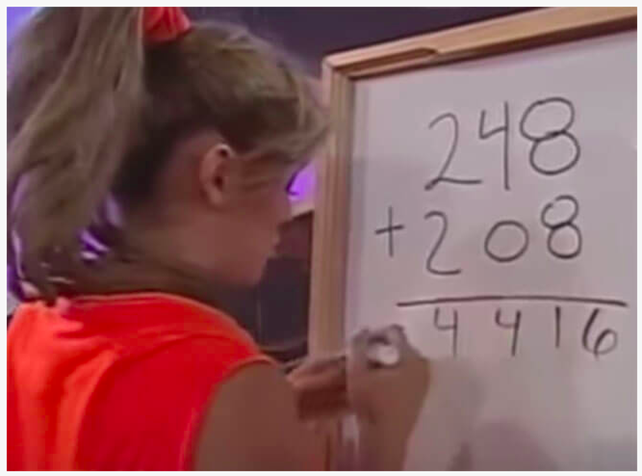
# Assignment 12

#### 1. For this challenge, forget how to add two numbers together. The best explanation on what to do for this function is this meme:



**Answer:**

Examples:  
meme\_sum(26, 39) ➞ 515  
# 2+3 = 5, 6+9 = 15  
# 26 + 39 = 515  
meme\_sum(122, 81) ➞ 1103  
# 1+0 = 1, 2+8 = 10, 2+1 = 3  
# 122 + 81 = 1103  
meme\_sum(1222, 30277) ➞ 31499

**def** meme\_sum(a,b):  
 a,b = str(a),str(b)  
 output = ''  
 **while** len(a) != len(b):  
 **if** len(a) < len(b):  
 a ='0'+a  
 **else**:  
 b='0'+b  
 **for** ele **in** range(len(a)):  
 output += str(int(a[ele])+int(b[ele]))  
 print(f'meme\_sum{a,b} ➞ {output}')  
   
meme\_sum(26, 39)  
meme\_sum(122, 81)  
meme\_sum(1222, 30277)

meme\_sum('26', '39') ➞ 515  
meme\_sum('122', '081') ➞ 1103  
meme\_sum('01222', '30277') ➞ 31499

#### 2. Given an integer, create a function that returns the next prime. If the number is prime, return the number itself.

**Answer:**

Examples:  
next\_prime(12) ➞ 13  
next\_prime(24) ➞ 29  
next\_prime(11) ➞ 11  
# 11 is a prime, so we return the number itself.

**def** next\_prime(in\_num):  
 in\_num\_clone = in\_num  
 **while** True:  
 **if** (in\_num-1)%6 == 0 **or** (in\_num+1)%6 ==0 :  
 temp = in\_num  
 **for** ele **in** range(3,in\_num+1):  
 **if** in\_num%ele == 0 **and** ele != in\_num:  
 in\_num = in\_num+1  
 **break**  
 **if** temp == in\_num:  
 **break**  
 **else**:  
 in\_num += 1  
   
 print(f'next\_prine({in\_num\_clone}) ➞ {in\_num}')  
   
next\_prime(12)  
next\_prime(24)  
next\_prime(11)

next\_prine(12) ➞ 13  
next\_prine(24) ➞ 29  
next\_prine(11) ➞ 11

#### 3. If a person traveled up a hill for 18mins at 20mph and then traveled back down the same path at 60mph then their average speed traveled was 30mph.

Write a function that returns the average speed traveled given an uphill time, uphill rate and a downhill rate. Uphill time is given in minutes. Return the rate as an integer (mph). No rounding is necessary.

**Answer:**

Examples:  
ave\_spd(18, 20, 60) ➞ 30  
ave\_spd(30, 10, 30) ➞ 15  
ave\_spd(30, 8, 24) ➞ 12

**def** ave\_spd(up\_time,up\_speed,down\_speed):  
 distance = up\_speed\*(up\_time/60)  
 down\_time = distance/down\_speed  
 output = (2\*distance)/((up\_time/60)+down\_time)  
 print(f'ave\_spd{up\_time,up\_speed,down\_speed} ➞ {int(output)}')  
   
ave\_spd(18, 20, 60)  
ave\_spd(30, 10, 30)  
ave\_spd(30, 8, 24)

ave\_spd(18, 20, 60) ➞ 30  
ave\_spd(30, 10, 30) ➞ 15  
ave\_spd(30, 8, 24) ➞ 12

#### 4. The Kempner Function, applied to a composite number, permits to find the smallest integer greater than zero whose factorial is exactly divided by the number.

kempner(6) ➞ 3 1! = 1 % 6 > 0 2! = 2 % 6 > 0 3! = 6 % 6 === 0

kempner(10) ➞ 5 1! = 1 % 10 > 0 2! = 2 % 10 > 0 3! = 6 % 10 > 0 4! = 24 % 10 > 0 5! = 120 % 10 === 0

A Kempner Function applied to a prime will always return the prime itself.  
kempner(2) ➞ 2  
kempner(5) ➞ 5

Given an integer n, implement a Kempner Function.

**Answer:**

Examples:  
kempner(6) ➞ 3  
kempner(10) ➞ 5  
kempner(2) ➞ 2

**def** kempner(in\_num):  
 **def** factorial(in\_num):  
 **if** in\_num == 1:  
 **return** 1  
 **else**:  
 **return** in\_num \* factorial(in\_num-1)  
 **for** ele **in** range(1,in\_num+1):  
 **if** factorial(ele)%in\_num == 0:  
 output = ele  
 **break**  
 print(f'kempner({in\_num}) ➞ {output}')  
   
kempner(6)  
kempner(10)  
kempner(5)  
kempner(2)

kempner(6) ➞ 3  
kempner(10) ➞ 5  
kempner(5) ➞ 5  
kempner(2) ➞ 2

#### 5. You work in a factory, and your job is to take items from a conveyor belt and pack them into boxes. Each box can hold a maximum of 10 kgs. Given a list containing the weight (in kg) of each item, how many boxes would you need to pack all of the items?

**Answer:**

Examples:  
boxes([2, 1, 2, 5, 4, 3, 6, 1, 1, 9, 3, 2]) ➞ 5  
# Box 1 = [2, 1, 2, 5] (10kg)  
# Box 2 = [4, 3] (7kg)  
# Box 3 = [6, 1, 1] (8kg)  
# Box 4 = [9] (9kg)  
# Box 5 = [3, 2] (5kg)

**def** boxes(in\_list):  
 in\_list\_clone = in\_list.copy()  
 output = []  
 temp\_box = []  
 **while** True:  
 **if** len(in\_list) != 0:  
 **if** sum(temp\_box) <= 10:  
 temp\_box.append(in\_list.pop(0))  
 **else**:  
 in\_list.insert(0,temp\_box.pop())  
 output.append(temp\_box)  
 temp\_box = []  
 **else**:  
 output.append(temp\_box)  
 temp\_box = []  
 **break**  
 print(f'boxes({in\_list\_clone}) ➞ {output} ➞ {len(output)}')   
   
boxes([2, 1, 2, 5, 4, 3, 6, 1, 1, 9, 3, 2])  
boxes([5, 5, 5, 5, 5, 5, 2, 3, 4, 5, 6])

boxes([2, 1, 2, 5, 4, 3, 6, 1, 1, 9, 3, 2]) ➞ [[2, 1, 2, 5], [4, 3], [6, 1, 1], [9], [3, 2]] ➞ 5  
boxes([5, 5, 5, 5, 5, 5, 2, 3, 4, 5, 6]) ➞ [[5, 5], [5, 5], [5, 5], [2, 3, 4], [5, 6]] ➞ 5