LDD2-Project: Session 4

Aims of this session: Saving and visualising graphs.

We are going to set up methods for saving and viewing our graphs. In the following, we suggest using the .dot (or .gv) format, but you are free to choose your own format.

The basic syntax of the .dot format is very simple. Here is an example:

```
digraph G {
v0 [label="&"];
v1 [label="~"];
v4 [label="|"];
v0 -> v1 -> v2;
v0 -> v3;
v2 -> v3;
v2 -> v3;
v3 -> v4;
v2 -> v4;
}
```

This graph can then be viewed using an appropriate tool. For example, with the command line:

```
dot -Tpdf <input_file.dot> -o <output_file.pdf>
```

If graphviz is installed on your system, you can replace the output format with png, svg, ps, ...). You can always use an online viewer, e.g.

https://dreampuf.github.io/GraphvizOnline/.

You can find out more about the .dot format here:

https://www.graphviz.org/.

Exercise 1 :
Construct a method save_as_dot_file(self, path, verbose=False), which saves the graph in question, in .dot format, at the location specified by path. You may have noticed that after you specify a label for a node, it no longer has an id. When verbose=True, we want to get both the label and the id (this simplifies the debugging).

The format allows arbitrary attributes to be given to nodes, which will simply be ignored if not recognised. It can be used to indicate whether a node is an input or an output. Adapt this method If you have decided to use another format to save the graphs.

Exercise 2:
Implement the "inverse" of the previous exercise: Construct a class method from_dot_file, which reads a .dot file and creates an open_digraph from it. Saving a graph with verbose=False and then loading it should give the same graph one started with.

Exercise 3: Create a display method (with the optional variable verbose=False), which displays the graph directly. You can use

os.system(<commandline>)

to launch the command line from python.

- If you have a way of viewing the graph via the command line, simply create the .dot file in a temporary location, create a pdf/ png/... and open it.
- If you want to use an online viewer, you can go directly to the library webbrowser (https://docs.python.org/3/library/webbrowser.html), or use the command line. For example :

firefox -url https://dreampuf.github.io/GraphvizOnline/#digraph{%0A%09v0 -> v1%3B%0A}

(Note that line breaks have disappeared (or are replaced by %0A%09) and semicolons ; are replaced by %3B).