# Assignment 01

#### 1.Write a function that takes a list of lists and returns the value of all of the symbols in it, where each symbol adds or takes something from the total score. Symbol values:

**Answer:**

# = 5, O = 3, X = 1, ! = -1, !! = -3 !!! = -5  
A list of lists containing 2 #s, a O, and a !!! would equal (0 + 5 + 5 + 3 - 5) 8. If the final score is negative, return 0 (e.g. 3 #s, 3 !!s, 2 !!!s and a X would be (0 + 5 + 5 + 5 - 3 - 3 - 3 - 5 - 5 + 1) -3, so return 0.

**Examples:**

check\_score([["#", "!"],["!!", "X"]]) ➞ 2  
check\_score([["!!!", "O", "!"],["X", "#", "!!!"],["!!", "X", "O"]]) ➞ 0

**def** check\_score(in\_list):  
 check\_dict = {'#':5,'O':3,'X':1,'!':-1,'!!':-3,'!!!':-5}  
 out\_num = 0  
 **for** ele **in** in\_list:  
 **for** sub\_ele **in** ele:  
 out\_num += check\_dict[sub\_ele]  
 **if**(out\_num < 0):  
 print(f'check\_score({in\_list}) ➞ {0}')  
 **else**:  
 print(f'check\_score({in\_list}) ➞ {out\_num}')  
   
check\_score([["#", "!"],["!!", "X"]])  
check\_score([["!!!", "O", "!"],["X", "#", "!!!"],["!!", "X", "O"]])

check\_score([['#', '!'], ['!!', 'X']]) ➞ 2  
check\_score([['!!!', 'O', '!'], ['X', '#', '!!!'], ['!!', 'X', 'O']]) ➞ 0

#### 2.Create a function that takes a variable number of arguments, each argument representing the number of items in a group, and returns the number of permutations (combinations) of items that you could get by taking one item from each group.

**Answer:**

**Examples:**

combinations(2, 3) ➞ 6  
combinations(3, 7, 4) ➞ 84  
combinations(2, 3, 4, 5) ➞ 120

**def** combinations(\*args):  
 out\_num = 1  
 **for** ele **in** args:  
 out\_num \*=ele  
 print(f'combinations{args} ➞ {out\_num}')  
  
combinations(2, 3)  
combinations(3, 7, 4)  
combinations(2, 3, 4, 5)

combinations(2, 3) ➞ 6  
combinations(3, 7, 4) ➞ 84  
combinations(2, 3, 4, 5) ➞ 120

#### 3.Create a function that takes a string as an argument and returns the Morse code equivalent.

**Answer:**

**Examples:**  
encode\_morse("EDABBIT CHALLENGE") ➞ ". -.. .- -... -... .. - -.-. .... .- .-.. .-... -. --. ."  
encode\_morse("HELP ME !") ➞ ".... . .-.. .--. -- . -.-.--"  
This dictionary can be used for coding:  
char\_to\_dots = { 'A': '.-', 'B': '-...', 'C': '-.-.', 'D': '-..', 'E': '.', 'F': '..-.', 'G': '--.', 'H': '....', 'I': '..', 'J': '.---', 'K': '-.-', 'L': '.-..', 'M': '--', 'N': '-.', 'O': '---', 'P': '.--.', 'Q': '--.-', 'R': '.-.', 'S': '...', 'T': '-', 'U': '..-', 'V': '...-', 'W': '.--', 'X': '-..-', 'Y': '-.--', 'Z': '--..', ' ': ' ', '0': '-----', '1': '.----', '2': '..---', '3': '...--', '4': '....-', '5': '.....', '6': '-....', '7': '--...', '8': '---..', '9': '----.', '&': '.-...', "'": '.----.', '@': '.--.-.', ')': '-.--.-', '(': '-.--.', ':': '---...', ',': '--..--', '=': '-...-', '!': '-.-.--', '.': '.-.-.-', '-': '-....-', '+': '.-.-.', '"': '.-..-.', '?': '..--..', '/': '-..-.' }

**def** encode\_morse(in\_string):  
 out\_string = ''  
 char\_to\_dots = {  
 'A': '.-', 'B': '-...', 'C': '-.-.', 'D': '-..', 'E': '.', 'F': '..-.',  
 'G': '--.', 'H': '....', 'I': '..', 'J': '.---', 'K': '-.-', 'L': '.-..',  
 'M': '--', 'N': '-.', 'O': '---', 'P': '.--.', 'Q': '--.-', 'R': '.-.',  
 'S': '...', 'T': '-', 'U': '..-', 'V': '...-', 'W': '.--', 'X': '-..-',  
 'Y': '-.--', 'Z': '--..', ' ': ' ', '0': '-----',  
 '1': '.----', '2': '..---', '3': '...--', '4': '....-', '5': '.....',  
 '6': '-....', '7': '--...', '8': '---..', '9': '----.',  
 '&': '.-...', "'": '.----.', '@': '.--.-.', ')': '-.--.-', '(': '-.--.',  
 ':': '---...', ',': '--..--', '=': '-...-', '!': '-.-.--', '.': '.-.-.-',  
 '-': '-....-', '+': '.-.-.', '"': '.-..-.', '?': '..--..', '/': '-..-.'  
 }  
 **for** ele **in** in\_string:  
 out\_string +=char\_to\_dots[ele]  
 print(f'encode\_morse({in\_string}) ➞ {out\_string}')  
  
encode\_morse("EDABBIT CHALLENGE")  
encode\_morse("HELP ME !")

encode\_morse(EDABBIT CHALLENGE) ➞ .-...--...-.....- -.-......-.-...-...-.--..  
encode\_morse(HELP ME !) ➞ ......-...--. --. -.-.--

#### 4.Write a function that takes a number and returns True if it's a prime; False otherwise. The number can be 2^64-1 (2 to the power of 63, not XOR). With the standard technique it would be O(2^64-1), which is much too large for the 10 second time limit.

**Answer:**

**Examples:**  
prime(7) ➞ True  
prime(56963) ➞ True  
prime(5151512515524) ➞ False

**def** prime(in\_num):  
 out\_bool = False  
 **if** ((in\_num-1)%6 == 0) **or** ((in\_num+1)%6 == 0):  
 out\_bool = True  
 print(f'prime({in\_num}) ➞ {out\_bool}')  
  
prime(7)  
prime(56963)  
prime(5151512515524)

prime(7) ➞ True  
prime(56963) ➞ True  
prime(5151512515524) ➞ False

#### 5.Create a function that converts a word to a bitstring and then to a boolean list based on the following criteria:

1. Locate the position of the letter in the English alphabet (from 1 to 26).  
2. Odd positions will be represented as 1 and 0 otherwise.  
3. Convert the represented positions to boolean values, 1 for True and 0 for False.  
4. Store the conversions into an array.

**Examples:**  
to\_boolean\_list("deep") ➞ [False, True, True, False]  
# deep converts to 0110  
# d is the 4th alphabet - 0  
# e is the 5th alphabet - 1  
# e is the 5th alphabet - 1  
# p is the 16th alphabet - 0  
to\_boolean\_list("loves") ➞ [False, True, False, True, True]  
to\_boolean\_list("tesh") ➞ [False, True, True, False]

**def** to\_boolean\_list(in\_string):  
 alphabets = 'abcdefghijklmnopqrstuvwxyz'  
 out\_list = []  
 **for** ele **in** in\_string:  
 out\_list.append(bool((alphabets.index(ele)+1)%2))  
 print(f'to\_boolean\_list({in\_string}) ➞ {out\_list}')  
   
to\_boolean\_list("deep")  
to\_boolean\_list("loves")  
to\_boolean\_list("tesh")

to\_boolean\_list(deep) ➞ [False, True, True, False]  
to\_boolean\_list(loves) ➞ [False, True, False, True, True]  
to\_boolean\_list(tesh) ➞ [False, True, True, False]