

Python Function Tuple and Dictionary as Arguments with *args and **kwargs

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1 Function Arguments

Go to the [RMD](#), [PDF](#), or [HTML](#) version of this file. Go back to [Python Code Examples](#) Repository ([bookdown site](#)) or the [pyfan](#) Package ([API](#)).

```
import pprint
```

1.1 Mutable Argument Default

If a parameter is a list, that is mutable, or a dict. Default values for the mutable parameter should be None, with the actual default value provided inside the function.

```
# Mutable dict as parameters
def ffi_tab_txt2tex(dc_fmd_sym_sig=None, dc_tex_sig_sym=None):
    if dc_fmd_sym_sig is None:
        # defaults
        dc_fmd_sym_sig = {'***': 1e-2, '**': 5e-2, '*': 1e-1}
    if dc_tex_sig_sym is None:
        # defaults
        dc_tex_sig_sym = {'1e-3': '\\sym{***}',
                          '1e-2': '\\sym{**}',
                          '5e-2': '\\sym{*}',
                          '1e-1': '\\dagger'}

    # print
    print(f'{dc_fmd_sym_sig=}')
    print(f'{dc_tex_sig_sym=}')

# Call function with default
ffi_tab_txt2tex()
# Call function update the first dict
```

```
## dc_fmd_sym_sig={'***': 0.01, '**': 0.05, '*': 0.1}
## dc_tex_sig_sym={'1e-3': '\\sym{***}', '1e-2': '\\sym{**}', '5e-2': '\\sym{*}', '1e-1': '\\dagger'}
```

```
ffi_tab_txt2tex(dc_fmd_sym_sig = {'***': 1e-3, '**': 1e-2, '*': 5e-2})
```

```
## dc_fmd_sym_sig={'***': 0.001, '**': 0.01, '*': 0.05}
```

```
## dc_tex_sig_sym={'1e-3': '\\sym{***}', '1e-2': '\\sym{**}', '5e-2': '\\sym{*}', '1e-1': '\\dagger'}
```

see “Least Astonishment” and the Mutable Default Argument.

1.2 Python Dictionary As Argument via kwargs

There is a python function that outputs a dictionary with key and value pairs that specify key aspects of how a model should be solved. For example, one of the parameters could specify the *vcpu* requirement. This *vcpu* requirement might change, and so it should be easy to update this key with alternative values.

These are accomplished in the following manner. Define the full key-value pair list, with default values for several dictionaries, with model simulation, support, and compute parameters for example. These lists could be updated with some default alternative combinations, or alternatively, it could be updated with externally provided dictionary with both updated values for existing keys, or even additional key value pairs.

First, we create a function that processes and outputs default parameters, it has two inputs, *it_default_group* to specify pre-fixed adjustments from defaults, and *kwargs* that allows for arbitrarily modifications and additions to parameter dictionary.

```
def gen_compesti_spec(it_default_group=None, **kwargs):
    # A. Define the default parameter keys and values
    esti_specs = {'esti_method': 'MomentsSimuStates',
                  'momsets_type': ['a', '20180805a'],
                  'esti_param_vec_count': 1,
                  'esti_max_func_eval': 10,
                  'graph_frequncy': 20}
    compute_specs = {'cpu': str(1024 * 1),
                    'memory': str(517), # only need about 160 mb in reality
                    'workers': 1,
                    'aws_fargate': False}

    # B. For different
    compesti_specs = {**compute_specs, **esti_specs}

    # C. Update dictionaries with parameter group values
    if it_default_group == 1:
        compesti_specs_updates = {'memory': str(1024 * 55),
                                  'compute_param_vec_count': 6,
                                  'esti_param_vec_count': 640}
        compesti_specs.update(compesti_specs_updates)

    # D. Update with kward, could append new
    compesti_specs.update(kwargs)

    return compesti_specs
```

Second, we test the defaults:

```
compesti_specs = gen_compesti_spec()
pprint.pprint(compesti_specs, width=1)
```

```
## {'aws_fargate': False,
##  'cpu': '1024',
##  'esti_max_func_eval': 10,
```

```
## 'esti_method': 'MomentsSimuStates',
## 'esti_param_vec_count': 1,
## 'graph_frequncy': 20,
## 'memory': '517',
## 'momsets_type': ['a',
##                  '20180805a'],
## 'workers': 1}
```

Third, we test using default group 1, pre-fixed changes to defaults:

```
compesti_specs = gen_compesti_spec(it_default_group=1)
pprint.pprint(compesti_specs, width=1)
```

```
## {'aws_fargate': False,
##  'compute_param_vec_count': 6,
##  'cpu': '1024',
##  'esti_max_func_eval': 10,
##  'esti_method': 'MomentsSimuStates',
##  'esti_param_vec_count': 640,
##  'graph_frequncy': 20,
##  'memory': '56320',
##  'momsets_type': ['a',
##                  '20180805a'],
##  'workers': 1}
```

Fourth, we use kwargs to feed in arbitrary dictionary to update and append to existing parameter dictionary:

```
compesti_specs_updates = {'esti_method': 'MomentsSimuStateszzzz',
                          'moments_type': ['a', '20180805azzz'],
                          'momsets_type': ['a', '20180805azzz'],
                          'momsets_type_uuu': ['a', '20180805azzz']}
compesti_specs = gen_compesti_spec(it_default_group=None, **compesti_specs_updates)
pprint.pprint(compesti_specs, width=1)
```

```
## {'aws_fargate': False,
##  'cpu': '1024',
##  'esti_max_func_eval': 10,
##  'esti_method': 'MomentsSimuStateszzzz',
##  'esti_param_vec_count': 1,
##  'graph_frequncy': 20,
##  'memory': '517',
##  'moments_type': ['a',
##                  '20180805azzz'],
##  'momsets_type': ['a',
##                  '20180805azzz'],
##  'momsets_type_uuu': ['a',
##                      '20180805azzz'],
##  'workers': 1}
```

1.3 Named Argument List and Dictionary

Define a function with named and unnamed arguments:

```
def gen_compesti_spec_named(it_default_group, esti_method, memory=123, graph_frequncy=10):
    # A. Define the default parameter keys and values
    esti_specs = {'esti_method': 'MomentsSimuStates',
                  'momsets_type': ['a', '20180805a'],
```

```

        'it_default_group': it_default_group,
        'esti_param_vec_count': 1,
        'esti_max_func_eval': 10,
        'graph_frequncy': graph_frequncy}
compute_specs = {'cpu': str(1024 * 1),
                 'memory': str(memory), # only need about 160 mb in reality
                 'workers': 1,
                 'aws_fargate': False}

# B. For different
compesti_specs = {**compute_specs, **esti_specs}

return compesti_specs

```

Provide inputs for the first two unnamed parameters explicitly. Then provided the two named parameters via a dictionary:

```

dc_inputs = {'memory':12345, 'graph_frequncy':2}
compesti_specs = gen_compesti_spec_named(None, 'MomentsSimuStates', **dc_inputs)
pprint.pprint(compesti_specs, width=1)

## {'aws_fargate': False,
##  'cpu': '1024',
##  'esti_max_func_eval': 10,
##  'esti_method': 'MomentsSimuStates',
##  'esti_param_vec_count': 1,
##  'graph_frequncy': 2,
##  'it_default_group': None,
##  'memory': '12345',
##  'momsets_type': ['a',
##                  '20180805a'],
##  'workers': 1}

```