

What Are First-Class Objects?

- An object that supports all operations that are otherwise applicable
- Any operator/operation applicable to any other object will also be applicable to first-class objects
- These operations may include being assigned to a variable or being passed as parameter to a function

Properties of First-Class Objects (Python)

- Can be used as parameters to functions
- Can be assigned to variables
- Should be a type of object
- Can be used as return type for functions
- Can be stored in different data structures: dictionary, lists, and so on

Functions as First-Class Objects

- Can be used as parameters to functions

```
my_var = 3

def my_func(var_x):
    var_result = var_x + 3
    return var_x

new_var = my_func(my_var)
#Output : 6
```

```
def square(x):
    return x * x

def my_func(var_x, var_func):
    var_result = var_func(var_x)
    return var_result

new_var = my_func(6, square)
#Output : 36
```

Functions as First-Class Objects (Continued)

- Can be used as return type for functions

```
my_var = 3

def my_func (x):
    ret_x = x + 2
    return ret_x

my_new_var = my_func(my_var)
#Output = 5
```

```
def do_some_op(x):
    def func_square_add(y,z):
        return y * y + z
    return func_square_add(x,x+1)

my_new_var = do_some_op(5)
#Output : 31
#do_some_op(5) ->
func_square_add(5,6)
# 5 * 5 + 6 = 31
```


Functions as First-Class Objects (Continued)

- Can be stored in different data structures

```
my_var = 3
```

```
my_var_2 = 56
```

```
my_var_3 = 89
```

```
my_list = [ my_var,  
            my_var_2, my_var_3 ]
```

```
def sqr( x ):  
    return x * x
```

```
def cube( x ):  
    return x * x * x
```

```
def four_pow(x):  
    return x * x * x * x
```

```
funcs_list = [sqr, cube, four_pow]
```

Summary

- First-class object is an object that supports all operations that are otherwise applicable
- Python treats its functions as first-class objects
- First-class objects can be passed as arguments

Summary (Continued)

- First-class objects can be stored in different data structures
- First-class objects can be returned from functions
- First-class objects can be assigned to variables