**GLUT ACM Practice Summary**

**班级:2016级计算机6班 2017年11月6日**

**姓名:杨易 学号:3162052051639**

**实验题目:经典：动态规划**

This summary was auto generated by python, you could found it at [**https://github.com/cthulhujk/glut\_acm\_practice**](https://github.com/cthulhujk/glut_acm_practice).

**1.Lab Topic**

* 经典：动态规划

0-1背包问题：若有物品n个，每个物品的价值Value，用vi表示，每个物品的重量weight用wi表示，其中vi和wi均为非负数。设背包的总容量为W，且W为非负数。现需要考虑的问题是：如何选择装入背包的物品，使装入背包的物品总价值最大。

**2.Requirement Analysis**

输入钱币面值和数量，以及要求的总额，计算如何选择使得钱币数量最少即能达到要求的总额

**3.APIs Design**

///////////////////////////////////////////////////////////////////////

/// Public Interface: Note that these interfaces were even not actually

/// APIs which could be called by other functions.

///////////////////////////////////////////////////////////////////////

//@summary No public APIs provided

//@param void none

//@return void none

static void NoneExportedAPI(void);

**4.Detail Design**

从背包最小额度开始，每次选择当前或者不选当前，计算最大收益，直到背包最大额度即为最优结果。

///////////////////////////////////////////////////////////////////////

/// Pseudocode implementations: implementation details of program

/// described by pseudocode. Its syntax was familiar to Python.

///////////////////////////////////////////////////////////////////////

void dpSolution() {

for (int i = 1; i <= n; i++) {

for (int k = 1; k <= totalWeight; k++) {

if (weight[i] <= k) {

dp[i][k] = std::max(dp[i - 1][k], dp[i - 1][k - weight[i]] + value[i]);

}

else {

dp[i][k] = dp[i - 1][k];

}

}

}

}

**5.Building and running**

I have A LOT free time to do uesless work. Obviously this project can easily use g++/clang compiled for all, but I still write a cmake rules to make it more engineered and modernization, even in previous you could see manual makefile. Notice that this project was licensed under [MIT License](https://github.com/cthulhujk/glut_acm_practice/blob/master/public/LICENSE), which means you can do almost everything you want with it. Anyway, I just want to make it more fun :-)

Prerequisite:

* unix make
* g++ version >= 4.8.4
* git
* cmake >= 3.5.0

For linux users:

$ git clone https://github.com/NagaseMinato/glut\_acm\_practice.git

$ cd glut\_acm\_practice/build

$ cmake .. -G"Unix Makefiles"

$ make -j8

$ ../bin/01pack\_v1.0 # try to run a built program

$ make clean

There are more details about each programs in testsuites, you can run it to see more if you had been installed valgrindtoolchain:

$ sudo apt-get install valgrind

$ make test # run testsuite

For windows users:

> git clone https://github.com/NagaseMinato/glut\_acm\_practice.git

> cd glut\_acm\_practice/build

> cmake .. -G"Visual Studio 15 2017"

Then double-click glut\_acm\_practice.sln, select a sub project and build it, enjoy it!

**6.Test Output**

0-1背包问题：若有物品n个，每个物品的价值Value，用vi表示，每个物品的重量weight用wi表示，其中vi和wi均为非负数。设背包的总容量为W，且W为非负数。现需要考虑的问题是：如何选择装入背包的物品，使装入背包的物品总价值最大。 [](https://github.com/cthulhujk/glut_acm_practice/blob/master/public/01pack_v1.0.png)

**7.Appendix**

* All programs had been passed my own test cases, you can add/modify/delete testcases into corresponding test/\*.data file. For me, I eliminated all warnings and memory leaking using [valgrind](http://valgrind.org/)
* For more information about how to run these test, see # 5.Usage section

Test project /home/racaljk/Desktop/glut\_acm\_practice/build

Start 1: test\_running\_\_01pack\_v1.0

1/16 Test #1: test\_running\_\_01pack\_v1.0 ............ Passed 0.01 sec

Start 2: test\_running\_\_8queen

2/16 Test #2: test\_running\_\_8queen ................. Passed 0.00 sec

Start 3: test\_running\_\_poj3299\_WA

3/16 Test #3: test\_running\_\_poj3299\_WA ............. Passed 0.00 sec

Start 4: test\_running\_\_poj\_1007\_40percentAC

4/16 Test #4: test\_running\_\_poj\_1007\_40percentAC ... Passed 0.01 sec

Start 5: test\_running\_\_poj\_1590\_33percentAC

5/16 Test #5: test\_running\_\_poj\_1590\_33percentAC ... Passed 0.00 sec

Start 6: test\_running\_\_poj\_2386\_49percentAC

6/16 Test #6: test\_running\_\_poj\_2386\_49percentAC ... Passed 0.00 sec

Start 7: test\_running\_\_poj\_2538\_47percentAC

7/16 Test #7: test\_running\_\_poj\_2538\_47percentAC ... Passed 0.00 sec

Start 8: test\_running\_\_poj\_3278\_31percentAC

8/16 Test #8: test\_running\_\_poj\_3278\_31percentAC ... Passed 0.00 sec

Start 9: test\_running\_\_poj\_3979\_30percentAC

9/16 Test #9: test\_running\_\_poj\_3979\_30percentAC ...\*\*\*Failed 0.13 sec

Start 10: test\_running\_\_solution1

10/16 Test #10: test\_running\_\_solution1 .............. Passed 0.00 sec

Start 11: test\_running\_\_solution2

11/16 Test #11: test\_running\_\_solution2 .............. Passed 0.00 sec

Start 12: test\_running\_\_solution3

12/16 Test #12: test\_running\_\_solution3 .............. Passed 0.00 sec

Start 13: test\_running\_\_solution4

13/16 Test #13: test\_running\_\_solution4 .............. Passed 0.00 sec

Start 14: test\_running\_\_solution5

14/16 Test #14: test\_running\_\_solution5 .............. Passed 0.00 sec

Start 15: test\_running\_\_solution6

15/16 Test #15: test\_running\_\_solution6 .............. Passed 0.00 sec

Start 16: test\_running\_\_solution8

16/16 Test #16: test\_running\_\_solution8 .............. Passed 0.00 sec

94% tests passed, 1 tests failed out of 16

Total Test time (real) = 0.19 sec