NCKU Programming Contest Training Course
Introduction & IO
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Online Judge

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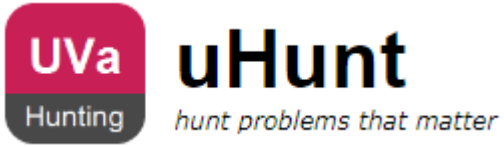
Online Judge

- POJ (PKU Online Judge)
  - POJ : http://poj.org

- Uva Online Judge -> useful tool: uHunt
  - UVa : https://uva.onlinejudge.org
  - uHunt : https://uhunt.onlinejudge.org



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Problem format

Description ← 問題描述

Calculate a+b

Input ← 輸入格式

Two integer a,b (0<=a,b<=10)

Output ← 輸出格式

Output a+b

Sample Input ← 輸入範例

```
1 2
```

Sample Output ← 輸出範例

```
3
```

A+B Problem

Time Limit: 1000MS **Memory Limit:** 10000K

Total Submissions: 342704 **Accepted:** 190305

時間、記憶體限制

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Result

Result	Memory	Time	Language	Code Length
Accepted	688K	0MS	G++	314B
Wrong Answer			C++	1849B
Compile Error			G++	319B
Accepted	4624K	94MS	G++	939B
Time Limit Exceeded			C++	2179B
Wrong Answer			C	300B
Wrong Answer			G++	1244B
Accepted	708K	0MS	G++	206B
Accepted	3528K	235MS	G++	1325B
Accepted	704K	0MS	G++	574B
Wrong Answer			C	389B
Wrong Answer			G++	1096B
Memory Limit Exceeded			G++	3073B
Accepted	732K	125MS	G++	1449B
Accepted	128K	0MS	C++	674B
Accepted	388K	79MS	G++	1288B
Presentation Error			C++	892B
Wrong Answer			G++	868B
Compile Error			G++	1285B
Accepted	664K	63MS	G++	428B

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Online Judge

- 常見 Online Judge (OJ):
  - POJ: 北京大學 - http://poj.org/
  - UVa: https://uva.onlinejudge.org/
  - ZOJ: 高中生程式解題 - http://zerojudge.tw/
  - SPOJ: http://www.spoj.com/

I/O

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Standard Input & Output

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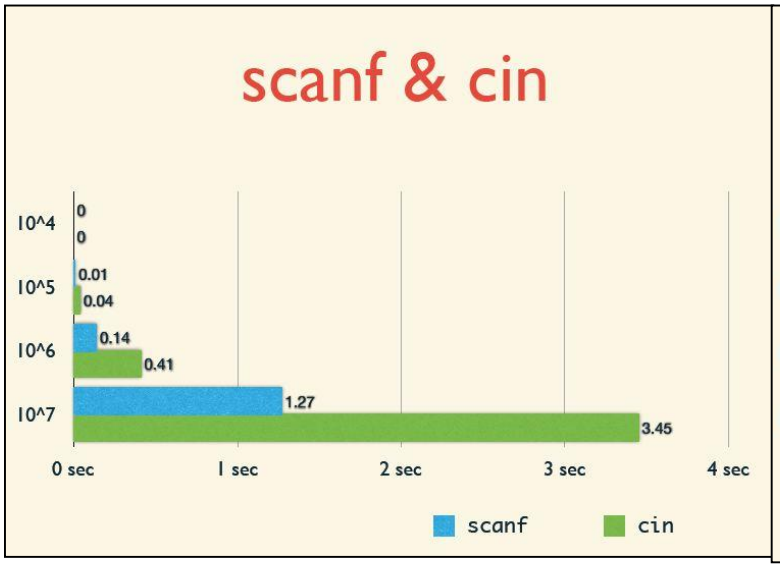
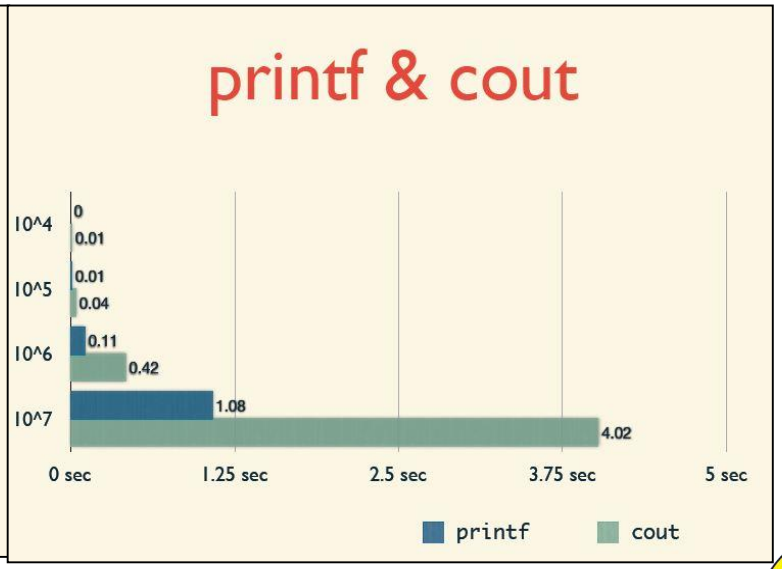
I/O for contest

- Input
  scanf, gets, getchar, cin……
- Output
  printf, puts, putchar, cout……

```
#include <iostream>
#include <cstdio>
#include <cstdlib>
using namespace std;
```





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Single Test Case

- A + B problem

Sample Input

```
1 2
```

Sample Output

```
3
```

Single Test Case

- A + B problem

```
#include <iostream>
using namespace std;

int main() {
    int a,b;
    cin >> a >> b;
    cout << a+b << endl;
    return 0;
}
```

Multiple Test Case

Sample Input

```
95.123 12
0.4321 20
5.1234 15
6.7592  9
98.999 10
1.0100 12
```

Sample Output

```
548815620517731830194541.899025343415715973535967221869852721
.000000051485546410769561219945112767671548384817602007263512038354297630134624 01
43992025569.928573701266488041146654993318703707511666295476720493953024
29448126.764121021618164430206909037173276672
904290727436295404 98.1075960194566517745610440100 01
1.126825030131969720661201
```


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Multiple Test Case (Input)

1. Given the number of test cases

A+B Problem

[Sample Input]

3
1 2
3 4
0 4

[Sample Output]

3
7
4

Multiple Test Case (Input)

1. Given the number of test cases

```
/* Given Test cases # */
…
int tc,a,b;
scanf("%d",&tc);
while(tc--) {
    scanf("%d%d",&a,&b);
    printf("%d\n",a+b);
}
…
```

A+B Problem

[Sample Input]

3
1 2
3 4
0 4

[Sample Output]

3
7
4

Multiple Test Case (Input)

2. Terminated by special values

Hi, “input #”.

[Sample Input]

30
10
25
0

[Sample Output]

Hi, 30.
Hi, 10.
Hi, 25.

Multiple Test Case (Input)

2. Terminated by special values

```
/* Until zero */
…
int n;
while(scanf("%d",&n)==1 && n) {
    printf("Hi, %d.\n",n);
}
…
```

Hi, “input #”.

[Sample Input]

30
10
25
0

[Sample Output]

Hi, 30.
Hi, 10.
Hi, 25.

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Multiple Test Case (Input)

3. Terminated by EOF signal

- 若題目未指定終止條件，則為判斷 EOF 為終止條件

Hi, “input #”.

[Sample Input]

30
10
25

[Sample Output]

Hi, 30.
Hi, 10.
Hi, 25.

Multiple Test Case (Input)

3. Terminated by EOF signal

```
/* Until EOF */
…
int n;
while(scanf("%d",&n)!=EOF) {
    printf("Hi, %d.\n",n);
}
…
```

Hi, “input #”.

[Sample Input]

30
10
25

[Sample Output]

Hi, 30.
Hi, 10.
Hi, 25.

Multiple Test Case (Input)

3. Terminated by EOF signal

scanf

```
while (scanf() != EOF)
{
    ...
}
```

fgets

```
while (fgets() != 0)
{
    ...
}
```

cin

```
while (cin >> x)
{
    ...
}
```

Multiple Test Case (Output)

1. Blank line after all cases

A+B Problem

[Sample Input]

1 2
3 4
0 4

[Sample Output]

Case 1: 3

Case 2: 7

Case 3: 4

Multiple Test Case (Output)

1. Blank line after all cases

```
/* \n\n */
…
int a,b,cs=1;
while(scanf("%d%d",&a,&b)!=EOF){
    printf("Case %d: %d\n\n",cs++,a+b);
}
…
```

A+B Problem

[Sample Input]

1 2
3 4
0 4

[Sample Output]

Case 1: 3

Case 2: 7

Case 3: 4

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Multiple Test Case (Output)

2. Separated by blank line

A+B Problem

[Sample Input]

1 2
3 4
0 4

[Sample Output]

Case 1: 3

Case 2: 7

Case 3: 4

Multiple Test Case (Output)

2. Separated by blank line

```
/* Separated */
…
int a,b,cs=1;
while(scanf("%d%d",&a,&b)!=EOF){
    if(cs>1) putchar("\n");
    printf("Case %d: %d\n",cs++,a+b);
}
…
```

A+B Problem

[Sample Input]

1 2
3 4
0 4

[Sample Output]

Case 1: 3

Case 2: 7

Case 3: 4

Cutting Skill

- String Token

[Sample Input]

Electron ICPC
kk free999 kevinx6000

[Sample Output]

2: Electron & ICPC
3: kk & free999 & kevinx6000

Cutting Skill

- strtok

```
char* strtok( char *str, const char *delimiters );
```

return value：指向當前切割字串之指標，若切割完畢則回傳 NULL。

Cutting Skill

- String Token

```
#include<cstring>
…
gets(str);
char token[]=" ",*ptr;
for( ptr=strtok(str,token); ptr; ptr=strtok(NULL,token) )
{
    /* ptr is one token */
}
…
```

[Sample Input]

Electron ICPC
kk free999 kevinx6000

[Sample Output]

2: Electron & ICPC
3: kk & free999 & kevinx6000

File I/O

- File I/O: freopen

```
/* freopen */
…
freopen("f1.in", "r", stdin);
freopen("f1.out", "w", stdout);
while(scanf(…)!=EOF){
    printf(…);
}
…
```

Vim

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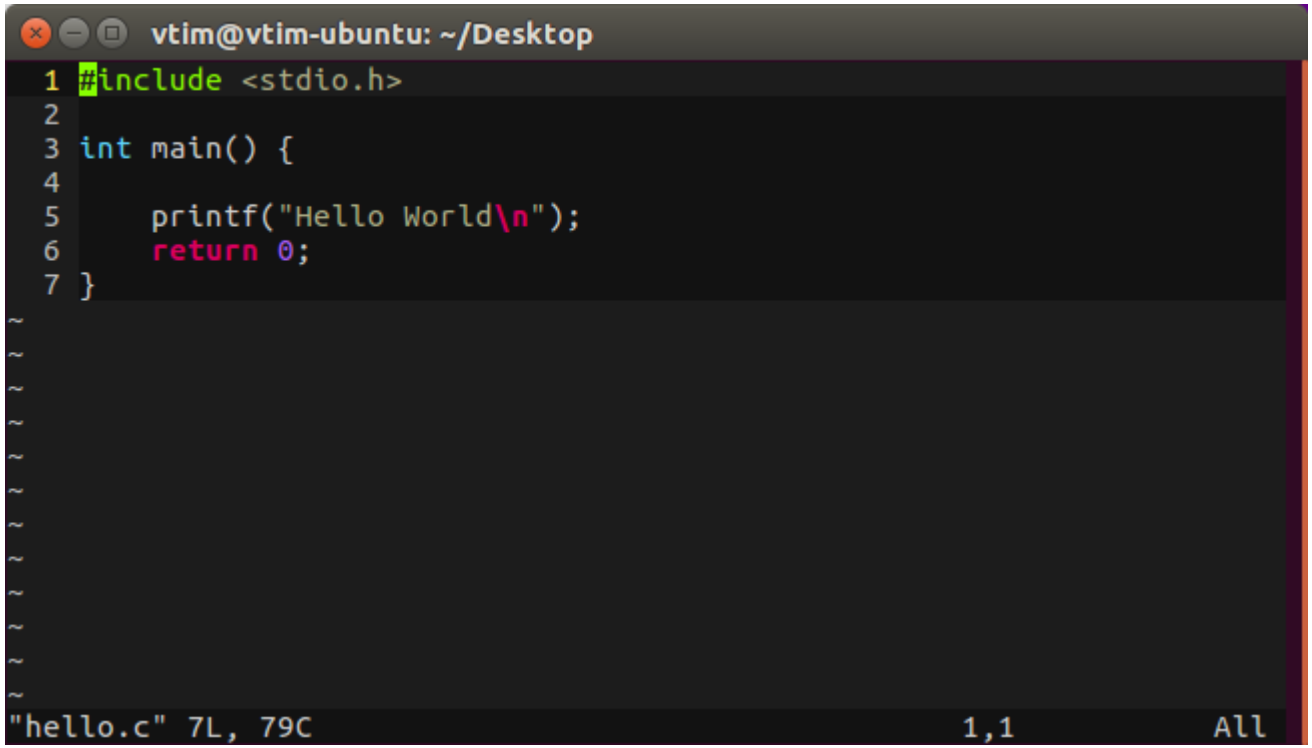
Vim

- Vim – powerful IDE



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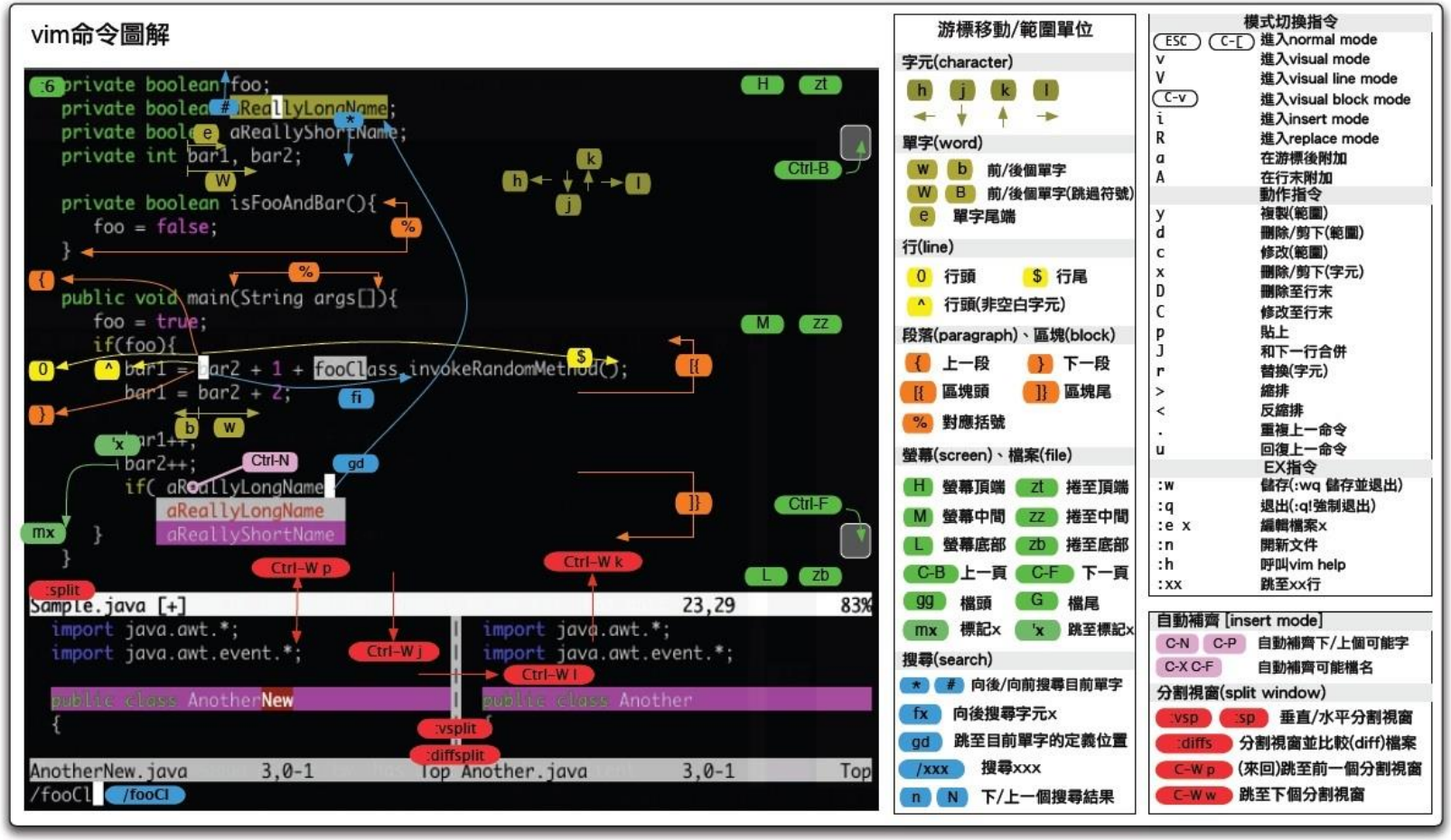
Vim

- 常用指令
  - /<string> – 搜尋
    - i 找下一個
    - I 找上一個
  - u – undo
  - v – 選取文字
  - y – 複製
  - p – 貼上
  - d – 刪除
  - :new – 新視窗(水平分割)
  - :vnew – 新視窗(垂直分割)
  - :sp – 水平分割開啟現有或指定檔案
  - :vsp - 垂直分割開啟現有或指定檔案

Vim



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Vim

- vimrc 設定教學
  - http://wiki.csie.ncku.edu.tw/vim/vimrc

```
57      size_t length = 0;
58      ssize_t read_length;
59      FILE *fp = fopen(listFileName, "r");
60
61      assert(fp != NULL && "Cannot open file list");
62
63      while((read_length = getline(&line, &length, fp)) != -1) {
64          current = (struct filelist *)malloc(sizeof(struct filelist));
65          if(current != NULL) {
66              current->next = NULL;
67              current->filename = strdup(line);
68
69              // Assume all source code from project is *.c
70              if(current->filename[read_length-1] == '\n') {
71                  current->filename[read_length-2] = 'o';
72                  current->filename[read_length-1] = '\0';
73              }
74              else
75                  current->filename[read_length-1] = 'o';
76              printf("%s\n",current->filename);
77          }
78
79          if(head == NULL) head = current;
                                                    61,1-4        38%
```


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Vim

- vimrc 常用設定
  - :set nu
    - 顯示行號
  - :set ai
    - 自動對其縮排
  - :set tabstop=4 (default 8)
    - 縮排間隔數
  - :set bg=dark (default light)
    - 上色模式

Thanks for your listening!

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Practice

- Uva (5)
  100, 579, 10424, 11727, 11984

- POJ (5)
  1000, 1004, 1298, 1450, 2159