

Assignment2

1. 安装 OpenTuner 并记录执行过程

```
conda create --name=opentuner python=3.8
```

```
conda create --name=opentuner python=3.8
Collecting package metadata (current_repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
    current version: 4.9.2
    latest version: 4.10.3

Please update conda by running

$ conda update -n base -c defaults conda

## Package Plan ##

environment location: /Users/wangwenqing/opt/anaconda3/envs/opentuner

added / updated specs:
- python=3.8

The following packages will be downloaded:
```

```
conda activate opentuner
pip install -r requirements.txt -r optional-requirements.txt
```

```
(Copentuner) wangweningdeMBP:软件系统优化 wangwenqing$ pip install -r requirements.txt -r optional-requirements.txt
Collecting argparse>=1.2.1
  Downloading argparse-1.4.0-py2.py3-none-any.whl (23 kB)
Collecting fn>=0.2.12
  Downloading fn-0.4.3.tar.gz (38 kB)
Collecting future
  Downloading future-0.18.2.tar.gz (829 kB)
    |██████████| 829 kB 360 kB/s
Collecting numpy>=1.8.0
  Downloading numpy-1.21.2-cp38-cp38-macosx_10_9_x86_64.whl (16.9 MB)
    |██████████| 16.9 MB 534 kB/s
Collecting SQLAlchemy>=0.8.2
  Downloading SQLAlchemy-1.4.25-cp38-cp38-macosx_10_14_x86_64.whl (1.5 MB)
    |██████████| 1.5 MB 527 kB/s
Collecting django
  Downloading Django-3.2.7-py3-none-any.whl (7.9 MB)
    |██████████| 7.9 MB 689 kB/s
Collecting matplotlib
  Downloading matplotlib-3.4.3-cp38-cp38-macosx_10_9_x86_64.whl (7.2 MB)
    |██████████| 7.2 MB 740 kB/s
Collecting pytest
  Downloading pytest-6.2.5-py3-none-any.whl (280 kB)
    |██████████| 280 kB 962 kB/s
```

```
Collecting toml
  Using cached toml-0.10.2-py2.py3-none-any.whl (16 kB)
Collecting py>=1.8.2
  Downloading py-1.10.0-py2.py3-none-any.whl (97 kB)
    !█████████████████████████████████████████████████| 97 kB 1.4 MB/s
Building wheels for collected packages: fn, future, pypandoc
  Building wheel for fn (setup.py) ... done
    Created wheel for fn: filename=fn-0.4.3-py3-none-any.whl size=28238 sha256=35f60f6e225e8eda00b8126e
e77d48e485eda128c974b9154e787c747f3c8772
    Stored in directory: /Users/wangwenqing/Library/Caches/pip/wheels/5d/3a/c0/2de7dc84ea4b39a4705dfbd2
84e4c14dc1fe0011b7369161b0
  Building wheel for future (setup.py) ... done
    Created wheel for future: filename=future-0.18.2-py3-none-any.whl size=491070 sha256=268da52d7f05a5
ce66aa6eaf69a5daa576acbcfd3f75c5b88390777753ffea86
    Stored in directory: /Users/wangwenqing/Library/Caches/pip/wheels/8e/70/28/3d6ccd6e315f65f245da0854
82a2e1c7d14b90b30f239e2cf4
  Building wheel for pypandoc (setup.py) ... done
    Created wheel for pypandoc: filename=pypandoc-1.6.4-py3-none-any.whl size=17427 sha256=f9fcfa4e03982
f7687c2c0d6b15d9ff27a273c361509aefaf4c0fe4343a7b8c950
    Stored in directory: /Users/wangwenqing/Library/Caches/pip/wheels/1d/e4/65/4bcc81dbf6dba03f945a3c3
bbf04c348ac3f3894520eb1375
Successfully built fn future pypandoc
Installing collected packages: six, pyparsing, toml, sqlparse, pytz, python-dateutil, py, pluggy, pil
low, packaging, numpy, kiwisolver, configparser, greenlet, cycler, attrs, asgiref, SQLAlchemy, pytest, p
ypandoc, matplotlib, future, fn, django, argparse
Successfully installed SQLAlchemy-1.4.25 argparse-1.4.0 asgiref-3.4.1 attrs-21.2.0 cycler-0.10.0 djan
go-3.2.7 fn-0.4.3 future-0.18.2 greenlet-1.1.1 configparser-1.1.1 kiwisolver-1.3.2 matplotlib-3.4.3 nump
y-1.21.2 packaging-21.0 pillow-8.3.2 pluggy-1.0.0 py-1.10.0 pypandoc-1.6.4 pyparsing-2.4.7 pytest-6.2
.5 python-dateutil-2.8.2 pytz-2021.1 six-1.16.0 sqlparse-0.4.2 toml-0.10.2
(Opentuner) wangweningdeMBP:软件系统优化 wangwenqing$
```

```
python setup.py develop
```

运行中出现如下报错

```
-----
Traceback (most recent call last):
  File "setup.py", line 30, in <module>
    long_description=read_md('README.md'),
  File "setup.py", line 13, in <lambda>
    read_md = lambda f: convert(f, 'rest')
  File "/Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/pypandoc/__init___.py", line 67, in convert
    return _convert_input(source, format, input_type, to, extra_args=extra_args,
  File "/Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/pypandoc/__init___.py", line 260, in _convert_input
    _ensure_pandoc_path()
  File "/Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/pypandoc/__init___.py", line 570, in _ensure_pandoc_path
    raise OSError("No pandoc was found: either install pandoc and add it\n"
OSError: No pandoc was found: either install pandoc and add it
to your PATH or or call pypandoc.download_pandoc(...) or
install pypandoc wheels with included pandoc.
```

进入该网址 <http://johnmacfarlane.net/pandoc/installing.html> 下载安装pandoc即可解决

最后结果如下

```
Adding numpy 1.21.2 to easy-install.pth file
Installing f2py script to /Users/wangwenqing/opt/anaconda3/envs/opentuner/bin
Installing f2py3 script to /Users/wangwenqing/opt/anaconda3/envs/opentuner/bin
Installing f2py3.8 script to /Users/wangwenqing/opt/anaconda3/envs/opentuner/bin

Using /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages
Searching for future==0.18.2
Best match: future 0.18.2
Adding future 0.18.2 to easy-install.pth file
Installing futurize script to /Users/wangwenqing/opt/anaconda3/envs/opentuner/bin
Installing pasterize script to /Users/wangwenqing/opt/anaconda3/envs/opentuner/bin

Using /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages
Searching for fn==0.4.3
Best match: fn 0.4.3
Adding fn 0.4.3 to easy-install.pth file

Using /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages
Searching for argparse==1.4.0
Best match: argparse 1.4.0
Adding argparse 1.4.0 to easy-install.pth file

Using /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages
Searching for greenlet==1.1.1
Best match: greenlet 1.1.1
Adding greenlet 1.1.1 to easy-install.pth file

Using /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages
Finished processing dependencies for opentuner==0.8.7
(Opentuner) wangweningdeMBP:opentuner-master wangwenqing$
```

测试安装

```
(opentuner) wangwenqingdeMacBook-Pro:opentuner-master wangwenqing$ pytest tests/*
=====
 test session starts =====
platform darwin -- Python 3.8.11, pytest-6.2.5, py-1.10.0, pluggy-1.0.0
rootdir: /Users/wangwenqing/Desktop/软件系统优化/hw2/opentuner-master
collected 23 items

tests/test_manipulator.py .. .....
tests/test_technique.py .....
[ 82%]
[100%]

=====
 warnings summary =====
./../../../../opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/future/standard_library
/_init_.py:65
 /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/future/standar
d_library/_init__.py:65: DeprecationWarning: the imp module is deprecated in favour of impo
rtlib; see the module's documentation for alternative uses
     import imp

./../../../../opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/fn/iters.py:2
 /Users/wangwenqing/opt/anaconda3/envs/opentuner/lib/python3.8/site-packages/fn/iters.py:2:
 DeprecationWarning: Using or importing the ABCs from 'collections' instead of from 'collect
ions.abc' is deprecated since Python 3.3, and in 3.10 it will stop working
     from collections import deque, Iterable

-- Docs: https://docs.pytest.org/en/stable/warnings.html
=====
 23 passed, 2 warnings in 15.75s
=====
(Opentuner) wangwenqingdeMacBook-Pro:opentuner-master wangwenqing$
```

2. 阅读论文《OpenTuner: An Extensible Framework for Program Autotuning》，理解其主要思想。

为了更好或者更便携的性能，在许多领域都演示了自动调谐。但是，autotuners本身通常不是很便携，因为使用域通知的搜索空间表示是很关键的。

OpenTuner是构建领域特定多目标程序autotuners的新框架。OpenTuner支持完全可以定制的配置表示形式，可以扩展的技术表示，以便与调优程序通信。OpenTuner中的关键功能是同时使用不同搜索技术的集合，实现良好性能的技术将接收更大的测试预算和技术，这将导致性能低下。

3.练习 Optimizing Block Matrix Multiplication 教程并记录执行过程和结果，了解开源项目

开发和维护流程。

```
(opentuner) wangweningdeMBP:hw2 wangwenqing$ python mmm_tuner.py --no-dups --stop-after=30
Traceback (most recent call last):
  File "mmm_tuner.py", line 7, in <module>
    import adddeps # fix sys.path
ModuleNotFoundError: No module named 'adddeps'
(opentuner) wangweningdeMBP:hw2 wangwenqing$
```

解决方法参考<https://github.com/jansel/opentuner/issues/105>

将import adddeps注释掉

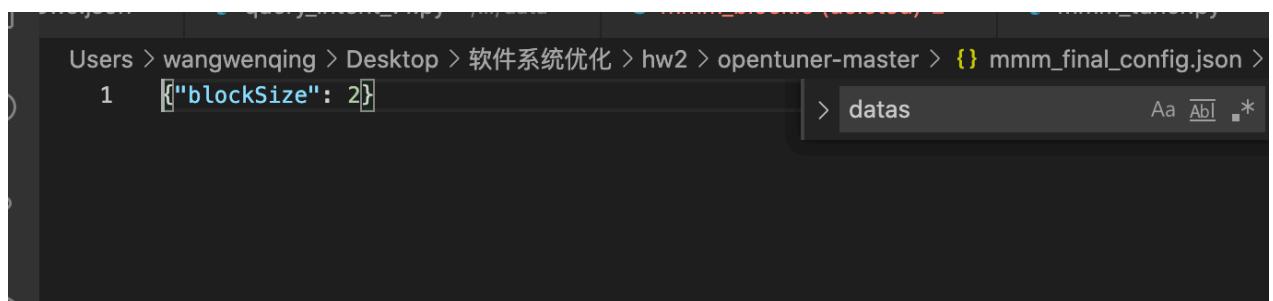
```
gcc_cmd += '-DBLOCK_SIZE=' + str(cfg['blockSize'])
```

在此处添加str

运行结果

```
(opentuner) wangweningdeMacBook-Pro:opentuner-master wangwenqing$ python mmm_tuner.py --no-dups --stop-after=30
[    3s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 466), ('UniformGreedyMutation', 31), ('DifferentialEvolutionAlt', 3), ('RandomNelderMead', 1)]
[    4s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 489), ('DifferentialEvolutionAlt', 8), ('UniformGreedyMutation', 4)]
[    6s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 485), ('UniformGreedyMutation', 8), ('DifferentialEvolutionAlt', 8)]
[    8s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 489), ('DifferentialEvolutionAlt', 8), ('UniformGreedyMutation', 4)]
[   10s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 485), ('UniformGreedyMutation', 8), ('DifferentialEvolutionAlt', 8)]
[   11s]   INFO opentuner.search.plugin.DisplayPlugin: tests=10, best {'blockSize': 2}, cost time=0.0059, found by RandomNelderMead,DifferentialEvolutionAlt
[   12s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 465), ('UniformGreedyMutation', 28), ('DifferentialEvolutionAlt', 8)]
[   15s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 493), ('UniformGreedyMutation', 4), ('DifferentialEvolutionAlt', 4)]
[   17s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 493), ('UniformGreedyMutation', 4), ('DifferentialEvolutionAlt', 4)]
[   20s]   INFO opentuner.search.metatechniques: AUCBanditMetaTechniqueA: [('NormalGreedyMutation', 489), ('DifferentialEvolutionAlt', 8), ('UniformGreedyMutation', 4)]
[   21s]   INFO opentuner.search.plugin.DisplayPlugin: tests=10, best {'blockSize': 2}, cost time=0.0059, found by RandomNelderMead,DifferentialEvolutionAlt,DifferentialEvolutionAlt
```

mmm_final_config.json可以看到



The screenshot shows a terminal window with the following path and content:

```
Users > wangwenqing > Desktop > 软件系统优化 > hw2 > opentuner-master > mmm_final_config.json >
1   [{"blockSize": 2}] > datas
```

The terminal window has a dark background and light-colored text. The current directory is displayed at the top, followed by the file name 'datas'. The file content is shown as a single line of JSON code: `[{"blockSize": 2}]`. The terminal also includes standard navigation and status bars.