Written by Joey See of SETH Hardware Group. Estimated install time: ~30-40 minutes

First, download the updated GNN4IP files here:
https://drive.google.com/file/d/1Ff_GfU8z4kIh2EApAeM9dEqEz-AJ9_Gm/view?usp=sharing

These are modified from the Git repository (https://github.com/AICPS/hw2vec) to solve some bugs and add functionality. This done, upload this to the server and unpack it with

```
tar -xvf gnn4ipFiles
```

It should be unpacked into a folder called h2vfiles. You can now delete the tar file if you want. Next create a conda environment with python 3.6 and activate it like so:

```
conda create --name <ENVIORNMENT_NAME> python=3.6
```

```
conda activate <ENVIORNMENT_NAME>
```

Next upload the following yaml and use to update the conda environment like so:
https://drive.google.com/file/d/1Yi_uAL8a9ziQAR8Sy4Rk6iT_PU2RtjFl/view?usp=sharing

```
conda env update --name <ENVIORNMENT_NAME>--file gnn4IPenv.yml
```

If you get an error regarding pip dependencies, try updating conda. If that doesn't work, edit the yml to remove the pip dependencies (they are near the bottom) and run it again. Then follow the following instructions as normal, and simply install the missing dependencies with pip when an issue with them pops up.

Once this is done, cd into h2vfiles/examples. You'll see a script named directPD.py. Run this with the following command:

```
python3 directPD.py --model_path ../assets/pretrained_DFG_IP_RTL/
```

This script compares the two files h2vfiles/examples/testfile1/testmodule1.v and h2vfiles/examples/testfile2/testmodule2.v by converting to graph structures and taking a cosine similarity score, which is what is returned. If this exceeds a certain threshold it is said that the circuits are pirated. Generally a score of less than 0.5 indicates a pair of files is not pirated (it is set to 0.6 by default in directPD.py), but do note that the threshold should change based on circuit; some will be recognized as similar to most circuits despite having completely different functions and others will be recognized as dissimilar to even quite similar circuits.

This is the basics of how to install and use GNN4IP. If you want to modify it/train it yourself, feel free to look at the extra documentation in the git repository linked at the start of this document. In addition, know that h2vfiles/hw2vec/config.py, h2vfiles/hw2vec/hw2graph.py, h2vfiles/graph2vec/trainers.py, and h2vfiles/graph2vec/models.py contain the bulk of the important code for GNN4IP.