System programing 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 responsbility to slove argument input and output path and file. You also can use -h argument to show the help.

Assembler.py: Defind all class in this file

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

Class: I also define lot of class with good architecture

- **class-Assembler**: Slove preproscessing 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 assmebler and write. Besides, it will processing the input file and make the text to Instruciton class and push to section.

- **class-Section**: Solve all instrucitons 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 instuction 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 instruciton

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.

It tells me git is a good tool to help you.

Deilemma:

- How to slove forward reference:
  - I use multi loop until all symbol are reslove, ensure all symbol can be set a location.
- How to fulfill Arithmetic in programing:
  - I use an package which can read arithmetic. I replace all symbol which knows location, and use package to calculate.
- How to control program block and set them to correct place.
  - In each instuction original location, I store an index in instruction calss and use it to resorting after program block change their position to ensure the instuctions location are correct.

More than the Required

Basic requirement Literals
Symbol-defining Statements
Program Blocks
Control Sections

To prove work, we can see example code `./example/code3.asm` and get result with `code_output-1.txt` `code_output-2.txt` `code_output-3.txt`

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

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Any thing you would like to let G.H.Hwang know

I really like latter half semester teaching with actual operation, and see what happen in computer. It really help for operation with our lab server when I make junior project. Thanks for teacher theaching this semester.