# Assignment 21

#### 1. Given a sentence, return the number of words which have the same first and last letter.

**Answer:**

Examples:  
count\_same\_ends("Pop! goes the balloon") ➞ 1  
count\_same\_ends("And the crowd goes wild!") ➞ 0  
count\_same\_ends("No I am not in a gang.") ➞ 1

**def** count\_same\_ends(in\_string):  
 special\_chars = '!@#$%^&\*.'  
 cleaned\_string = ''  
 out\_num = 0  
 **for** ele **in** in\_string:  
 **if** ele **not** **in** special\_chars:  
 cleaned\_string += ele  
 **for** ele **in** cleaned\_string.split(" "):  
 **if** ele[0].lower() == ele[-1].lower():  
 **if** len(ele) != 1:  
 out\_num +=1  
 print(f'count\_same\_ends({in\_string}) ➞ {out\_num}')  
   
count\_same\_ends("Pop! goes the balloon")  
count\_same\_ends("And the crowd goes wild!")  
count\_same\_ends("No I am not in a gang.")

count\_same\_ends(Pop! goes the balloon) ➞ 1  
count\_same\_ends(And the crowd goes wild!) ➞ 0  
count\_same\_ends(No I am not in a gang.) ➞ 1

#### 2. The Atbash cipher is an encryption method in which each letter of a word is replaced with its "mirror" letter in the alphabet: A <=> Z; B <=> Y; C <=> X; etc.

Create a function that takes a string and applies the Atbash cipher to it.

**Answer:**

Examples:  
atbash("apple") ➞ "zkkov"  
atbash("Hello world!") ➞ "Svool dliow!"  
atbash("Christmas is the 25th of December") ➞ "Xsirhgnzh rh gsv 25gs lu Wvxvnyvi"

**def** atbash(in\_string):  
 alpha = 'abcdefghijklmnopqrstuvwxyz'  
 r\_alpha = 'zyxwvutsrqponmlkjihgfedcba'  
 out\_string = ''  
 **for** ele **in** in\_string:  
 **if** ele **not** **in** " !1234567890":  
 out\_string += r\_alpha[alpha.index(ele.lower())].upper() **if** ele.isupper() **else** r\_alpha[alpha.index(ele.lower())]  
 **else**:  
 out\_string += ele  
 print(f'atbash({in\_string}) ➞ {out\_string}')  
   
atbash("apple")  
atbash("Hello world!")  
atbash("Christmas is the 25th of December")

atbash(apple) ➞ zkkov  
atbash(Hello world!) ➞ Svool dliow!  
atbash(Christmas is the 25th of December) ➞ Xsirhgnzh rh gsv 25gs lu Wvxvnyvi

#### 3. Create a class Employee that will take a full name as argument, as well as a set of none, one or more keywords. Each instance should have a name and a lastname attributes plus one more attribute for each of the keywords, if any.

**Answer:**

Examples:  
john = Employee("John Doe")  
mary = Employee("Mary Major", salary=120000)  
richard = Employee("Richard Roe", salary=110000, height=178)  
giancarlo = Employee("Giancarlo Rossi", salary=115000, height=182, nationality="Italian")

john.name ➞ "John"  
mary.lastname ➞ "Major"  
richard.height ➞ 178  
giancarlo.nationality ➞ "Italian"

**class** Employee:  
 **def** \_\_init\_\_(self,name=None,salary=None,height=None,nationality=None):  
 self.name = name  
 self.firstname = name.split(" ")[0]  
 self.lastname = name.split(" ")[1]  
 self.salary = salary  
 self.height = height  
 self.nationality = nationality  
   
john = Employee("John Doe")   
mary = Employee("Mary Major",salary=120000)  
richard = Employee("Richard Roe", salary=110000, height=178)  
giancarlo = Employee("Giancarlo Rossi", salary=115000, height=182, nationality="Italian")  
  
print(f'john.name ➞ "{john.name}"')  
print(f'mary.lastname ➞ "{mary.lastname}"')  
print(f'richard.height ➞ {richard.height}')  
print(f'giancarlo.nationality ➞ "{giancarlo.nationality}"')

john.name ➞ "John Doe"  
mary.lastname ➞ "Major"  
richard.height ➞ 178  
giancarlo.nationality ➞ "Italian"

#### 4. Create a function that determines whether each seat can "see" the front-stage. A number can "see" the front-stage if it is strictly greater than the number before it.

Everyone can see the front-stage in the example below:

# FRONT STAGE [[1, 2, 3, 2, 1, 1], [2, 4, 4, 3, 2, 2], [5, 5, 5, 5, 4, 4], [6, 6, 7, 6, 5, 5]]

# Starting from the left, the 6 > 5 > 2 > 1, so all numbers can see.  
# 6 > 5 > 4 > 2 - so all numbers can see, etc.

Not everyone can see the front-stage in the example below:

# FRONT STAGE [[1, 2, 3, 2, 1, 1], [2, 4, 4, 3, 2, 2], [5, 5, 5, 10, 4, 4], [6, 6, 7, 6, 5, 5]]

# The 10 is directly in front of the 6 and blocking its view.

The function should return True if every number can see the front-stage, and False if even a single number cannot.

**Answer:**

Examples:  
can\_see\_stage([[1, 2, 3],[4, 5, 6],[7, 8, 9]]) ➞ True  
can\_see\_stage([[0, 0, 0],[1, 1, 1],[2, 2, 2]]) ➞ True  
can\_see\_stage([[2, 0, 0],[1, 1, 1],[2, 2, 2]]) ➞ False  
can\_see\_stage([[1, 0, 0],[1, 1, 1],[2, 2, 2]]) ➞ False

# Number must be strictly smaller than  
# the number directly behind it.

**def** can\_see\_stage(in\_list):  
 transposed\_list = []  
 **for** ele **in** range(len(in\_list)):  
 temp\_list = []  
 **for** item **in** range(len(in\_list[ele])):  
 temp\_list.append(in\_list[item][ele])  
 transposed\_list.append(temp\_list)  
 output = True  
 **for** ele **in** transposed\_list:  
 **if** ele != sorted(ele) **or** len(ele) != len(set(ele)):  
 output = False  
 **break**  
 print(f'can\_see\_stage({in\_list}) ➞ {output}')  
   
can\_see\_stage([[1, 2, 3],[4, 5, 6],[7, 8, 9]])  
can\_see\_stage([[0, 0, 0],[1, 1, 1],[2, 2, 2]])  
can\_see\_stage([[2, 0, 0],[1, 1, 1],[2, 2, 2]])  
can\_see\_stage([[1, 0, 0],[1, 1, 1],[2, 2, 2]])

can\_see\_stage([[1, 2, 3], [4, 5, 6], [7, 8, 9]]) ➞ True  
can\_see\_stage([[0, 0, 0], [1, 1, 1], [2, 2, 2]]) ➞ True  
can\_see\_stage([[2, 0, 0], [1, 1, 1], [2, 2, 2]]) ➞ False  
can\_see\_stage([[1, 0, 0], [1, 1, 1], [2, 2, 2]]) ➞ False

#### 5. Create a Pizza class with the attributes order\_number and ingredients (which is given as a list). Only the ingredients will be given as input.

You should also make it so that its possible to choose a ready made pizza flavour rather than typing out the ingredients manually! As well as creating this Pizza class, hard-code the following pizza flavours.

| Name | Ingredients |
| --- | --- |
| hawaiian | ham, pineapple |
| meat\_festival | beef, meatball, bacon |
| garden\_feast | spinach, olives, mushroom |
| **Answer:** |  |

Examples:

p1 = Pizza(["bacon", "parmesan", "ham"]) # order 1  
p2 = Pizza.garden\_feast() # order 2  
p1.ingredients ➞ ["bacon", "parmesan", "ham"]  
p2.ingredients ➞ ["spinach", "olives", "mushroom"]  
p1.order\_number ➞ 1  
p2.order\_number ➞ 2

**class** Pizza:  
 order\_count = 0  
 **def** \_\_init\_\_(self,ingredients=None):  
 self.ingredients = ingredients  
 self.order\_number = Pizza.order\_count+1  
 Pizza.order\_count = self.order\_number  
 **def** hawaiian(self):  
 self.ingredients = ['ham', 'pineapple']  
 **def** meat\_festival(self):  
 self.ingredients = ['beef', 'meatball', 'bacon']  
 **def** garden\_feast(self):  
 self.ingredients = ['spinach', 'olives', 'mushroom']  
   
p1 = Pizza(["bacon", "parmesan", "ham"])  
p2 = Pizza()  
p2.garden\_feast()  
print(f'p1.ingredients ➞ {p1.ingredients}')  
print(f'p2.ingredients ➞ {p2.ingredients}')  
print(f'p1.order\_number ➞ {p1.order\_number}')  
print(f'p2.order\_number ➞ {p2.order\_number}')

p1.ingredients ➞ ['bacon', 'parmesan', 'ham']  
p2.ingredients ➞ ['spinach', 'olives', 'mushroom']  
p1.order\_number ➞ 1  
p2.order\_number ➞ 2