**Smell detection**

Name: <large class>

Location: <assignment1>‐<fileHandler.py>‐<PrintClass>-<between Line 8 and 185>

Reasons:

1. this class has 185 lines

2. this class do more than one things, including reading file, extracting data, getting the output format and writing the files.

Strategies/ approaches: <extract class>

Name: <large method>

Location: <assignment1>‐<fileHandler.py>‐<PrintClass>-<output\_class>-<between Line 136 and 167>

Reasons:

1. this method has 31 lines.

2. this class do more than one things, including setting the output format for class name, attribute and method, and extracting the class name, attribute name, method name.

Strategies/ approaches: <extract method>

Name: < switch statements >

Location: <assignment1>‐<command.py>‐<Command>-<do\_display>-<between Line 45 and 57>

Reasons:

1. it has a sequence of if statements which are “/a”, “/p”, “/l”

Strategies/ approaches: <extract method>

**Refactoring**

1. The worst bad smell: large class (PrintClass)

Why: it takes 185 lines, having the greatest effects on the program.

Steps of refactoring:

I identified the responsibilities of PrintClass and divided this class into several classes based on the different responsibilities. Particularly, FileReader should only read files and write files, and ClassMaker should handle the class data and set the output format of class, AttributeMaker should handle the attribute data and set the output format of attribute, MethodMaker should handle the method data and set the output format of method, and RelationshipMaker should identify the different types of relationships and set the output format of relationship.

Evaluations:

The bad smell has been removed successfully and classes are much easier to read. Moreover, when I refactored this bad smell, I also deal with the second bad smell, which is large method. However, another bad smell was created, which is switch statements (in RelationshipMaker class, identify\_relationship\_type method).

1. The second bad smell: long method (output\_class method)

Why: it takes 31 lines.

Steps of refactoring:

Create AttributeMaker, MethodMaker classes

Use add\_class\_attributes and add\_class\_methods methods in ClassMaker to get the attribute names and method names.

Use \_\_str\_\_ in AttributeMaker, MethodMaker to set the output format of attribute and method

In ClassMaker, use print\_class method to get the format of the output file.

Evaluation:

This bad smell is removed successfully. These methods are doing one different thing respectively. No other bad smell is created.

1. The third bad smell: switch statements (in RelationshipMaker class, identify\_relationship\_type method)

Why: it takes 13 lines.

Steps:

Create relationship\_type\_dictionary method to create a dictionary for a sequence of if statements

Replace the if statement by using the dictionary

Evaluation:

This bad smell is removed successfully and the code becomes better since I only need to add new keys and values in the dictionary if there are new if statements.