

# Description of the Python code file and my observations based on the evaluation of codes on **Owlready for biomedical ontologies**

I installed the owlready2 package, and I ran two different python code blocks on two different data sets based on biomedical ontologies.

The research paper I have used as a reference for this activity can be found on this [weblink](#).

**CodeBlock1** shows a small program that uses Gene Ontology(GO).

- Line #1 imports Owlready.
- Line #2 loads GO in the “go” variable.
- Line #3 defines a namespace for accessing GO concepts. This is needed because the IRIs of GO concepts do not start with the ontology IRI.
- Line #4 uses the namespace for accessing the concept GO\_0006310.
- In order to display the entities in a more friendly manner, lines #5-9 define a rendering function. This function takes one parameter, the entity, and returns a string for displaying this entity. The function defined here generates strings of the form “ID: label”, or “ID” if no label is available. The .first() method of the list returns the first element (here, the first label), or None if the list is empty.
- Line #10 prints the concept GO\_0006310 again, and now its label appears, “DNA recombination”.
- Lines #11-14 iterate over all classes in GO, and for each class, it prints the class and its superclasses.

**CodeBlock 2** shows a more complex example with GO and illustrates the uses of Python methods in OWL classes. In GO, the cellular component hierarchy uses part of relations in addition to the subclass of relations. This example will extend the cellular component OWL class with an additional method for dealing with the part of the hierarchy. Then, it will extract the sets of all GO concepts related to the nucleus using two different methods: linguistic and semantic. Finally, it will compare the two results and verify that all GO concepts mentioning “nucleus” are indeed related to the nucleus GO concept.

The `print(linguistic - semantic)` computes and prints the set difference between linguistic and semantic. Two results are found: GO\_0071561 (nucleus-vacuole junction) and GO\_0042025 (host cell nucleus). The first one involves the junction between the nucleus and vacuole, which explains why it is not a part of the nucleus itself. The second is not the nucleus of the cell but of another cell, the host.