「有了他我们无法活」

——炮打司令部

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Outline

- 采访
- Faster I/O
- C++11 / 14
- Common pitfalls
- Bitmask
- Bitmask+dp
- 如何让队友认错之如何表扬队友

采访

~~a.k.a. 教学质量检查~~

- 上次课讲的内容大家都听懂了吗?

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- 那还记得上次讲的什么吗?
- 对不起，这次没有A Water Problem

Faster I/O

Why?

- No need to parse the format string
- Makes better use of the I/O buffer

Faster I/O

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How?

- `.sync_with_stdio(false)`
- `getchar()`
- `fread()`

Faster I/O

Faster input - getchar()

```
int readint()
{
        int ret=0;
        char ch=getchar();
        while(ch<'0'||ch>'9')
                ch=getchar();
        do
        {
                ret=ret*10+ch-'0';
                ch=getchar();
        }while(ch>='0'&&ch<='9');
        return ret;
}
```

Faster I/O

Even faster input - fread()

```
char s[SOME_LARGE_VALUE];
size_t ptr,len;
len=fread(s,1,SOME_LARGE_VALUE,stdin);
int readint()
{
        //replace getchar() with s[ptr++]
        ...
}
```

Faster I/O

Even faster input - fread()

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char s[SOME_LARGE_VALUE];
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```

Reading real numbers?

Faster I/O

Faster output

- Print digit by digit
- Save to buffer then `fwrite()` to `stdout`.

C++11 / 14 - Useful features that reduces coding efforts

C++11

- Uniform initialization

```
struct S{int a;double b;char c;};
S s{1,2.0,'3'};//s.a==1; s.b==2.0; s.c=='3';
```

- Type inference

```
std::set<int> s;
auto a=1;
auto it=s.begin();
```

- Range-based for loop

```
std::vector<int> v;
for(auto &i:v)...
```

C++11 / 14 - Useful features that reduces coding efforts

C++11 cont'd

- Lambda functions

```
std::sort(p+1,p+nv,[o=p[0]](const v3d& a,const v3d& b)->bool
        {
                double cross=(a.x-o.x)*(b.y-o.y)-(b.x-o.x)*(a.y-o.y);
                if(sgn(cross))return sgn(cross)>0;
                double la=hypot(a.x-o.x,a.y-o.y);
                double lb=hypot(b.x-o.x,b.y-o.y);
                return la<lb;
        }
);
```

- Right angle bracket

```
        std::vector<std::pair<int,int>> v;
```

- `long long int`

  Yeah, it was not standard until C++11 (C99).

C++11 / 14 - Useful features that reduces coding efforts

C++11 STL

- Hash tables
  `std::unordered_map, std::unordered_set`
- `std::tuple`
- Regular expressions
- Threading
- Random number generators

C++11 / 14 - Useful features that reduces coding efforts

C++14

C++14 is a small extension to C++11.

- Improved auto

```
auto factorial(int x){
        if(x==1)return 1;
        return x*factorial(x-1);
}
```

- Improved lambda functions

```
auto lambda=[](auto x,auto y){return x+y;};
```

- Lambda capture expressions

Common pitfalls

- Huge global variable causes linkage error.

```
int a[1LL<<12][1LL<<48],b[1LL<<12][1LL<<48],c[1LL<<12][1LL<<48];
int main(){c[0][0]=1;}
```

Compilation result:

```
g++ -Wall -std=c++14 -g -o "test" "test.cpp" -lm (in directory:
/home/chrisoft/code)
/tmp/ccOkFQ7A.o: In function ‘main’:
/home/chrisoft/code/test.cpp:2:(.text+0x6):
relocation truncated to fit: R_X86_64_PC32 against symbol
‘c’ defined in .bss section in /tmp/ccOkFQ7A.o
collect2: error: ld returned 1 exit status
Compilation failed.
```

- relocation of `.bss` section exceeding platform limitations.

Common pitfalls

- Stack size is very small compared to heap
  `int main(){int a[100000000];...}`
- Results in stack overflow.
- Math library
- `memset()` TLE

Bitmask

- A set in its binary form
- Codeforces 550B

Bitmask

- A set in its binary form
- Codeforces 550B
- Codeforces 579A

Bitmask+dp

- Concept of a **state**

Bitmask+dp

- Concept of a **state**
- Value function

Bitmask+dp

- Concept of a **state**
- Value function
- Initial state

Bitmask+dp

- TSP(Travelling Salesman Problem)
- Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city exactly once and returns to the origin city?

Bitmask+dp

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- f[s][i]: s: set of visited cites, i: current city
- functional equation: $f[s][i] = \min_{k:N} f[s-i][k] + dist[k][i](k \notin s)$
- Initial state: f[U][0]=0;

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- Initial state: f[U][0]=0;
- Variant
- Loop direction

Bitmask+dp

- TSP: POJ 3311
- Counting: POJ 3254
- f[i][s]: row i with set s occupied

如何让队友认错之如何表扬队友

队友需要表扬才能更有生产力

俞旭铮

（你看 你也可以趁机表扬我一发对不对> >

如何让队友认错之如何表扬队友

光辉事迹

- 比赛中要其他队伍帮忙写对拍
- 比赛中睡3小时觉
- 全权负责实验室事务
- 发说说

宇宙智障的说说

就终于考完试了_(:з」∠)_
然而暑假这种？不存在的(滑稽
还是献给辣鸡的(划掉)acm好了
学期结束,事儿反而就又突然多了起来
假装已有计划的专题训练
各种姿势被虐的多校联合
以及暑期集训的萌新教学
与开始正式接手的实验室各种大小事务的锅

相信,一定会是个忙碌的七八月份吧
希望,也同会是个充满收获的七八月
就也会更期待着
在八月初的短假里
与小姐姐愉快的玩耍呢
总之,一定会是个不平凡的假期
再以及,小姐姐寄的明信片也终于到了:)

宇宙智障的说说

俞旭铮　明天挂着这个上场,大概会有气势加成(滑稽脸

拍摄于 2017年5月20日 西安市西北工业大学(长安校区)

2017年5月20日　来自小米5

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为何要表扬队友

- 让恬不知耻的队友知道错（似乎对宇宙智障无效）
- 叫醒队友
- 鼓励队友~~WA~~更多题

放假事宜

- 宇宙智障已经畏罪潜逃
- 宇宙智障8月7日将被扭送
- 大家一定不用比宇宙智障回来的早