discuss_in_set_theory

June 14, 2018

1 Everything is an object in Python.

1.1 Data and Operations

$$Algorithms + DataStructures = Programs$$

1.2 Sets

$$E = \{e \mid e\ is\ a\ pointer\ which\ point\ to\ a\ piece\ of\ memory\}$$

$$O = \{o \mid o \in E \wedge (PyObject*)o\ is\ valid \wedge o->ob\_type \in T\}$$

$$T = \{t \mid t \in O \wedge (PyTypeObject*)t\ is\ valid\}$$

$$M = \{m \mid m \in T \wedge \exists t.(t \in T \wedge t->ob\_type == m)\}$$

$$M \subset T \subset O \subset E$$

1.3 Function

$$type : O \to T$$

1.3.1 type is surjective

$$\forall t \in T.\exists o \in O.type(o) = t$$

1.4 Predicates

1.4.1 isinstance

$$\forall o.(o \in O \wedge o->ob\_type == t \wedge t \in T \implies isinstance(o,t))$$

$$\forall t.(t \in T \wedge t->ob\_type == m \wedge m \in M \implies isinstance(t,m))$$

$$\forall o \in O \implies isinstance(o,object) \quad is \quad True \implies PyObject\_IsInstance(o,object) == true$$

1.4.2 issubclass

https://www.youtube.com/watch?v=UXBoiqRJ6DQ

```
In [3]: class A:
            pass

        a = A()

        class B:
            pass

        b = B()

        type(a) is type(b)
```

```
Out[3]: True
```

https://en.wikipedia.org/wiki/Polymorphism_(computer_science)