

CSE 30

Programming Abstractions: Python

Programming Assignment 3

In this assignment you will create a class called `Lines` which will be placed in a file `lines.py`. Much of the work is already done in the template `lines_stub.py` which is posted at

https://classes.soe.ucsc.edu/cse030/Spring21/Examples/pa3/lines_stub.py

The `Line` class provides an abstract representation of a line in the x - y coordinate plane. Included in the above stub is the `Point` class presented in the `geometry.py` example, also posted on the class webpage. Your task is fill in the definitions of the methods (10 in all) belonging to the `Line` class, and add one new method to the `Point` class.

The `Line` class represents a line in the plane by maintaining two attributes: a `Point` object representing a point on the line, and a numeric value giving its slope. The obvious names for these attributes are *point* and *slope* respectively, which is what I will use in this document, but you can give them any names you like. One logical problem encountered with this representation is dealing with vertical lines, i.e. lines that have no numerical value as slope. Such lines are often said to have "infinite slope" in Geometry textbooks. We will handle this situation by setting the *slope* attribute, which is normally a number, to be the string `'infinity'`. This choice will create some special cases in the design of several required functions.

Included in the above template is the correct output of the `main()` function. If your function definitions are adequate, the output will match the quoted output exactly. However, `main()` should not be considered a complete test of all of the required functions. As always, you should thoroughly test every logical pathway within every function you design, making sure that it adheres to its specification. To do this testing, you may alter `main()` temporarily, but be sure to return it to its original state before you submit the file.

Once all coding and testing are complete, change the name of the file from `lines_stub.py` to `lines.py` and submit it to Gradescope before the due date. As always get help early.