

My Notes

Important Concepts worth keeping

U1.

Today:

遞迴原理:

把問題分成很多個小問題, 分別去處理以相同方式

① 一個函式即可解決, 精簡

② debug 困難

ex1. binary search

① 一个一个找尋

② 遞迴

1. 先排序

2. 分一半去找, 找左右邊, 判斷值是大小於中間數

3. 如果是大於 \Rightarrow 右邊找, 小於 \Rightarrow 左邊找

4. 重複

CS Keyframe

My Notes

Punctuality: Showing esteem for others by doing the right things at the right time.

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My Questions

Problems & Difficulties needing exploration

ex2. 反序印出字串

① 印出最後一個字

② 保證能停止

③ 給出停止/開始遞迴的條件

```
void writeBackward (string s,
                    int size) {
    if (size > 0) {
        cout << s.substr(size-1, 1);
        writeBackward (s, size-1);
    }
}
```

\Rightarrow 0 1 2 3 4 5 6 7 8 9

Recursive Solution

① 遞迴定義

② 問題簡化

③ 終止條件

④ 保證終止

My Opinions

Thoughts, inspirations, and suggestions

ex3. 塔內塔



起要換到終, 小的在杆面

if (count == 1)

END

else

towers (count - 1, source, spare, destination);

towers (1, source, destination, spare);

towers (count - 1, spare, destination, source);



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Today:

ex4. 費氏數列

0 1 1 2 3 5 8 ...

* That is, $n_k > 2^{k/2}$. It's exponential! 平方級數以指數成長

* 空間換時間 (用陣列記數表)

if (k == 1)

return (k, 0)

else

(i, j) = linearFibonacci(k-1);

return (i+j, i)

ex5. n選k

$C(n, k) = 1$ if $k = 0$ (都不選)
 0 if $k = n$ (全放)
 0 if $k > n$ (選超過n個)
 $\Rightarrow C(n-1, k-1) + C(n-1, k)$ if $0 < k < n$

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4. The devil is hidden in details, and the angel, too.

魔鬼藏在細節裡, 天使更是這樣。

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U2

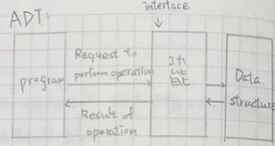
Today

物件導向:

① 皆是物件

② 有做動作

③ 容易讀, 寫



* 反轉序列

```
reverseList > (int alist: List, out source: boolean)
```

```
for (int i to alist.getLength() - 1)
```

```
{ alist.retrieve (alist.getLength() - 1, dataItem, success);
```

```
alist.insert (i, dataItem, success);
```

```
alist.remove (alist.getLength() - 1, success);
```

```
}
```

C++ Classes [描述
寫作]

以球為例

描述: 預設, 自訂, 設定半徑, 取得半徑... (預設解構)

寫作: 把描述的寫成code

6 The meaning is not in the words, but in the heart.

My Questions

Problems & Difficulties needing exploration

* 多載

```
class {
```

```
Add (int num, int k); 裡面放的參數不一樣, Add 不同
```

```
Add (int num);
```

* 刪除

```
void List::remove (int index, bool & success){
```

```
success = (index > 1) && (index < size);
```

```
if (success){
```

```
for (int fromPosition = index + 1; fromPosition <= size; fromPosition++)
```

```
item[translate (fromPosition - 1)] = item[translate (fromPosition)]
```

My Opinions

Thoughts, inspirations and suggestions

```
}
```

* Polynomial

1. 多項式最高次項

degree ()

2. Power 項的係數

coefficient (in: Power)

3. 將 Power 項的係數改變, new Coefficient

changeCoefficient (in: Coefficient
in: power)

意義不在字眼裡, 而在心眼裡。

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Today

* Namespaces

namespace smallNamespace 自訂命名空間

```
{
```

```
int count = 0;
```

```
void abc ();
```

```
}
```

using namespace smallNamespace 使用命名空間

```
count += 1
```

```
abc ();
```

My Questions

Problems & Difficulties needing exploration

* Exceptions

```
try { ... throw (type); ... }
```

```
catch (type1) {
```

```
statement(s);
```

```
}
```

```
catch (type2) {
```

```
statement(s);
```

```
}
```

做完了跳過範圍

My Opinions

Thoughts, inspirations and suggestions

你們的話, 是, 就說是; 不是, 就說不是。
【馬太福音】

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