

Assignment 03 — 30.09.2020 – v1.0

Smalltalk: Understanding Classes and Metaclasses

Please submit this exercise by email to pascal.gadiant@inf.unibe.ch before 07. October 2020, 10:15am.

Exercise 1 – Metamodels (2.5 pts)

Answer the following questions regarding metamodels:

- i) What is a metamodel?
- ii) How are metamodels used in Pharo?
You must use the classes `Object`, `Class`, and `Metaclass` in your answer.
- iii) What are responsibilities of a metaclass in Pharo?
- iv) Where is `ProtoObject` located in Pharo's class hierarchy?
- v) What is the purpose of the class `ProtoObject`?

Exercise 2 – Sub and super classes (3 pts)

Answer the questions below. Please provide your code *and* your results.

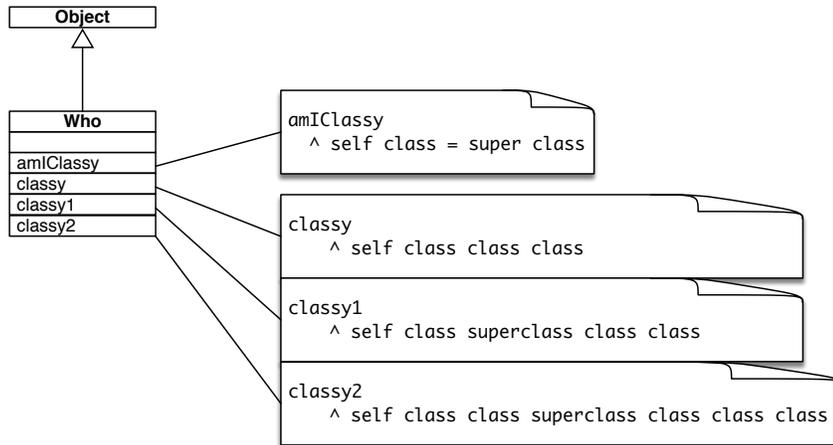
- i) How many superclasses does `Collection` have?
- ii) How many direct subclasses does `Collection` have?
- iii) How many indirect subclasses does `Collection` have?

NB: Direct subclasses are classes that extend a base class directly (e.g. relation parents to children), whereas indirect subclasses extend the direct and (recursively) indirect subclasses (e.g. relation grandparents to grandchildren).

NB: Please use a fresh copy of GT.

Please continue reading on the next page.

Exercise 3 – Class identity (3 pts)



Consider the implementation shown in the illustration.

What are the results (either `true` or `false`) of the following statements?

Explain for each statement why GT replied the corresponding result.

- a) `Who new amIClassy.`
- b) `Who new classy = Who new classy1.`
- c) `Who new classy1 = Who new classy2.`

Exercise 4 – Object instantiation (1.5 pts)

A new instance of a class is created by sending the message `new` to the respective class.

Please answer the following related questions:

- i) Where is `new` defined?
- ii) Explain Pharo's message implementation resolution strategy for the `new` message.
- iii) List the concrete code in GT finally executed by the message `new`.