

## Exercise 1 - Biggest of two numbers - Are these programs equivalent? Why

In [ ]:

```
### program 1

x = 10
y = 5
if(x > y):
    print('x is bigger')
elif (y < x):
    print('y is bigger')
else:
    print('equal')
```

In [ ]:

```
### program 2

x = 10
y = 5
if (x = y):
    print('equal')
elif(x > y):
    print('x is bigger')
else:
    print('y is bigger')
```

In [ ]:

```
## program 3

diff = x - y
if (diff == 0):
    print('equal')
elif(diff > 0):
    print('x is bigger')
else:
    print('y is bigger')
```

## Answer

- Problem 3 is correct.
- Program 1's first and second condition are actually the same, the variables are just swapped, they both check that y is less than x. So if y is bigger than x, the program will print 'equal'. if we change the second condition to be "y>x" instead of "y<x" , the program will be correct
- Program 2 has a syntax error in the first if condition , we use "==" for comparing equality and one "=" to do assignment.

## Exercise 2 - Absolute number

Write a program that calculates the absolute value of a number

Example:

- num = 10, output = 10
- num = -10, output = 10

(the absolute of a positive number is just the same number, the absolute of negative number is the positive version of number)

In [1]:

```
### Answer
num = input('Enter a number')

if(num >= 0):
    print(num)
else:
    print(-1*num)
```

```
Enter a number10
10
```

## Exercise 3 - Repeat the text

write a program which takes as input text and a number n, and prints out the text repeated n times

Example:

- text = 'hello', n = 3, outputs => hello hello hello
- text= 'hi', n = 2, outputs => hi hi

Hint: Check string operations from last lecture

In [3]:

```
### Answer
text = raw_input('Enter text ')
n = input('Enter number ')
print(text * n)
```

```
Enter text hello
Enter number 5
hellohellohellohellohello
```

## Exercise 4 - Sum from 1 to n

write a program that takes a number as input and outputs the sum from 1 to this number.

Example: n= 5, output= 1 + 2 + 3 + 4 + 5 = 15

In [5]:

```
n = input('Enter a number ')
i = 1
sum = 0
while i <=n:
    sum = sum + i
    i = i + 1
print(sum)
```

Enter a number 5  
15

## Strings & Lists - Revisiting

Strings and lists are similar. String can be considered as a special case of list. It has a list of letters/characters. List can contain of any type of elements.

```
list_numbers = [1,2,3,4]
list_strings = ["hello", "world", "hii"]
list_mixed = [1, "hello", 4, 5.0]
list_of_lists = [[1,2,3],['a','b','c']]
```

**strings and lists have many similar in the operations that you can perform on them**

In [3]:

```
text = 'hello'
```

In [4]:

```
## get first character of string
text[0]
```

Out[4]:

```
'h'
```

In [ ]:

```
## get length of string
```

In [22]:

```
len(text)
```

Out[22]:

```
5
```

In [5]:

```
## get last character of string  
text[4]
```

Out[5]:

'o'

In [13]:

```
list_numbers = [1, 2, 3, 4, 10]
```

In [11]:

```
## get first element of list  
list_numbers[0]
```

Out[11]:

1

In [14]:

```
## get number of elements in list  
len(list_numbers)
```

Out[14]:

5

In [15]:

```
## get last element of list  
list_numbers[4]
```

Out[15]:

10

In [22]:

```
## concatenating/appending two strings  
text = 'hello'  
text + '....'
```

Out[22]:

'hello....'

In [6]:

```
### appending two lists  
list_numbers = [1, 2, 3, 4, 10]  
list_numbers + [11,12,13]
```

Out[6]:

[1, 2, 3, 4, 10, 11, 12, 13]

In [41]:

```
## checking if a string contains another string
substring = 'ell'
if(substring in text):
    print 'text contains ell'
```

text contains ell

In [7]:

```
## checking if an element is in a list
num = 1
if(num in list_numbers):
    print 'list contains 1'
```

list contains 1

## Exercise 5 - Are these 3 programs equivalent ? Why?

In [ ]:

```
### Program 1
text = 'hello'

for letter in text:
    print(letter)
```

In [ ]:

```
## Program 2
text = "hello"
index = 0
while index < len(text):
    print(text[index])
    index = index + 1
```

In [ ]:

```
text = "hello"
letters = ['h','e','l','l','o']
count = 0

while count <= len(letters)-1:
    print(letters[count])
    count = count + 1
```

## Answer

All above three programs are correct.

- Program 1 uses a for loop to go through each letter in string and prints it
- Program 2 uses while loop and a variable index, used to access each character from string. The index is incremented by 1 in each iteration, to go to the next letter.
- Program 3 uses while loop as well, but the text is represented as a list of characters instead of a string.

## Exercise 6 - Occurrences of a letter in text

Write a program that takes a text from user and a letter, and output the number of occurrences of that letter in the string. **Use while loop and not for loop!**

Hint:

- you can use len() to know the # of characters of the string.
- Example:
  - len('hello') gives as output 5

In [13]:

```
### Answer

text = raw_input('Enter text ')
special_letter = raw_input('Enter letter ')
index = 0
letter_count = 0
while index < len(text):
    if text[index] == special_letter:
        letter_count = letter_count + 1
    index = index + 1
print(letter_count)
```

```
Enter text hello
Enter letter l
2
```

## Homework

### Exercise 7

Write a program that takes from user a number n and prints out the product from 1 till n.

Example:

- n = 2, output =  $1 * 2 = 2$
- n = 3, output =  $1 * 2 * 3 = 6$

In [16]:

```
n = int(input('Please enter the number n:'))
i = 1
result = 1

while i <= n:
    result = result * i
    i = i + 1

print('If you multiply all numbers from 1 to n, you will get:')
print(result)
```

Please enter the number n:3

If you multiply all numbers from 1 to n, you will get:

6

## Exercise 8

Write a program that takes from user text as input and outputs how many vowels occur in text. vowels: a, e, i, o, u.

Example:

- text = 'hello', output = 2
- text = 'cat', output = 1

In [17]:

```
vowels = ['a','e','i','o','u']

str = raw_input('Please enter a string: ')
vowels_counter = 0

for letter in str:
    if letter in vowels:
        vowels_counter = vowels_counter + 1

print('Number of vowels in your string:')
print(vowels_counter)
```

Please enter a string: hello

Number of vowels in your string:

2

## Exercise 9 - Year by Year Balance

You have amount X saved in the bank. Each year your balance in the bank increases by interest rate 2%

Example:

- if in 2016 you had an amount 100 euros in the bank
- in 2017, it will be 102
- in 2018, it will be 104.04

Assuming the amount in the bank doesn't change (you do not spend from it or add to it ) Below is a program that takes as input the amount you have in the bank (e.g. 100) and the interest rate (e.g. 0.2), then print the balance for next 5 years.

\*modify the program so that you take the number of years as input n, and print the balance for each year (from year 1 till year n)

In [18]:

```
money = int(input('How much money will you put to your account:'))
interest = int(input('What is the interest your bank is offering (in
percent):'))
total_years = int(input('How many years will your money be stored in the
bank:'))

year = 1
while year <= total_years:
    money = money + money*(interest/100.0)
    print('Year:')
    print(year)
    print('Result:')
    print(money)
    print('\n')
    year = year + 1
```

```
How much money will you put to your account:100
What is the interest your bank is offering (in percent):2
How many years will your money be stored in the bank:3
Year:
1
Result:
102.0
```

```
Year:
2
Result:
104.04
```

```
Year:
3
Result:
106.1208
```