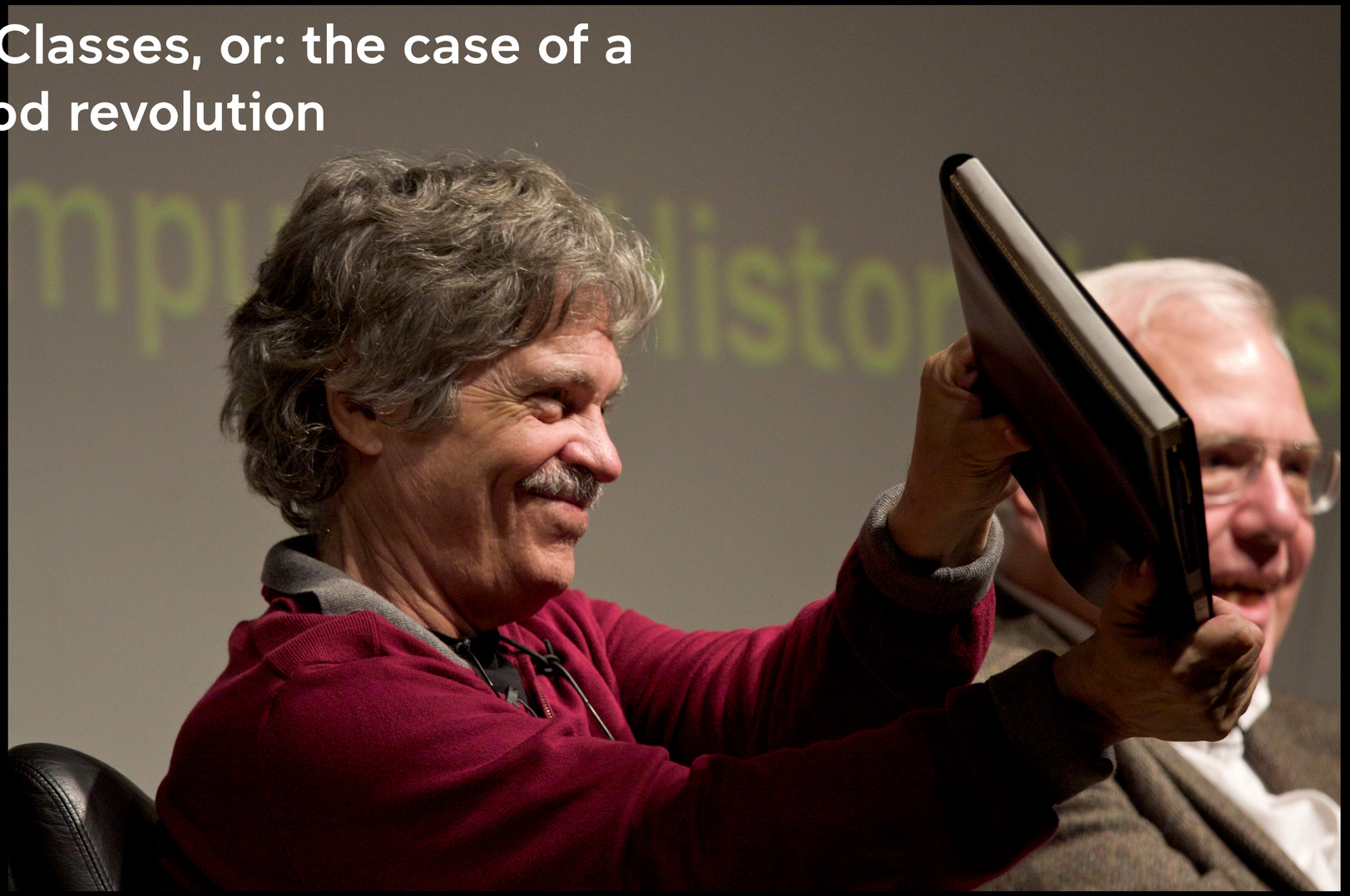
COMP1531

8.3 - Python Classes, or: the case of a misunderstood revolution



UNSW SYDNEY

1950s: the first languages were *imperative*

Imperative: Giving an authoritative command

this worked well for many years...

And still does

```c
#include <stdio.h>
/* Created a structure here. The name of the structure is
 * FarmAnimal.
 */
struct FarmAnimal
{
    char *breed;
    char *name;
    int age;
};
int main()
{
    /* animal is the variable of structure FarmAnimal*/
    struct FarmAnimal animal;

    /*Assigning the values of each struct member here*/
    animal.breed = "dog";
    animal.name = "Spot";
    animal.age = 7;

    /* Displaying the values of struct members */
    printf("animal breed is: %s\n", animal.breed);
    printf("animal Name is: %s\n", animal.name);
    printf("animal Age is: %d\n", animal.age);
    return 0;
}
```

So why OOP?

question: why do we avoid globals?

as programs grew,
so did complexity

enter:
Alan Kay

“I made up the term ‘object-oriented’, and I can tell you I didn’t have C++ in mind.” ~ Alan Kay, OOPSLA ‘97

The big idea was to use encapsulated mini-computers in software which communicated via message passing rather than direct data sharing — to stop breaking down programs into separate “data structures” and “procedures”.

Alan Kay

1970s: Alan Kay's SmallTalk

SmallTalk: An OOP language

```
result := myObject getAge
```

```
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```

```
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```
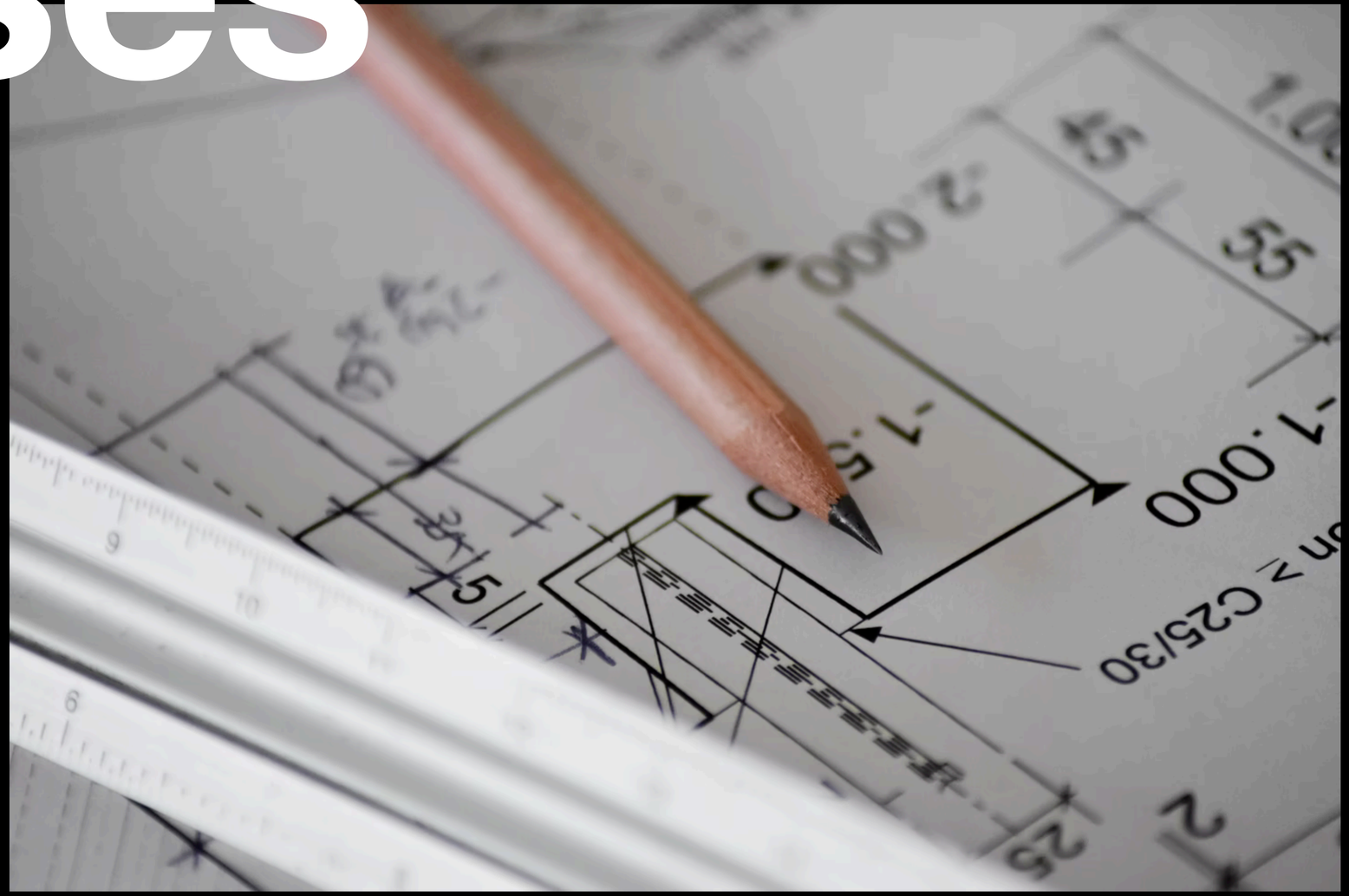

```
result := myObject getAge
```

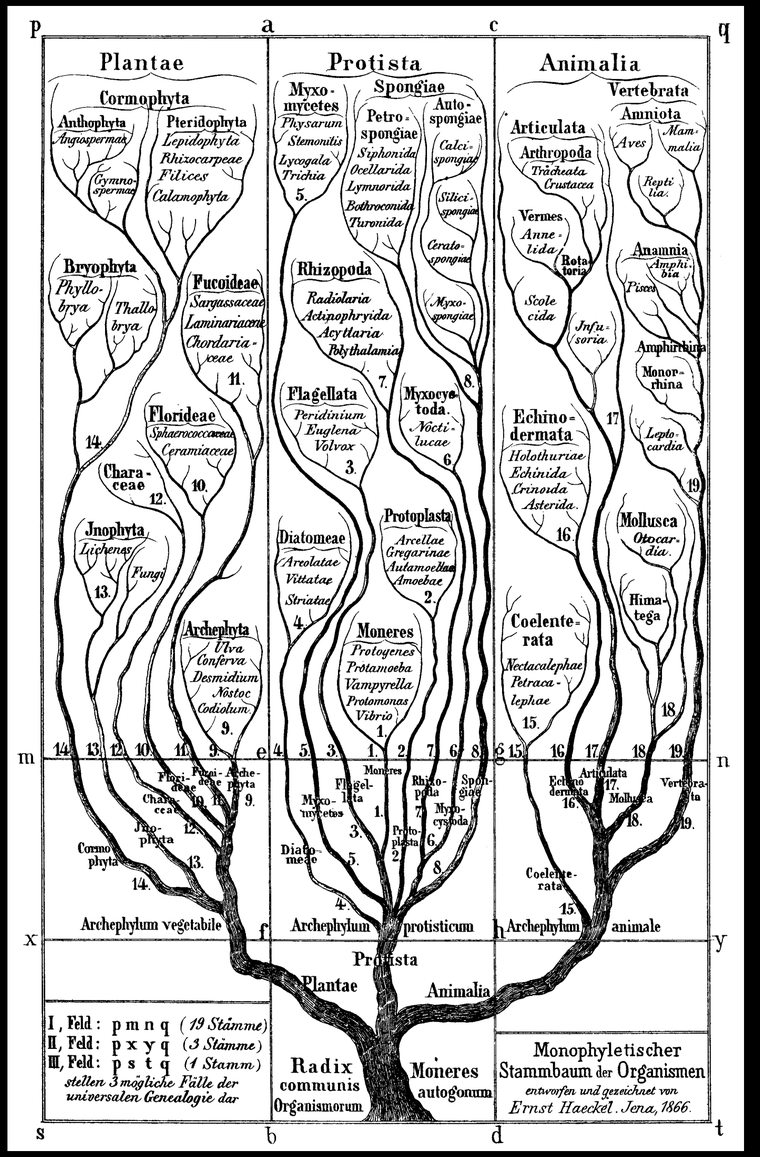
```
getAge:
    self hasAge ifTrue: [^self age].
```

OOP Concepts

Classes



Classes


Plantae
Protista
Animalia
Cormophyta
Anthophyta
Angiospermae
Gymnospermae
Pteridophyta
Lepidophyta
Rhizocarpeae
Filices
Calamophyta
Bryophyta
Phyllobrya
Thallobrya
Fucoideae
Florideae
Characeae
Jnophyta
Lichenes
Fungi
Archephyta
Ulva
Conferva
Desmidium
Nostoc
Codiolum
Myxomycetes
Physarum
Stemonitis
Lycogala
Trichia
Spongiae
Petrospongiae
Siphonida
Ocellarida
Lymnorida
Bathroconida
Turonida
Autospongiae
Calcispongiae
Silicispongiae
Ceratospongiae
Myxospongiae
Rhizopoda
Radiolaria
Actinophryida
Acyttaria
Polythalamia
Flagellata
Peridinium
Euglena
Volvox
Myxocytoda
Noctilucae
Diatomeae
Areolatae
Vittatae
Striatae
Protoplasta
Arcellae
Gregarinae
Autamoebae
Amoebae
Moneres
Protogenes
Protamoeba
Vampyrella
Protomonas
Vibrio
Vertebrata
Amniota
Aves
Mammalia
Reptilia
Anamnia
Amphibia
Pisces
Amphibiuria
Monorhina
Leptocardia
Articulata
Arthropoda
Tracheata
Crustacea
Vermes
Annelida
Rotatoria
Scolecida
Infusoria
Echinodermata
Holothuriae
Echinida
Crinoida
Asterida
Mollusca
Otocardia
Himatega
Coelenterata
Nectacalephae
Petracalephae
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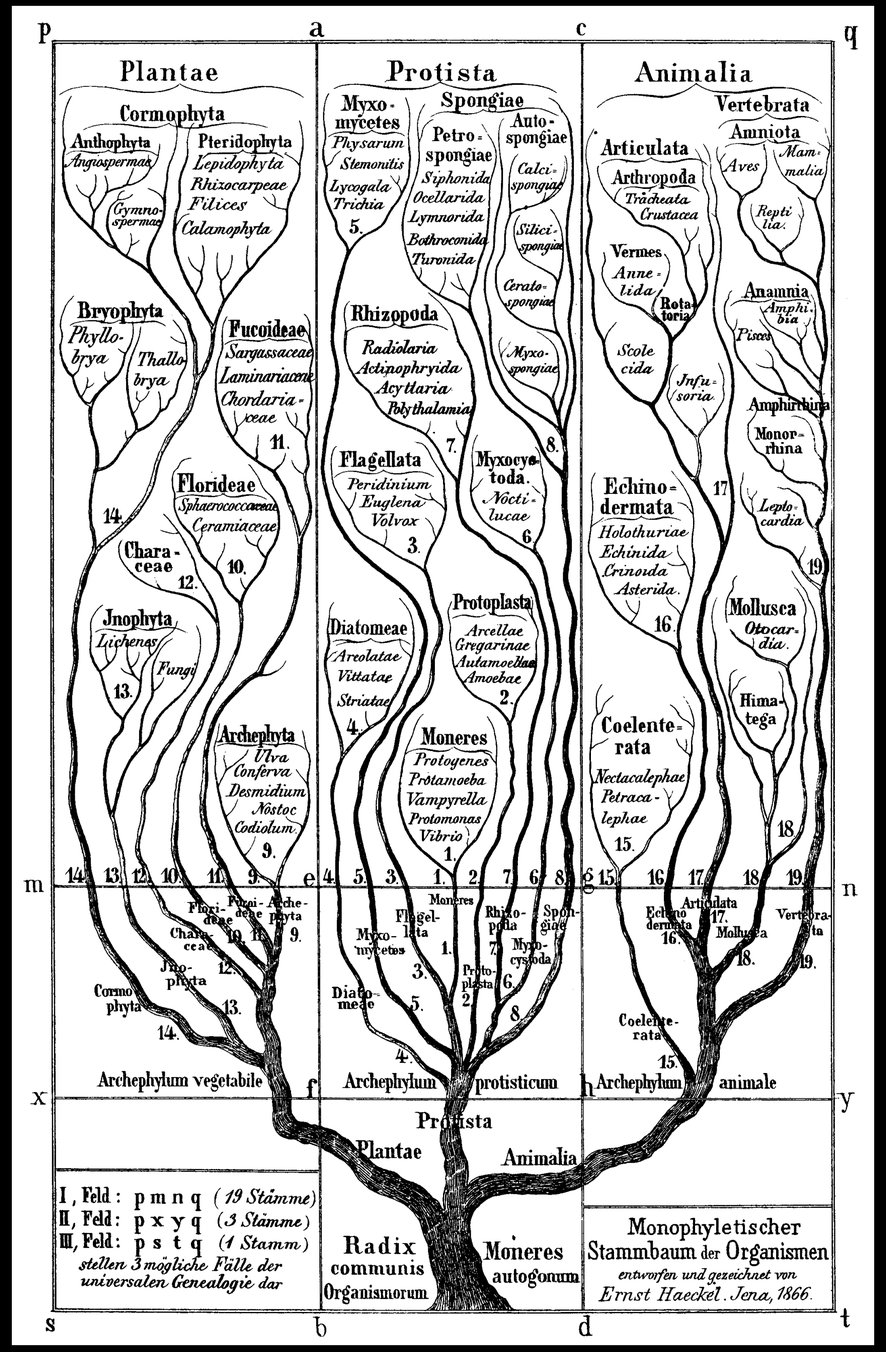
Archephylum vegetabile
Archephylum protisticum
Archephylum animale
Protista
Plantae
Animalia
Radix communis Organismorum
Moneres autogonum
I, Feld: p m n q (19 Stämme)
II, Feld: p x y q (3 Stämme)
III, Feld: p s t q (1 Stamm)
stellen 3 mögliche Fälle der universalen Genealogie dar
Monophyletischer Stammbaum der Organismen
entworfen und gezeichnet von
Ernst Haeckel. Jena, 1866.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Sargassaceae
Laminariaceae
Chordariaceae
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Florideae
Sphaerococcaceae
Ceramiaceae
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Characeae
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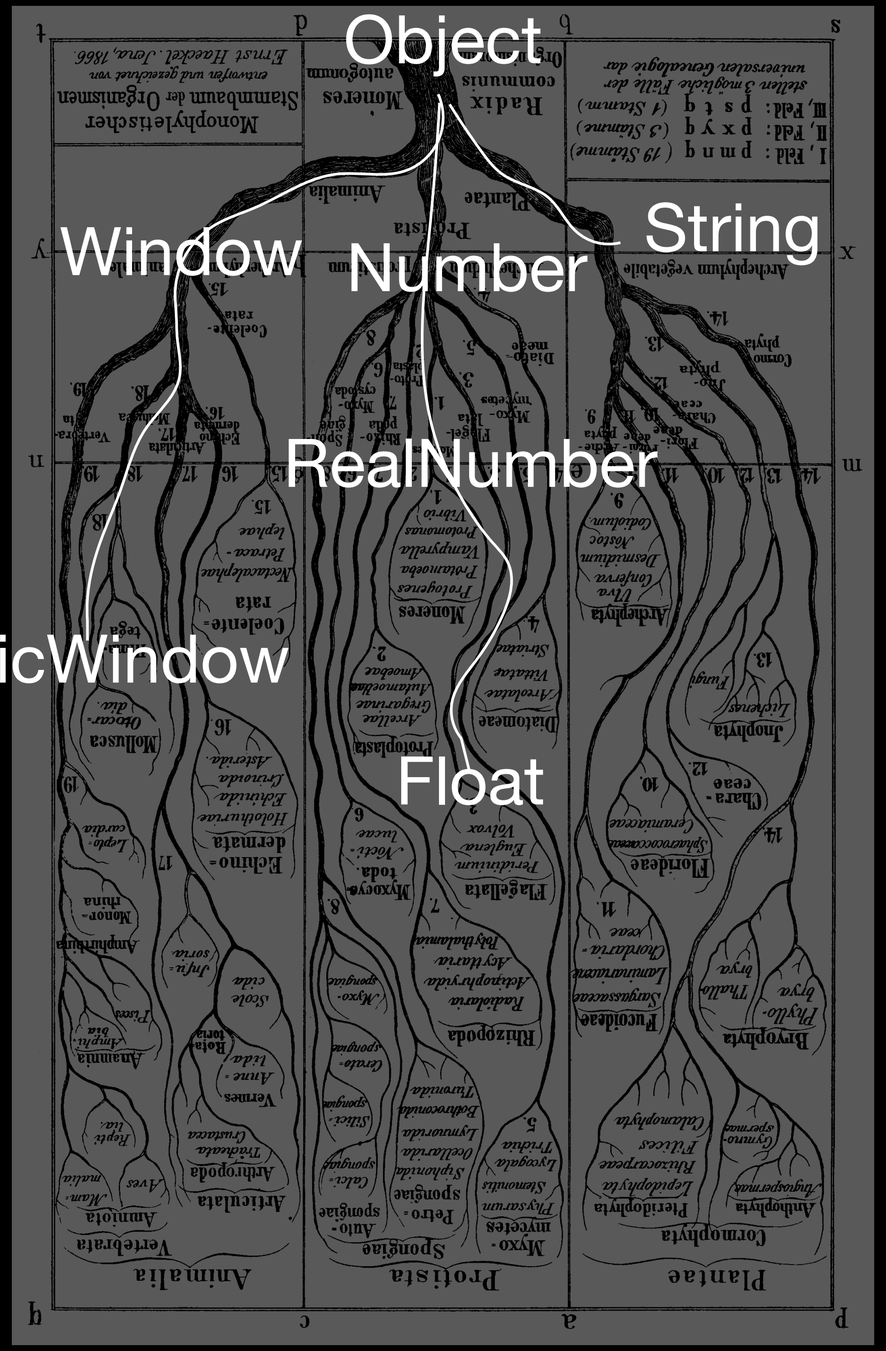
Object
String
Window
Number
RealNumber
GraphicWindow
Float

Objects

Objects

Objects know things,
and can do things

Demo