

# Turing Machine ReadMe

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This document is intended for users who want to know how to run a Turing machine which is in the format described by `tm_def.pdf`.

## 1 Preparation

Before a Turing Machine can be run, first it must exist in a place where it can be found. Make sure that the target directory is located at:

```
parsimony/src/tm/tm2/tm2_files/ (if it is a 2-symbol machine)
or
parsimony/src/tm/tm4/tm4_files/ (if it is a 4-symbol machine)
```

(If you created your Turing machine via compilation from a higher-level language, it will already exist in the right place.)

Then, BEFORE running any of the commands described below, navigate to:

```
parsimony/src/tm/tm2/tm2_files/ (if it is a 2-symbol machine)
or
parsimony/src/tm/tm4/tm4_files/ (if it is a 4-symbol machine)
```

## 2 Running the Turing Machine

To run a Turing machine, run the command:

```
python tm2_simulator.py [name of TM file without .tm2 extension]
(for 2-symbol machines)
or
```

```
python tm4_simulator.py [name of TM file without .tm4 extension]
(for 4-symbol machines)
```

After this command is run, the simulator will dump the TM history to standard output. If you'd prefer that not happen, the `-q` (quiet) flag will cause the interpreter to not output any TM history. The `-s` (max steps) flag, followed by an integer  $k$ , will cause the interpreter to only run  $k$  steps. The `-f` (file output) flag will cause the interpreter to dump the TM history to a history file. The `-f` flag can only be used if the `-s` flag is also enabled. Finally, the `-l` (limited output) flag will cause only one step in 10,000 to be displayed (this flag is only available for simulation of 4-symbol machines). Watch out—if you run the TM for many steps, this can create some truly enormous files! The created TM history file will show up at:

```
parsimony/src/tm/tm2/tm2_histories/[name of TMD directory]_-
history.txt (for 2-symbol machines)
```

or

```
parsimony/src/tm/tm4/tm4_histories/[name of TMD directory]_-
history.txt (for 4-symbol machines)
```