How to Run Compiler:

Initial Compiler Setup and Usage Guide

The set up is already configured that one can just add the filenames and run the code. The code is in the `src` directory.

Single File Compilation

- **1. Configure File Paths**

  In `src/main.py`, set the following file paths:

```
code_filename = "RecSPL.txt"          # Input source code file
lexer_filepath = "out/lexer.xml"      # Lexer output
parser_filepath = "out/syntax_tree.xml"  # Parser output
crawling_filepath = "out/semantics_crawling_output.txt"  # Semantic crawling results
semantics_filepath = "out/semantics_symbols_output.txt"  # Symbol table output
```

- **2. Run the Compiler**

  To compile a single file, use the `single()` function:

```
single(
    code_filename,
    lexer_filepath,
    parser_filepath,
    crawling_filepath,
    semantics_filepath
)
```

Batch Compilation

To compile multiple files at once, use the `bulk()` function. Here's how to set it up:

```
# Create a list of file configurations
batch_files = []

# Generate file paths for each test case (1 through 20)
for k in range(1, 21):
    file_paths = {
        "code_filename": f"out/testing/typechecker/recspl/code-{k}.txt",
        "lexer_filepath": f"out/testing/typechecker/tokens/lexer-{k}.xml",
        "parser_filepath": f"out/testing/typechecker/tree/tree-{k}.xml",
        "crawling_filepath": f"out/testing/typechecker/crawling/crawl-{k}.txt",
        "semantics_filepath": f"out/testing/typechecker/symbols/symbols-{k}.txt"
    }
    batch_files.append(file_paths)

# Run the compiler on all files
bulk(batch_files)
```

- Installing Python Virtual Environment:

```
# Installing dependencies
sudo apt-get update
sudo apt-get install python3-venv
python3 -m venv venv
```

- Activating the Python Virtual Environment:

```
source venv/bin/activate
```

- Deactivating the Python Virtual Environment:

```
deactivate
```

- Run/Test The Compiler:

```
# Change Directories
cd src
# Instling Dependencies
pip install -r requirements.txt

# Runnung the Compiler
python main.py
# Running the Tests
pytest .
# Running Tests and Showing Output
pytest -s
```

- Project Structure

```
.
├── conftest.py
├── helpers
│   ├── analyser.py
│   ├── convert_to_dfa.py
│   ├── dfa_lexer.py
│   ├── __init__.py
│   ├── lexing.py
│   ├── node_class.py
│   ├── parsing.py
│   ├── README.md
│   ├── symbols_class.py
│   ├── syntax_tree.py
│   └── type_checker.py
├── __init__.py
├── lexer.py
├── main.py
├── out
│   ├── dfa_output.txt
│   ├── lexer.xml
│   ├── README.md
│   ├── semantics_crawling_output.txt
│   ├── semantics_sybols_output.txt
│   ├── semantics_symbols_output.txt
│   ├── syntax_tree.xml
│   └── testing
│       ├── recspl
│       │   ├── code-1.txt
│       │   └── ...
│       ├── semantics
│       │   ├── crawling
│       │   │   ├── crawl-1.txt
│       │   │   └── ...
│       │   ├── recspl
│       │   │   ├── code-1.txt
│       │   │   └── ...
│       │   ├── symbols
│       │   │   ├── symbols-1.txt
│       │   │   └── ...
│       │   ├── tokens
│       │   │   ├── lexer-1.xml
│       │   │   └── ...
│       │   └── tree
│       │       ├── tree-1.xml
│       │       └── ...
│       ├── tokens
│       │   ├── lexer-1.xml
│       │   └── ...
│       ├── tree
│       │   ├── tree-1.xml
│       │   └── ...
│       └── typechecker
│           ├── crawling
│           │   ├── crawl-1.txt
│           │   └── ...
│           ├── recspl
│           │   ├── code-1.txt
│           │   └── ...
│           ├── symbols
│           │   ├── symbols-1.txt
│           │   └── ...
│           ├── tokens
│           │   ├── lexer-1.xml
│           │   └── ...
│           └── tree
│               ├── tree-1.xml
│               └── ...
├── parser.py
├── pytest.ini
├── RecSPL.txt
├── requirements.txt
├── runner.py
├── semantics.py
├── test
│   ├── __init__.py
│   ├── test_default.py
│   ├── test_lexer.py
│   ├── test_parser.py
│   ├── test_semantics.py
│   └── test_type_check.py
├── tree.txt
├── type_checker.py
├── utilities
│   ├── __init__.py
│   ├── nfa_to_dfa.py
│   ├── random_id.py
│   ├── README.md
│   ├── tree_crawling.py
│   └── xml_methods.py
└── venv
    ├── bin
    │   ├── ...
    ├── include
    ├── lib
    │   └── ...
    ├── lib64 -> lib
    └── pyvenv.cfg
```