BCED321 Advanced Programming

Assessment Two

Practical Assessment 2

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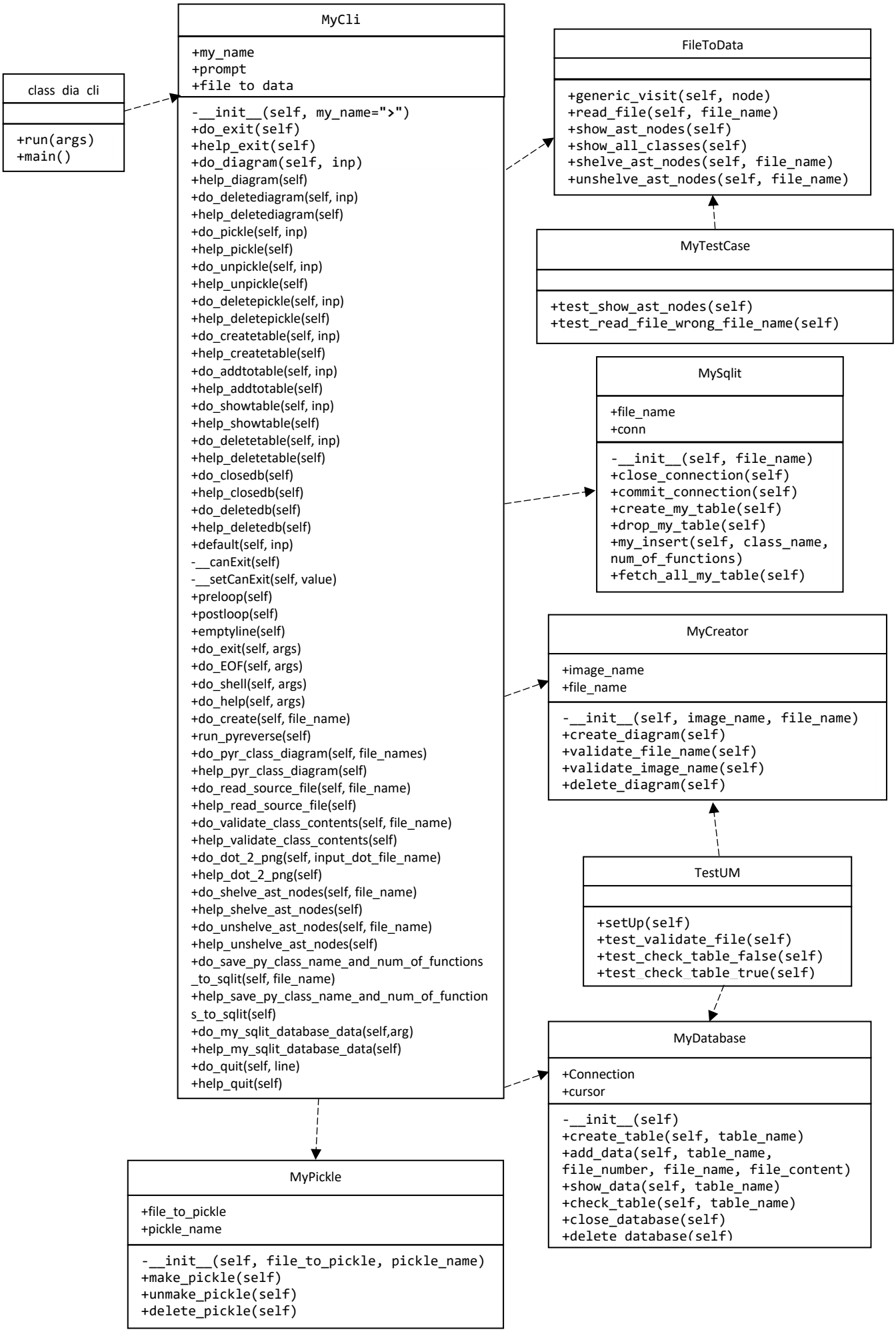
1 Class Diagram



2 Matthew's help file details

Command	Help
Diagram [inp]	Create a class diagram. Enter file location of py/dot file, then enter name/type of image.
Deletediagram [inp]	Deletes a diagram
Pickle [inp]	pickle [filename], enter file to pickle then the name of the pickle file
Unpickle [inp]	unpickle [picklefilename], enter the name of a text file that has been pickled
Deletepickle [inp]	Deletes a pickle file
Createtable [inp]	createtable [TABLE_NAME], creates a table with: file_number INTEGER PRIMARY KEY, file_name VARCHAR(30),' 'file_content VARCHAR(999)
Addtotable [inp]	addtotable [TABLE_NAME], adds data to specified table
Showtable [inp]	showtable [TABLE_NAME], shows data held within specified table
Deletetable [inp]	deletetable [TABLE_NAME], deletes specified table
closedb	Closes current open database
deletedb	Deletes current database
default	Appears when an incorrect command is input

3 John's help file details

4 Harry's help file details

1) python class_dia_cli.py --help (in the system command line)

   usage: class_dia_cli.py [-h] [-l LETTER]

   This is a program going to a CLI to generate UML class diagram from Source

   Codes

   optional arguments:

   -h, --help show this help message and exit

   -l LETTER optional: give a letter displaced at the beginning of each

   command line. If user enter a string, only first character will

   be shown.

2) >>>>> help pyr_class_diagram (in the line-oriented command interpreter)

   Generate and display a class diagram in png format from a given python file

   Syntax: pyr_class_diagram [output png file name suffix] [input source code file name.py])

3) >>>>> help read_source_file (in the line-oriented command interpreter)

   Extract data from the given python file to be an ast node

   Syntax: read_source_file [input source code file name.py]

4) >>>>> help validate_class_contents (in the line-oriented command interpreter)

   Validate, list and display class names, function names and the total numbers of them in the given python file.

   Class and function names are displayed in command line.

Total numbers of classes and functions are displayed in a bar graph.

Syntax: validate_class_contents [input source code file name.py].

5) >>>>> help dot_2_png (in the line-oriented command interpreter)

Generate and display png file from the given dot file.

Syntax: dot_2_png [input dot file name.dot].

6) >>>>> help shelve_ast_nodes (in the line-oriented command interpreter)

This function extracts data from the given python file to be an ast node and stores the node in files using shelve.

The files are given_file_name.py.db.bak, given_file_name.py.db.dat and given_file_name.py.db.dir.

The given file name should be [py_file_name.py]. The node will display as an indication of shelve done

Syntax: shelve_ast_nodes [input source code file name.py].

7) >>>>> help unshelve_ast_nodes (in the line-oriented command interpreter)

This function retrieves data from the given shelved db file which stored an ast node by using shelve_ast_nodes command.

The given file name should have three corresponding files stored in the current directory.

The three files are given_file_name.py.db.bak, given_file_name.py.db.dat and given_file_name.py.db.dir.

The given file name should be [a_name.py.db]. The node will display as an indication of unshelve done

Syntax: unshelve_ast_nodes [a_name.py.db].

8) >>>>> help quit (in the line-oriented command interpreter)

Quit from this CLI

:return: True

5 Lists of Matthew's own work, self-reflection on robustness, and self-reflection on the completeness and implement

	Component	Location	Used by your peers (2 mark)	Robustness (2 mark)	Complete and well implemented, i.e., "What is clever about this?" (2 mark)	Marks
1	Support command-line arguments	Lines 27-134 in my_cli.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6
2	Has a line-oriented command interpreter	Lines 27-134 in my_cli.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6

	based on cmd or similar package					
3	Display command line help of available commands	Lines 27-134 in my_cli.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. All commands have a help command associated with them. Code follows pep8 guidelines and is Pythonic.	6
4	Change commands and options	Lines 27-134 in my_cli.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. All commands have a help command associated with them that can be accessed by typing ? [COMMAND]. Code follows pep8 guidelines and is Pythonic	6
5	Extract data	Lines 11-15 in PickleMaker.py and Line 14 in DiagramCreator.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Data is extracted using Pickle. Code follows pep8 guidelines and is Pythonic	6
6	Validate data	Lines 88-94 in my_cli.py and 17-24 in DiagramCreator.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6
7	Provides object persistence / object serialization using either pickle or shelve	PickleMaker.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6
8	Can load data from a file	Lines 11-15 in PickleMaker.py and Lines 11 to 15 in DiagramCreator.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6
9	Can deal with file directory	PickleMaker.py and DiagramCreator.py	2 marks	1 mark. Some errors when creating a diagram in DiagramCreator.py due to it forcing a “classes.” Prefix.	2 marks. Code follows pep8 guidelines and is Pythonic	5
10	Can raise exceptions and provide exception handling	Lines 88-94 in my_cli.py and 17-24 in DiagramCreator.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6
11	Amount of checking for	Lines 17-24 in DiagramCreator.py	2 marks	2 marks. Encounters no	2 marks. Function in SQLDatabase.py	6

	pre- and post-conditions of methods	and 63-69 in SQLDatabase.py		unhandled exceptions	checks that the table exists before allowing the code to process. Code in DiagramCreator.py checks that files exist before processing. Code follows pep8 guidelines and is Pythonic	
12	Provide doctests	MattDoctests.py	2 marks	2 marks. All tests pass	2 marks. 21 tests total.	6
13	Provide unittests	MattUnittests.py	2 marks	1 mark. All tests pass, but only 3 tests	1 mark. Only 3 tests	4
14	Pretty print, i.e., displaying data in chart/ diagram, e.g., bar chart, pie chart, UML diagram, etc	DiagramCreator.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code creates a class diagram. Code follows pep8 guidelines and is Pythonic	6
15	Can save and read data from a database, e.g., SQLite, MySQL and MongoDB	SQLDatabase.py	2 marks	2 marks. Encounters no unhandled exceptions	2 marks. Code follows pep8 guidelines and is Pythonic	6

6 List of John's own work, self-reflection on robustness, and self-reflection on the completeness and implement

7 List of Harry's own work, self-reflection on robustness, and self-reflection on the completeness and implement

1. Support command-line arguments
   1.1. Used by peers
   - File: class_dia_cli.py. I did the three functions below:
     - def run(args):
     - def main():
     - if __name__ == '__main__': (note that: this is an entry point of the whole program)

   1.2. Robustness
   - If user inputs wrong flag, my program will tell the user that the input was wrong as show below

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -s
usage: class_dia_cli.py [-h] [-l LETTER]
class_dia_cli.py: error: unrecognized arguments: -s
```

- There is exception handling as shown below. If there are any errors, the program will ask the user try again.

```python
# Harry's work
def run(args):
    my_cli = MyCli(args.letter[0])
    try:
        my_cli.cmdloop()
    except Exception as err:
        print("Please try again! The exception is: ", err)
```

1.3. Complete and well implemented
- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are two blank lines between functions.

2. Has a line-oriented command interpreter based on cmd or similar package

2.1. Used by peers
- File: my_cli.py. I did the functions below:
  - def __init__(self, my_name=">"):
  - def do_pyr_class_diagram(self, file_names):
  - def help_pyr_class_diagram(self):
  - def do_read_source_file(self, file_name):
  - def help_read_source_file(self):
  - def do_validate_class_contents(self, file_name):
  - def help_validate_class_contents(self):
  - def do_dot_2_png(self, input_dot_file_name):
  - def help_dot_2_png(self):
  - def do_quit(self, line):
  - def help_quit(self):
  - if __name__ == '__main__': (for manual testing only)
- File: file_to_data.py. It is used by my_cli.py. I did the functions below:
  - def generic_visit(self, node):
  - def read_file(self, file_name):
  - def show_ast_nodes(self):
  - def show_all_classes(self):
  - if __name__ == "__main__": (for doctects and manual testing)

2.2. Robustness
- If the file, which user inputs into “def do_pyr_class_diagram(self, file_names):” function, does not exist, my program will tell the user that Your given python file does not exist in the current directory or your input arguments were wrong. The input arguments should be [png_file_name_suffix py_file_name.py]. Please try again! The screenshot is shown below:

```
>>>>> pyr_class_diagram diagram tes
Your given python file does not exist in the current directory or you
>>>>>
```

- There is exception handling as shown below. If there are any errors, the program will ask the user try again.

```python
    # Harry's work
    def do_pyr_class_diagram(self, file_names):
        """Generate a class diagram in png format from given [png_file_name_suffix py_file_name.py]"""
        self.file_names = file_names
        python_file_name = file_names[(file_names.find(" ")+1):]
        try:
            if path.exists(python_file_name):
                pyreverse_command = 'pyreverse -ASmn -o png -p ' + file_names
                subprocess.call(pyreverse_command)
                print(file_names + ' are done')
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The input arguments "
                      "should be [png_file_name_suffix py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

2.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

3. Display command line help of available commands

3.1. Used by peers

- File: class_dia_cli.py and my_cli.py. Both files have the command line help as shown below:
  - For class_dia_cli.py, an example of the help function is below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -h
usage: class_dia_cli.py [-h] [-l LETTER]

This is a program going to a CLI to generate UML class diagram from Source
Codes

optional arguments:
  -h, --help  show this help message and exit
  -l LETTER   optional: give a letter displaced at the beginning of each
              command line. If user enter a string, only first character will
              be shown.

C:\Users\harry\Documents\BCDE321Ass2>
```

  - For my_cli.py, two examples of the help functions are below:

```
>>>>> help

Documented commands (type help <topic>):
========================================
displayallclasses       help               quit
displaysourcefilenodes  pyr_class_diagram  readsourcefile

Undocumented commands:
======================
dot_2_png

>>>>> help pyr_class_diagram
Generate a class diagram in png format from a given python file
Syntax: pyr_class_diagram [output png file name suffix] [input source code file name.py])
>>>>>
```

3.2. Robustness

- File: class_dia_cli.py and my_cli.py. They both have exception handling as shown below.
  - For class_dia_cli.py, my program will tell the user to use -h or - -help for help if the user used a wrong flag for help as shown below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -hela
usage: class_dia_cli.py [-h] [-l LETTER]
class_dia_cli.py: error: argument -h/--help: ignored explicit argument 'ela'
```

  - For my_cli.py, my program will tell the user that no help on the command which does not exist or was wrongly spelled as shown below:

```
>>>>> help pyr_class_diagra
*** No help on pyr_class_diagra
>>>>> help wrong_command
*** No help on wrong_command
>>>>>
```

3.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

4. Change commands and options

4.1. Used by peers

- File: my_cli.py. It can change options as shown below:
  - There are three options: (i) -h or - -help flap for help; (ii) -l flap for adding a letter at the prompt as shown below (e.g. giving -l v flag will get the prompt of >>v>>); (iii) no flap for having a >>>>> prompt)

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -h
usage: class_dia_cli.py [-h] [-l LETTER]

This is a program going to a CLI to generate UML class diagram from Source
Codes

optional arguments:
  -h, --help  show this help message and exit
  -l LETTER   optional: give a letter displaced at the beginning of each
              command line. If user enter a string, only first character will
              be shown.

C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -l v
>>v>> quit
Quitting......

C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py
>>>>>
```

- For my_cli.py, there are more than one commands. An example of change commands (pyr_class_diagram and read_source_file commons) is below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py
>>>>> pyr_class_diagram trial test.py
parsing test.py...
trial test.py are done
>>>>> read_source_file test.py
The ast nodes below has been read from the given python file, test.py:
Module(body=[ClassDef(name='Car', bases=[], keywords=[], body=[FunctionDef(
one, kwonlyargs=[], kw_defaults=[], kwarg=None, defaults=[]), body=[Assign(
```

4.2. Robustness

- File: class_dia_cli.py and my_cli.py. They both have exception handling as shown below.
  - For class_dia_cli.py, my program will tell the user what options (i.e. flags) are available if the user used a wrong option (i.e. wrong flag) which is not available as shown below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py -wrongFlag
usage: class_dia_cli.py [-h] [-l LETTER]
class_dia_cli.py: error: unrecognized arguments: -wrongFlag
```

  - For my_cli.py, my program will tell the user if the user used a wrong function or a wrong argument as shown below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py
>>>>> read_source_fil
*** Unknown syntax: read_source_fil
>>>>> read_source_file
Your given python file does not exist in the current directory
or your input arguments were wrong. The input arguments
should be [py_file_name.py].
Please try again!
>>>>> read_source_file te.py
Your given python file does not exist in the current directory
or your input arguments were wrong. The input arguments
should be [py_file_name.py].
Please try again!
>>>>>
```

4.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

5. Extract data

5.1. Data can be extracted from a python file through the def read_file(self, file_name): function in class FileToData(ast.NodeVisitor): in file_to_data.py. This read_file function is used by few functions in the my_cli.py, for example def do_read_source_file(self, file_name):. The codes of the two functions are shown below:

file_to_data.py | ast.py | exampledot.dot | classes_test.png | my_cli.py | CommandLine.py | Test

```python
    # Harry's work
    def read_file(self, file_name):
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)

```

my_cli.py | file_to_data.py | ast.py | exampledot.dot | classes_test.png | CommandLine.py | TestClass.py

```python
    # Harry's work
    def do_read_source_file(self, file_name):
        """This function extract data from the given python file to be an ast node.
        The file name should be [py_file_name.py]. The node will display as an indication of extraction"""
        try:
            if path.exists(file_name):
                self.file_to_data.read_file(file_name)
                print("The ast nodes below has been read from the given python file, " + file_name + ":")
                self.file_to_data.show_ast_nodes()
            else:
                print("Your given python file does not exist in the current directory ")
                print("or your input arguments were wrong. The input arguments ")
                print("should be [py_file_name.py]. ")
                print("Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)

```

5.2. Robustness

- Both aforementioned def read_file(self, file_name): and def do_read_source_file(self, file_name): functions have exception handling which checks if the file exists or not and if there is error or not. My program will tell the users if file does not exist in current directory or there are errors as shown in the codes at item 5.1 above.

5.3. Complete and well implemented

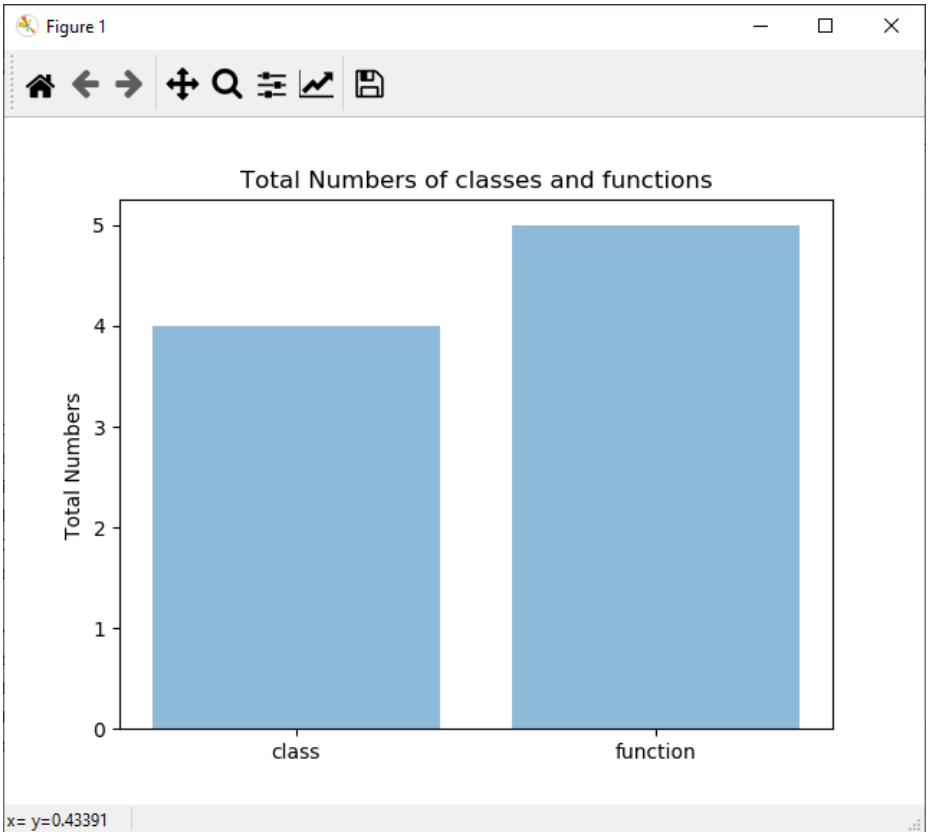
- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

6. Validate data

6.1. Used by peers

- File: my_cli.py. The def do_validate_class_contents(self, file_name): function validates class names, function names and the total numbers of them in the given python file, and display them in command lines and a graph as below:

```
C:\Users\harry\Documents\BCDE321Ass2>python class_dia_cli.py
>>>>> validate_class_contents test.py
---There are 4 classes.-------------------
-----The classes are: -------------------
-------Car class
-------Door class
-------Wheel class
-------Taxi class
---------The Car class has 2 functions
-----------The functions in Car class are
---------------__init__ function
---------------is_sold function
---------The Door class has 1 functions
-----------The functions in Door class are
---------------__init__ function
---------The Wheel class has 1 functions
-----------The functions in Wheel class are
---------------__init__ function
---------The Taxi class has 1 functions
-----------The functions in Taxi class are
---------------__init__ function
total number of classes is 4
total number of functions is 5
```



6.2. Robustness

- The def do_validate_class_contents(self, file_name): function has exception handling which checks if the file exists or not and if there is error or not. My program will tell the users if file does not exist in current directory or there are errors as shown in the codes below. There are "try" and "if path.exists(file_name)".

```
t.py × my_cli.py × test.py × trial.py × file_to_data.py × class_dia_cli.py ×
# Harry's work
def do_validate_class_contents(self, file_name):
    """Validate, list and display class names, function names and the total numbers of them
    in the given python file. Class and function names are displayed in command line.
    Total numbers of classes and functions are displayed in a bar graph.
    Syntax: validate_class_contents [input source code file name.py]"""

    # sample: validate_class_contents test.py
    num_of_classes = 0
    num_of_functions = 0
    try:
        if path.exists(file_name):
            self.file_to_data.read_file(file_name)
            num_of_classes = len(self.file_to_data.tree.body)
            print("---There are " + str(num_of_classes) + " classes.-------------------")
            print("-----The classes are: -------------------")
            for my_class in self.file_to_data.tree.body:
                print("-------" + my_class.name + " class")
            for my_class in self.file_to_data.tree.body:
                print("---------The " + my_class.name + " class has " + str(len(my_class.body)) + " functions")
                num_of_functions += len(my_class.body)
                print("-----------The functions in " + my_class.name + " class are ")
                for my_function in my_class.body:
                    print("---------------" + my_function.name + " function")
            print("total number of classes is " + str(num_of_classes))
            print("total number of functions is " + str(num_of_functions))
            # for my_function in my_class.body:
Cli › do_validate_class_contents() › try › if path.exists(file_name)
```

6.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.

- ➢ There are either one or two blank lines between code blocks according to PEP8.

7. Provides object-persistence / object serialization using either pickle or shelve

7.1. Used by peers

- shelve_ast_nodes and unshelve_ast_nodes commands in my_cli.py file can be used by peers. The commands used shelve to store and retrieve an ast node in and from a specific db file.

7.2. Robustness

- Those commands call def shelve_ast_nodes(self, file_name): and def unshelve_ast_nodes(self, file_name): in file_to_data.py. They have exception handling as shown below:

file_to_data.py | PickleMaker.py | class_dia_cli.py | my_cli.py | .githint

```python
        #     print(len(tree.body)) # show 4 classes

    # Harry's work
    def shelve_ast_nodes(self, file_name):
        db_file_name = file_name + ".db"
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
                try:
                    shelve_tree = shelve.open(db_file_name)
                    shelve_tree[db_file_name] = self.tree
                except Exception as err:
                    print("Please try again! The exception is: ", err)
                finally:
                    shelve_tree.close()
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)

    # Harry's work
    def unshelve_ast_nodes(self, file_name):
        try:
            unshelve_object = shelve.open(file_name)
            self.tree = unshelve_object[file_name]
        except Exception as err:
            print("Please try again! The exception is: ", err)
        finally:
            unshelve_object.close()
```

7.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - ➢ The code meets the naming convention of PEP 8.
  - ➢ There are either one or two blank lines between code blocks according to PEP8.

8. Can load data from a file

8.1. Used by peers

- File: file_to_data.py. Data can be loaded from a python file through the def read_file(self, file_name): function as shown below in class FileToData(ast.NodeVisitor): in file_to_data.py file. This read file function is used by do_read_source_file(self, file_name): function, def do_validate_class_contents(self, file_name): function, and def do_validate_class_contents(self, file_name): function in my_cli.py file.

```
file_to_data.py   my_cli.py   DiagramCreator.py   trial4.py   trial5.py   trial.py

    # Harry's work
    def read_file(self, file_name):
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

8.2. Robustness

- The aforementioned def read_file(self, file_name): have exception handling which checks if the file exists or not and if there is error or not. My program will tell the users if file does not exist in current directory or there are errors as shown in the codes at item 8.1 above.

8.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

9. Can deal with file directory

9.1. Used by peers

- File: file_to_data.py. The path.exists() function is used in def read_file(self, file_name): function to check if the given file is in the current file directory or not. The program will tell the user if the file is not in the current file directory. The corresponding code is below:

```
file_to_data.py   my_cli.py   DiagramCreator.py   trial4.py   trial5.py   trial.py

    # Harry's work
    def read_file(self, file_name):
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

9.2. Robustness

- The aforementioned path.exists() function is for exception handling which checks if the file is in current file directory or not. My program will tell the users if the current directory does not have the file.

9.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

10. Can raise exceptions and provide exception handling

10.1. Used by peers

- I have provided exception handling in different parts of the codes. Few examples only (not all) are given below:
  - def run(args): function in class_dia_cli.py as shown below:

class_dia_cli.py | file_to_data.py | my_cli.py

```python
# Harry's work
def run(args):
    my_cli = MyCli(args.letter[0])
    try:
        my_cli.cmdloop()
    except Exception as err:
        print("Please try again! The exception is: ", err)

```

  - def read_file(self, file_name): function in file_to_data.py as shown below:

file_to_data.py | class_dia_cli.py | my_cli.py

```python
    # Harry's work
    def read_file(self, file_name):
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

  - def do_pyr_class_diagram(self, file_names):: function in my_cli.py as shown below:

my_cli.py | file_to_data.py | class_dia_cli.py

```python
    # Harry's work
    def do_pyr_class_diagram(self, file_names):
        """Generate and display a class diagram in png format from given [png_file_name_suffix py_file_name.py]"""
        self.file_names = file_names
        python_file_name = file_names[(file_names.find(" ") + 1):]
        png_file_name = 'classes_' + file_names[0:(file_names.find(" "))] + '.png'
        try:
            if path.exists(python_file_name):
                pyreverse_command = 'pyreverse -ASmn -o png -p ' + file_names
                subprocess.call(pyreverse_command)
                print(file_names + ' are done')

                if path.exists(png_file_name):
                    # show png image
                    img = mpimg.imread(png_file_name)
                    fig = plt.imshow(img)
                    fig.axes.get_xaxis().set_visible(False)
                    fig.axes.get_yaxis().set_visible(False)
                    plt.show()
                else:
                    print("The image of class diagram cannot be generate.")
                    print("Please check with your system administrators.")
            else:
```

MyCli › do_pyr_class_diagram()

  - def do_read_source_file(self, file_names): function in my_cli.py as shown below:

```python
    # Harry's work
    def do_read_source_file(self, file_name):
        """This function extract data from the given python file to be an ast node.
        The file name should be [py_file_name.py]. The node will display as an indication of extraction"""
        try:
            if path.exists(file_name):
                self.file_to_data.read_file(file_name)
                print("The ast nodes below has been read from the given python file, " + file_name + ":")
                self.file_to_data.show_ast_nodes()
            else:
                print("Your given python file does not exist in the current directory ")
                print("or your input arguments were wrong. The input arguments ")
                print("should be [py_file_name.py]. ")
                print("Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

- def do_validate_class_contents(self, file_name): function in my_cli.py as shown below:

```python
    # Harry's work
    def do_validate_class_contents(self, file_name):
        """Validate, list and display class names, function names and the total numbers of them
        in the given python file. Class and function names are displayed in command line.
        Total numbers of classes and functions are displayed in a bar graph.
        Syntax: validate_class_contents [input source code file name.py]"""

        # sample: validate_class_contents test.py
        num_of_classes = 0
        num_of_functions = 0
        try:
            if path.exists(file_name):
                self.file_to_data.read_file(file_name)
                num_of_classes = len(self.file_to_data.tree.body)
                print("---There are " + str(num_of_classes) + " classes.-------------------")
                print("-----The classes are: -------------------")
                for my_class in self.file_to_data.tree.body:
                    print("-------" + my_class.name + " class")
                for my_class in self.file_to_data.tree.body:
                    print("---------The " + my_class.name + " class has " + str(len(my_class.body)) + " functions")
                    num_of_functions += len(my_class.body)
                    print("-----------The functions in " + my_class.name + " class are ")
                    for my_function in my_class.body:
```

- def do_dot_2_png(self, input_dot_file_name): function in my_cli.py as shown below:

```python
    # Harry's work
    def do_dot_2_png(self, input_dot_file_name):
        """Generate and display png file from the given dot file.
        Syntax: dot_2_png [input dot file name.dot]"""
        try:
            if path.exists(input_dot_file_name):
                dot_command = 'dot -Tpng ' + input_dot_file_name + ' -o ' + input_dot_file_name + '.png'
                subprocess.call(dot_command)
                print(input_dot_file_name + '.png ' + ' are done')
                png_file_name = input_dot_file_name+".png"
                if path.exists(png_file_name):
                    # show png image
                    img = mpimg.imread(png_file_name)
                    fig = plt.imshow(img)
                    fig.axes.get_xaxis().set_visible(False)
                    fig.axes.get_yaxis().set_visible(False)
                    plt.show()
                else:
                    print("The image of class diagram cannot be generate.")
                    print("Please check with your system administrators.")
            else:
                print("Your given dot file does not exist in the current directory ")
                print("or your input arguments were wrong. The input arguments ")
```

10.2. Robustness

- The aforementioned functions have exception handling which checks if there is error or not. My program will tell the users if error.

10.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

11. Amount of checking for pre- and post- conditions of methods

11.1. Used by peers

- Flies: file_to_data.py and my_cli.py.
  - The def read_file(self, file_name): function as shown below in file_to_data.py has check pre-condition which checks if the required file exists in the current directory before the file is opened.

```
file_to_data.py   my_cli.py   class_dia_cli.py
    # Harry's work
    def read_file(self, file_name):
        try:
            if path.exists(file_name):
                with open(file_name, "r") as source:
                    self.tree = ast.parse(source.read())
            else:
                print("Your given python file does not exist in the current directory "
                      "or your input arguments were wrong. The file name "
                      "should be [py_file_name.py]. "
                      "Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

  - The def do_pyr_class_diagram(self, file_names): function as shown below in my_cli.py has check both pre- and post- conditions which checks if both the required input file and the output file respectively as show below exist in the current directory before the files are opened.

```
my_cli.py   file_to_data.py   class_dia_cli.py
BCDE321Ass2 sts
    # Harry's work
    def do_pyr_class_diagram(self, file_names):
        """Generate and display a class diagram in png format from given [png_file_n
        self.file_names = file_names
        python_file_name = file_names[(file_names.find(" ") + 1):]
        png_file_name = 'classes_' + file_names[0:(file_names.find(" "))] + '.png'
        try:
            if path.exists(python_file_name):
                pyreverse_command = 'pyreverse -ASmn -o png -p ' + file_names
                subprocess.call(pyreverse_command)
                print(file_names + ' are done')

                if path.exists(png_file_name):
                    # show png image
                    img = mpimg.imread(png_file_name)
                    fig = plt.imshow(img)
                    fig.axes.get_xaxis().set_visible(False)
                    fig.axes.get_yaxis().set_visible(False)
                    plt.show()
                else:
                    print("The image of class diagram cannot be generate.")
MyCli > do_pyr_class_diagram()
```

  - The def do_read_source_file(self, file_name): function as shown below in my_cli.py has check pre-condition which checks if the required file exists in the current directory before the file is opened.

```python
    # Harry's work
    def do_read_source_file(self, file_name):
        """This function extract data from the given python file to be an ast node.
        The file name should be [py_file_name.py]. The node will display as an indication of extraction"""
        try:
            if path.exists(file_name):
                self.file_to_data.read_file(file_name)
                print("The ast nodes below has been read from the given python file, " + file_name + ":")
                self.file_to_data.show_ast_nodes()
            else:
                print("Your given python file does not exist in the current directory ")
                print("or your input arguments were wrong. The input arguments ")
                print("should be [py_file_name.py]. ")
                print("Please try again!")
        except Exception as err:
            print("Please try again! The exception is: ", err)
```

- The def do_validate_class_contents(self, file_name): function as shown below in my_cli.py has check pre-condition which checks if the required file exists in the current directory before the file is opened.

```python
    # Harry's work
    def do_validate_class_contents(self, file_name):
        """Validate, list and display class names, function names and the total numbers of them
        in the given python file. Class and function names are displayed in command line.
        Total numbers of classes and functions are displayed in a bar graph.
        Syntax: validate_class_contents [input source code file name.py]"""

        # sample: validate_class_contents test.py
        num_of_classes = 0
        num_of_functions = 0
        try:
            if path.exists(file_name):
                self.file_to_data.read_file(file_name)
                num_of_classes = len(self.file_to_data.tree.body)
                print("---There are " + str(num_of_classes) + " classes.-------------------")
                print("-----The classes are: -------------------")
                for my_class in self.file_to_data.tree.body:
                    print("-------" + my_class.name + " class")
                for my_class in self.file_to_data.tree.body:
                    print("---------The " + my_class.name + " class has " + str(len(my_class.body)) + " functions")
                    num_of_functions += len(my_class.body)
```

- The def do_dot_2_png(self, input_dot_file_name): function as shown below in my_cli.py has check both pre- and post- conditions which checks if both the required input file and the output file respectively as show below exist in the current directory before the files are opened.

```python
    # Harry's work
    def do_dot_2_png(self, input_dot_file_name):
        """Generate and display png file from the given dot file.
        Syntax: dot_2_png [input dot file name.dot]"""
        try:
            if path.exists(input_dot_file_name):
                dot_command = 'dot -Tpng ' + input_dot_file_name + ' -o ' + input_dot_file_name + '.png'
                subprocess.call(dot_command)
                print(input_dot_file_name + '.png ' + ' are done')
                png_file_name = input_dot_file_name+".png"
                if path.exists(png_file_name):
                    # show png image
                    img = mpimg.imread(png_file_name)
                    fig = plt.imshow(img)
                    fig.axes.get_xaxis().set_visible(False)
                    fig.axes.get_yaxis().set_visible(False)
                    plt.show()
                else:
                    print("The image of class diagram cannot be generate.")
                    print("Please check with your system administrators.")
            else:
                print("Your given dot file does not exist in the current directory ")
```

11.2. Robustness

- The path.exists() function in the aforementioned codes is for both pre- and post- conditions (for input file and output file respectively) which checks if the file is in current file directory or not. My program will tell the users if the current directory does not have the file.

11.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

12. Provide doctests

12.1. Used by peers

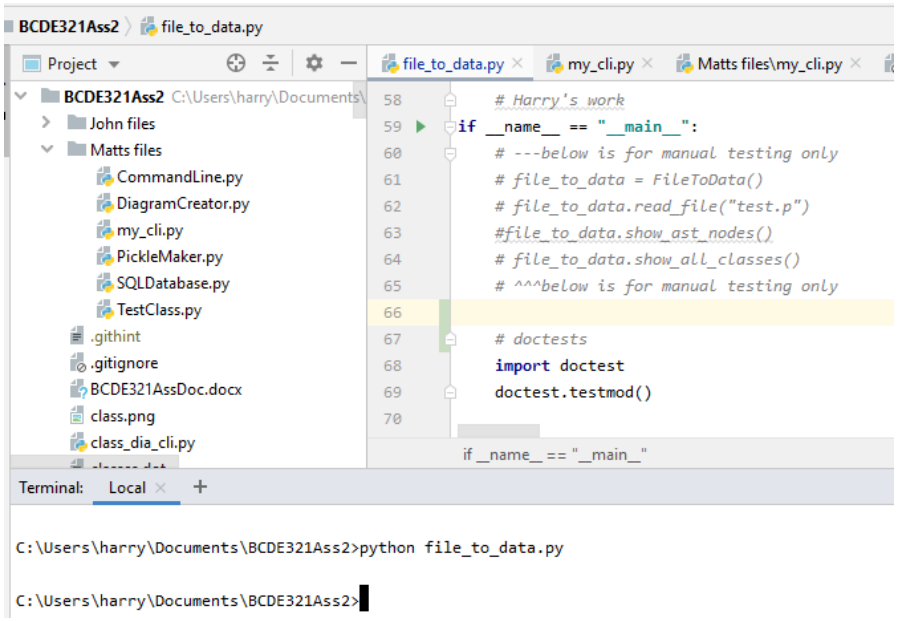
- File: file_to_data.py
  - Two doctests are shown below:

```python
# Harry's work
class FileToData(ast.NodeVisitor):
    """doctest
    >>> file_to_data = FileToData()
    >>> file_to_data.read_file("test.py")
    >>> file_to_data.show_ast_nodes()
    Module(body=[ClassDef(name='Car', bases=[], keywords=[], body=[FunctionDef(name='__init__

    >>> file_to_data = FileToData()
    >>> file_to_data.read_file("test.p")
    Your given python file does not exist in the current directory or your input arguments we
    """
```

```python
    # Harry's work
if __name__ == "__main__":
    # ---below is for manual testing only
    # file_to_data = FileToData()
    # file_to_data.read_file("test.p")
    #file_to_data.show_ast_nodes()
    # file_to_data.show_all_classes()
    # ^^^below is for manual testing only
    import doctest
    doctest.testmod()
```

12.2. Robustness

- All doctests were passed as shown below



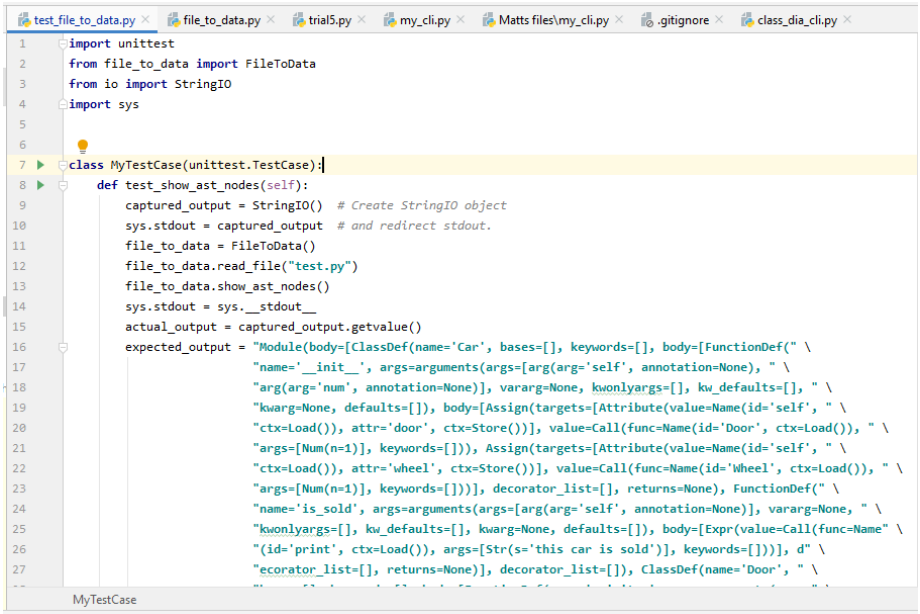
12.3. Complete and well implemented

- Less than 10 different doctests

13. Provide unittests

13.1. Used by peers

- File: test_file_to_data.py
  - ➢ Two unit tests are shown below:



```python
                    "ctx=Load()), args=[], keywords=[])), Assign(targets=[Attribute(value=Name(id='self', " \
                    "ctx=Load()), attr='color', ctx=Store())], value=Str(s='red'))], decorator_list=[], " \
                    "returns=None)], decorator_list=[])])\n"

        self.assertEqual(actual_output, expected_output)

    def test_read_file_wrong_file_name(self):
        captured_output = StringIO()  # Create StringIO object
        sys.stdout = captured_output  # and redirect stdout.
        file_to_data = FileToData()
        file_to_data.read_file("test.p")
        sys.stdout = sys.__stdout__
        actual_output = captured_output.getvalue()
        expected_output = "Your given python file does not exist in the current directory or your input " \
                    "arguments were wrong. The file name should be [py_file_name.py]. Please try again!\n"

        actual_output = 0

        expected_output = 0
        self.assertEqual(actual_output, expected_output)


if __name__ == '__main__':
    unittest.main()
```

13.2. Robustness

- All unit tests were passed as shown below

```python
import unittest
from file_to_data import FileToData
from io import StringIO
import sys


class MyTestCase(unittest.TestCase):
    def test_show_ast_nodes(self):
        captured_output = StringIO()  # Create StringIO object
        sys.stdout = captured_output  # and redirect stdout.
        file_to_data = FileToData()
        file_to_data.read_file("test.py")
        file_to_data.show_ast_nodes()
        sys.stdout = sys.__stdout__
        actual_output = captured_output.getvalue()
        expected_output = "Module(body=[ClassDef(name='Car', bases=[], keywords=[], body=[FunctionDef(" \
                    "name='__init__', args=arguments(args=[arg(arg='self', annotation=None), " \
```

```
C:\Users\harry\Documents\BCDE321Ass2>python test_file_to_data.py
..
----------------------------------------------------------------------
Ran 2 tests in 0.002s

OK

C:\Users\harry\Documents\BCDE321Ass2>
```

13.3. Complete and well implemented

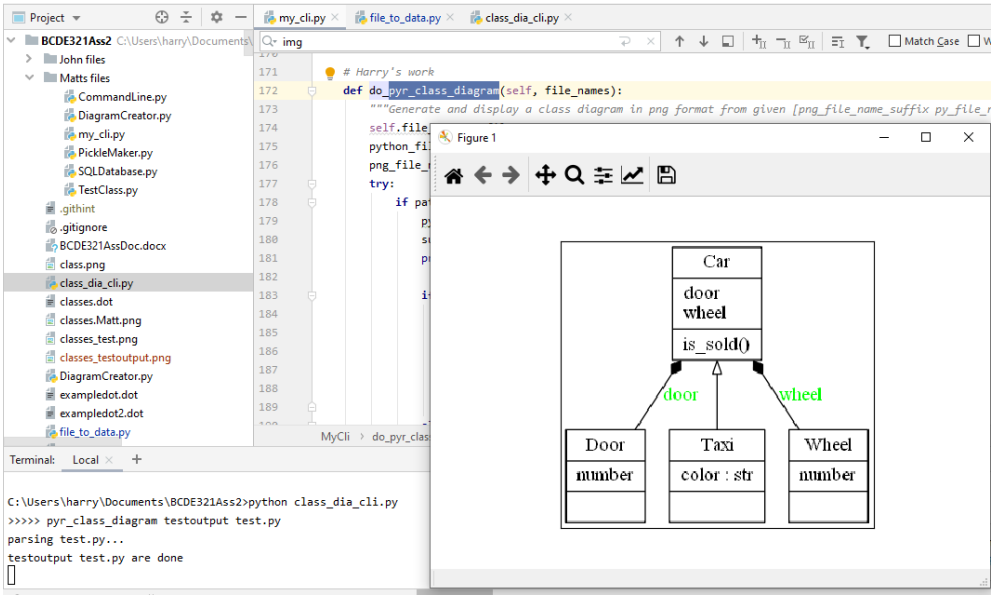
- Less than 10 different unit tests

14. Pretty print, i.e., displaying data in chart / diagram, e.g., bar chart, pie chart, UML diagram, etc.

14.1. Used by peers

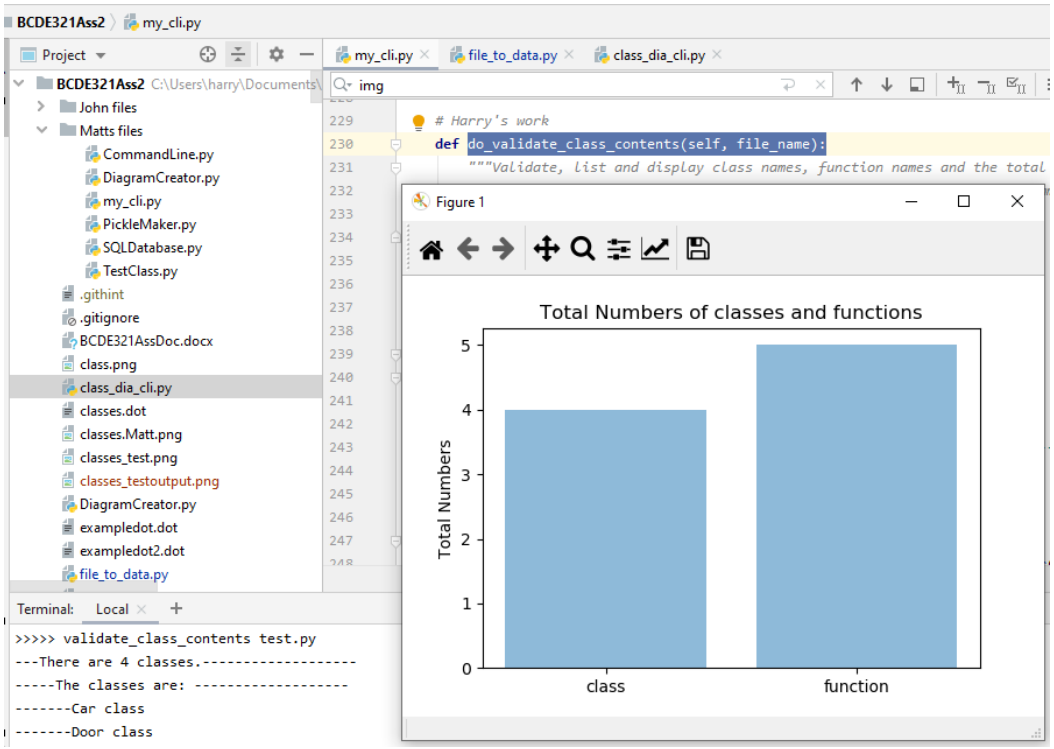
- File: my_cli.py
  - The def do_pyr_class_diagram(self, file_names): function can display a class diagram based on a python file as shown below:

```python
# Harry's work
def do_pyr_class_diagram(self, file_names):
    """Generate and display a class diagram in png format from given [png_file_na
    self.file_names = file_names
    python_file_name = file_names[(file_names.find(" ") + 1):]
    png_file_name = 'classes_' + file_names[0:(file_names.find(" "))] + '.png'
    try:
        if path.exists(python_file_name):
            pyreverse_command = 'pyreverse -ASmn -o png -p ' + file_names
            subprocess.call(pyreverse_command)
            print(file_names + ' are done')

            if path.exists(png_file_name):
                # show png image
                img = mpimg.imread(png_file_name)
                fig = plt.imshow(img)
                fig.axes.get_xaxis().set_visible(False)
                fig.axes.get_yaxis().set_visible(False)
                plt.show()
            else:
                print("The image of class diagram cannot be generate.")
```



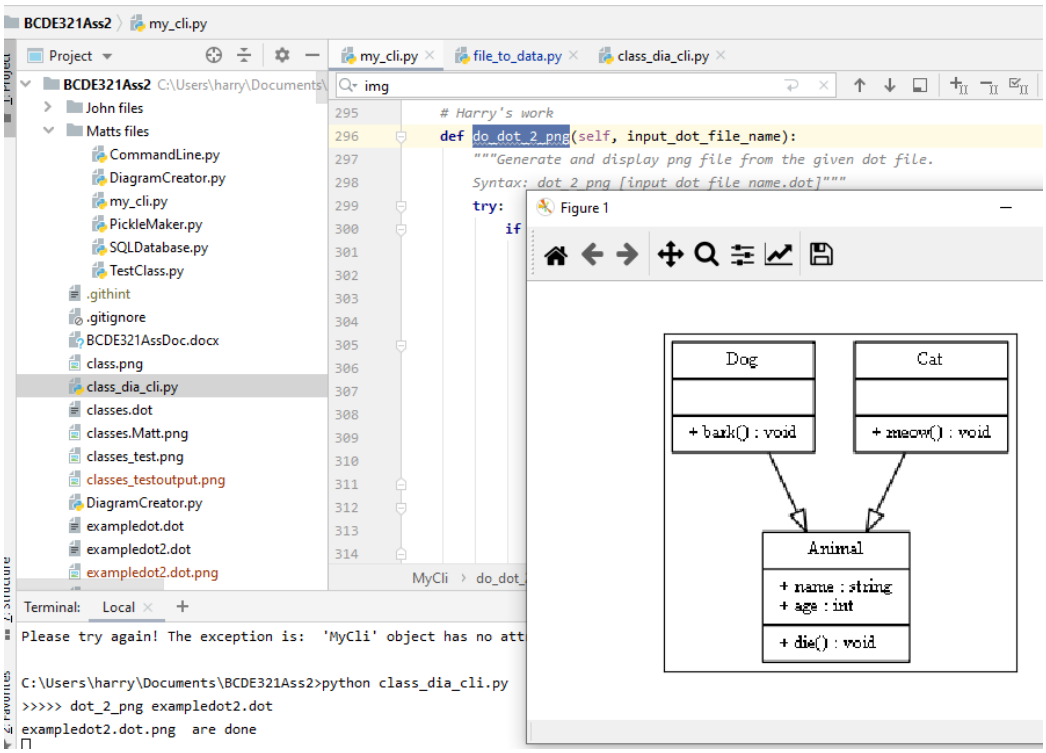
- The def do_validate_class_contents(self, file_name): function can display a bar diagram to show the total numbers of classes and functions in the input python file as shown below:

```python
# Harry's work
def do_validate_class_contents(self, file_name):
    """Validate, list and display class names, function names and the total numbers of them
    in the given python file. Class and function names are displayed in command line.
    Total numbers of classes and functions are displayed in a bar graph.
    Syntax: validate_class_contents [input source code file name.py]"""

    # sample: validate_class_contents test.py
    num_of_classes = 0
    num_of_functions = 0
    try:
        if path.exists(file_name):
            self.file_to_data.read_file(file_name)
            num_of_classes = len(self.file_to_data.tree.body)
            print("---There are " + str(num_of_classes) + " classes.-------------------")
            print("-----The classes are: -------------------")
            for my_class in self.file_to_data.tree.body:
                print("-------" + my_class.name + " class")
            for my_class in self.file_to_data.tree.body:
```



- The def do_dot_2_png(self, input_dot_file_name): function can display a class diagram based on a dot file as shown below:

```python
    # Harry's work
    def do_dot_2_png(self, input_dot_file_name):
        """Generate and display png file from the given dot file.
        Syntax: dot_2_png [input dot file name.dot]"""
        try:
            if path.exists(input_dot_file_name):
                dot_command = 'dot -Tpng ' + input_dot_file_name + ' -o ' + input_dot_file_name + '.png'
                subprocess.call(dot_command)
                print(input_dot_file_name + '.png ' + ' are done')
                png_file_name = input_dot_file_name+".png"
                if path.exists(png_file_name):
                    # show png image
                    img = mpimg.imread(png_file_name)
                    fig = plt.imshow(img)
                    fig.axes.get_xaxis().set_visible(False)
                    fig.axes.get_yaxis().set_visible(False)
                    plt.show()
                else:
                    print("The image of class diagram cannot be generate.")
                    print("Please check with your system administrators.")
```



-

14.2. Robustness

- The aforementioned functions have exception handling which checks if the file exists or not and if there is error or not. My program will tell the users if file does not exist in current directory or there are errors as shown in the codes at item 14.1 above.

14.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

15. Can save and read data from a database ,e.g., from a database, e.g., SQLite, MySQL and MongoDB.

15.1. Used by peers

- File: my_cli.py
  - The def do_save_py_class_name_and_num_of_functions_to_sqlit(self, file_name): function can save all class name and its number of function in a sqlit database file as shown below. It creates an object of MySqlit class in my_sqlit file to handle the database matters as shown below.

my_cli.py | file_to_data.py | PickleMaker.py | class_dia_cli.py | my_sqlit.py | .githint

```python

    # Harry's work
    def do_save_py_class_name_and_num_of_functions_to_sqlit(self, file_name):
        """Save all class names and its number of functions to a sqlit database.
        The classes are extracted from the given python file.
        Using of my_sqlit_database_data command can list out all the data in the database.
        Syntax: save_py_class_name_and_num_of_functions_to_sqlit [input source code file name.py]"""

        # sample: save_py_class_name_and_num_of_functions_to_sqlit test.py

        num_of_classes = 0
        num_of_functions = 0
        try:
            if path.exists(file_name):
                my_sqlit = MySqlit('my_sqlite.db')
                my_sqlit.drop_my_table()
                my_sqlit.create_my_table()

                self.file_to_data.read_file(file_name)
                num_of_classes = len(self.file_to_data.tree.body)

                for my_class in self.file_to_data.tree.body:
                    my_sqlit.my_insert(my_class.name, len(my_class.body))

                my_sqlit.commit_connection()
                my_sqlit.close_connection()

```

MyCli › do_save_py_class_name_and_num_o...

my_sqlit.py | my_cli.py | file_to_data.py | PickleMaker.py | class_dia_cli.py | .githint

```python
import sqlite3

class MySqlit:

    def __init__(self, file_name):
        self.file_name = file_name
        try:
            self.conn = sqlite3.connect(self.file_name) #e.g. file_name = 'my_sqlite.db'
        except Exception as err:
            print("Please try again! The exception is: ", err)
        else:
            print("Database at my_sqlite.db is connected")

    def close_connection(self):
        self.conn.close()
        print('mytable is closed')

    def commit_connection(self):
        self.conn.commit()
        print('mytable is committed')

    def create_my_table(self):
        my_cursor = self.conn.cursor()
        my_cursor.execute("""CREATE TABLE IF NOT EXISTS mytable (
                            classname text,
                            numoffunction integer
                            )""")
```

MySqlit

- The def do_my_sqlit_database_data(self,arg):function as shown below can read all class name and its number of function in a sqlit database file which has been saved by using the aforementioned function def do_save_py_class_name_and_num_of_functions_to_sqlit(self, file_name). It creates an object of MySqlit class in my_sqlit file to handle the database matters as shown in the last screenshot above.

my_cli.py | my_sqlit.py | file_to_data.py | PickleMaker.py | class_dia_cli.py | .githint

```python
    # Harry's work
    def do_my_sqlit_database_data(self,arg):
        """List all the data stored in the sqlit database by using
        the save_py_class_name_and_num_of_functions_to_sqlit command.
        This gives all the pairs of class name and its number of functions.
        Syntax: my_sqlit_database_data"""

        # sample: save_py_class_name_and_num_of_functions_to_sqlit test.py
        file_name = 'my_sqlite.db'
        try:
            if path.exists(file_name):
                my_sqlit = MySqlit(file_name)
                my_sqlit.fetch_all_my_table()
                my_sqlit.commit_connection()
                my_sqlit.close_connection()
            else:
                print("The database file does not exist in the current directory")
                print("Please use save_py_class_name_and_num_of_functions_to_sqlit command to create the database")
                print("Please try again after the database is created!")
        except Exception as err:
            print("Please try again! The exception is: ", err)

    # Harry's work
    def help_my_sqlit_database_data(self):
        print("\n".join(['List all the data stored in the sqlit database by using ',
                         'the save_py_class_name_and_num_of_functions_to_sqlit command.',
                         'This gives all the pairs of class name and its number of functions.',
```

MyCli

15.2. Robustness

- The aforementioned functions have exception handling which checks if the file exists or not and if there is error or not. My program will tell the users if file does not exist in current directory or there are errors as shown in the codes at item 15.1 above.

15.3. Complete and well implemented

- My code is pythonic. It complies with PEP 8 and is beautiful better than ugly. For example:
  - The code meets the naming convention of PEP 8.
  - There are either one or two blank lines between code blocks according to PEP8.

8 Location of GitHub repository

https://github.com/harrykhlo/BCDE321Ass2