for迴圈介紹

2015 資訊之芽/語法班, Gin

什麼是迴圈?

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- Loop(迴圈)

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- 符合某些條件的時候！

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- Ex. 印出數字1~100在螢幕上

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- Ex. 印出數字1~100在螢幕上
  重複做的事：印出數字

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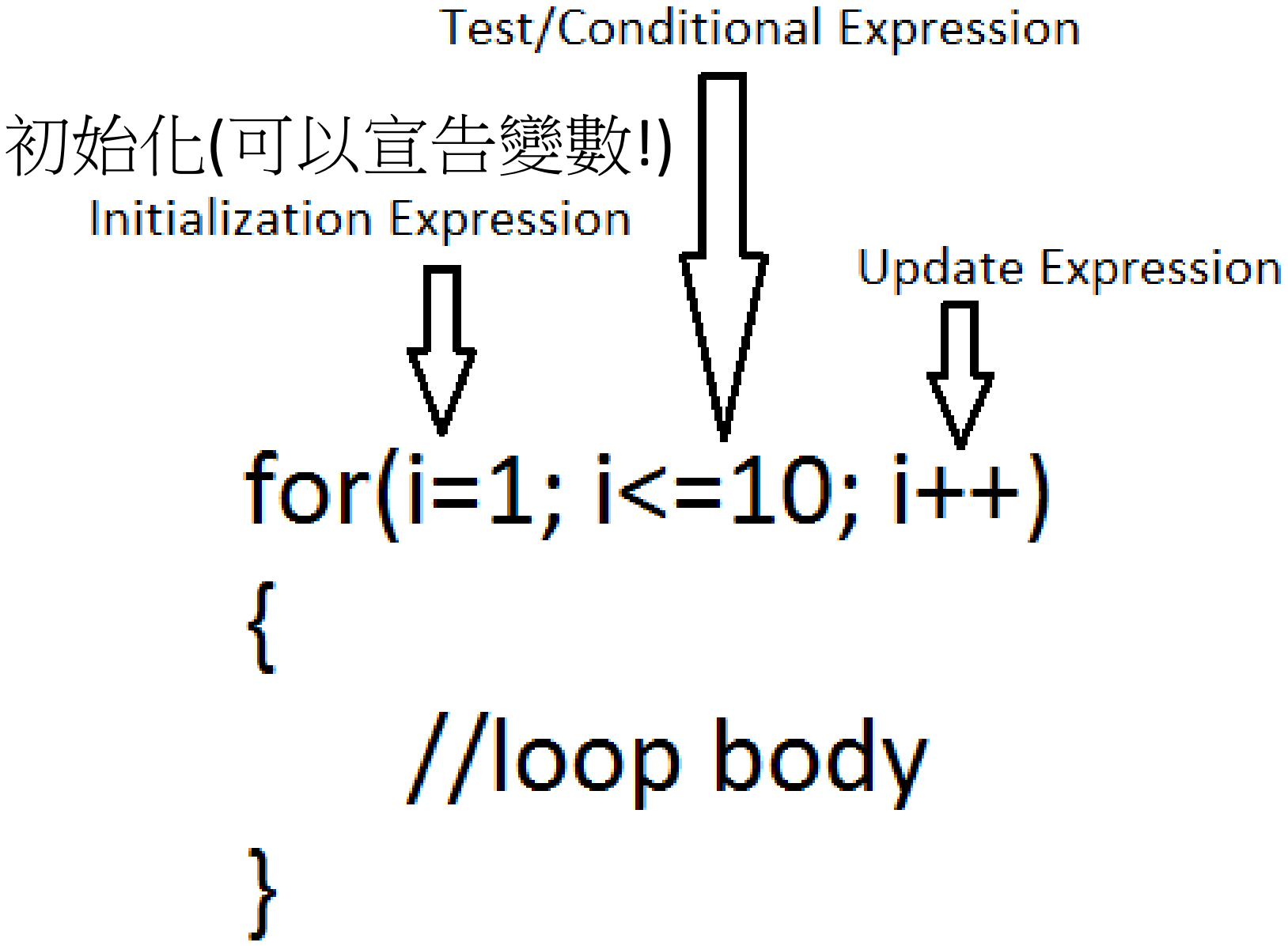
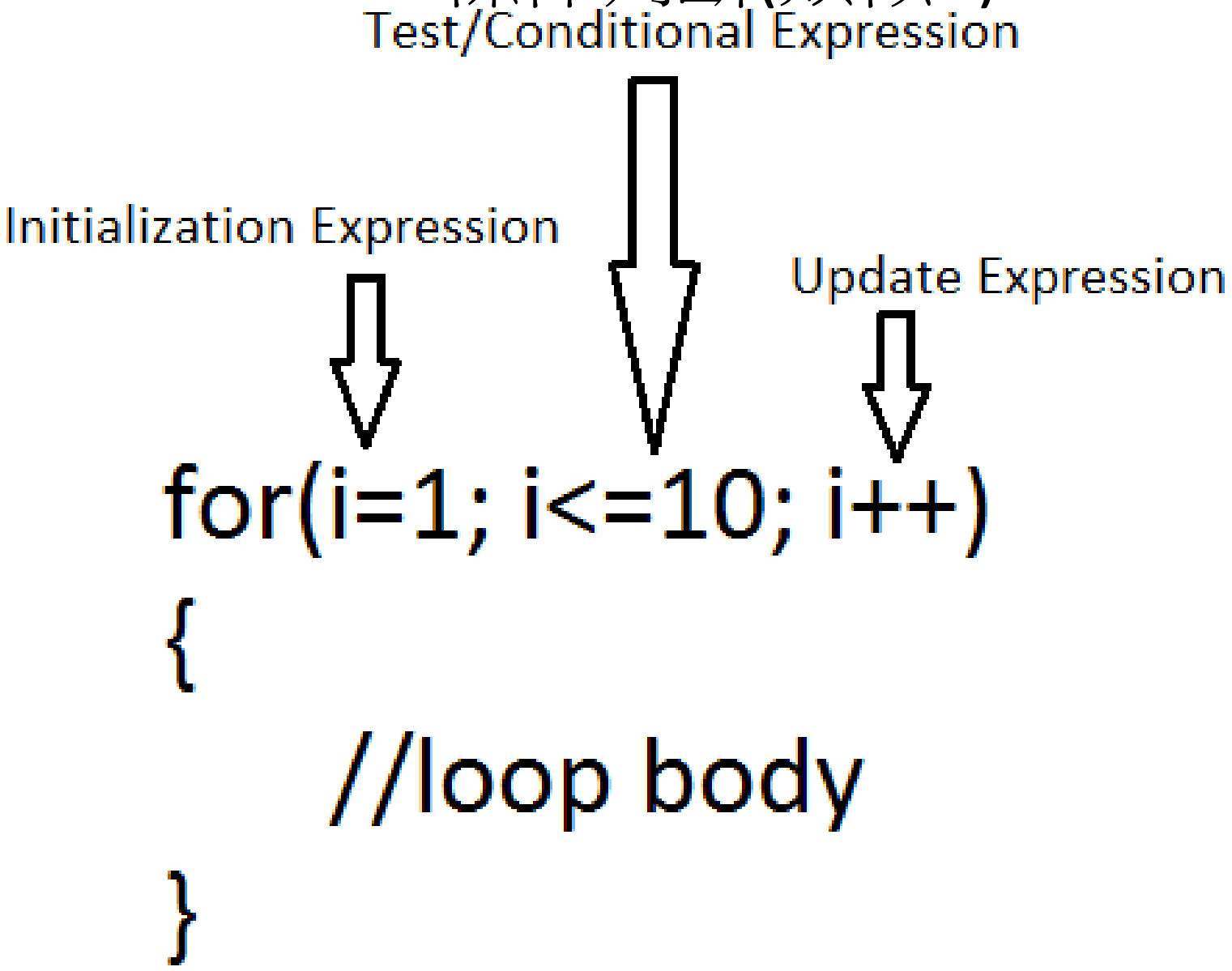
- 什麼時候停止？
- 符合某些條件的時候！
- Ex. 印出數字1~100在螢幕上
  重複做的事：印出數字
  什麼時候停：印了100次之後

那for又是甚麼？


Test/Conditional Expression
初始化(可以宣告變數!)
Initialization Expression
Update Expression
for(i=1; i<=10; i++)
{
//loop body
}

條件判斷(類似if)


Test/Conditional Expression
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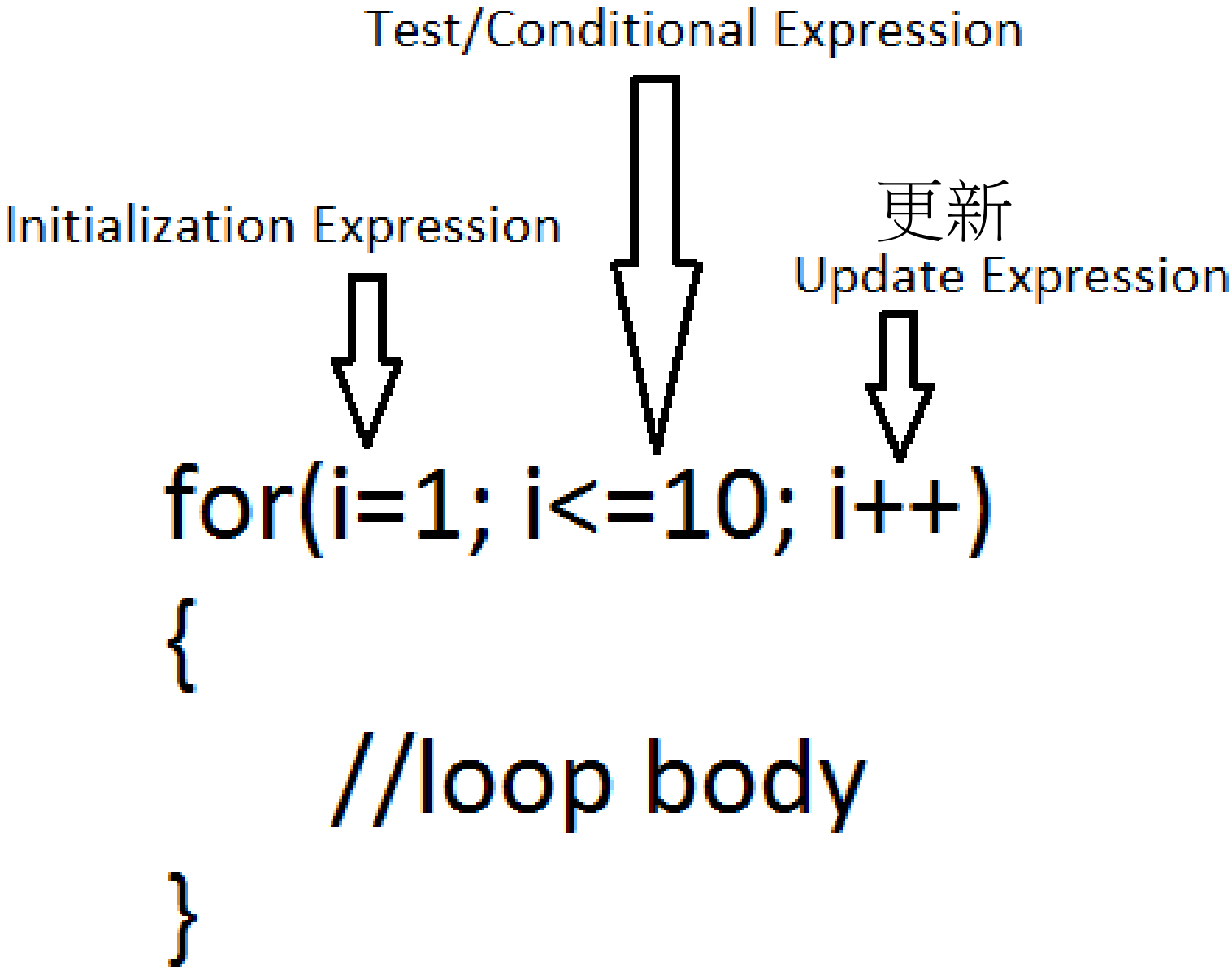
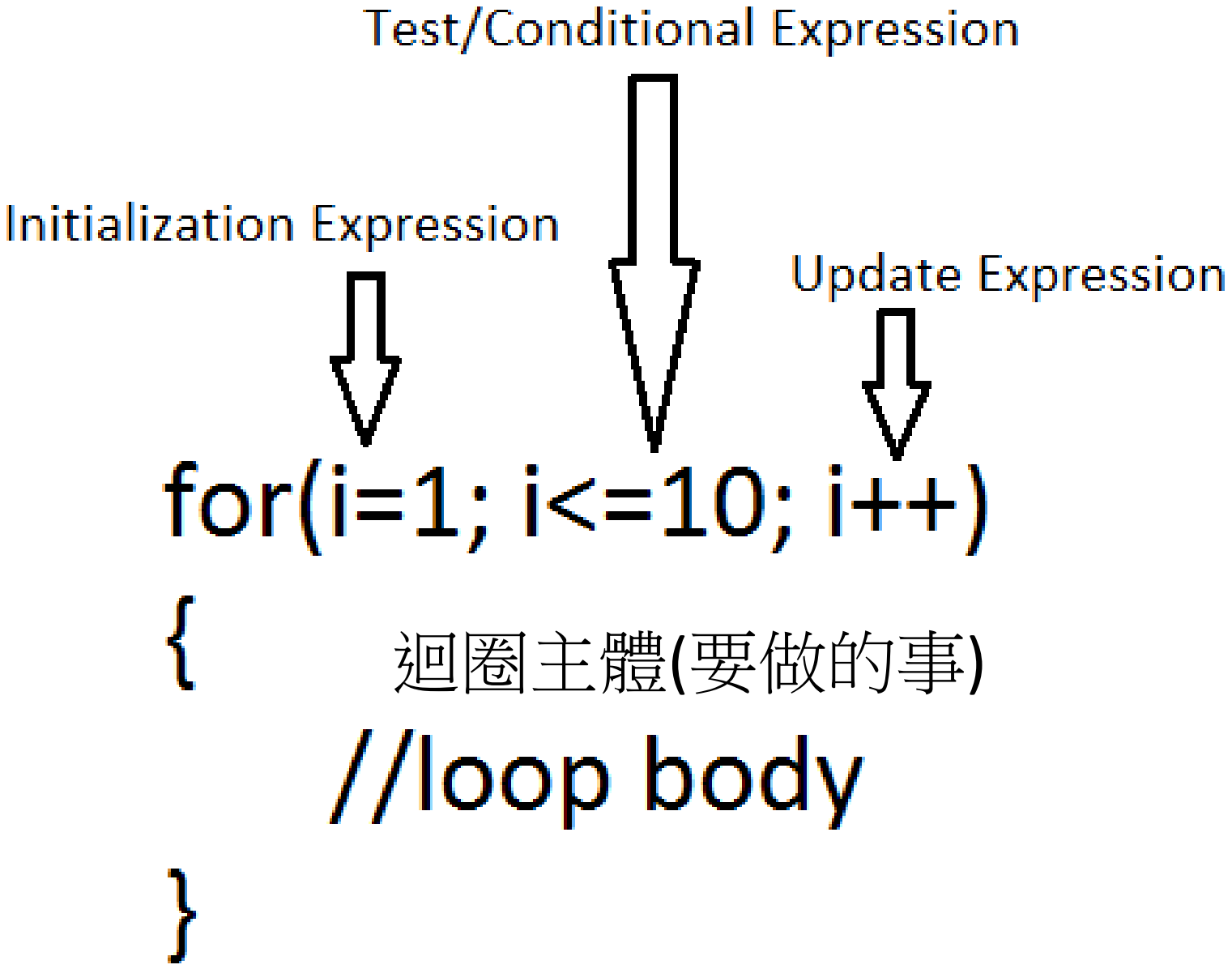
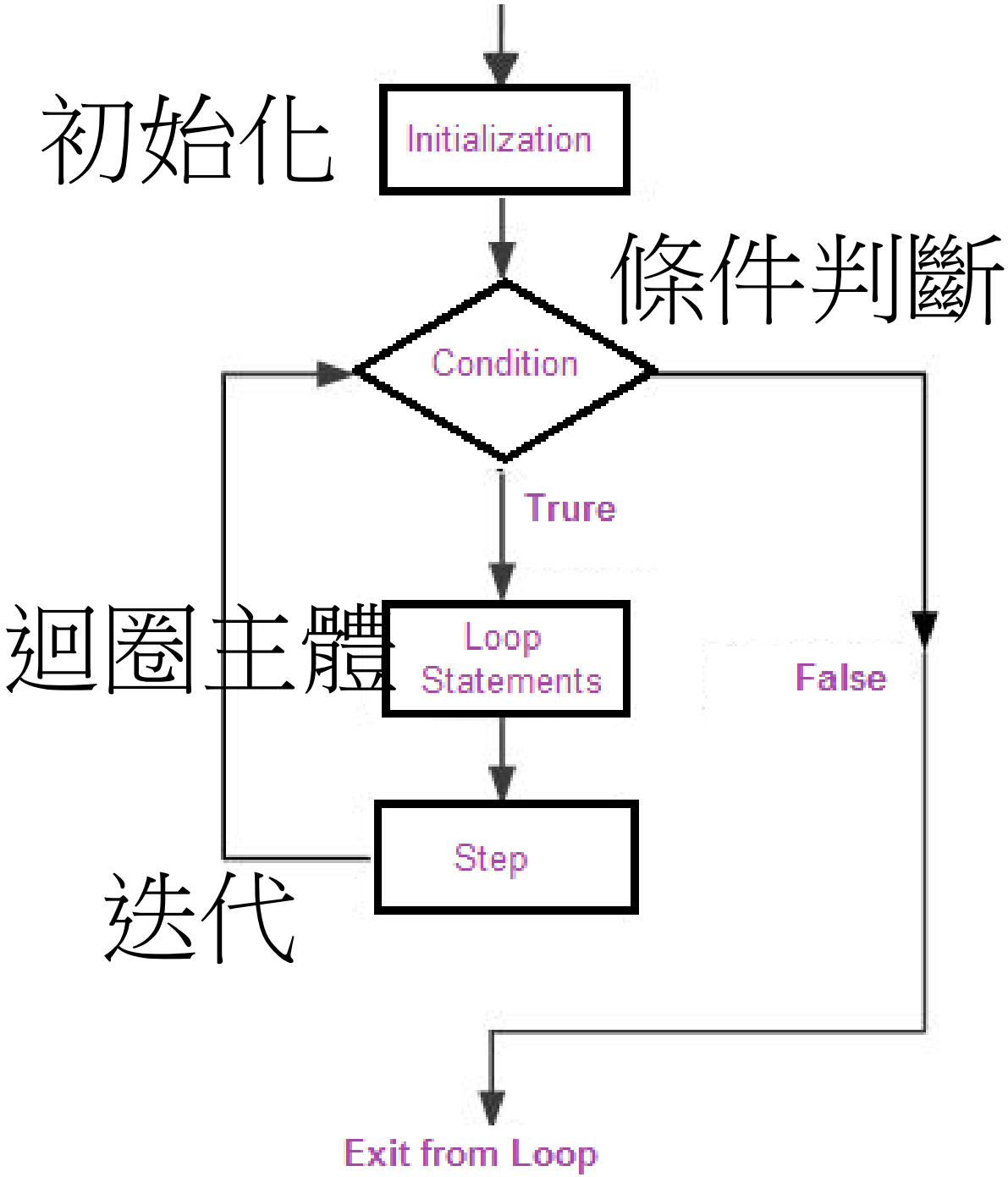
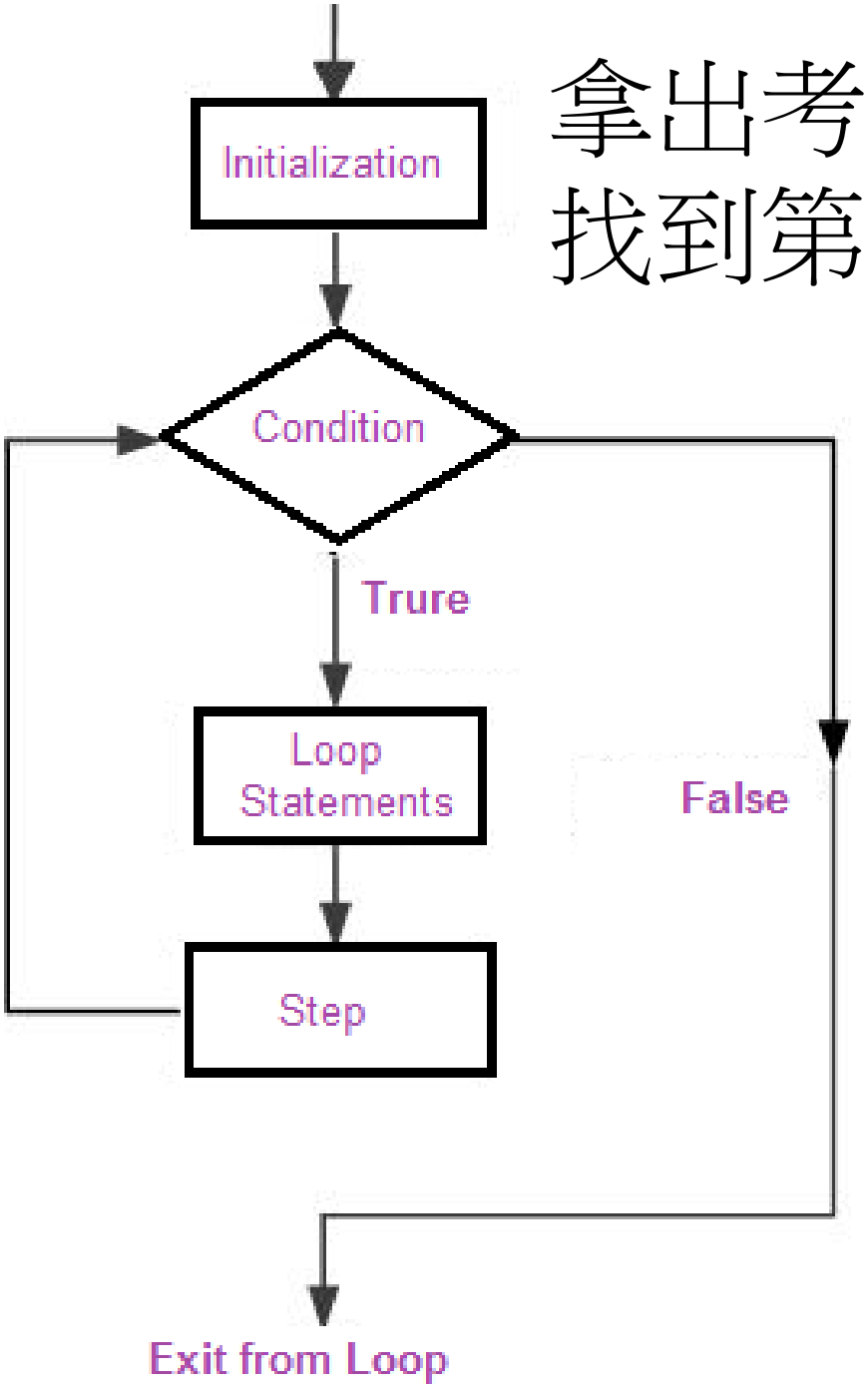

Test/Conditional Expression
Initialization Expression
更新
Update Expression
for(i=1; i<=10; i++)
{
//loop body
}


Test/Conditional Expression
Initialization Expression
Update Expression
for(i=1; i<=10; i++)
{
迴圈主體(要做的事)
//loop body
}


初始化
Initialization
條件判斷
Condition
Trure
迴圈主體
Loop
Statements
False
Step
迭代
Exit from Loop

Example:
抄考卷

拿出考卷
找到第一格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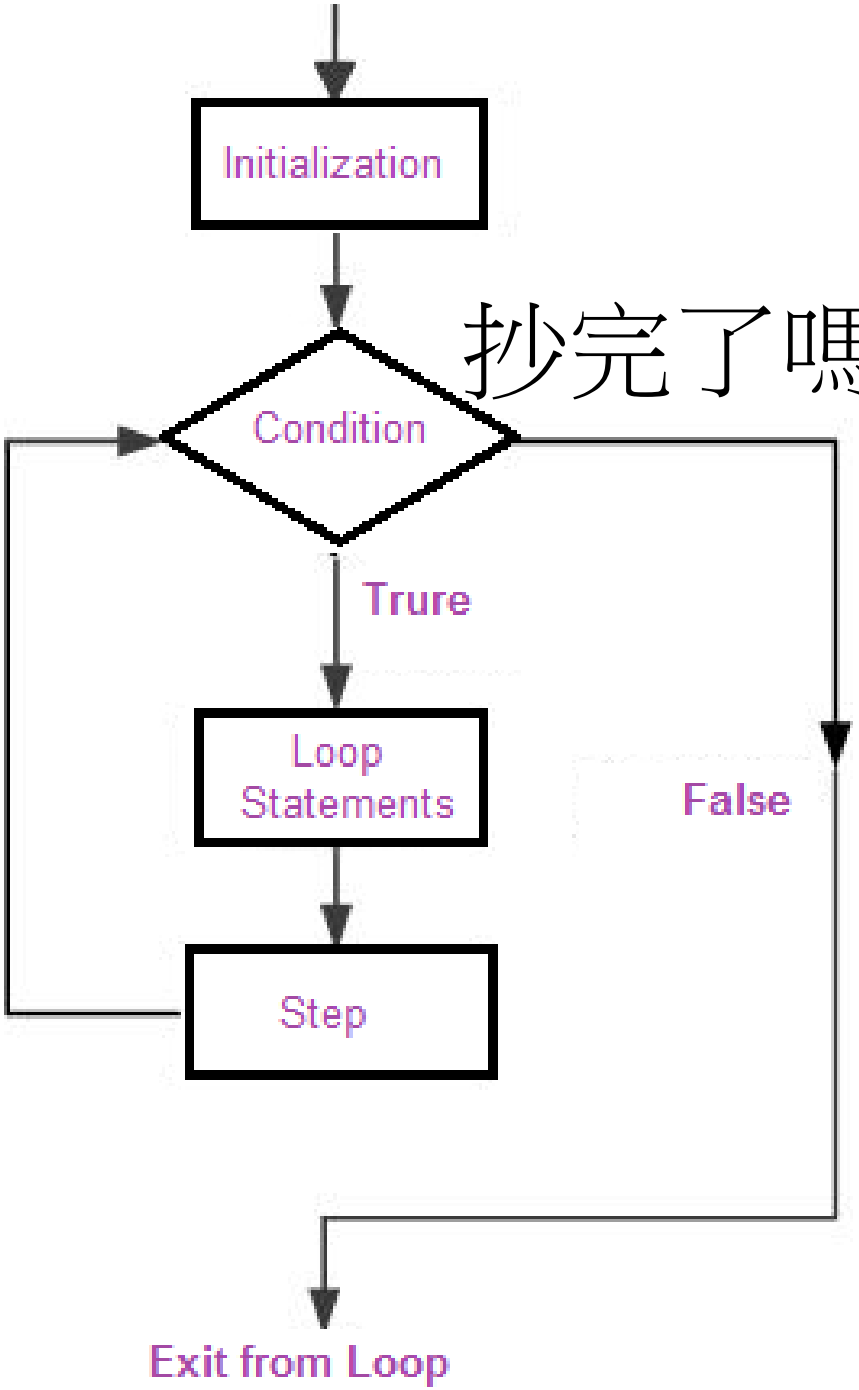
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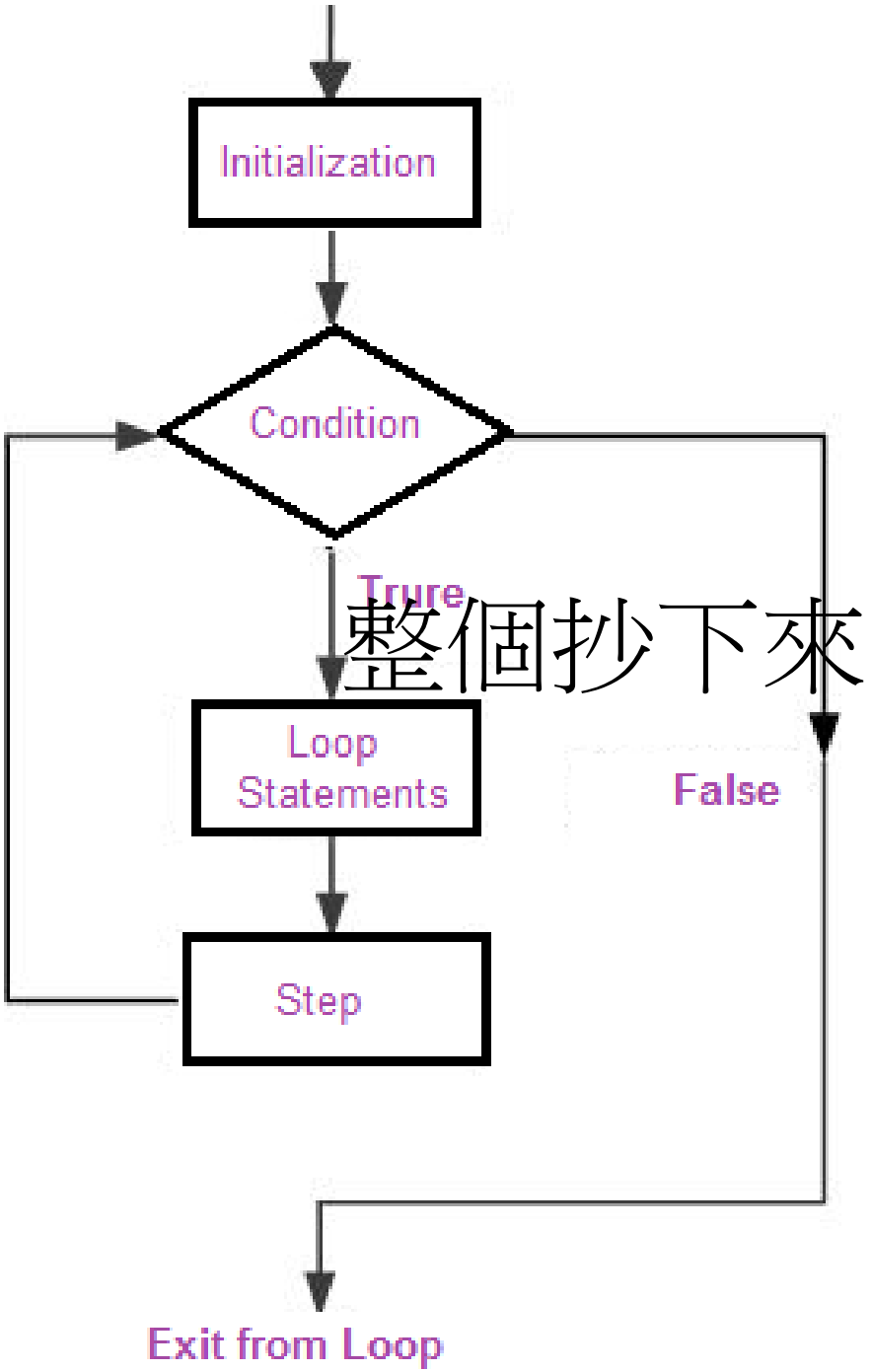
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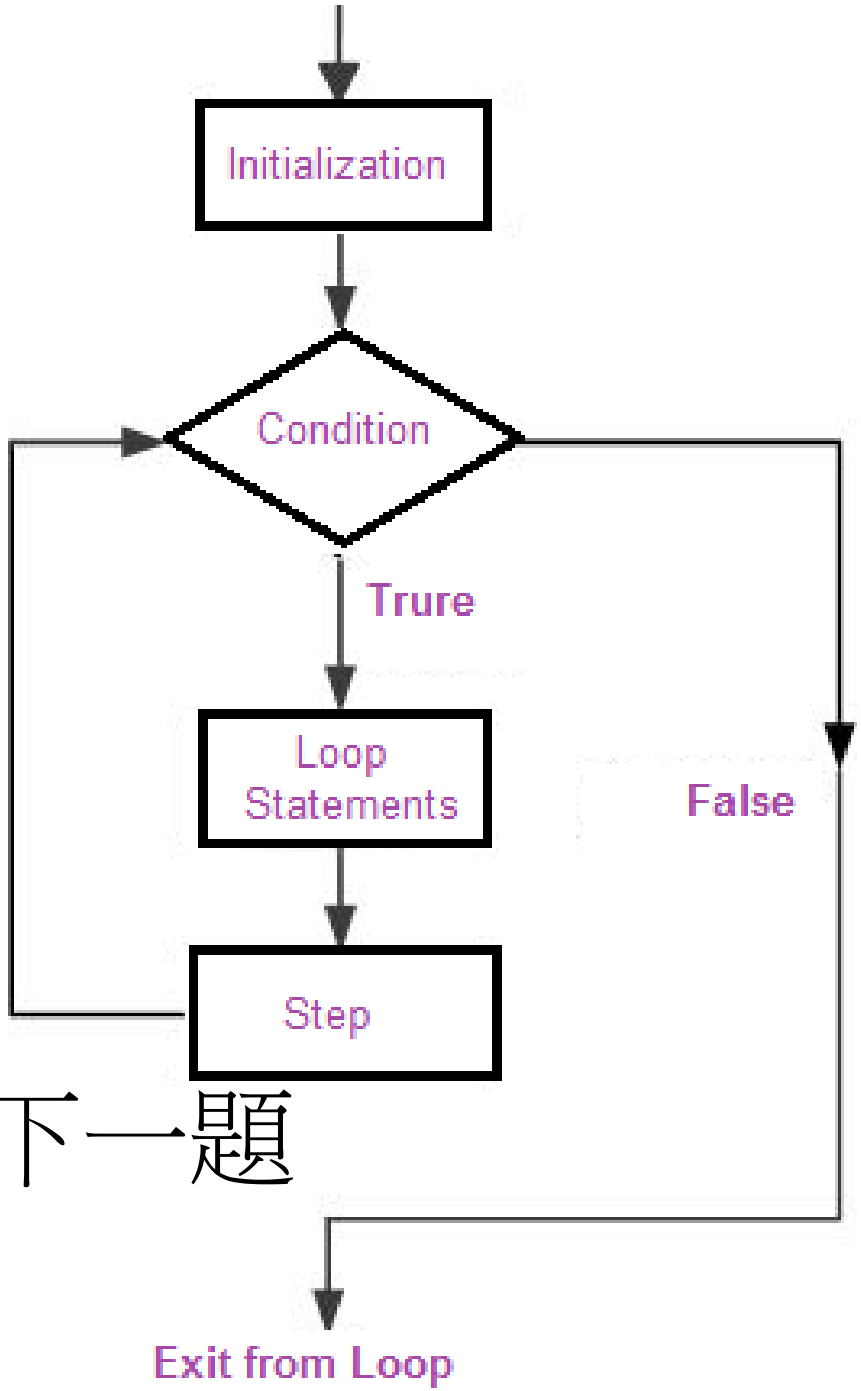
整個抄下來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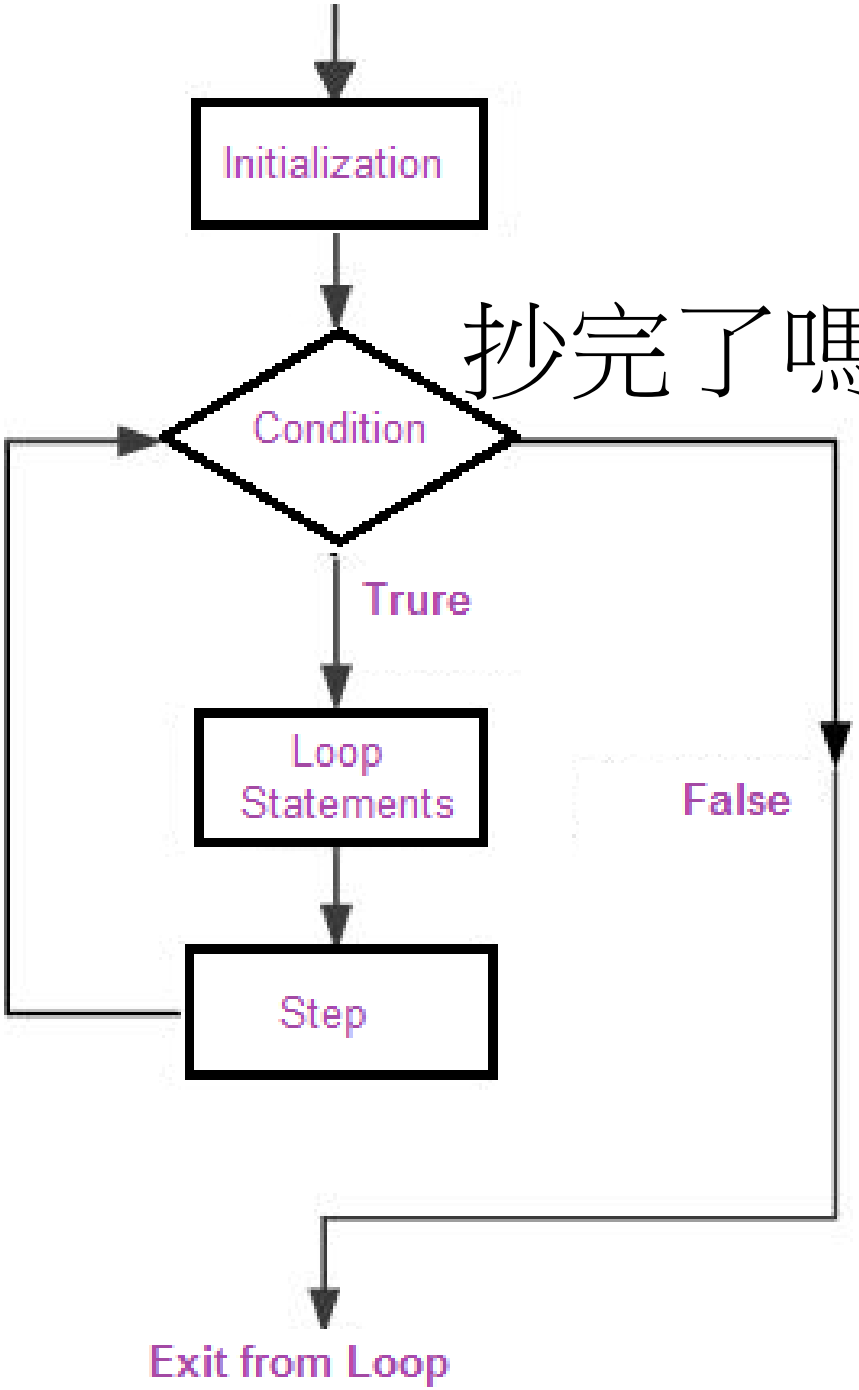
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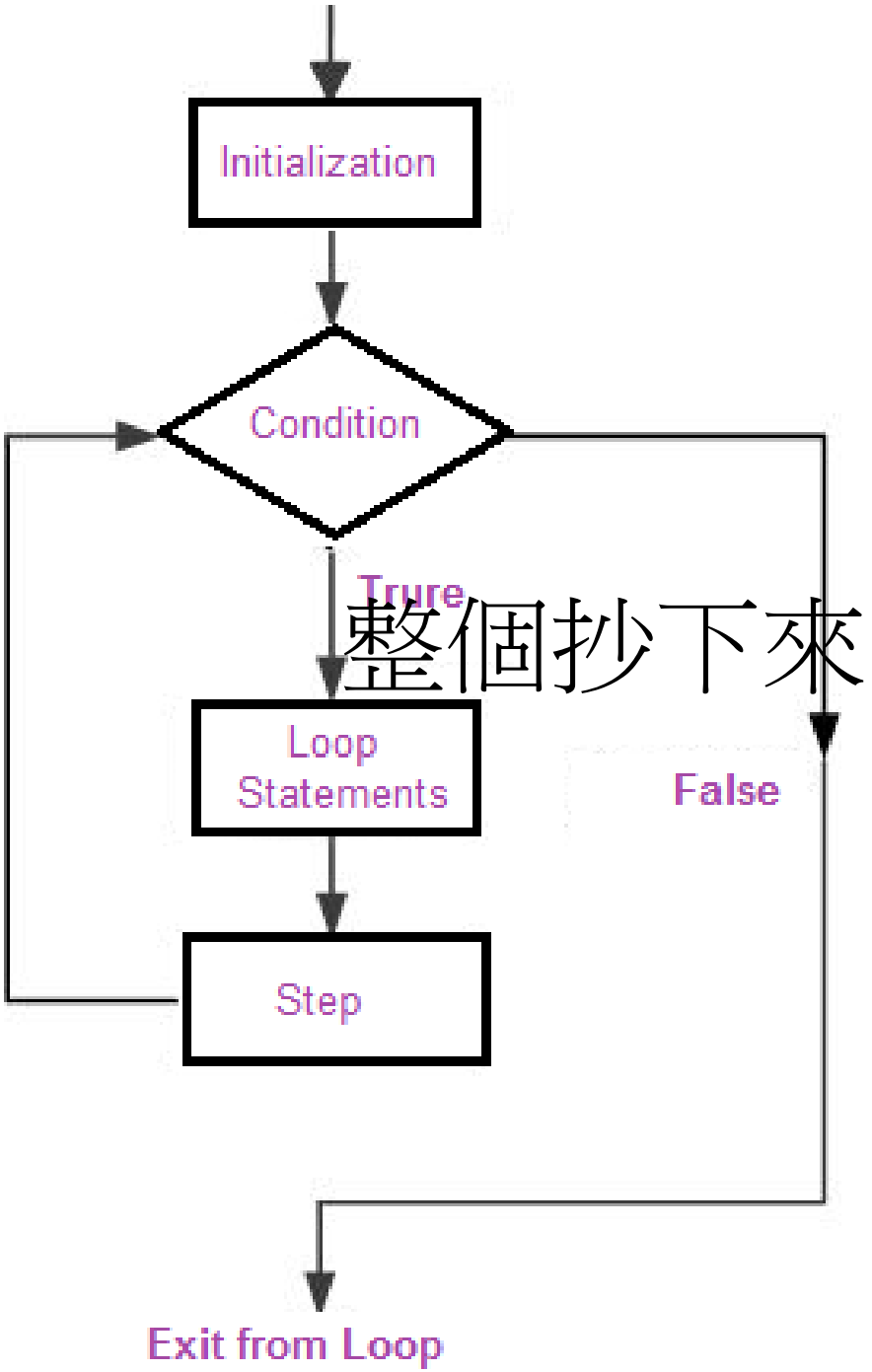
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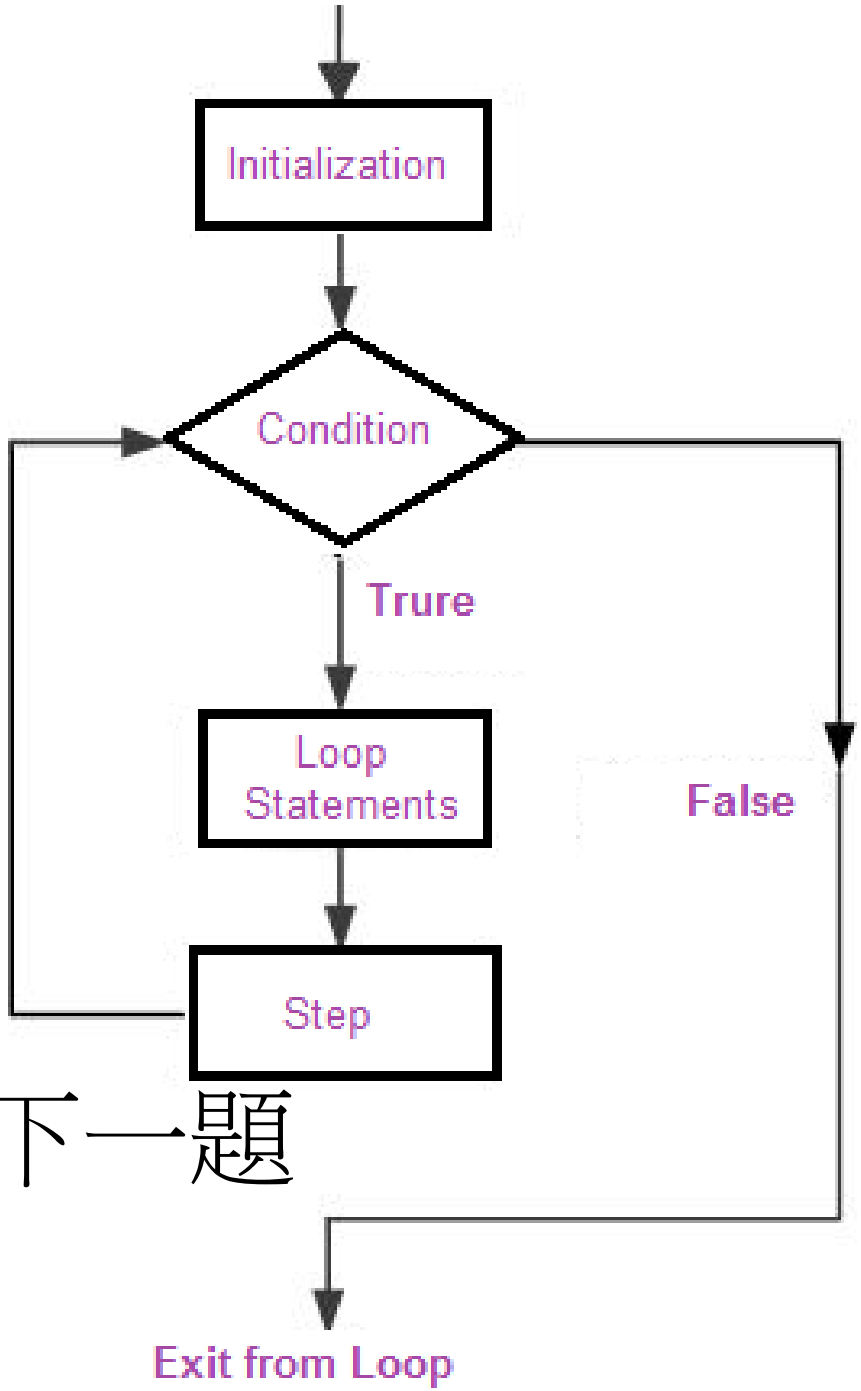
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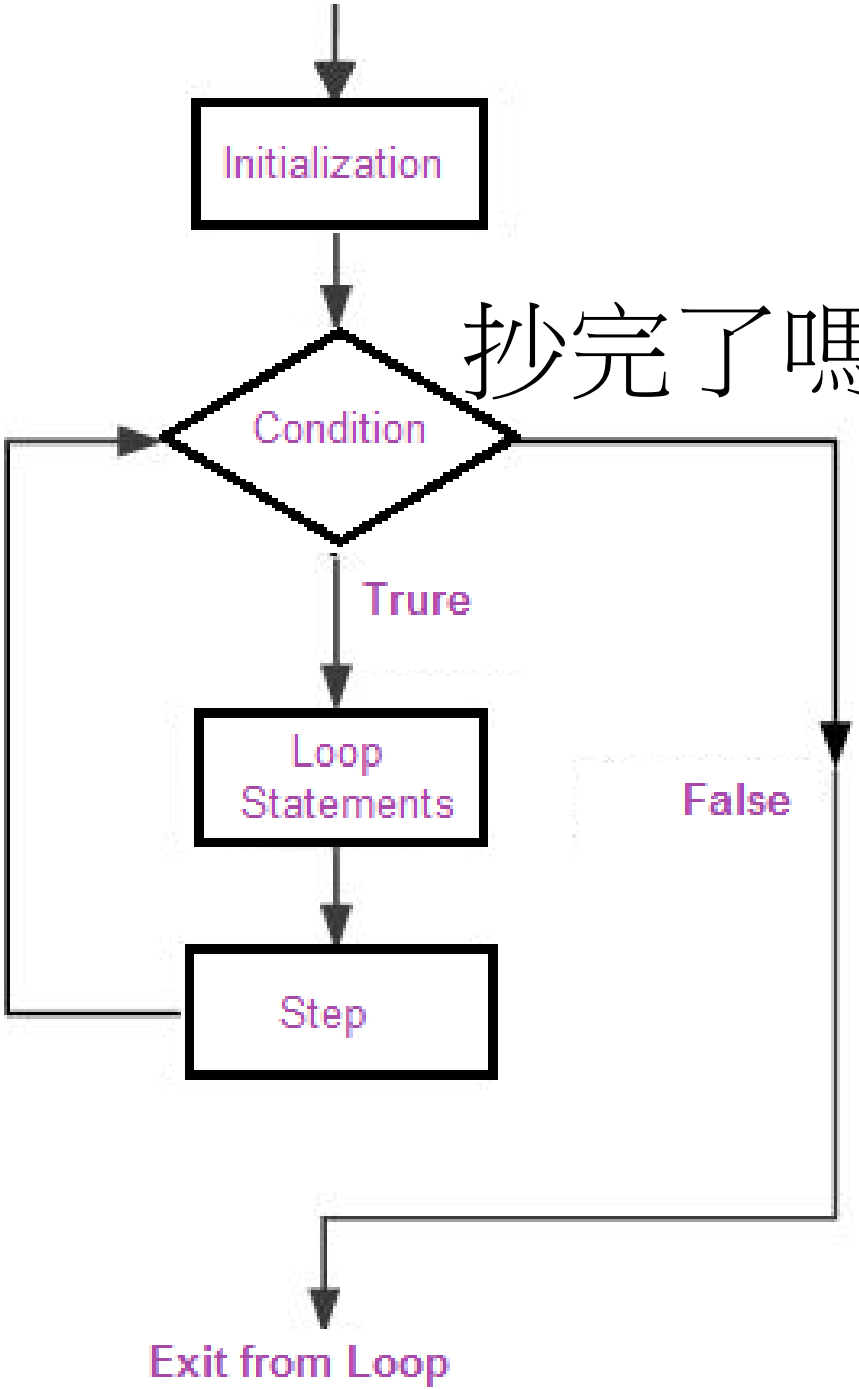
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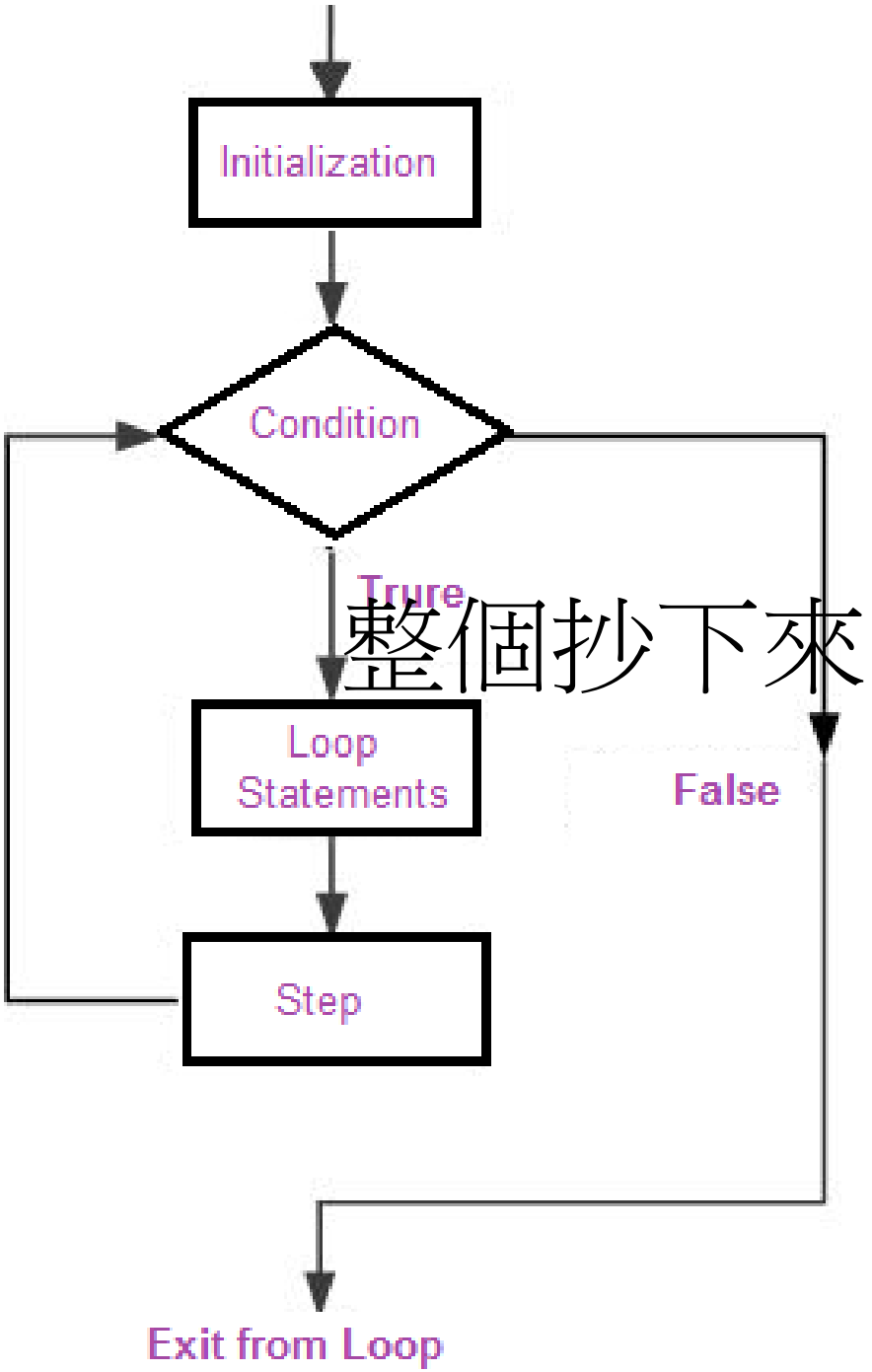
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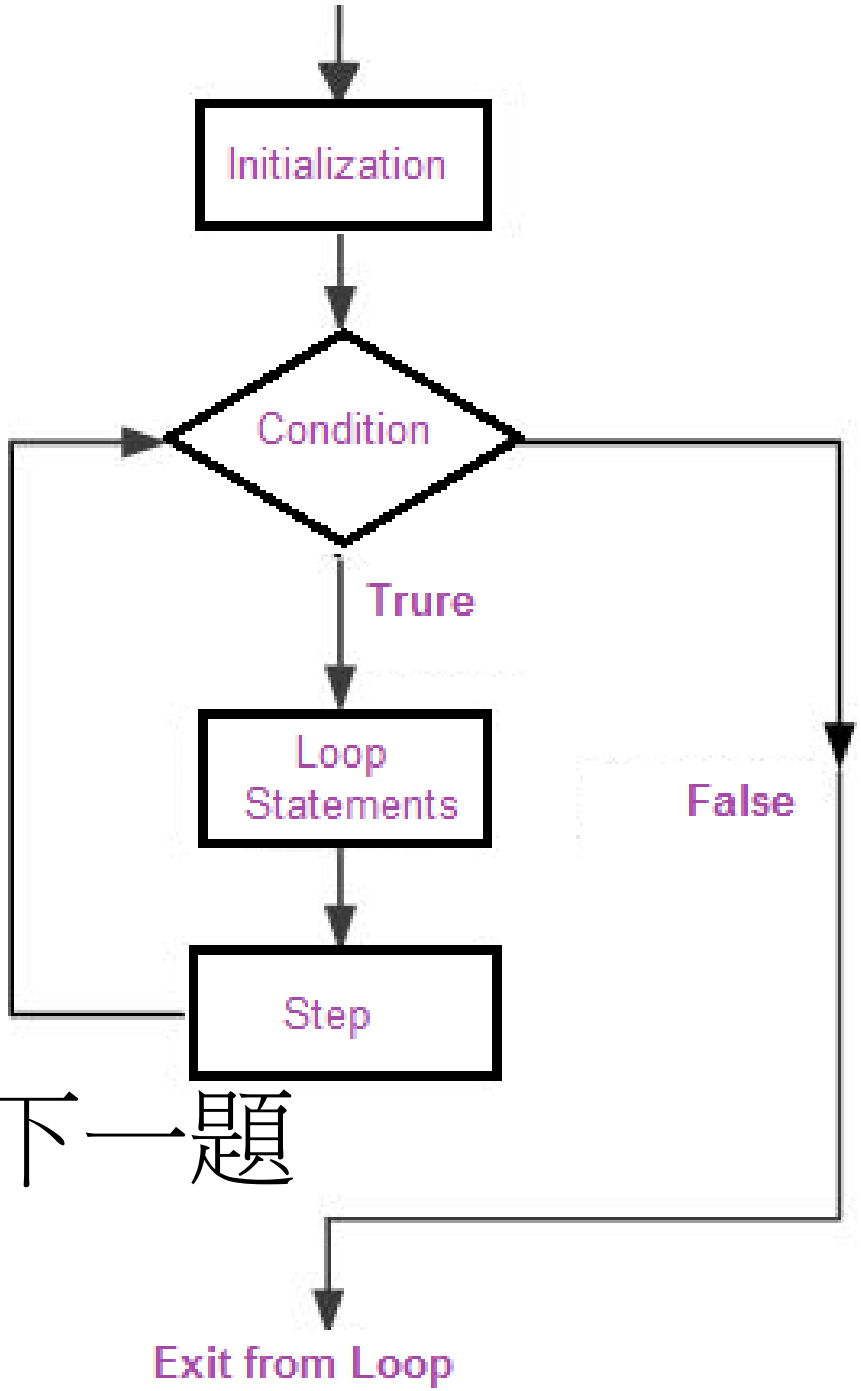
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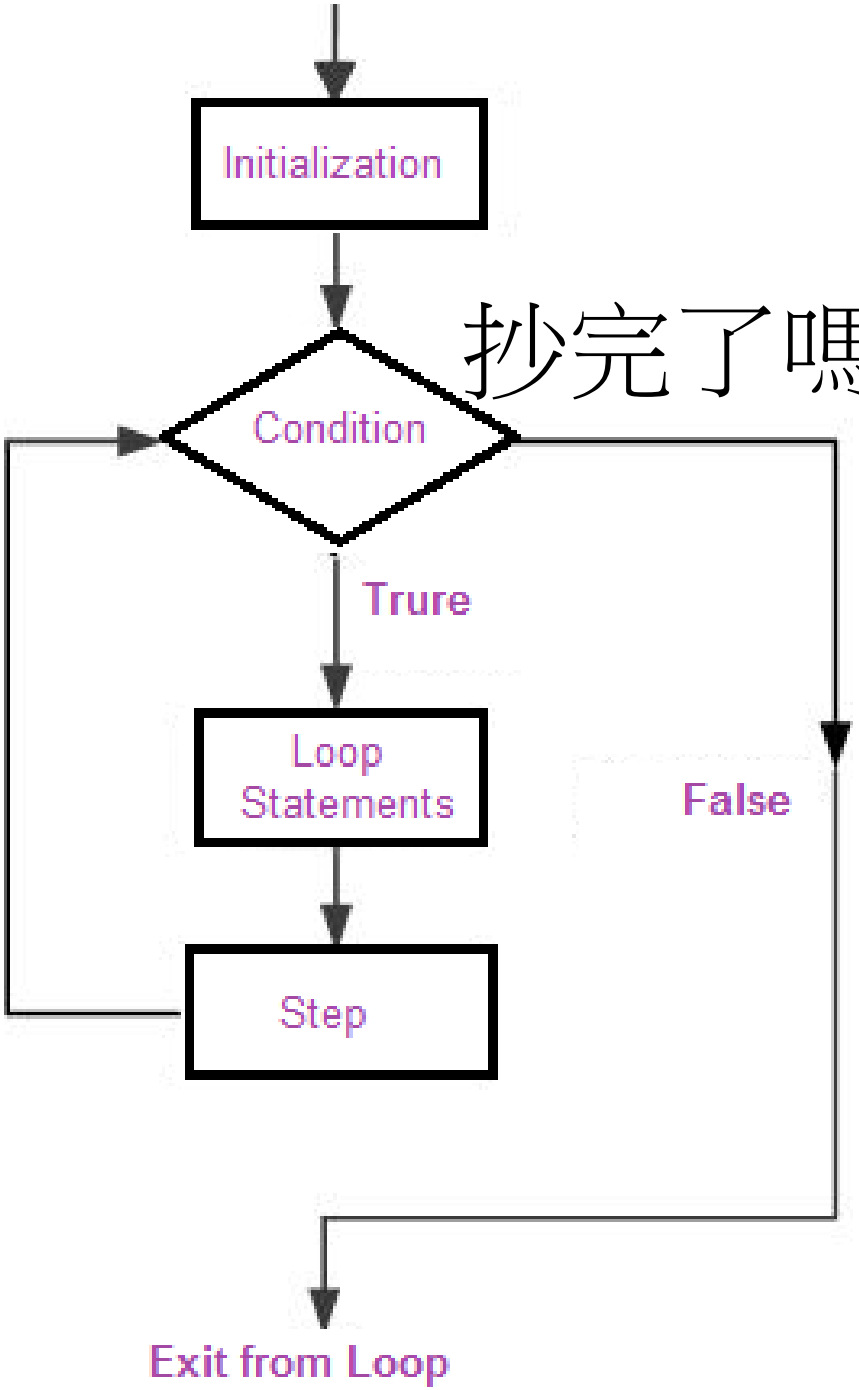
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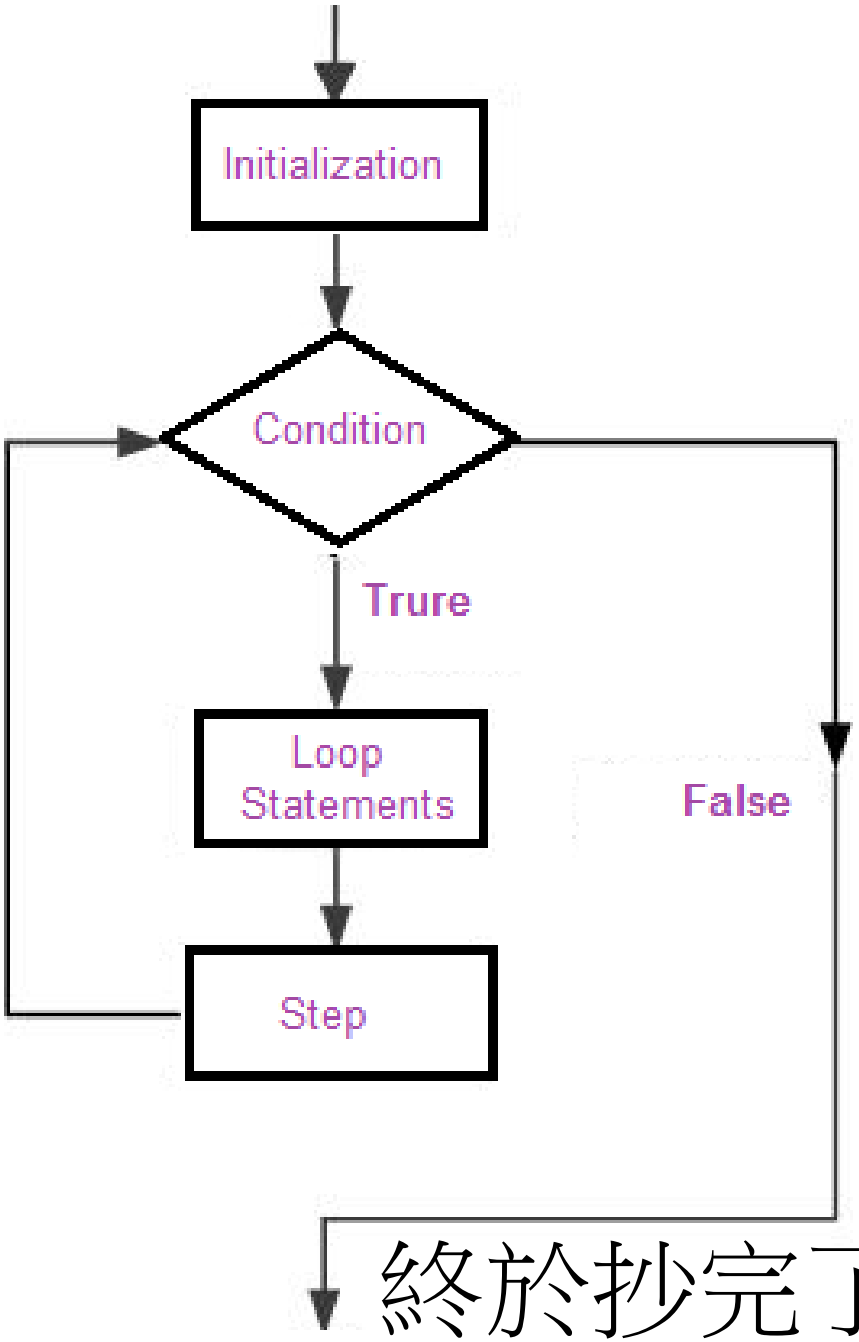
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終於抄完了

Coding……

```
for(拿出考卷找第一格；還沒抄完；抄下一題)
{
    整個抄下來;
}
```

Coding.....

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for(拿出考卷找第一格；還沒抄完；抄下一題)
{
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單行敘述時
大括號可省略

```
for(拿出考卷找第一格；還沒抄完；抄下一題)
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Coding……

for(拿出考卷找第一格；還沒抄完；抄下一題)

整個抄下來;

Example

- 印出1~10

```
for (i =   ; i <=   ;     )
    std::cout <<   << " ";
```

Example

- 印出1~10

```
for (i = 1; i <=    ;     )
    std::cout <<    << " ";
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Example

- 印出1~10

```
for (i = 1; i <= 10;    )
    std::cout <<   << " ";
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Example

- 印出1~10

```
for (i = 1; i <= 10; i++)
    std::cout <<   << " ";
```

Example

- 印出1~10

```
for (i = 1; i <= 10; i++)
    std::cout << i << " ";
```

輪到你的回合:
終極倒數！
TOJ No.???

可視範圍
Scope

在for裡宣告變數

```
for (int i = 0; i < 10; i++)
{
    std::cout << "hello" << " ";
    std::cout << i << "\n";
}
```

在for裡宣告變數

```
for (int i = 0; i < 10; i++)
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    std::cout << "hello" << " ";
    std::cout << i << "\n";
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std::cout << i;
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在for裡宣告變數

```
for (int i = 0; i < 10; i++)
{
    std::cout << "hello" << " ";
    std::cout << i << "\n";
}
std::cout << i;
```

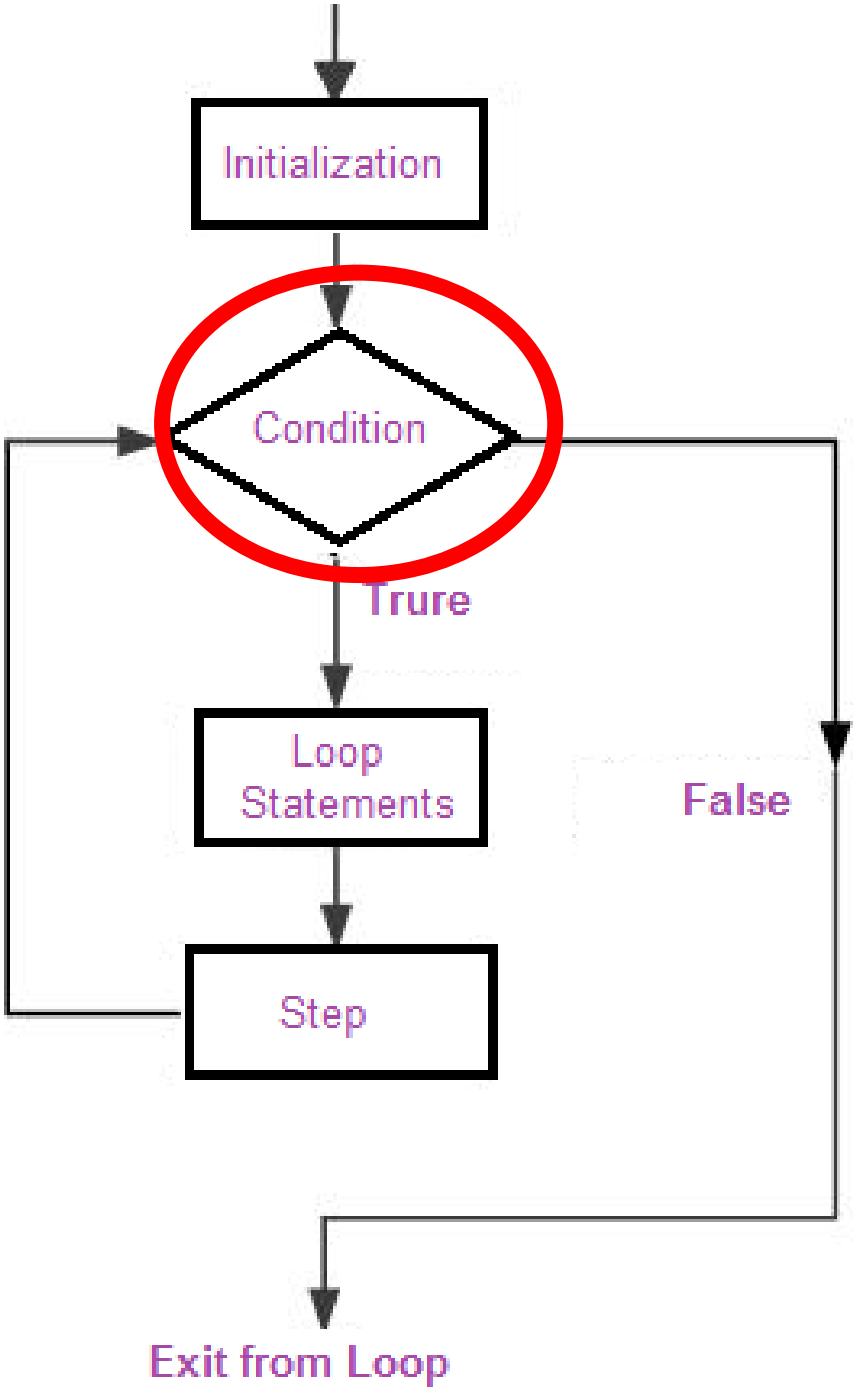
Compile Error!

遮蔽

```
int i = 12345678;
for (int i = 0; i < 10; i++)
{
    std::cout << "hello" << " ";
    std::cout << i << "\n";
}
std::cout << i;
```

The value will be ?

迷思：迴圈最少跑一次？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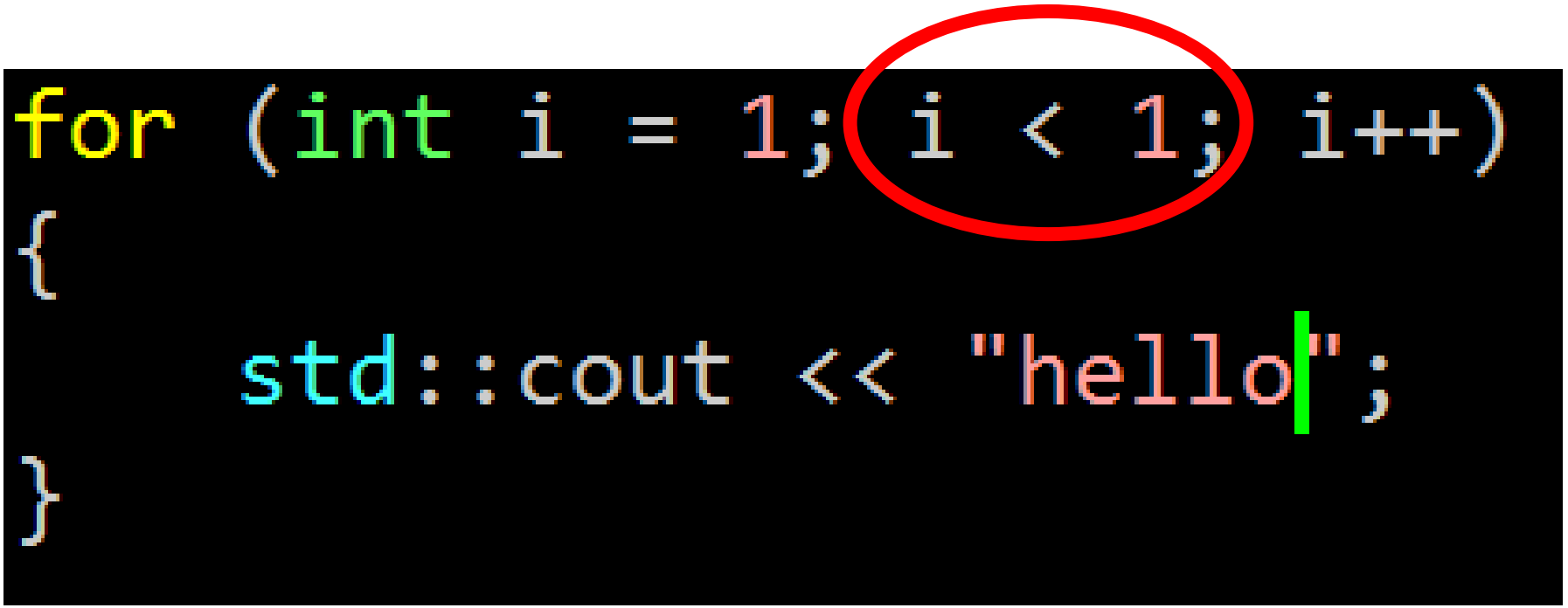
Of course..... NOT



多重表達式

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印出：5 1 -3 -7 -11 -15 -19 -23 -27 -31

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開始從 n = 0, 印 (5-4n) ?

多重表達式

印出：5 1 -3 -7 -11 -15 -19 -23 -27 -31

嘗試另一種方法!

```
for (int i = 0, j = 5; i < 10; i++, j -= 4)
{
    std::cout << j << " ";
}
```

無限迴圈

無限迴圈

```
for (int i = 0; i >= 0; i++)
{
    std::cout << i << " ";
}
```

無限迴圈

```
for (;;)
{
    std::cout << "yo";
}
```

又是你的回合:
四次方和!
TOJ No.???

巢狀迴圈:
迴圈裡的迴圈?

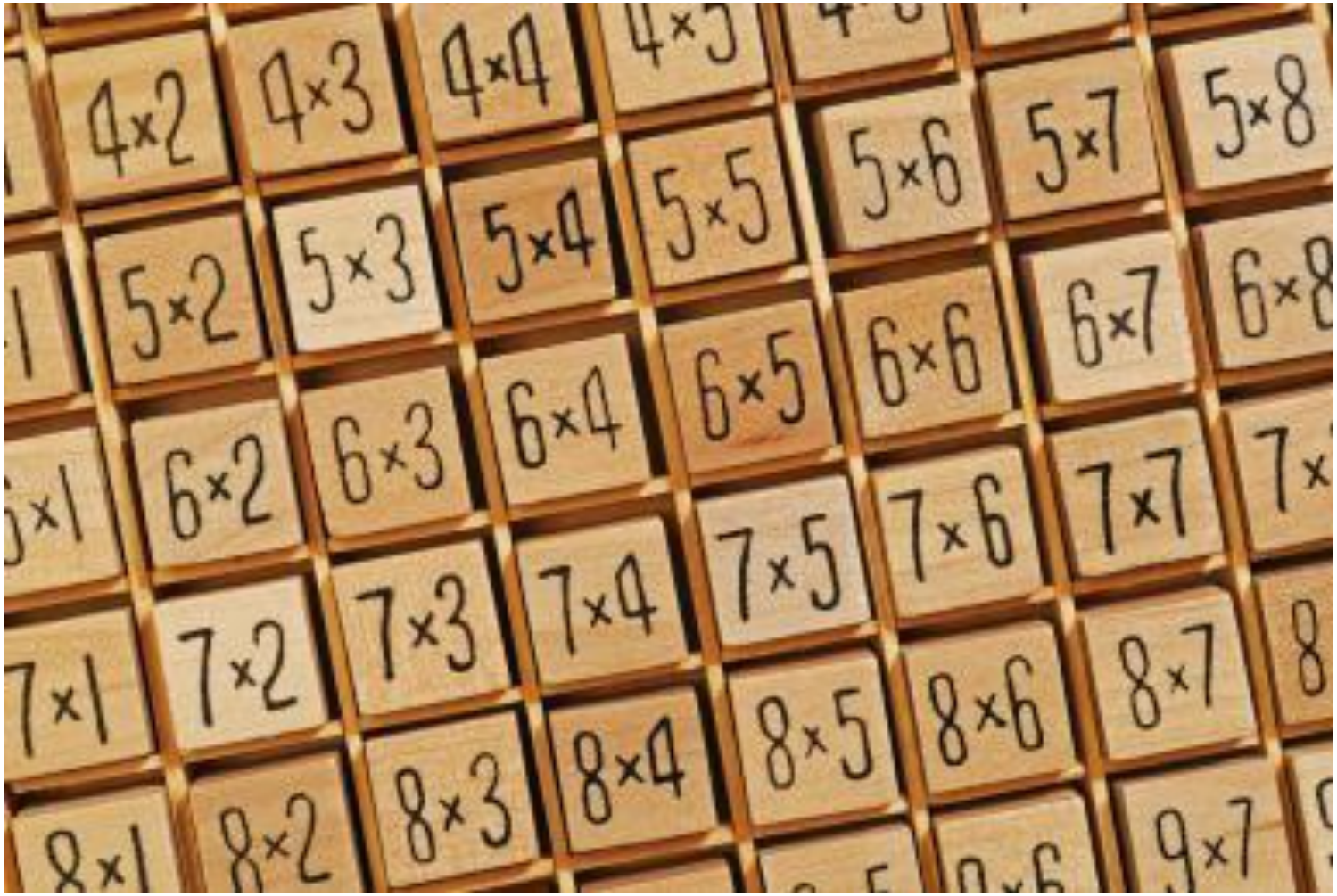
巢狀迴圈

- 怎麼印出這個? (每行有100個數字)
- 11111111111111111111111111111...
- 22222222222222222222222222222...
- 33333333333333333333333333333...
- .
- .
- .
- 99999999999999999.....

巣状迴圏

```
for(int i = 1; i <= 9; i++)
{
    for(int j = 0; j < 100; j++)
        std::cout << i;
    std::cout << "\n";
}
```

Example: 印出九九乘法表



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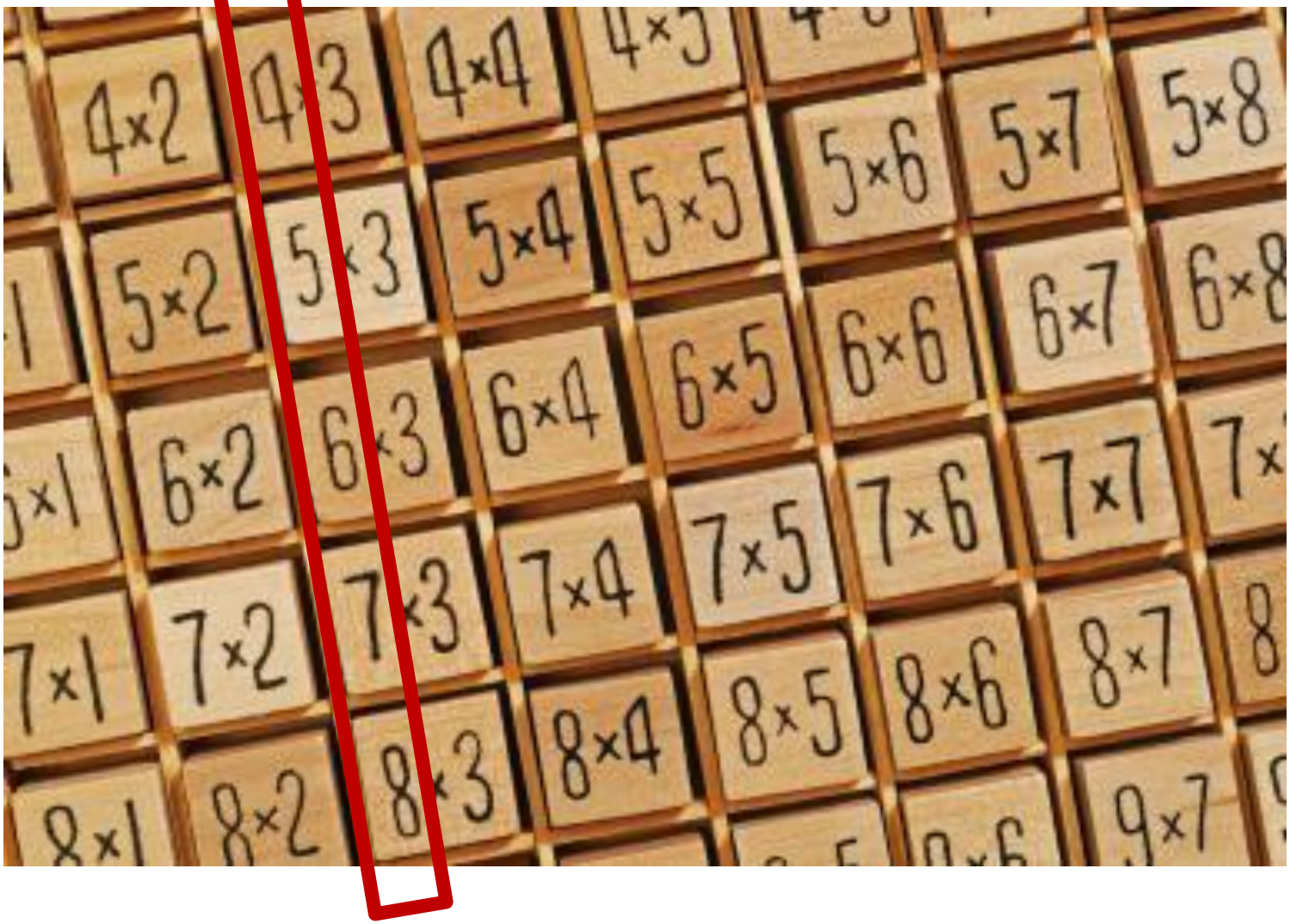

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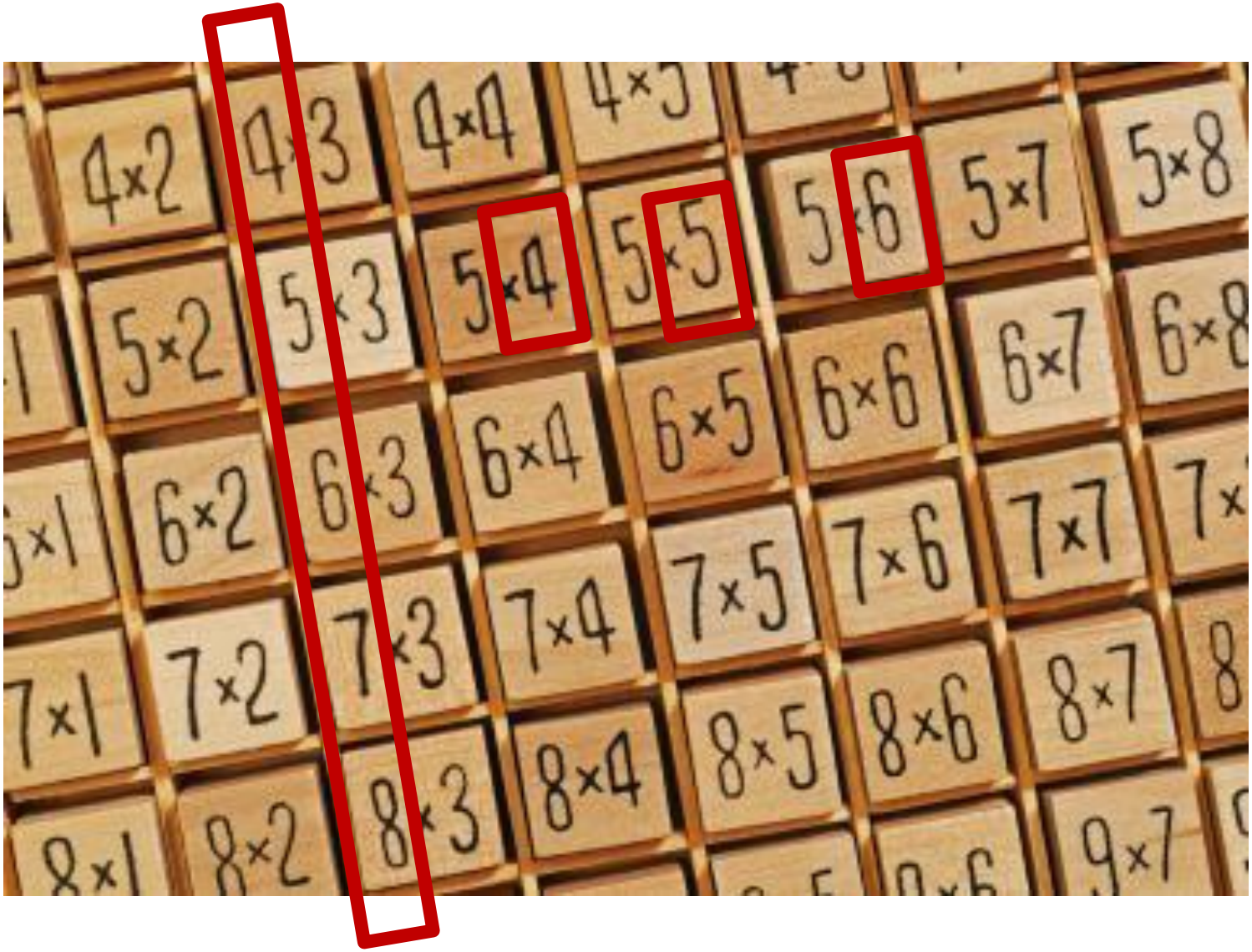

Your Turn :

複習九九乗法!

TOJ No.???