

Memory Leak

Quiz!

Definition of memory leak

- A memory leak occurs when you call "new" without calling a corresponding "delete" later.

Sometimes it's not so obvious!
(See "shallow copy".)

How to avoid it?

- C++: "new" and "delete" must appear in pairs!
- C: "malloc" (or "calloc", or "realloc") and "free" must appear in pairs!

Example

```
int main() {
    // OK
    int * p = new int;
    delete p;

    // Memory leak
    int * q = new int;
    // no delete
}
```

```
void memLeak( )
{
    int *data = new int;
    *data = 15;
}
```

More examples!

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(20:06)

by Oliver Chang

C++: new & delete

C: malloc & free

Memory Leak: forget to delete, memory 被疊掉

How to Tackle Memory Leak?

Good programming style

- Delete/free pairs should appear in the same scope
 - Do not allocate memory in a function and free it outside.
- Avoid shallow copy
- ...

Libraries

- STL vectors
- Smart pointers
- ...

Tools for debugging

- Windows: Purify
- Unix/Linux: Valgrind

Google "avoid memory leak"...

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Tackle Memory Leak

- Avoid shallow copy
- STL