the index (position) of each character in the string. Same as problem 4. except that the data structure is a list of characters.

   Ex. Input: [c,d,a,e,f,b]; output: pos(a) = 3; pos(b) = 6; pos(c) = 1; pos(d) = 2; pos(e)= 4; pos(f)= 5.

6. Write a Python program that reads two lists and then calls a function that takes the two lists and returns True if they have at least one common member.

   Ex. Input: string1=cdaefb string2=xyzea; output: TRUE

   As a comment in your code write the time complexity of your algorithm as a function of the lengths n and m of the two lists

7. Write a Python program to exchange the position of every *n-th* value, *n* odd, with the *(n+1)th* in a list.
   Ex. Input list: [0,1,2,3,4,5] Output: [1, 0, 3, 2, 5, 4]

8. Write a Python program to construct and print a 10×10 matrix $M[i,j]$ of integers such as $M[i,j] = i * j$. In the output every row is on a separate line

9. Write a Python program that constructs two 10×10 matrices *M* and *N* of integers, selected at random in the range [0,20]. It then computes and prints the matrix C which is the difference of *M* and *N*, i.e. $C[i,j] = M[i,j] - N[i,j]$.