

System programming Project

Architecture

I write two file: main.py and Assembler.py

main.py: Solve the argument input and output

This is the program entry point, it will be responsibility to solve argument input and output path and file. You also can use -h argument to show the help.

Assembler.py: Define all class in this file

This is define all class in this file, If anyone want to expanding this assembler, he could use this file to expanding.

Class: I also define lot of class with good architecture

- **class-Assembler:** Solve preprocessing data, split control section and IO control

A class in assembler.py, it will split the control section to Section class, and control all section processing such as assembler and write. Besides, it will processing the input file and make the text to Instruction class and push to section.

- **class-Section:** Solve all instructions and change instructions to obj code

A class in assembler.py, it will process the instruction to object code, it will do following work flow.

- solve_literal: Replace all literal to a symbol
- sorting_block: Sorting program block with same block to a group
- set_symbol: set all symbol to correct location
- set_location: set all instruction location
- set_exdef_location: set the exdef location
- sorting_index: Sorting the instruction to original position
- generate_object_code: Generate object code

The result object will be save at Instruction class.

- **class-Modification_record:** Store modification record
- **class-Instruction:** Store each instruction

Learned and Experienced

Great architecture can help you write great code: At the first time, my architecture is messy, I hardly to debug. So I rebuild all project with great architecture and help me easy to debug.

Remember to commit the code: I have write a bad code result in my thought totally confusion. So I decide to rewrite that part. However, I forgot to commit my code record and I can't revert to code version to previous.

I tell me git is a good tool to help you.

Deilemma:

- How to slove forward reference:
 - In final, I give up to use one-pass assmebler, and deside to use multi-pass assmebler.
- How to fulfill Arithmetic in programing:
 - I use an package to fulfill it.
- How to control program block and set them to correct place.
 - store an index in instruction calss and use it to resorting.

More than the Required

Basic requirement

Literals

Symbol-defining Statements

Program Blocks

Control Sections

Information

Lang: python

Version: 3.9.6

Testing Environment: macOS M1

Usage:

```
python3 main.py [-h] [-o O] inputfile
```

e.g. `python3 main.py input -o my_output` output: myoutput-1

positional arguments:

inputfile: input file path

options:

-h, --help show this help message and exit

-o O output file path

Copyright Claim

MIT License

Copyright (c) 2023 Takala

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of

the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.