Assignment 6: Files and objects

Part A: Reading and Writing Files

This assignment is the "*Mad Libs*" exercise from chapter 8 in *Automate the Boring Stuff*, see https://automatetheboringstuff.com/chapter8/ (https://automatetheboringstuff.com/chapter8/) in the bottom.

It says:

Create a Mad Libs program that reads in text files and lets the user add their own text anywhere the word `ADJECTIVE`, `NOUN`, `ADVERB`, or `VERB` appears in the text file. For example, a text file may look like this, see file `mad_libs.txt`:

```
The ADJECTIVE panda walked to the NOUN and then VERB. A nearby NOUN was u
naffected by these events.
```

The program would find these occurrences and prompt the user to replace them.

```
Enter an adjective:
silly
Enter a noun:
chandelier
Enter a verb:
screamed
Enter a noun:
pickup truck
```

The following text file would then be created:

```
The silly panda walked to the chandelier and then screamed. A nearby pick
up truck was unaffected by these events.
```

The results should be printed to the screen and saved to a new text file.

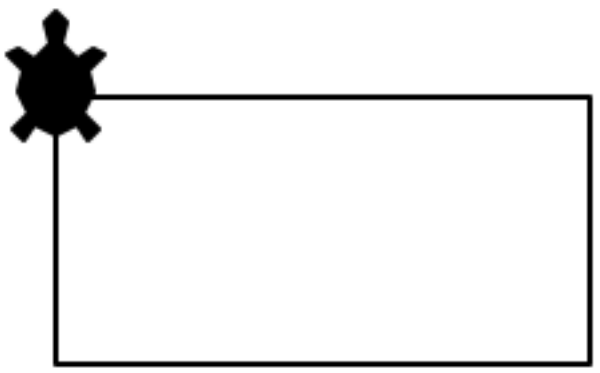
Part B: Using an Object's Methods

- Create a module `turtle_runner.py`, which will create a turtle graphics from a text file.
  - We wrote a `turtle_runner.py` file to help you get started.
  - **Hint**: If you didn't already do `Part D` in the workshop, now is a good time
- Let your program consume one argument from the command-line, which is a path to a script file.
  - A script file here is just a text file, see for example `script1.trtl`, `script2.trtl`, and `script3.trtl`.
  - Scripts contain only two entries per line, a *command* and a *value*, separated by a space.
  - The only two commands any script can contain are `Walk` and `Turn`,
- Let your program read such a script file line by line and let it split each line's content on a space.
- Assign the two resulting elements to two variables as in

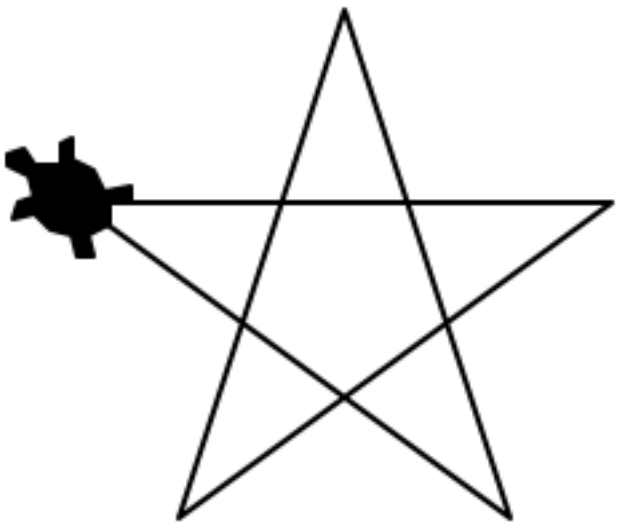
```
command, value = line.split(' ')
```

- Convert the value in the variable called `value` into an `int`.
- Write a function `def do_line(turtle, command, value):`, which lets a `turtle` object passed to the function `do_line` so what is given in
  - For example, when the command is `Walk` the you shall call the `turtle`s `forward` method with the argument given in `value`.
  - When the command is `Turn` the you shall call the `turtle`s `right` method with the argument given in `value`.

Consequently, running `python turtle_runner.py script1.trtl` shall produce an image as in the following:



Whereas running `python turtle_runner.py scrip3.trtl` produces:



Part C: Creating Classes

- Create a module called `turtle_geometry.py`.
- In it create a class called `GeometryTurtle` which is a subclass of the class `Turtle` from the `turtle` module, see below.
- Now, implement the methods `make_square(self, width)`, `make_rectangle(self, width, height)`, `make_triangle(self, length)`, and `make_star(self, length)` that let a turtle print the corresponding figures. All methods should not change the last position of the turle, i. e. assume that the turtle is in the correct place with the correct angle.
  - The `make_square` should draw a square that is `width` long

    - The `make_rectangle` should draw a rectangle that is `width` long and `height` high.
    - The `make_triangle` should draw a triangle where all three sides are the same length, given by the `length` argument
    - The `make_star` should draw a star with 5 points (each corner angled with 144 degrees) where the `length` parameter specifies the full diameter of the star
- In the `main` function below you see the application of methods, some of which you implemented in your class `GeometryTurtle`, such as, `make_square`, `make_rectangle`, `make_triangle`, and `make_star` and some of which are inherited from the superclass `Turtle`, such as, `penup`, `forward`, `pendown`, and `right`.

```python
from turtle import Turtle, done


class GeometryTurtle(Turtle):
    # TODO: Implement me!!!
    pass


def main():
    my_turtle = GeometryTurtle()
    my_turtle.make_square(50)

    my_turtle.penup()
    my_turtle.forward(70)
    my_turtle.pendown()

    for i in range(6):
        my_turtle.right(60)
        my_turtle.make_square(30)

    my_turtle.penup()
    my_turtle.forward(70)
    my_turtle.pendown()

    my_turtle.make_rectangle(50, 20)

    my_turtle.penup()
    my_turtle.forward(70)
    my_turtle.pendown()

    my_turtle.make_triangle(50)

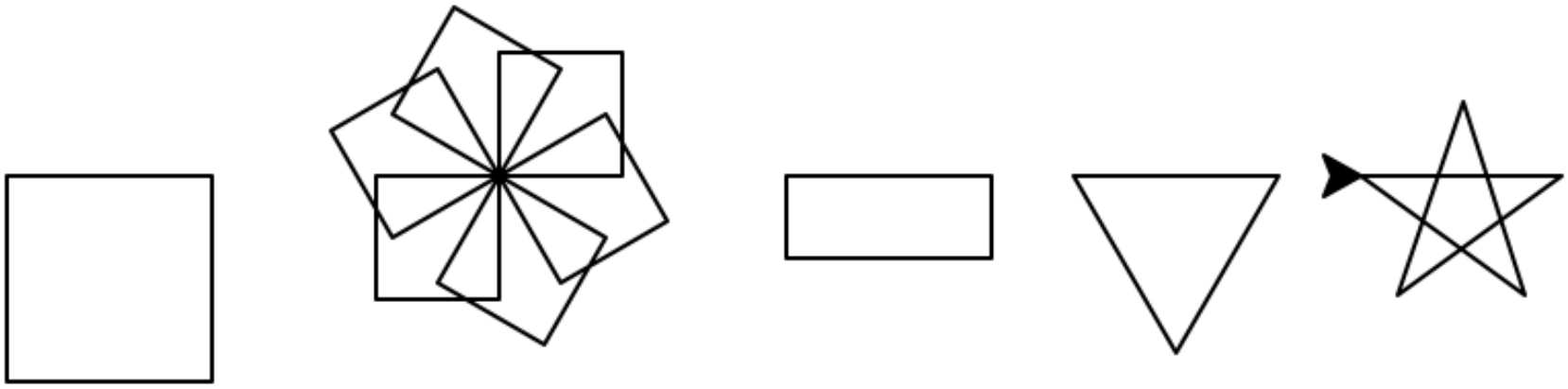
    my_turtle.penup()
    my_turtle.forward(70)
    my_turtle.pendown()

    my_turtle.make_star(49)

    # The call to the function `done` from the `turtle` module means that
you
    # Have to close the window manually
    done()


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

Running the program `turtle_geometry.py` with your implementation via `python turtle_geometry.py`, should produce an image similar to the following:



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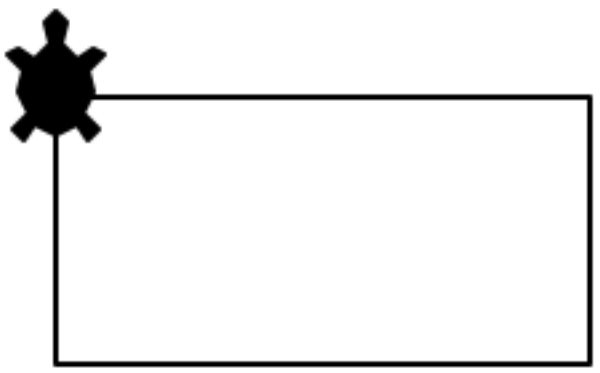
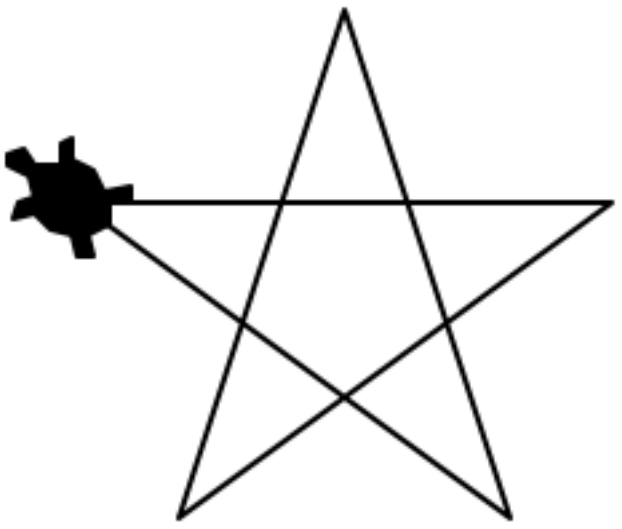
Consequently, running `python turtle_runner.py script1.trtl` shall produce an image as in the following:



Whereas running `python turtle_runner.py scrip3.trtl` produces:



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    my_turtle.penup()
    my_turtle.forward(70)
    my_turtle.pendown()

    my_turtle.make_star(49)

    # The call to the function `done` from the `turtle` module means that
you
    # Have to close the window manually
    done()


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

Running the program `turtle_geometry.py` with your implementation via `python turtle_geometry.py`, should produce an image similar to the following: