CSE 30 6-1-21

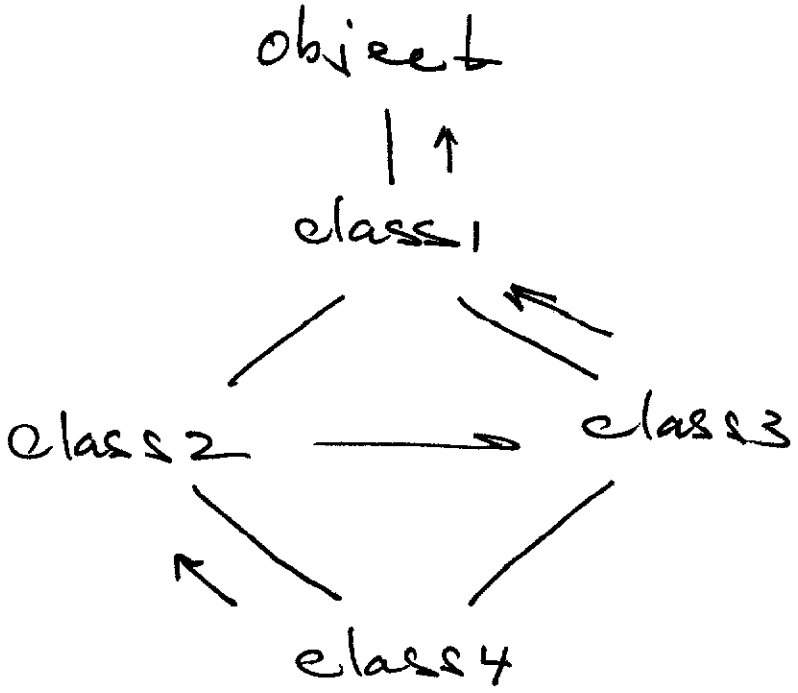
- Quizs : today
- final : Wed. June 9, 2-10 PM
- Pa6 : 1 more day → Wed.

Subclasses and Inheritance

Problem of Multiple Inheritance

if a class inherits from two parent classes, both having a method called m(), which version of m() does the class get.

Ex. MultipleInheritance.py



Built in function super() iterates over the method resolution order list for the class. the first class in the mro list having a method of the required name is the inherited.

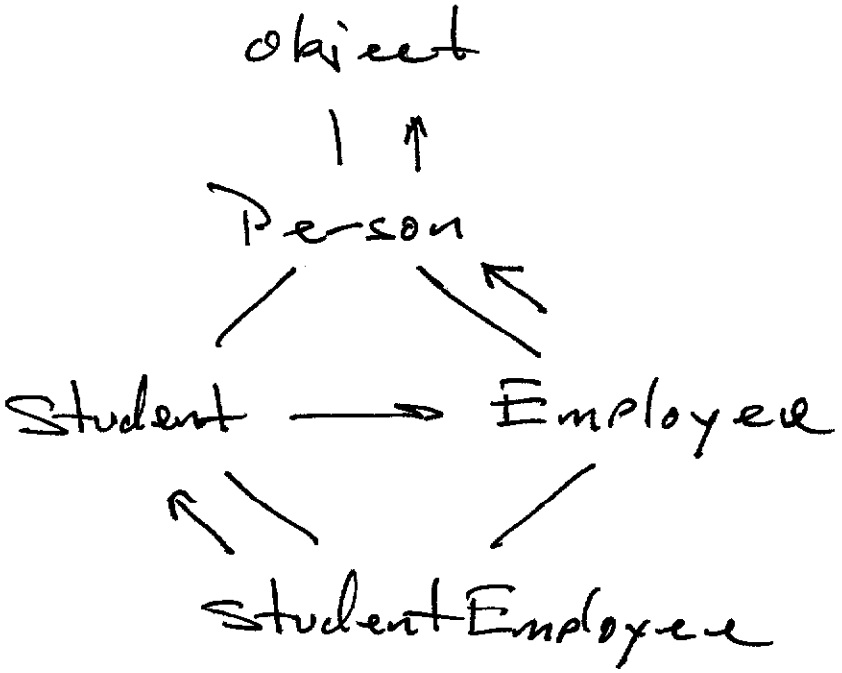
Ex for class4:

mro: class4, class2, class3 class1, object

The class 'type' has a member method called mro() which returns a list giving the method resolution order.

Back to

Ex. Person.py



A non-contrived example

Defn

A directed graph (dig-raph) is a pair of sets $G = (V, E)$ where $V \neq \emptyset$ and $E \subseteq V \times V$, i.e. a set of ordered pairs of vertices

(x, y)

(origin) $x \longrightarrow y$ (terminus)

we define:

adjacency, incidence, walk, trail, Path, cycle (closed Walk, closed trail), reachability, Path length, distance between vertices, and SSSP Problem

just as before.

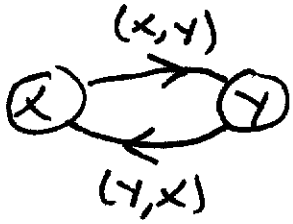
Recall: undirected:

not allowed 

" " 

$\{x,x\} = \{x\}$

But in directed case:

allowed 

" 

(x,x)

Defn

y is reachable from x iff G contains a directed x-y Path

Defn

G is called strongly connected iff for all $x, y \in V(G)$: y is reachable from x and x is reachable from y.

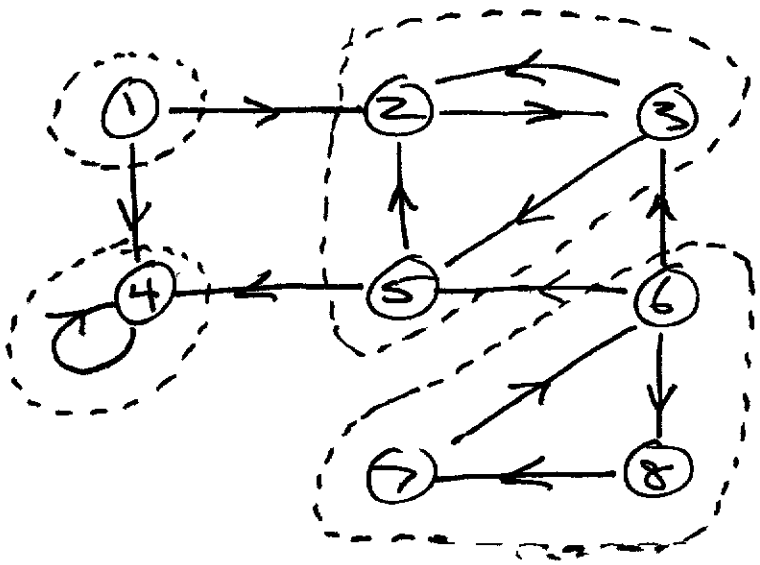
more generally, a subset $S \subseteq V(G)$ is strongly connected iff for all $x, y \in S$: x is reachable from y, and y from x.

Defn:

$S \subseteq V(G)$ is called a strongly connected component iff

(1) S is strongly connected and (2) S is maximal w.r.t. Property (1).

Ex



SCCs:

{1}

{4}

{2, 3, 5}

{6, 7, 8}

Adj list representation

	indegree	outdegree
1 : 2, 4	0	2
2 : 3	3	1
3 : 2, 5	2	2
4 : 4	3	1
5 : 2, 4	2	2
6 : 3, 5, 8	1	3
7 : 6	1	1
8 : 7	1	1

note

reachable() } run exactly same
~~BFS~~()

Exercise create a stand-alone class representing a directed graph.

Then see!

Examples/Classes/Graphs/graphs.py

new module