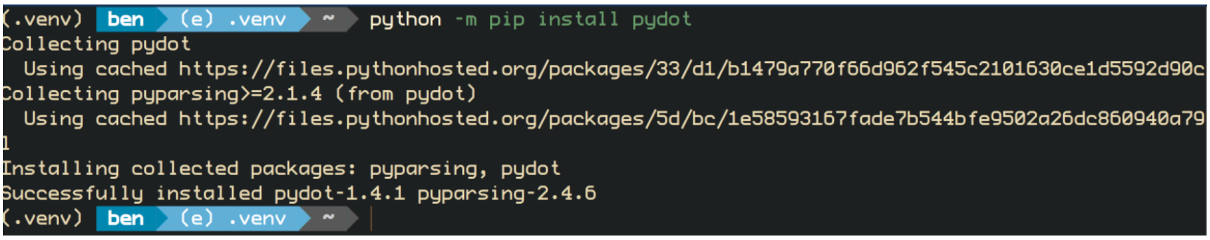
Compiler Design Documentation

Dependency Installation:

Pydot:

The compiler requires the pthon plugin Pydot to draw the parse tree and output it to a file. To install Pydot run the command:
python -m pip install pydot

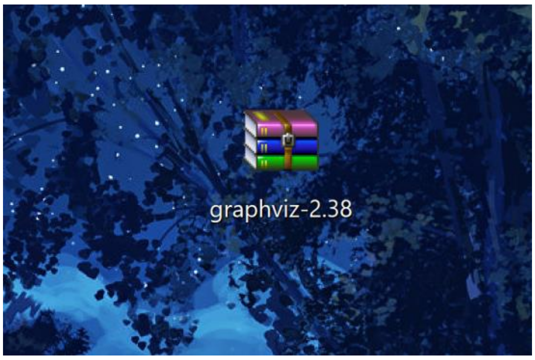


```
(.venv)  ben  (e) .venv  ~  python -m pip install pydot
Collecting pydot
  Using cached https://files.pythonhosted.org/packages/33/d1/b1479a770f66d962f545c2101630ce1d5592d90c
Collecting pyparsing>=2.1.4 (from pydot)
  Using cached https://files.pythonhosted.org/packages/5d/bc/1e58593167fade7b544bfe9502a26dc860940a79
1
Installing collected packages: pyparsing, pydot
Successfully installed pydot-1.4.1 pyparsing-2.4.6
(.venv)  ben  (e) .venv  ~
```

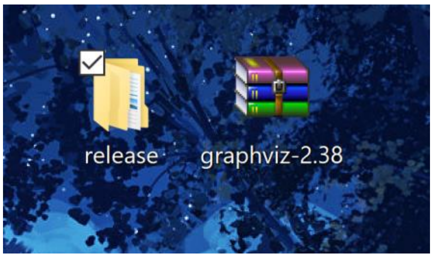
Graphviz:

The compiler requires graphviz in order to create the parse tree as it is a dependency of the pydot plugin. Follow these installation steps:

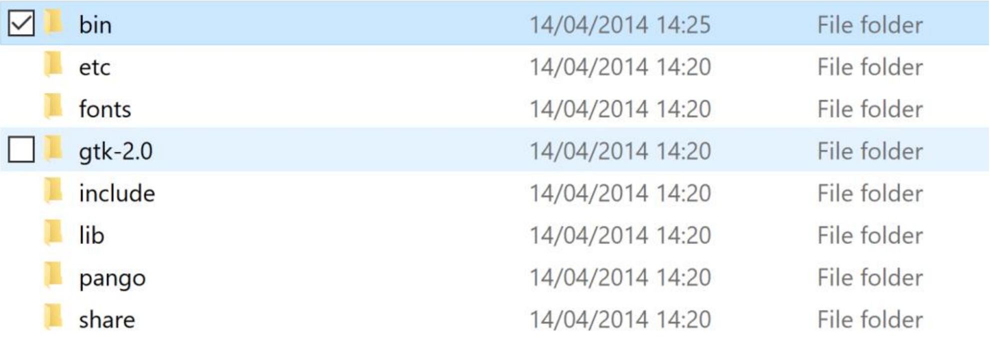
1. Download graphviz for windows from this URL
https://graphviz.gitlab.io/_pages/Download/windows/graphviz-2.38.zip



2. Extract the release folder from the downloaded zip file

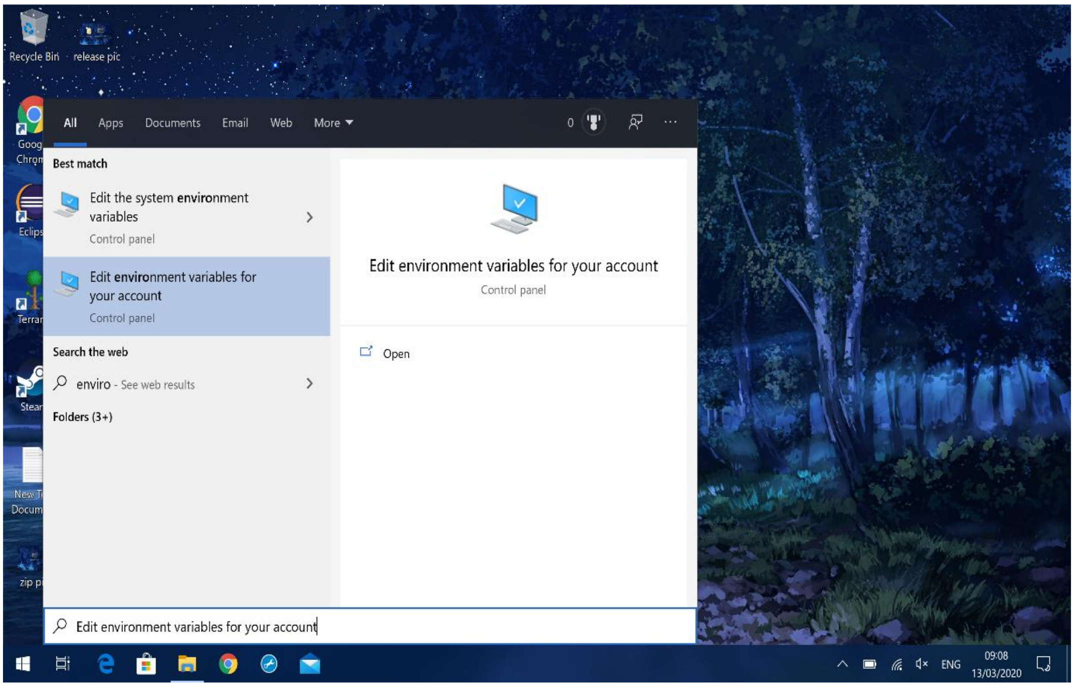


3. Copy the path of the bin folder



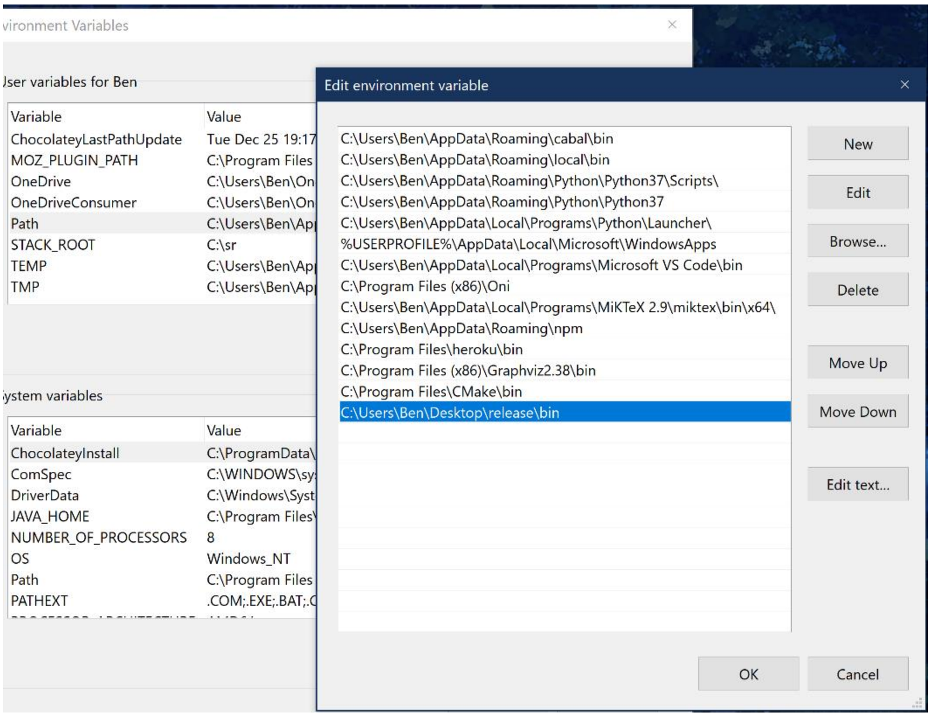
☑	bin	14/04/2014 14:25	File folder
	etc	14/04/2014 14:20	File folder
	fonts	14/04/2014 14:20	File folder
□	gtk-2.0	14/04/2014 14:20	File folder
	include	14/04/2014 14:20	File folder
	lib	14/04/2014 14:20	File folder
	pango	14/04/2014 14:20	File folder
	share	14/04/2014 14:20	File folder

4. Edit your user environment variables



Edit environment variables for your account

5. Add the bin path to your user path variable



Jser variables for Ben

Variable	Value
ChocolateyLastPathUpdate	Tue Dec 25 19:17
MOZ_PLUGIN_PATH	C:\Program Files
OneDrive	C:\Users\Ben\On
OneDriveConsumer	C:\Users\Ben\On
Path	C:\Users\Ben\Ap
STACK_ROOT	C:\sr
TEMP	C:\Users\Ben\Ap
TMP	C:\Users\Ben\Ap

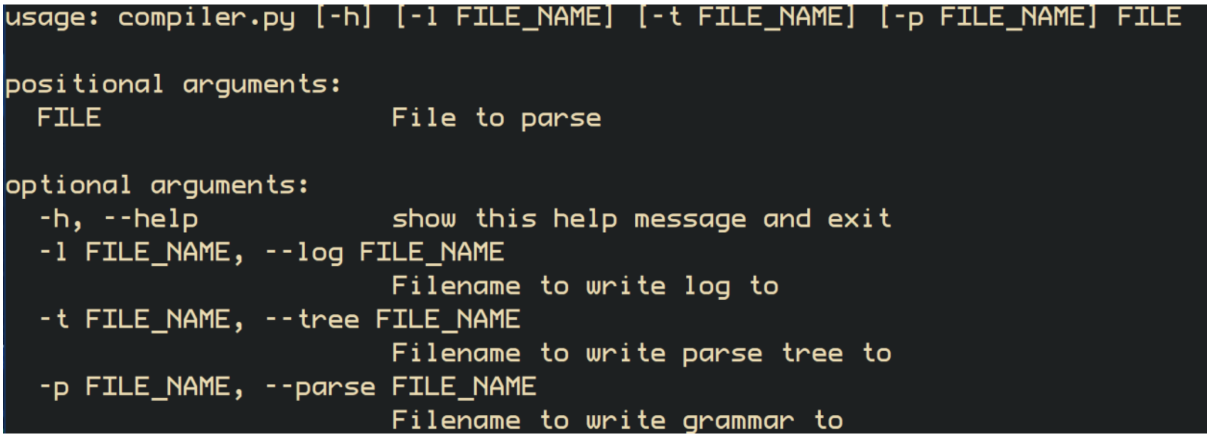
ystem variables

Variable	Value
ChocolateyInstall	C:\ProgramData\
ComSpec	C:\WINDOWS\sy
DriverData	C:\Windows\Syst
JAVA_HOME	C:\Program Files\
NUMBER_OF_PROCESSORS	8
OS	Windows_NT
Path	C:\Program Files
PATHEXT	.COM;.EXE;.BAT;.C

```
C:\Users\Ben\AppData\Roaming\cabal\bin
C:\Users\Ben\AppData\Roaming\local\bin
C:\Users\Ben\AppData\Roaming\Python\Python37\Scripts\
C:\Users\Ben\AppData\Roaming\Python\Python37
C:\Users\Ben\AppData\Local\Programs\Python\Launcher\
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
C:\Users\Ben\AppData\Local\Programs\Microsoft VS Code\bin
C:\Program Files (x86)\Oni
C:\Users\Ben\AppData\Local\Programs\MiKTeX 2.9\miktex\bin\x64\
C:\Users\Ben\AppData\Roaming\npm
C:\Program Files\heroku\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Program Files\CMake\bin
C:\Users\Ben\Desktop\release\bin
```

Running the compiler:

Running the command “python compiler.py -h” presents instructions for running



```
usage: compiler.py [-h] [-l FILE_NAME] [-t FILE_NAME] [-p FILE_NAME] FILE

positional arguments:
  FILE                  File to parse

optional arguments:
  -h, --help            show this help message and exit
  -l FILE_NAME, --log FILE_NAME
                        Filename to write log to
  -t FILE_NAME, --tree FILE_NAME
                        Filename to write parse tree to
  -p FILE_NAME, --parse FILE_NAME
                        Filename to write grammar to
```

The log, tree, and grammar files are all save prepended with the current date and time for easier sorting.

Input file format:

The input file is as specified in the specification. You can omit the Variables, Constants, and Predicates rows from the input file as they will be assumed to be empty if omitted.

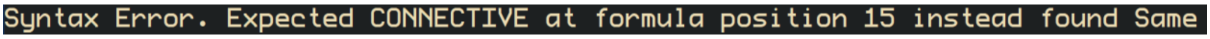
Variables, Constants, and Predicates can only contain alphanumeric characters and underscore.

Quantifiers and Connectives can contain alphanumeric characters, underscores, and backslash

Equality can contain alphanumeric characters, underscores, backslash, and =

Errors:

There are various errors produced by the compiler. The first are input file validation errors and parsing errors. Parsing errors take the same form, showing what was expected in a position in the formula and what was actually found e.g.



```
Syntax Error. Expected CONNECTIVE at formula position 15 instead found Same
```

Input file validation errros occur if:

1. There are duplicate field names e.g. defining the set of variables twice
2. There are invalid field names e.g. INVALID:
3. There are 2 symbols defined that are the same e.g. a variable called X and a constant called X
4. A symbol contains invalid characters e.g. a variable contains a backslash

5. Not enough connectives, quantifiers, or equality symbols specified