Lesson 4

September 28, 2017

0.0.1 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')
```

0.0.2 Exercise 3 - 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 [7]: num = input('Enter a number')

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

```
Enter a number10
10
```

```
In [10]: -20000*-1
```

```
Out[10]: 20000
```

0.0.3 Exercise 4 - 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 [11]: "hello" + " world"
```

```
Out[11]: 'hello world'
```

```
In [14]: text = raw_input('Enter text')
         n = input('Enter number')
         print(text * n)
```

```
Enter texthello
Enter number3
hellohellohello
```

0.0.4 Exercise 5 - 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

0.0.5 Strings & Lists - Revisiting

```
In [ ]: text = 'hello'
```

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

```
In [ ]: ## get length of string
```

```
In [ ]: len(text)
```

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

In [ ]: list_numbers = [1, 2, 3, 4, 10]

In [ ]: list_numbers[0]

In [ ]: len(list_numbers)

In [ ]: list_numbers[4]

In [28]: text + '....'

Out[28]: 'hello...'

In [29]: list_numbers + [11,12,13]

Out[29]: [1, 2, 3, 4, 10, 11, 12, 13]

In [41]: substring = 'ell'
         if(substring in text):
             print 'text contains ell'

text contains ell


In [42]: num = 1
         if(num in list_numbers):
             print 'list contains 1'

list contains 1
```

0.0.6 Exercise 6 - Are these 3 programs equivalent ? Why?

```
In [ ]: ### Program 1
        text = 'hello'

        for letter in text:
            print(letter)

In [ ]: ## Program 2
        count = 0
        while count < len(text):
            print(text[count])
            count = count + 1


In [ ]: letters = ['h','e','l','l','o']
        count = 0

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

0.0.7 Exercise 7 - 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

0.0.8 Exercise 8 - Reverse a string

Write a program which takes a text string from user, and prints out the reverse string.

Example: - text = 'hello', output = 'olleh'

0.0.9 Exercise 9 - number is in list

Write a program that takes as input a list of numbers and then a number. If the list of numbers contains this number print 'exists' otherwise print 'doesn't exist'.

Example: - a = [1,2,3,4], element = 4, output => exists - b = [1,5,3,4], element = 2, output => doesn't exist

1 Homework

1.1 Exercise 10

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

1.1.1 Exercise 11

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

1.1.2 Exercise 12 - 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 [ ]: balance = input()
        interest = input()

        balance = balance +  (balance * interest)
        print('year 1 balance', balance)
        balance = balance +  (balance * interest)
        print('year 2 balance', balance)
        balance = balance +  (balance * interest)
        print('year 3 balance', balance)
        balance = balance +  (balance * interest)
        print('year 4 balance', balance)
        balance = balance +  (balance * interest)
        print('year 5 balance', balance)
```

1.1.3 Exercise 13 - Reverse a string

Write a program which takes a text string from user, and prints out the reverse string.
Example: - text = 'hello', output = 'olleh'

```
In [ ]:
```