

# Workshop: Files and objects

This workshop will let you practice using files and objects. Go through the slides to make sure you understand the following:

- Classes and objects
  - Can you write you own class?
  - What is the difference between an object and a class?
  - What is a method in a class?
- Reading files in Python
  - `open(filename, 'r')`
- Writing to files in Python
  - `open(filename, 'w')`
  - `open(filename, 'a')`

## Part A: Understanding turtles

A blogger wrote up some examples on how to work with Turtles: <https://michael0x2a.com/blog/turtle-examples> (<https://michael0x2a.com/blog/turtle-examples>)

- Go through the first three examples and understand what is happening. Preferably without running the code. Can you describe in pseudo-code what is happening line by line?
- After understanding the code, copy-paste it into Mu and use the debugger to run it line by line. Does your pseudo-code match the reality?

## Part B: What is turtle race doing?

1. Download the file `turtle_race.py` from the materials repository
2. Run the program `turtle_race.py` with `python turtle_race.py` and observe what it is doing.
  - Without looking at the code, write it down in pseudo-code
3. Understand what the program `turtle_race.py` is doing and how it works by opening the code in Mu and doing the following:
  - Set a breakpoint on line 33
  - Run `turtle_race.py` through the debugger line by line, starting from line 33
  - Explain to your fellow student what is going on. In particular:
    - What happens on lines 33, 34, and 35?
    - What does `Turtle()` mean on line 33?

## Part C: Reading and writing files

1. Write a program `print_file_contents.py` that opens the file `script1.trtl` from the `homework` directory and prints every line that it contains to the screen.

- **Hint:** Whenever you are asked to use a file, such as `script1.trtl` , make sure to open it and see what it contains

2. Write a new program `print_file_contents_split.py` , which:

- Opens the file `script1.trtl` ,
- `split` s every line on space ' ' ,
- Converts the number value, i.e., the value following the space to an integer, and
- Prints the two values on separate lines.

Example:

If the file `script1.trtl` contains

```
Walk 10
Turn 20
Walk 30
Turn 40
Walk 50
Turn 60
Walk 70
```

The your program shall print:

```
Walk
10
Turn
20
Walk
30
Turn
40
Walk
50
Turn
60
Walk
70
```

3. Extend your first program `print_file_contents.py` so that it reads a file given to it via a command line argument. That is, if it is called via the terminal like so:

```
$ python print_file_contents.py turtle_program.trtl
```

it shall print:

Walk 10  
Turn 20  
Walk 30  
Turn 40  
Walk 50  
Turn 60  
Walk 70