



程式結構與流程圖

Flow chart structure

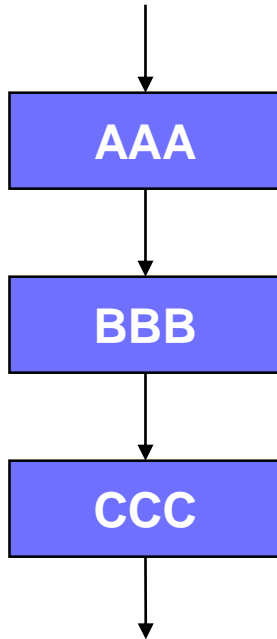
鍾宜玲

程式結構

- 結構化程式設計(structured programming)
 - 程式的效能
 - 程式的可讀性
- 三種基本控制結構
 - 控制流程-循序結構(sequencing)
 - 控制流程-選擇結構(selection)
 - 控制流程-重複結構(repetition)

控制流程-循序結構(sequencing)

■ 循序

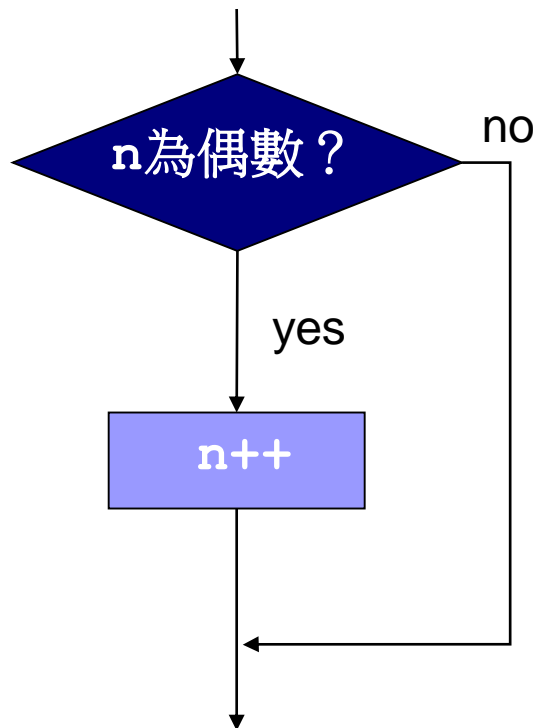


程式一行一行往下執行

```
#include <stdio.h>
int main()
{
    int amount, coin10, coin5, coin1;
    printf("請輸入要兌換的金額：");
    scanf("%d",&amount);
    coin10=amount/10;           //先換10元
    coin5=(amount%10)/5;       //剩下再換5元
    coin1=((amount%10)%5)/1;    //全換為1元
    printf("可兌換10元硬幣 %d 個\n",coin10);
    printf("可兌換5元硬幣 %d 個\n",coin5);
    printf("可兌換1元硬幣 %d 個\n",coin1);
    return 0;
}
```

控制流程-選擇結構(selection)

■ 單一選擇 single path selection structure



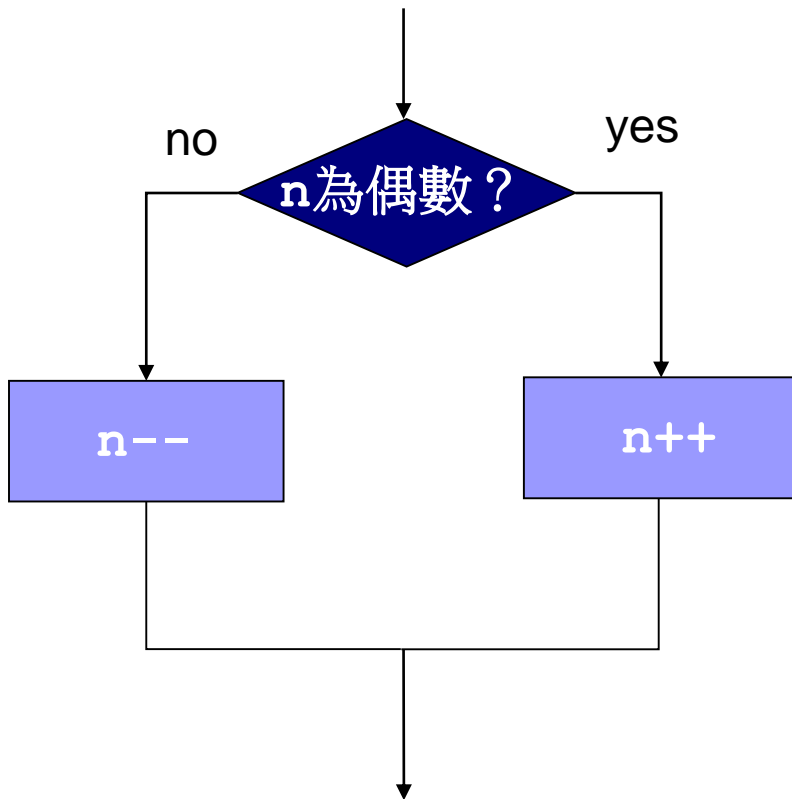
例如：n++ 這件事要不要執行？
如果n偶數就執行，否則不執行

C程式如下：

```
if (n%2 == 0) //假如n被2整除  
    n++;
```

控制流程-選擇結構(selection)

■ 二選一 double path selection structure



例如：要執行 $n++$ 還是 $n--$ ？

如果 n 偶數

就執行 $n++$ ，

否則

就執行 $n--$

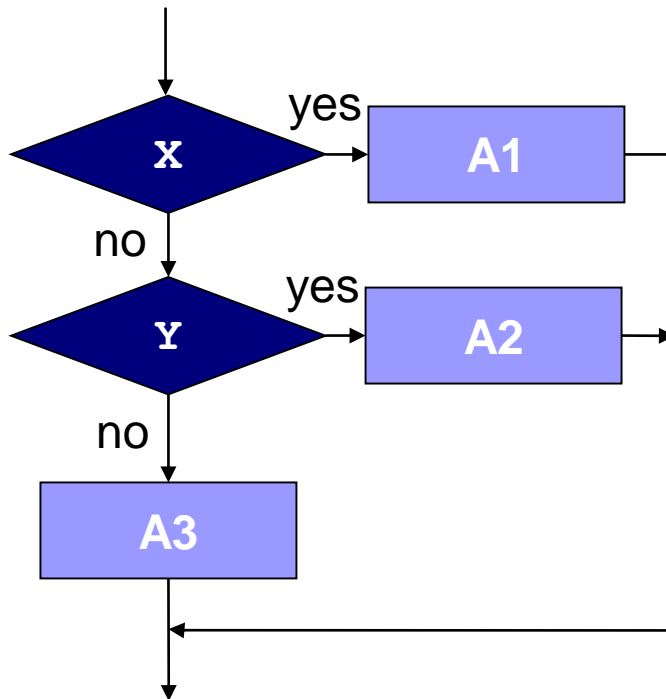
C程式如下：

```
if( n%2 == 0)
    n++;
else
    n--;
```

控制流程-選擇結構(selection)

■ 多重選擇

multiple path selection structure



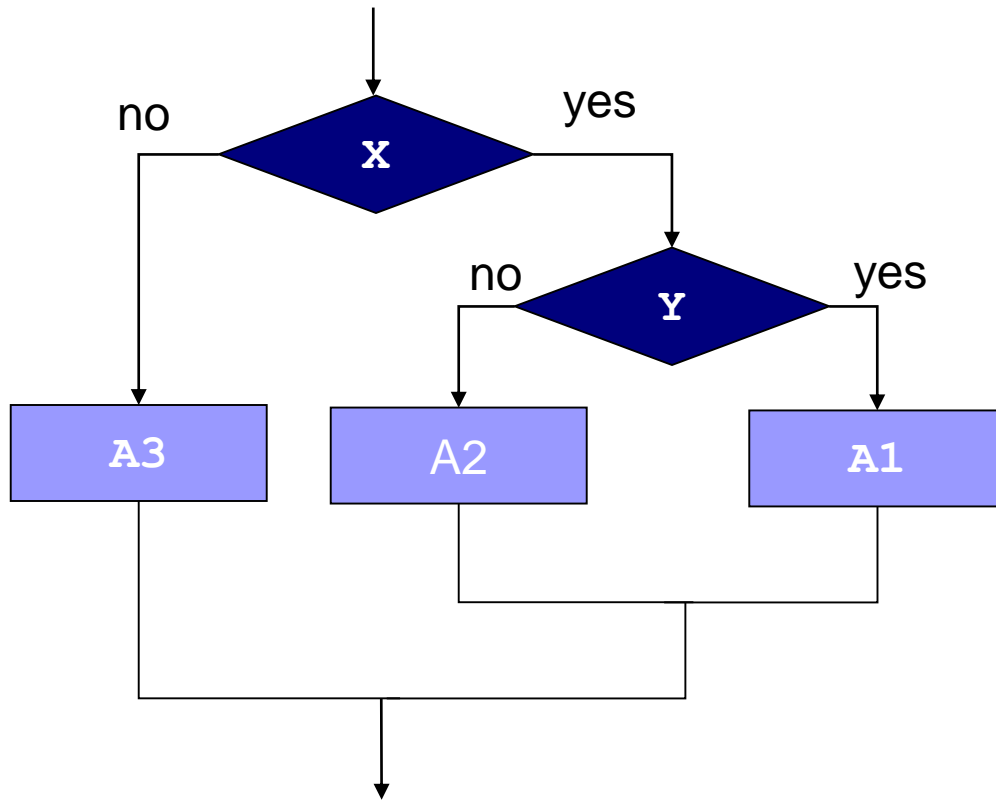
例如：要執行A1, A2還是A3？

```
if( X )
    A1;
else
    if( Y )
        A2;
    else
        A3;
```

```
if( X )
    A1;
else if( Y )
    A2;
else
    A3;
```

控制流程-選擇結構(selection)

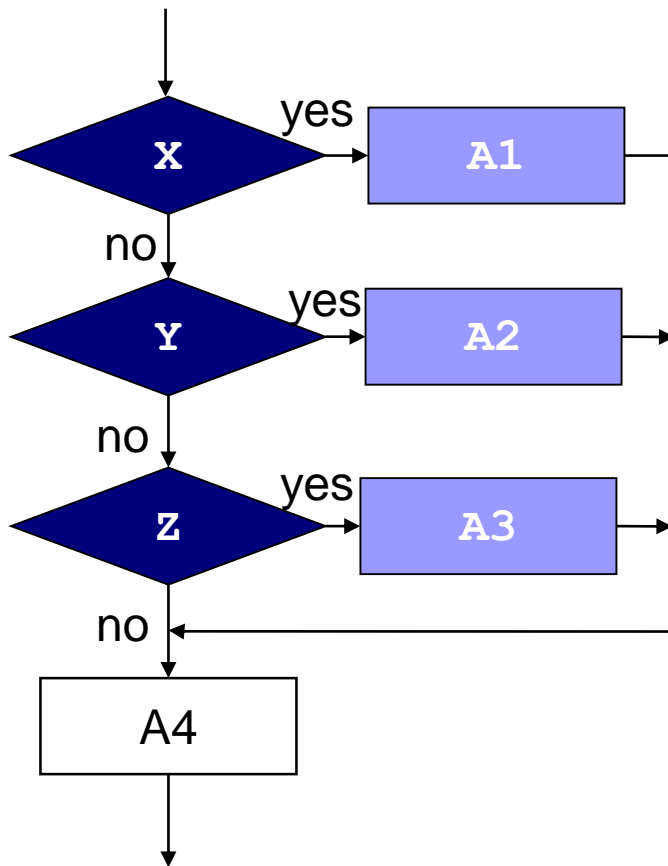
- 多重選擇 multiple path selection structure



```
if( X )
    if( Y )
        A1;
    else
        A2;
else
    A3;
```

控制流程-選擇結構(selection)

- 多重選擇 multiple path selection structure

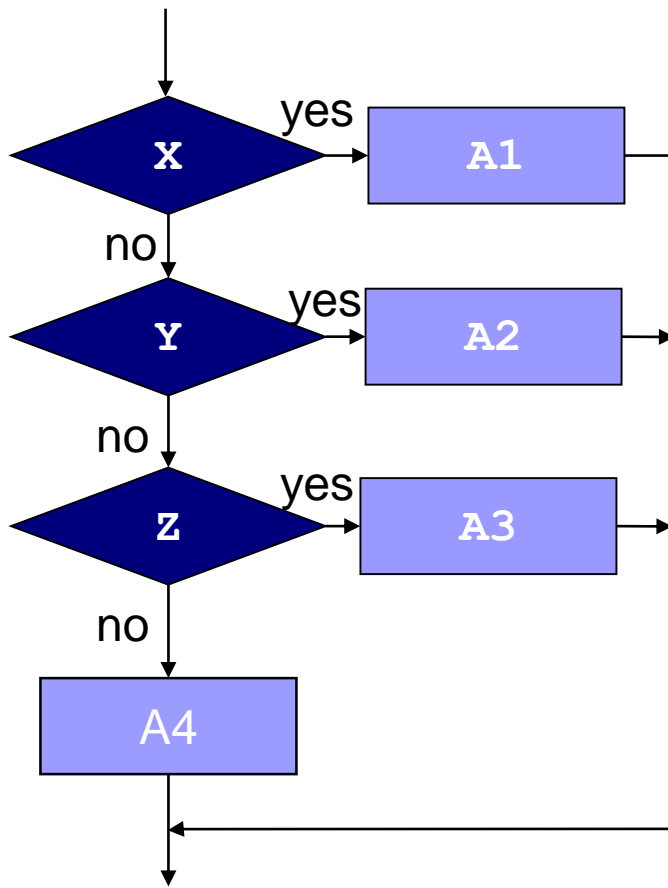


```
if( X )
    A1;
else if( Y )
    A2;
else if( Z )
    A3;

A4;
```


控制流程-選擇結構(selection)

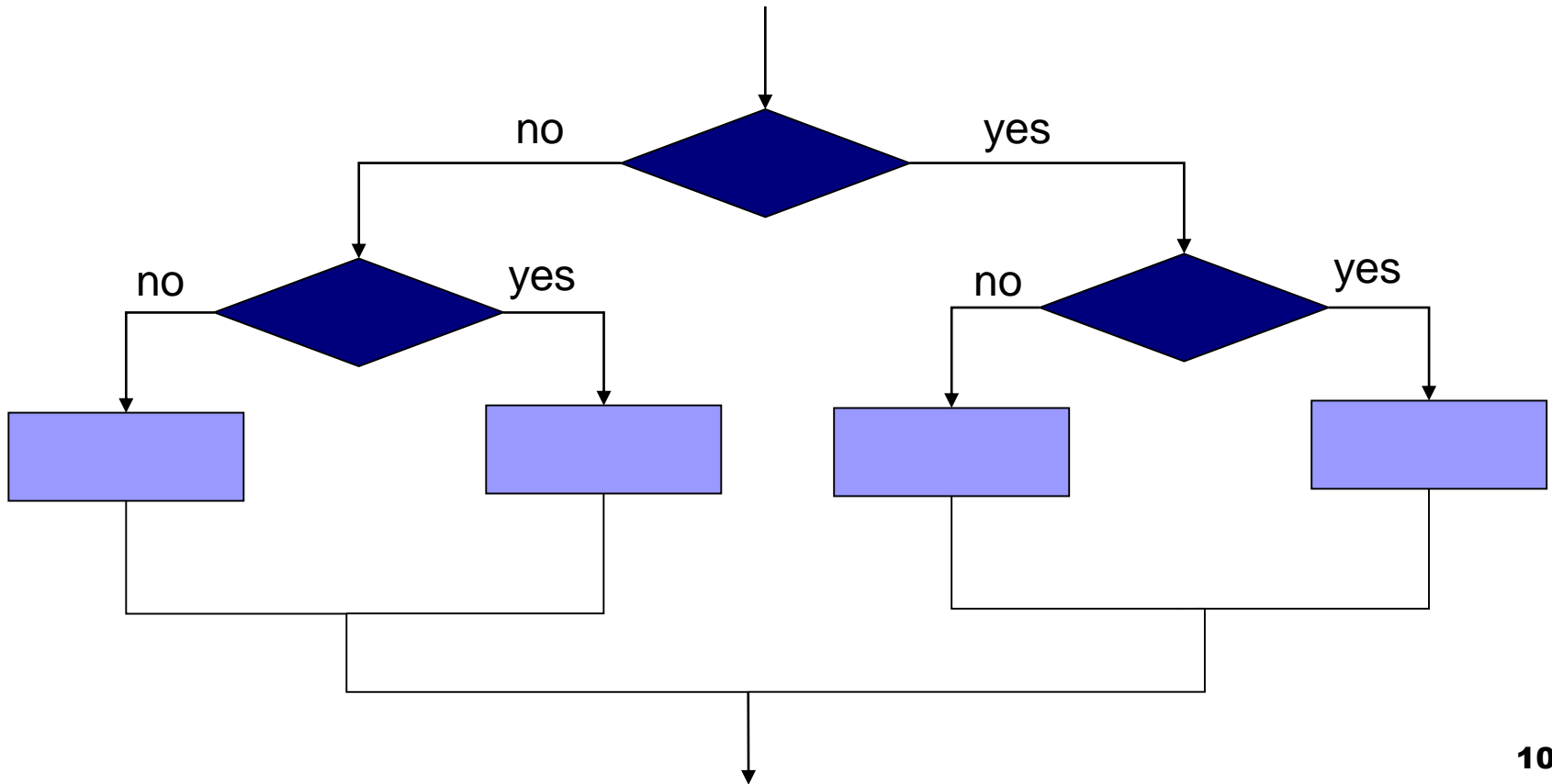
■ 多重選擇 multiple path selection structure



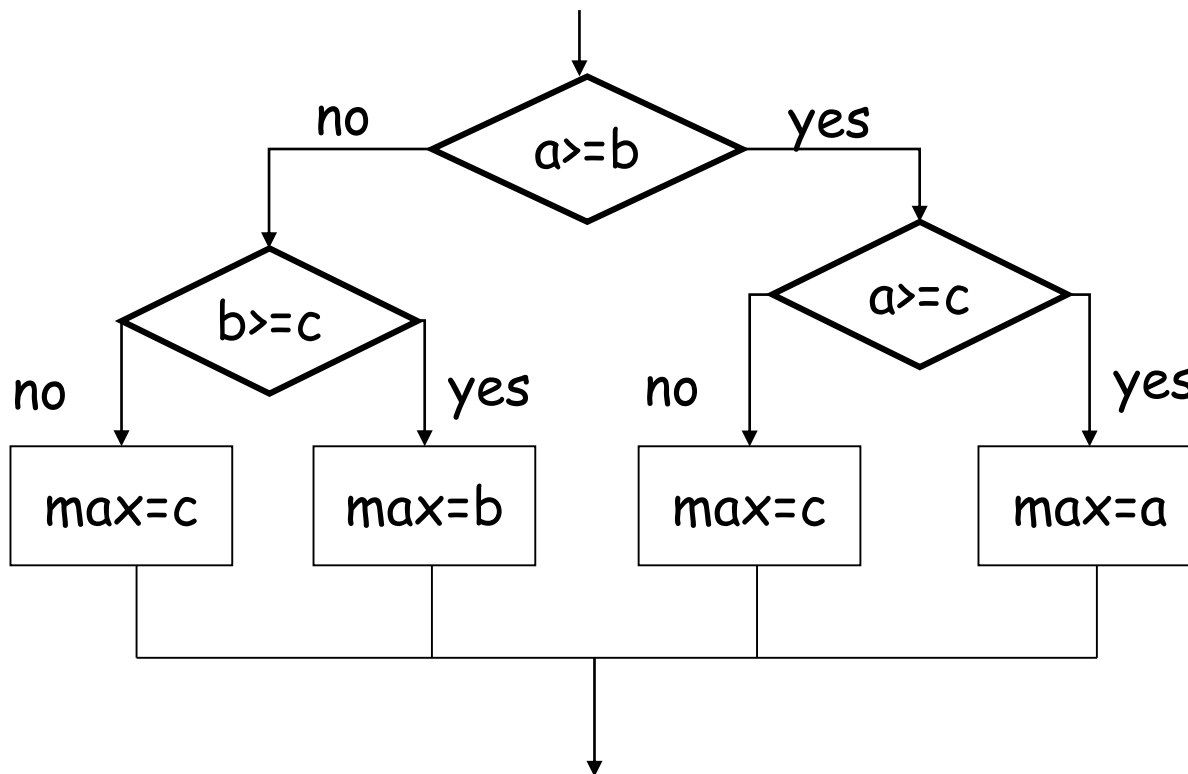
```
if( X )
    A1;
else if( Y )
    A2;
else if( Z )
    A3;
else
    A4;
```

控制流程-選擇結構(selection)

- 多重選擇 multiple path selection structure

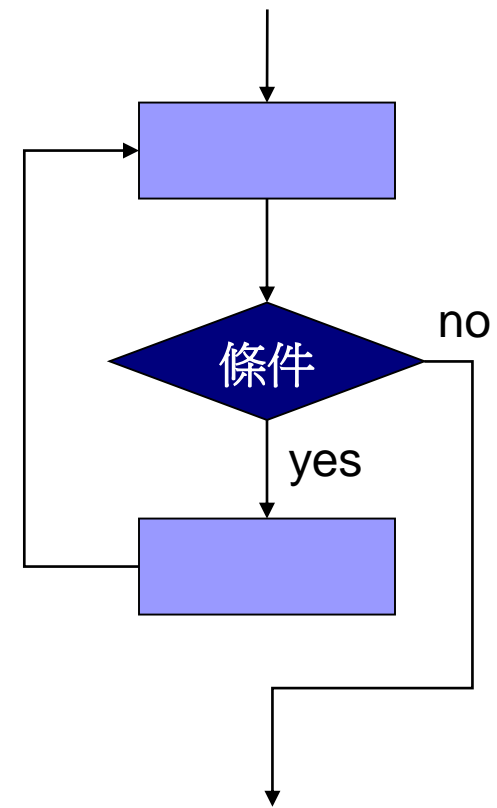
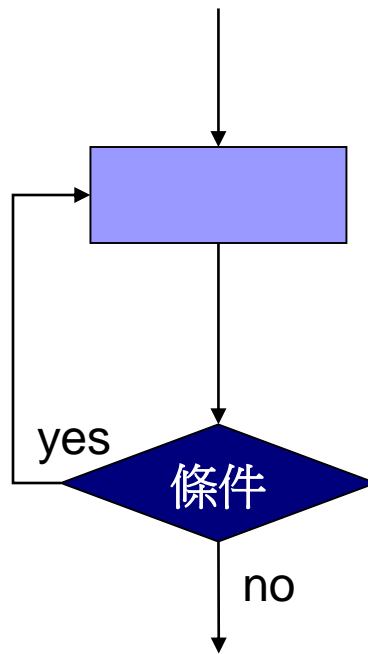
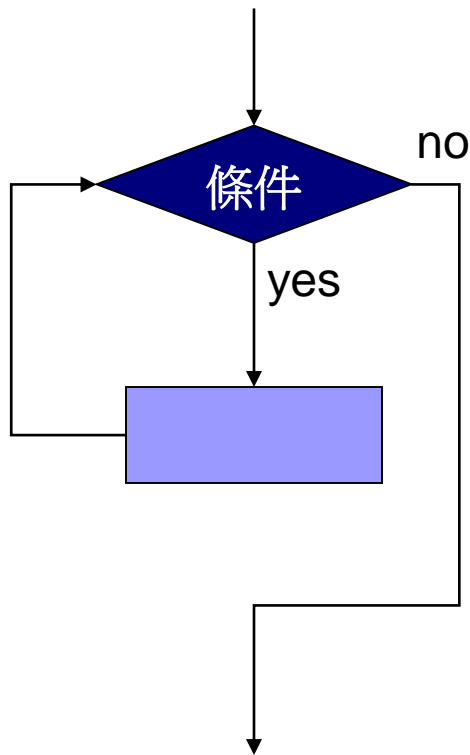


範例-判斷a, b, c之最大值 (Find Maximum)



```
if (a >= b)
    if (a >= c)
        max = a;
    else
        max = c;
else
    if (b >= c)
        max = b;
    else
        max = c;
```

控制流程-重複結構(repetition)



範例

