if & switch & for & while

CH02 流程控制

主講人：資訊二甲 林柏丞

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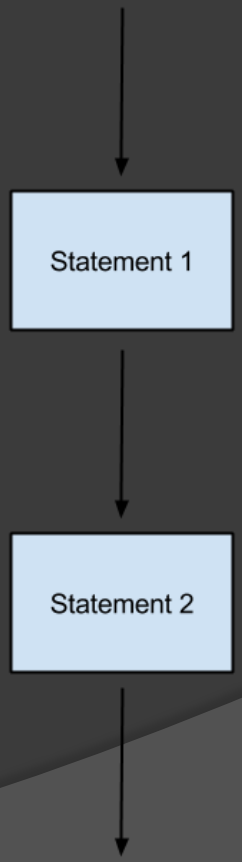
程式結構

- 順序性結構 Sequential
- 選擇性結構 Selection
- 重複性結構 Iteration

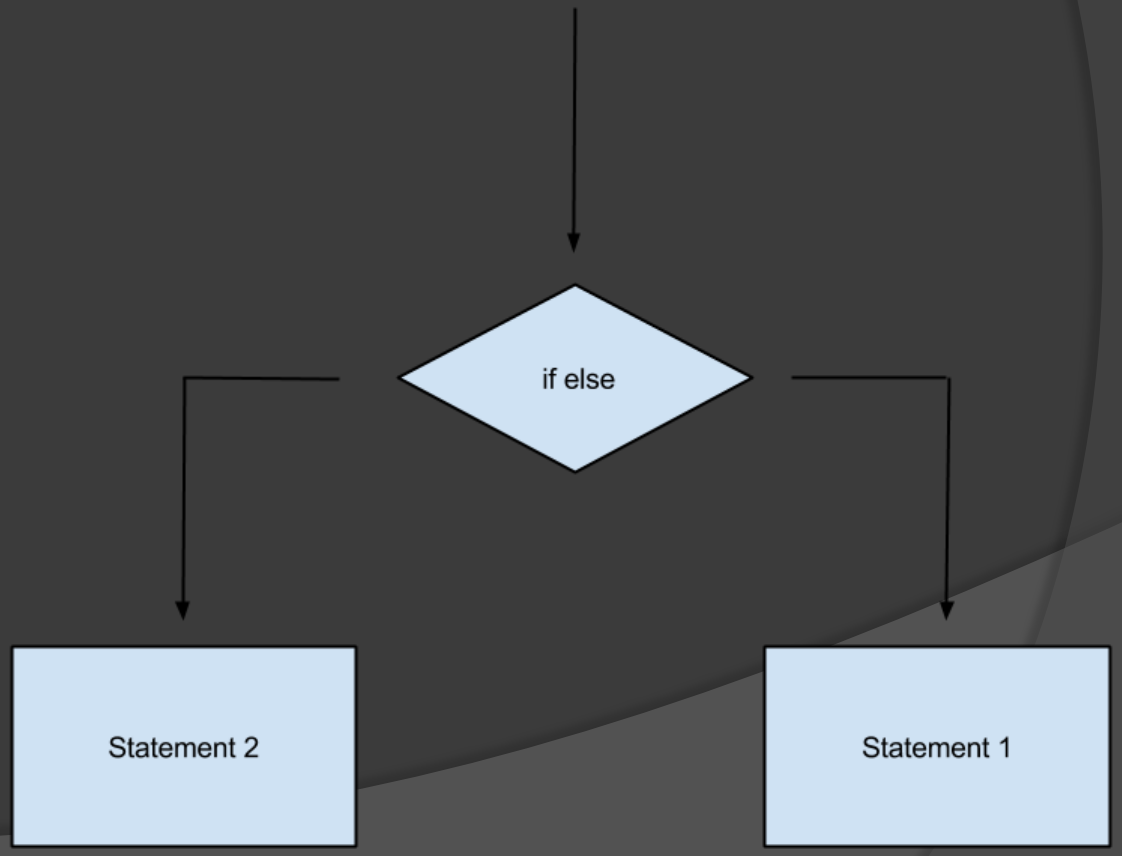
順序性結構 Sequential

- 一個敘述由上而下接著另一個敘述執行



選擇性結構 Selection

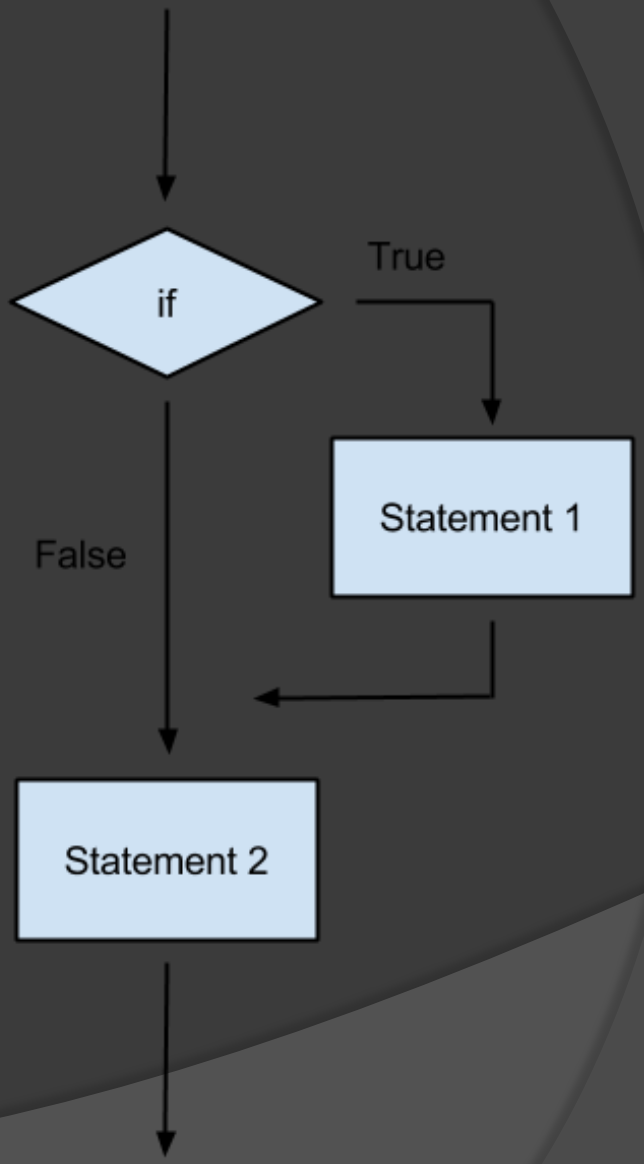
- 程式執行過程中，依據某條件成立與否去執行不同工作。



If…

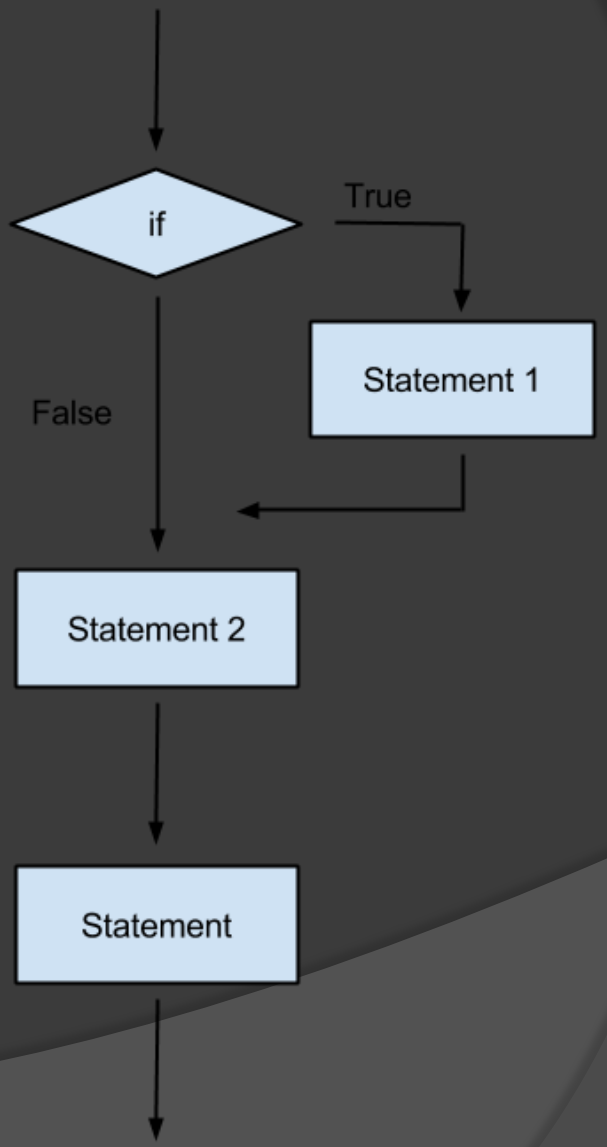
```
if(條件式) {
        程式敘述
}
```

```
If(a%2 == 0) {
        a = a/2;
}
```



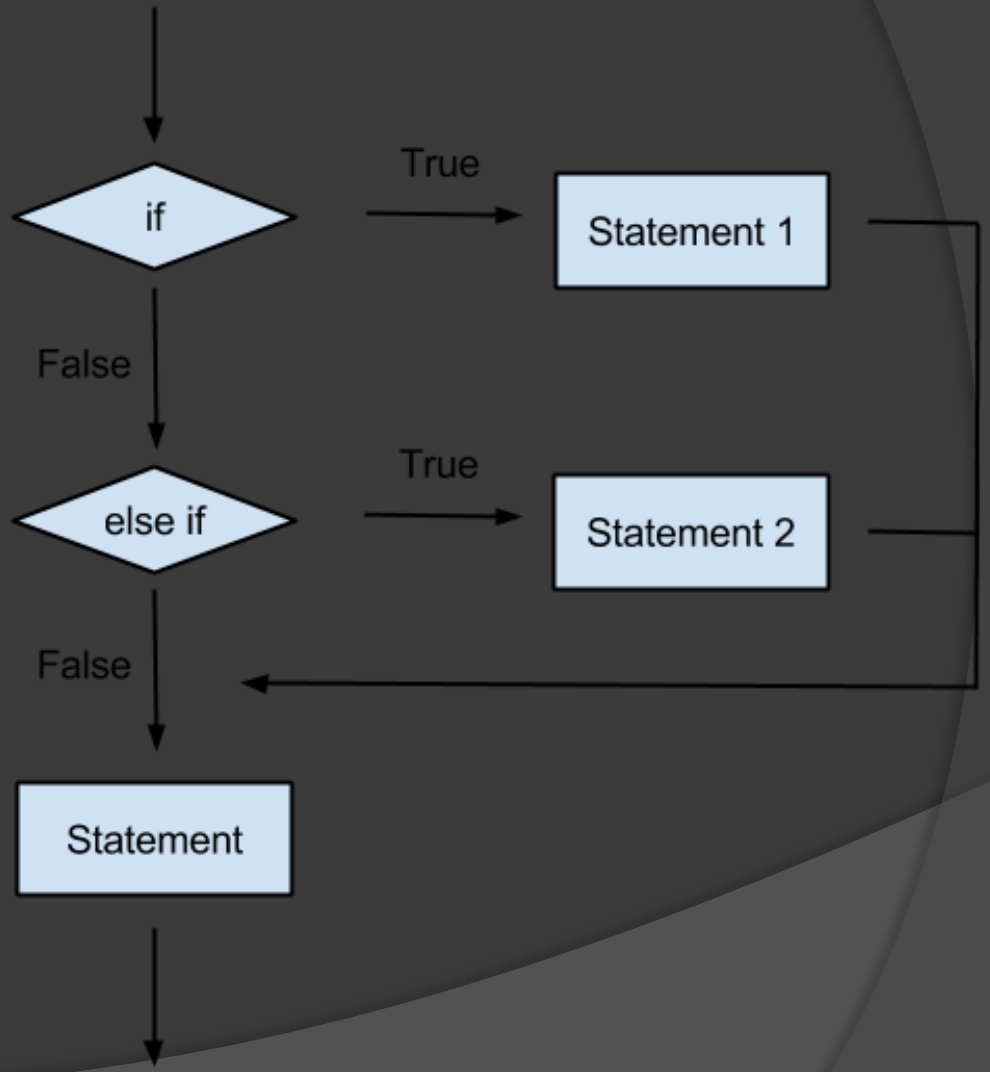
If…else…

```
if(條件式) {
        程式敘述1
}

else {
        程式敘述2
}
```



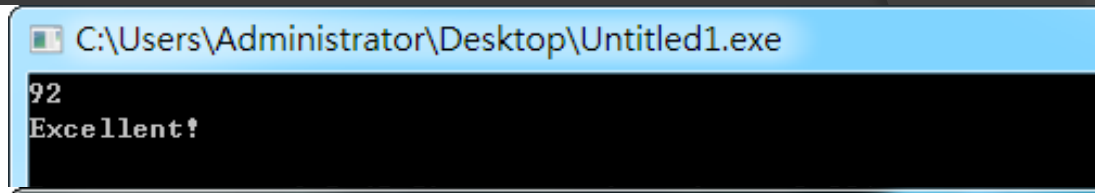
If…else if…else…

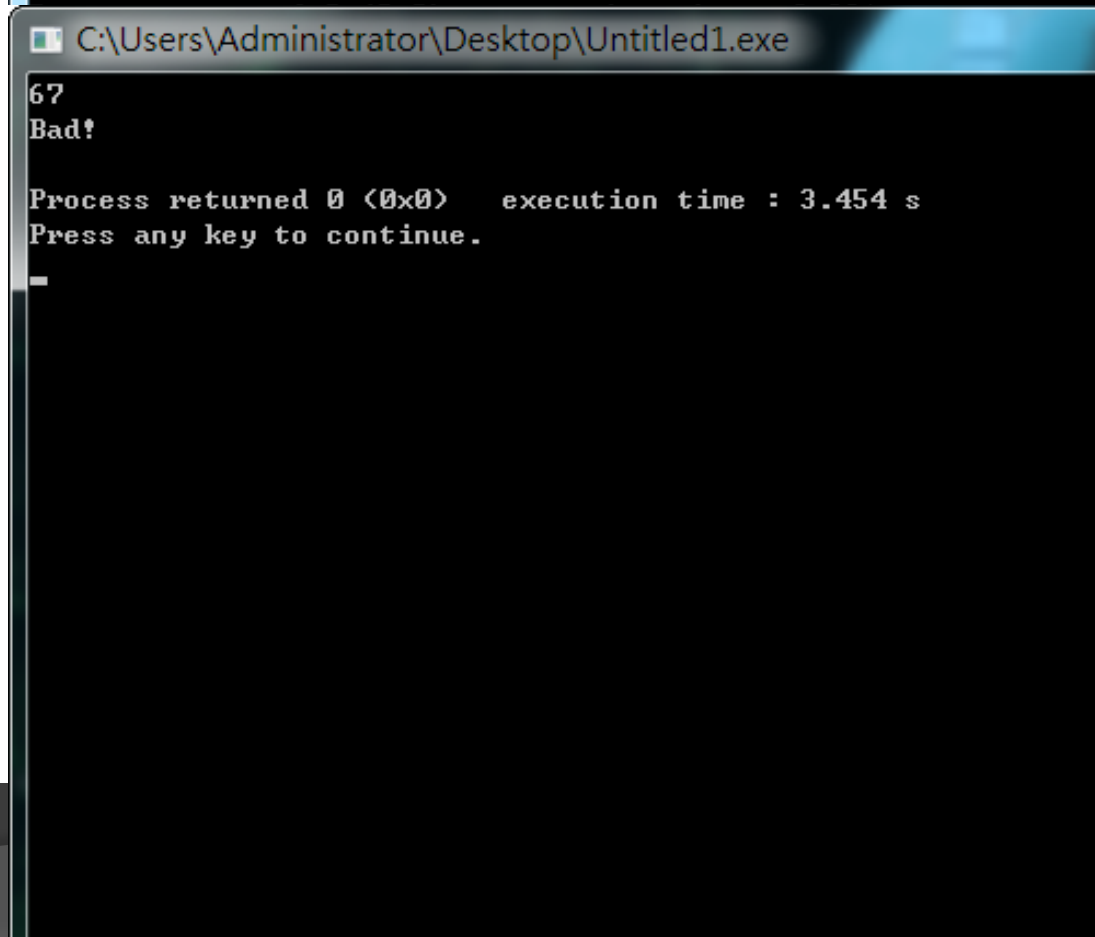
```
if(條件式) {
        程式敘述1
}

else if(條件式2) {
        程式敘述2
}

else {
        程式敘述3
}
```



範例：if…else if…else…

```c
#include<stdio.h>

int main(){
    int score;
    scanf("%d",&score);
    if(score>=90){
        printf("Excellent!\n");
    }
    else if(score>=80){
        printf("Very good!\n");
    }
    else if(score>=70){
        printf("Good!\n");
    }
    else {
        printf("Bad!\n");
    }

    return 0;
}
```





練習題1

請寫出一程式，輸入西元年分，判斷該年是否為閏年。

（四年一閏，逢百年不閏，四百年又閏）

測資：2100 不為閏年

2000 為閏年

480 為閏年

Switch 多重選擇控制

只能比較數值或字元，某些狀況下比If判斷更有效率。

Switch 多重選擇控制

```
switch(字元或數值) {
        case 值:
                statement 1
                break;
        case 值2:
                statement 2
                break;
        default:
                statement 3
}
```

範例：switch

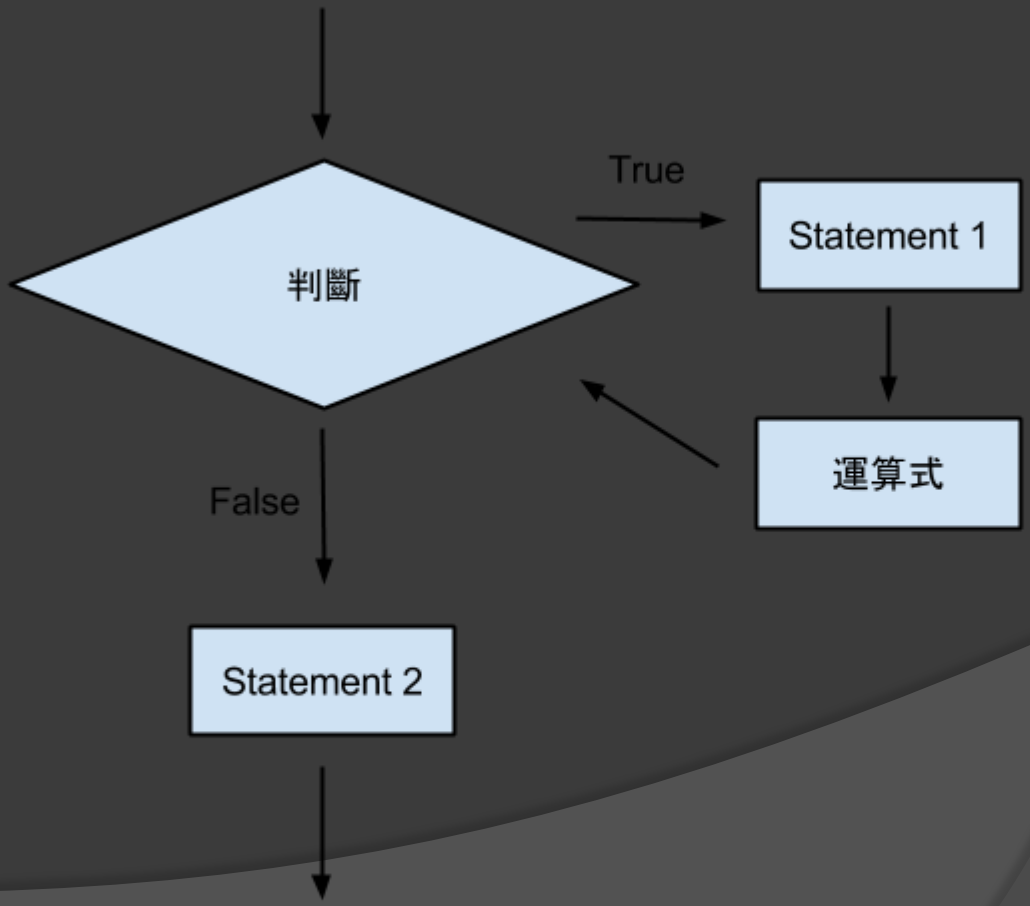
```c
#include<stdio.h>

int main(){
    char ch;
    scanf("%c",&ch);
    switch(ch){
        case '+':
            printf("a + b\n");
            break;
        case '-':
            printf("a - b\n");
            break;
        default:
            printf("Error!\n");
    }
    return 0;
}
```

Switch v.s. If

如果純綷比對數字或字元的話，建議使用switch，因為它只會在一開始的switch括號中取出變數 值一次，然後將這個值與下面所設定的case比對。但如果您使用if的話，每次遇到條件式時，都要取出變數值。

重複性結構 Iteration

- 程式執行過程中，需要重複做同一個工作好幾次。

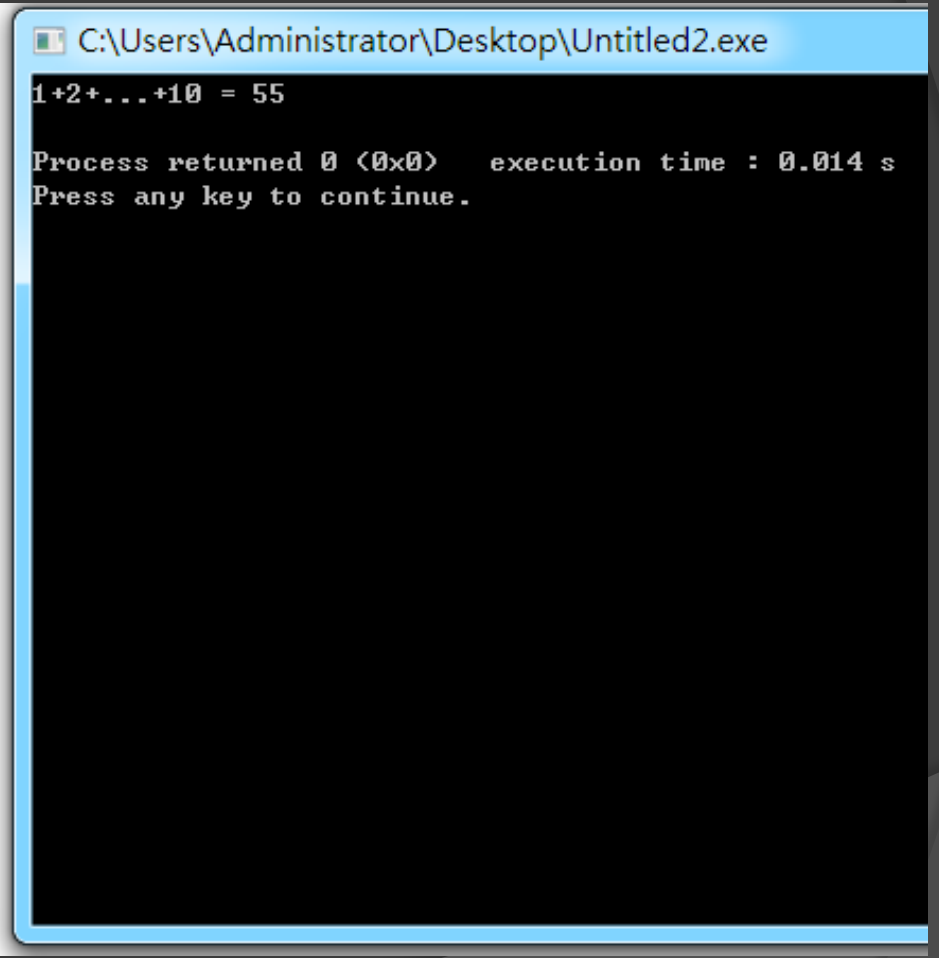


for

```
for(起始式 ; 判斷式 ; 運算式) {
        statement
}

for(i=0 ; i<3 ; i++) {
        printf( “%d”,i);
}
```

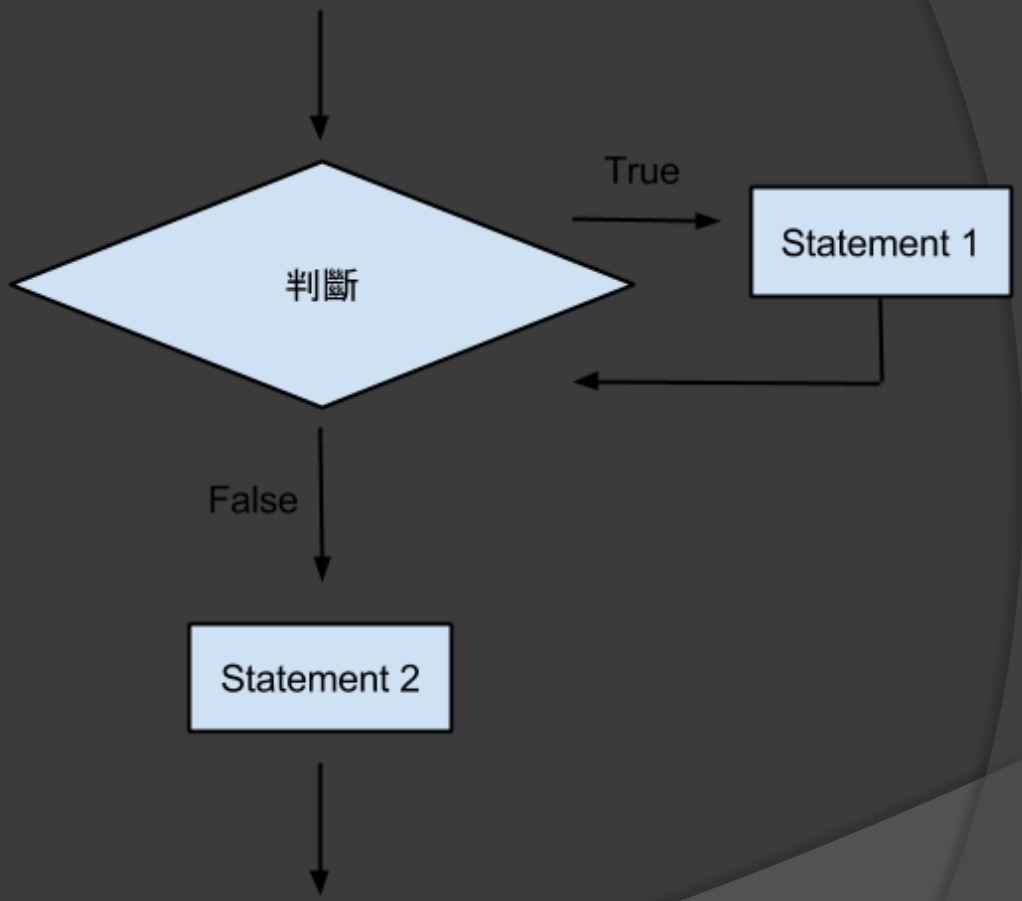
範例：for

```c
#include<stdio.h>

int main(){
    int i,total = 0;
    for(i=1;i<11;i++){
        total = total + i;
    }
    printf("1+2+...+10 = %d\n",total);
    return 0;
}
```



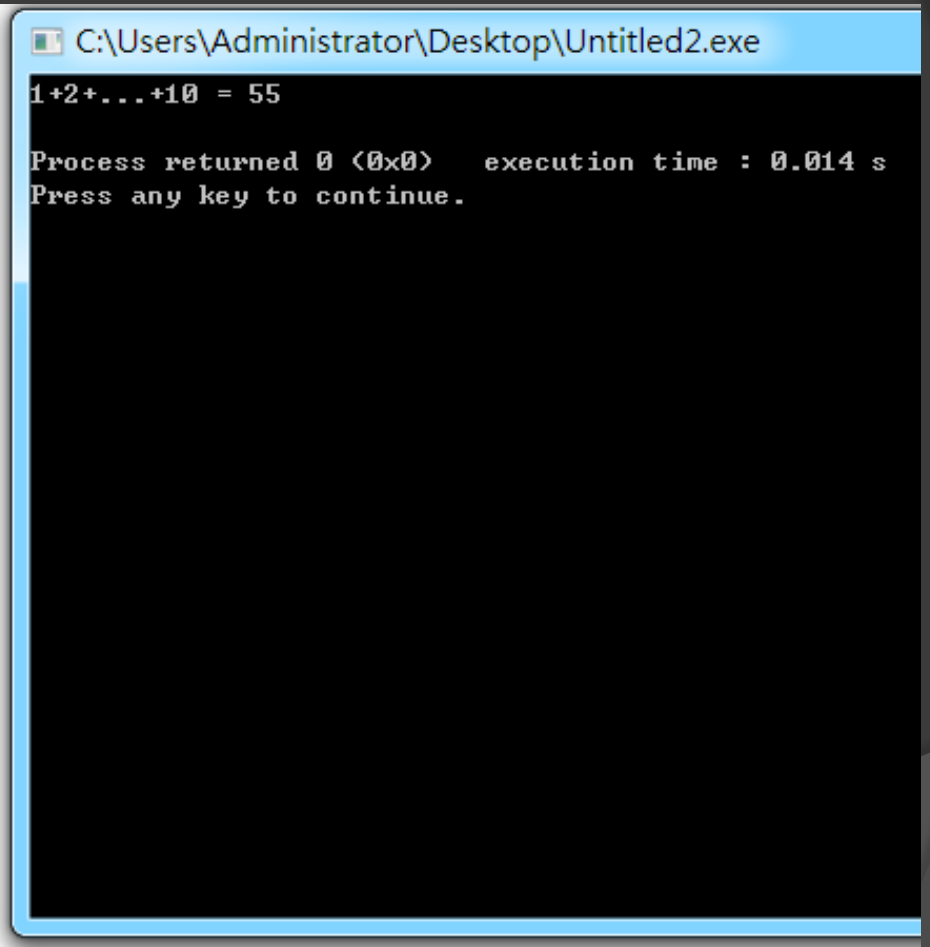
while

```
while(判斷式) {
        statement
}
```



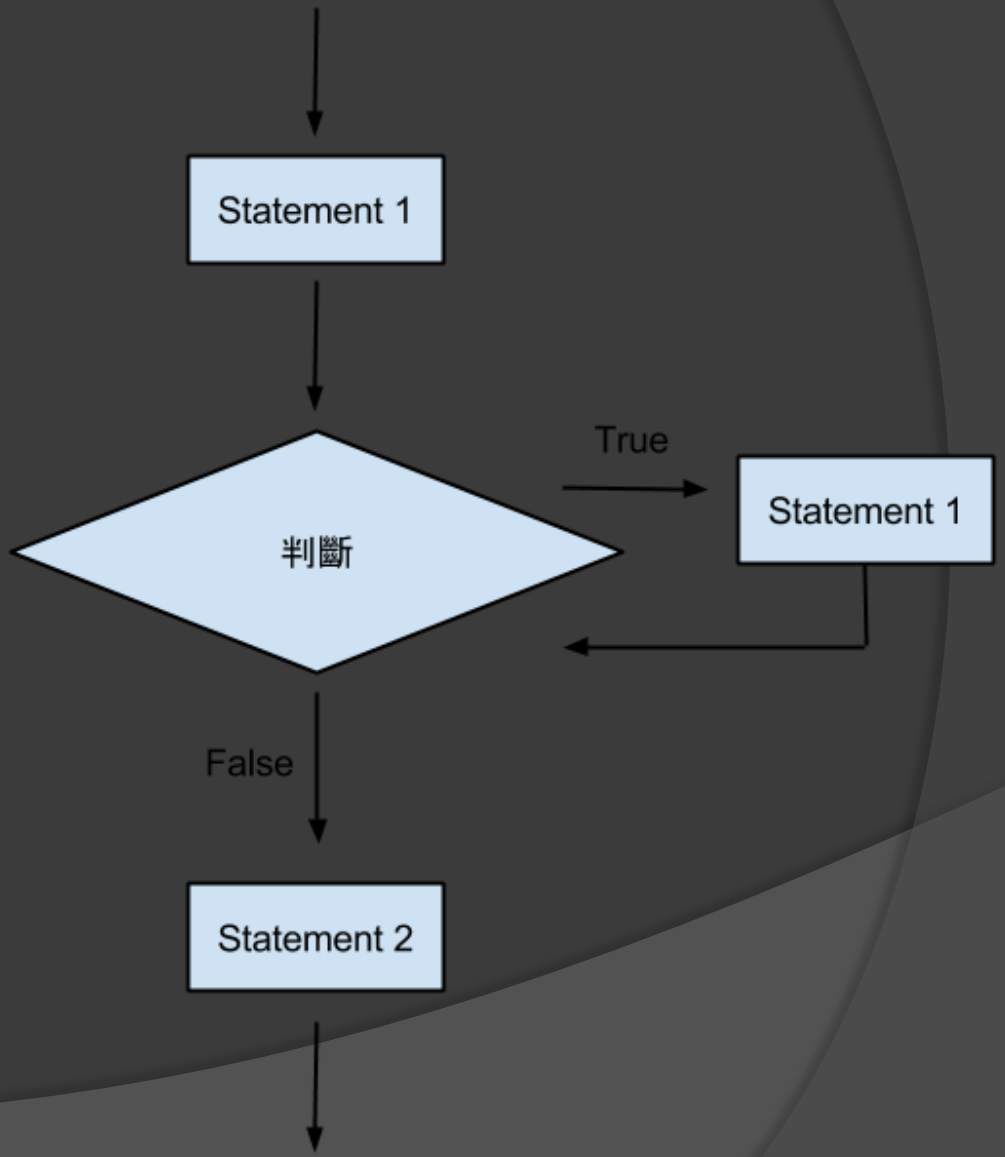
範例：while

```c
#include<stdio.h>

int main(){
    int i = 1,total = 0;
    while(i<11){
        total = total + i;
        i++;
    }
    printf("1+2+...+10 = %d\n",total);
    return 0;
}
```



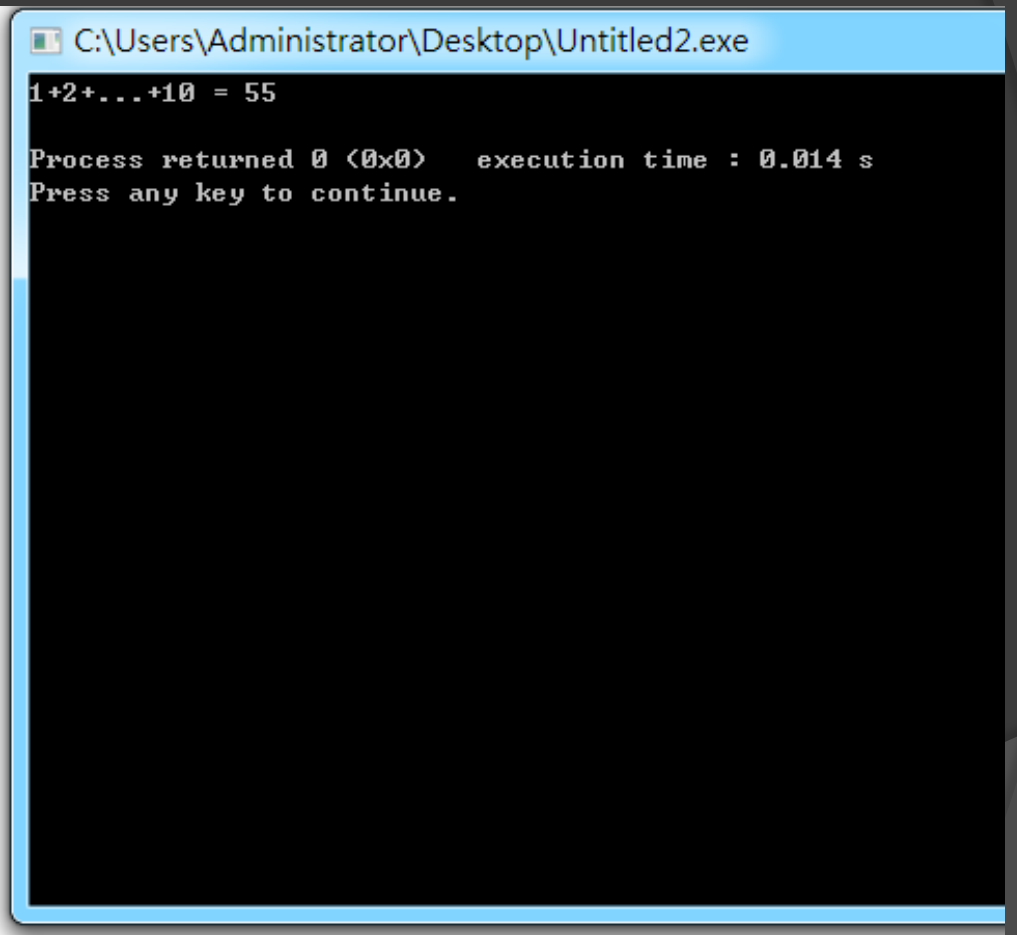
do…while

```
do{
        statement
}while(判斷式);
```



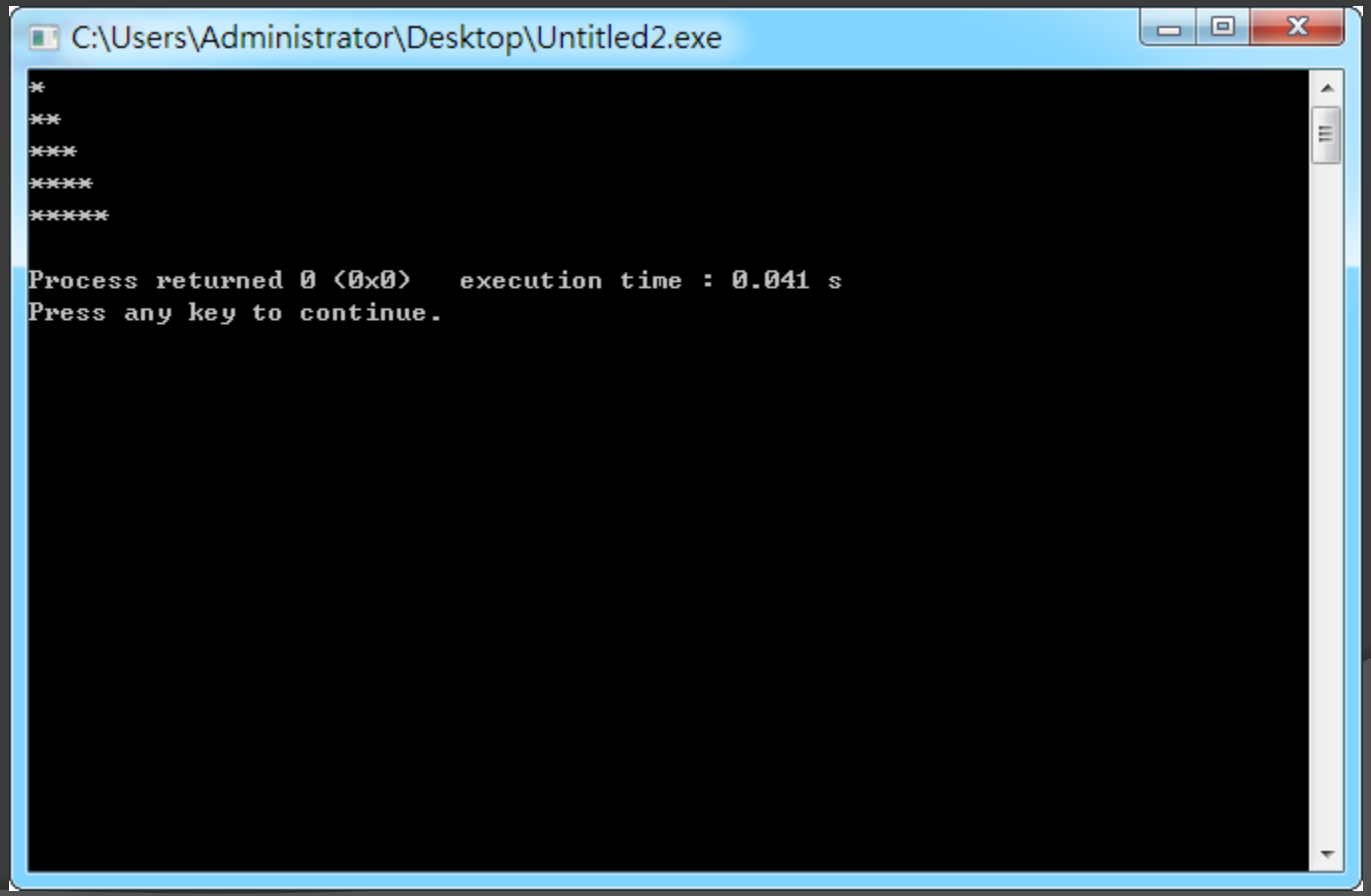
範例：do…while

```c
#include<stdio.h>

int main(){
    int i = 1,total = 0;
    do{
        total = total + i;
        i++;
    }while(i<11);
    printf("1+2+...+10 = %d\n",total);
    return 0;
}
```



練習題2

印出右斜三角程式



break & continue

- break：程式中斷，跳出所在迴圈或Switch
- continue：回到最近的迴圈的程式開頭

綜合練習

- 印出1~100間所有質數。
- 提示：for迴圈搭配if判斷式。