

(continued from previous page)

```
# Also see descr_new() in Objects/descrobject.c
self.name = name
self.clsname = clsname
self.offset = offset

def __get__(self, obj, objtype=None):
    'Emulate member_get() in Objects/descrobject.c'
    # Also see PyMember_GetOne() in Python/structmember.c
    value = obj._slotvalues[self.offset]
    if value is null:
        raise AttributeError(self.name)
    return value

def __set__(self, obj, value):
    'Emulate member_set() in Objects/descrobject.c'
    obj._slotvalues[self.offset] = value

def __delete__(self, obj):
    'Emulate member_delete() in Objects/descrobject.c'
    value = obj._slotvalues[self.offset]
    if value is null:
        raise AttributeError(self.name)
    obj._slotvalues[self.offset] = null

def __repr__(self):
    'Emulate member_repr() in Objects/descrobject.c'
    return f'<Member {self.name!r} of {self.clsname!r}>'
```

The type.\_\_new\_\_() method takes care of adding member objects to class variables:

```
class Type(type):
    'Simulate how the type metaclass adds member objects for slots'

    def __new__(mcls, clsname, bases, mapping):
        'Emulate type_new() in Objects/typeobject.c'
        # type_new() calls PyTypeReady() which calls add_methods()
        slot_names = mapping.get('slot_names', [])
        for offset, name in enumerate(slot_names):
            mapping[name] = Member(name, clsname, offset)
        return type.__new__(mcls, clsname, bases, mapping)
```

The object.\_\_new\_\_() method takes care of creating instances that have slots instead of an instance dictionary. Here is a rough simulation in pure Python:

```
class Object:
    'Simulate how object.__new__() allocates memory for __slots__'

    def __new__(cls, *args):
        'Emulate object_new() in Objects/typeobject.c'
        inst = super().__new__(cls)
        if hasattr(cls, 'slot_names'):
            empty_slots = [null] * len(cls.slot_names)
            object.__setattr__(inst, '_slotvalues', empty_slots)
        return inst

    def __setattr__(self, name, value):
        'Emulate _PyObject_GenericSetAttrWithDict() Objects/object.c'
        cls = type(self)
        if hasattr(cls, 'slot_names') and name not in cls.slot_names:
            raise AttributeError(
                f'{type(self).__name__!r} object has no attribute {name!r}'
```

(continues on next page)