IO

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Input and Output

Your Objectives:

- Write input routines for three kinds of test inputs,
- use ‘scanf‘ and ‘printf‘ properly for various types of variables, and
- write code for interactive tests.

Explicit Test Count

- First line of input is the number of tests you will receive.

```c
#include <stdio.h>

int main() {
  int cases,x,y;
  scanf("%d",&cases);
  while (cases>0) {
    cases--;
    scanf("%d %d",&x,&y);
    printf("%d\n",x+y);
  }
}
```

Termination Marker

- The input itself will use a special value.

```
#include <stdio.h>

int main() {
  int x,y;
  while (1) {
    scanf("%d %d",&x,&y);
    if (x==-1 && y==-1)
    break;
    printf("%d\n",x+y);
  }
}
```

Termination Marker, pt 2

```c
#include <stdio.h>

int main() {
  int x,y;
  while (scanf("%d %d",&x,&y) && x != -1 && y != -1) {
    if (x==-1 && y==-1)
    break;
    printf("%d\n",x+y);
  }
}
```

End of File

- Use EOF explicitly.

```c
#include <stdio.h>

int main() {
  int x,y;
  while (scanf("%d %d",&x,&y) != EOF) {
    if (x==-1 && y==-1)
    break;
    printf("%d\n",x+y);
  }
}
```

Why scanf and printf?

- There are problems that TLE if you use cin and cout.
- scanf has some regular-expression like features that can be useful.

Code	**Meaning**
%d	Scan an integer
%lld	Scan a long long integer
%s	Scan a string
%c	Scan a character

Spaces and such

- Literal Characters

```c
// will read "(10,20)"
scanf("(%d,%d)");
```

- Spaces

```c
// will read "(10,20)", " ( 10, 20 )", but not "(10 ,20)"
scanf(" ( %d, %d )");
```

- A binary followed by vowels

```c
// will read "110101 eieio"
scanf("%[01] %[aeiou]");
```

Interactive Tests

- Not common yet, but ICPC is starting to use them.
- One rule: call flush(stdout) every time you print.

```c
#include <stdio.h>

int main() {
  int x,y;
  while (scanf("%d %d",&x,&y) != EOF) {
    if (x==-1 && y==-1)
        break;
    printf("%d\n",x+y);
    fflush(stdout);
  }
}
```