# ctypes

C                              DLL                              .              2.5
    .

| C Type | Python Type | ctypes Type |
|---|---|---|
| bool | bool(1) | c_bool |
| char | 1-character string | c_char |
| wchar_t | 1-character Unicode string | c_wchar |
| char | int/long | c_byte |
| unsigned char | int/long | c_ubyte |
| short | int/long | c_short |
| unsigned short | int/long | c_ushort |
| int | int/long | c_int |
| size_t | int/long | c_size_t |
| unsigned int | int/long | c_uint |
| long | int/long | c_long |
| unsigned long | int/long | c_ulong |
| long long | int/long | c_longlong |
| unsigned long long | int/long | c_ulonglong |
| float | float | c_float |
| double | float | c_double |
| long double | float | c_longdouble |
| char * (NULL terminated) | string or none | c_char_p |
| wchar_t * (NULL terminated) | unicode or none | c_wchar_p |
| void * | int/long or none | c_void_p |

```python
from ctypes import *

print c_ushort(-5)

seitz = c_char_p("loves the python")
print seitz
print seitz.value
```

```
c_ushort(65531)
c_char_p('loves the python')
loves the python
```

,

value                    .

```
seitz = c_char_p("loves the python")
print seitz.value
```

char *, wchar_t *, void *                              POINTER              .

int *            x              NULL                .

```
x = POINTER(c_int)()
```

POINTER                        contents                    .

C/C++                                                                    .

```
functionname( byref(parameter) )
```

,

,                Structure, Union                    .

## C

```
struct beer_recipe
{
    int amt_barley;
    int amt_water;
};
```

## ctypes

```
class beer_recipe(Structure):
    _fields_ = [
        ("amt_barley", c_int),
        ("amt_water", c_int),
    ]
```

## C

```
union {
    long barley_long;
    int barley_int;
```

```
    char barley_char[8];
}barley_amount;
```

## ctypes

```python
class barley_amount(Union):
    _fields_ = [
        ("barley_long", c_long),
        ("barley_int", c_int),
        ("barley_char", c_char * 8),
    ]
```

```python
class test(Structure):
    _fields_ = [
        ("a",  c_ushort),
        ("b",  c_ushort)
    ]

s = POINTER(test)
s = s(test())

# s = POINTER(test)(test())              .

s.contents.a = 1
s.contents.b = 2
```

# DLL

3                              .

### cdll()

cdecl                      export

### windll()

stdcall                    export

### oledll()

windll()            HRESULT                    COM        export                    .

msvcrt.dll    printf                        .

```python
from ctypes import *
msvcrt = cdll.msvcrt
message_string = "Hello world!\n"
msvcrt.printf("Testing: %s", message_string)
```

  * ctypes