[Session 1] Python Basics Supplement

`print()` function

`print()` function is one of most important function in Python, because we can see the result of expression or function's return value by using this.

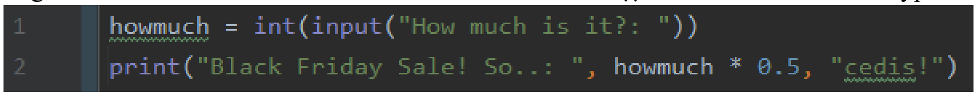
Basically, we can use like this:

- ➢ `print(value, sep, end)`
- `value`: Something that can be printed. As we mentioned in the lecture, this can contain multiple items.
- `sep`: We can specify the separator. If we print multiple items, then we put separator between each item. For example, `print(1, 2, 3, sep="_")` will print `"1_2_3"`. The default is " ", a whitespace.
- `end`: We can specify ending character. The default is "\n", a line feed. (and this is why many lines are printed when we call `print()` function many times) For example, `print("hello", end="!")` prints `"hello!"`, without line feed.
- Note that, these can be omitted all, `print()` is also ok.

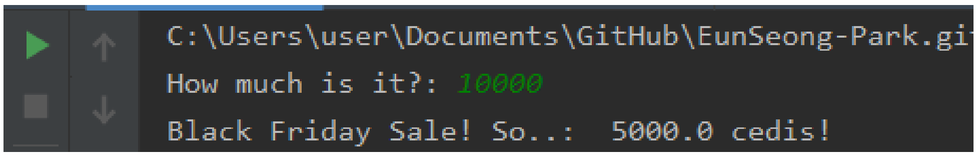
`input()` function

We can get some input from user, by using **`input()`** function. We can show some prompt(the signal or message that computer is ready for the input) with parameter. (Like `print()` function, we can put many things as long as these can be printed)

The return value of the `input()` function is the **string** you are typed (and then Enter). Sometimes, we may want to get a number from user. How can we do that? Use `int()` function to convert its type.



```
howmuch = int(input("How much is it?: "))
print("Black Friday Sale! So..: ", howmuch * 0.5, "cedis!")
```



```
C:\Users\user\Documents\GitHub\EunSeong-Park.gi
How much is it?: 10000
Black Friday Sale! So..:  5000.0 cedis!
```

Indexing & Slicing of List / Tuple / String

These three datatypes have in the following commons:

- **Can be iterated**: We can traverse each element (or character). (e.g. `for` statement)
- **Can be indexed:** We can access ith element directly, with [i]. (e.g. `(1, 3, 2, 1)[2]` => 2)
- **Can be sliced:** We can get a sub-data from the original, according to certain rules

Indexing and slicing are very important (and powerful) operations in Python. You should be accustomed to using these.

(Index Rule)

1. **Index starts at 0**. In order to access to ith element, we use `(Data)[i-1]`, not `(Data)[i]`.
2. Index out of range will cause error. For example, `(1, 2, 3)[3]` is an invalid indexing

3. Negative index can be valid. For example, `list[-1]` is the last element, and `list[-2]` is the second-last element. Note that, if the number of elements is n, then index under -n is invalid.
   - So, For some list with n items, `list[i] = list[-(n-i)]`

(Slicing Rule)

1. Basically, for some iterable data, A, use `A[start:end:step]`. All of them can be omitted. (even A[:] or A[::] are ok) The default of step is 1. For a list A, with n items
   A. `A[:end] = A[0:end] = A[0:end:1]`
   B. `A[start:] = A[start:n-1] = A[start:n-1:1]`
   C. `A[:] = A[::] = A`
2. In `A[start:end]`, `A[end]` is not included.

We uploaded some exercises for practice of this.

Recursion

The situation that some function calls itself is called "**recursion**". Recursion is sometimes useful, because it can simplify the code. For example, we will implement "Fibonacci number" function in two ways.

```python
def fibo(n):
    if n == 0:
        return 0
    elif n == 1:
        return 1
    else:
        result = 0
        a, b = 0, 1
        for i in range(2,n+1):
            result = a + b
            a = b
            b = result
        return result
```

```python
def fibo_recursion(n):
    if n == 0:
        return 0
    elif n == 1:
        return 1
    else:
        return fibo_recursion(n-2) + fibo_recursion(n-1)
```

The latter code has better readability and is more straightforward.

However, note that, **recursion must be ended eventually**. If the function calls itself infinitely, our computer cannot withstand and causes some problem. This is called "**stack overflow**". (Fortunately, in most programming language prevents this, but we still cannot run the program properly.) So read your code carefully, and ensure that the recursion can be terminated eventually.