

實作輔導 3

- 日期: 4/14 (星期六) 09:10~12:00
- 地點: 臺北市立大學 臺北市中正區愛國西路一號 (中正紀念堂站7號出口)
- 公誠樓三樓 G316 電腦教室([資訊科學系](#))
- 可自行攜帶筆電
- 目標: 協助習題、安裝java 環境、path設定
- 參加者: 請email [給laiahfur@gmail.com](mailto:laiahfur@gmail.com) 或直接到輔導地點
- 下次預定:

搶答!!

在分支敘述下變數內容追蹤(1)

印出結果?

```
int a = 10, b = 8, c;
```

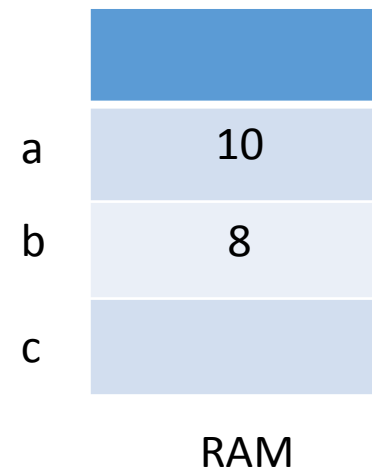
```
if(a >= b)
```

```
    c = a+b;
```

```
else
```

```
    c = a-b;
```

```
System.out.print("c = " + c);
```



在分支敘述下變數內容追蹤(2)

印出結果?

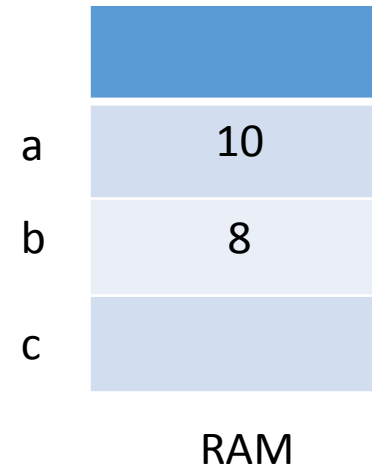
```
int a = 10, b = 8, c;
```

```
if(a >= b)
```

```
    c = a+b;
```

```
    c = c-1;
```

```
System.out.print("c = " + c);
```



在分支敘述下變數內容追蹤(3)

印出結果?

```
int x = 10, y = 30, z = 40;
```

```
if !(y == z)
```

```
    x = (z+1)%15
```

```
System.out.print("x = " + x);
```

x	10
y	30
z	40
RAM	

在分支敘述下變數內容追蹤(4)

印出結果?

```
int p = 30, q = 20, r = 15;
```

```
if(p >= 25 && q<50)
```

```
    r = p/r;
```

```
else
```

```
    r = p-r;
```

```
System.out.print("r = " + r);
```

p	30
q	20
r	15

RAM

在分支敘述下變數內容追蹤(5)

印出結果?

```
int p = 30, q = 20, r = 15;
```

```
if (p >= 25 || q < 50)
```

```
    r = p/r;
```

```
else
```

```
    r = p-r;
```

```
System.out.print("r = " + r);
```

p	30
q	20
r	15
RAM	

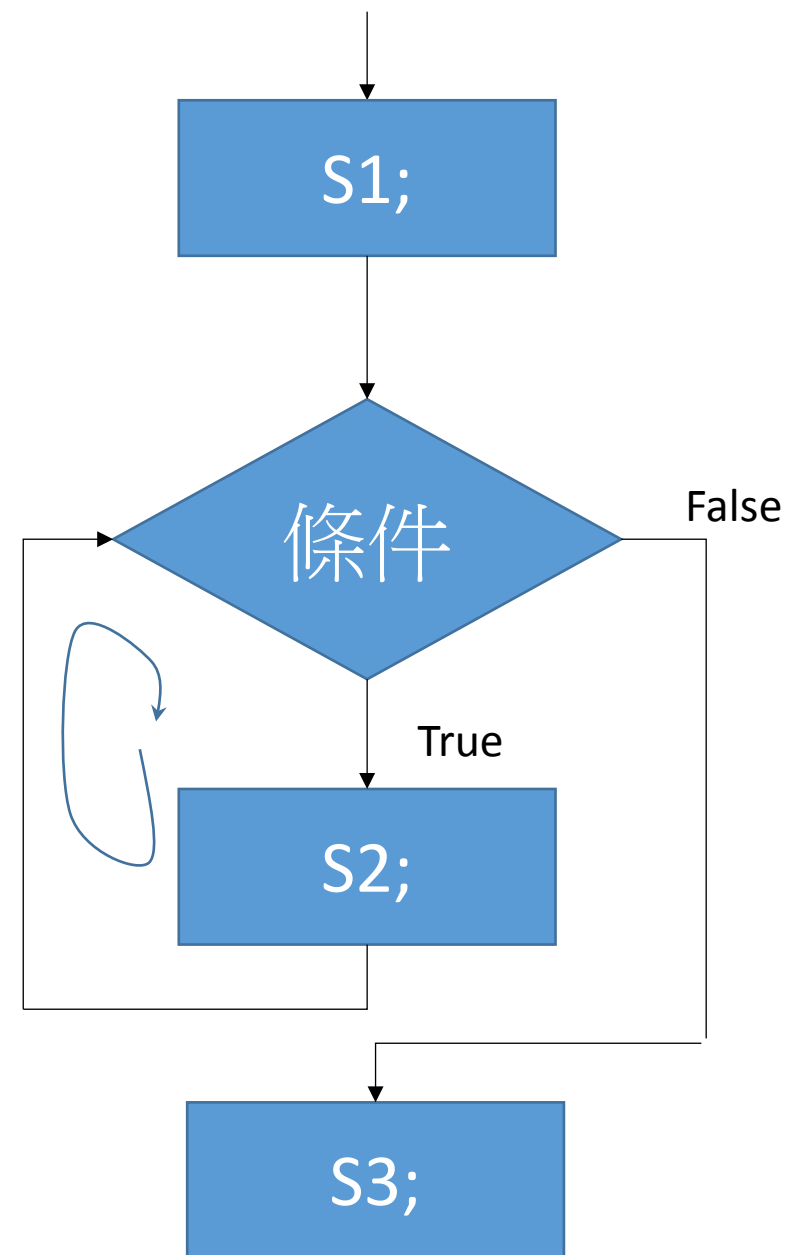
Q6 : 印出結果?

```
public class loop_1 {  
    public static void main(String[] args) {  
        int a = 20;  
        int b = 15;  
        int i=0;  
        while (a>b) {  
            i=i+1;  
            a--;  
        }//while  
        System.out.println("i="+i+" a="+a);  
    }//main  
}//class
```

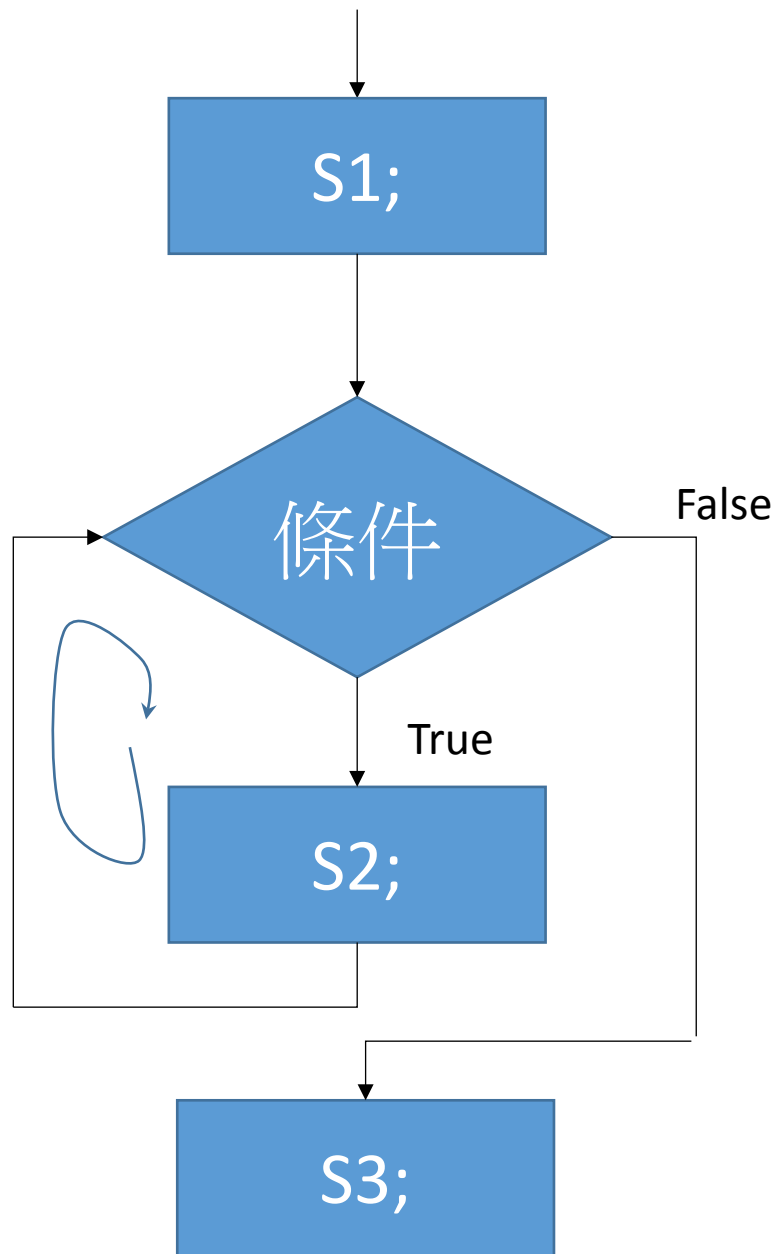
while 迴圈 II

追蹤迴圈

- 無窮迴圈
- 空迴圈
- 如何跳出迴圈



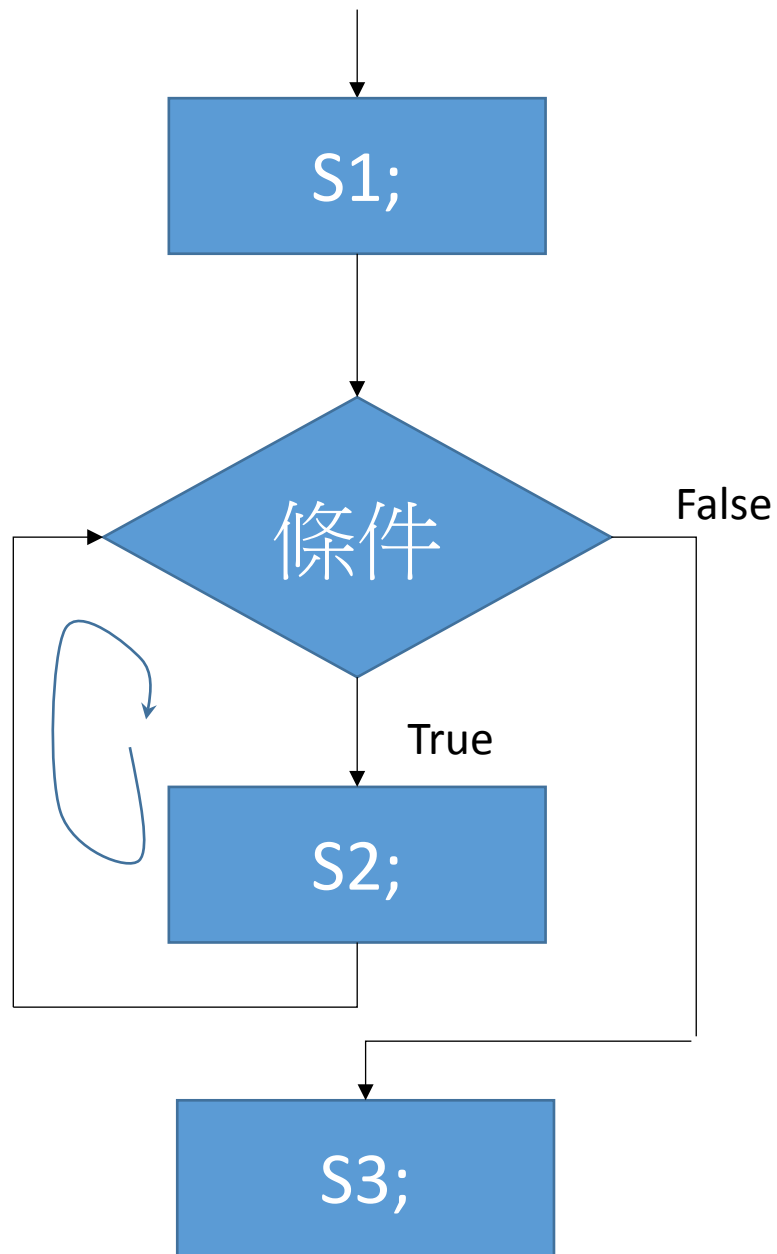
追蹤迴圈1-1



```
int a = 10;  
int b = 20;  
int i=0, j=0;  
System.out.println("i="+i);  
while (a>b) {  
    i=i+1;  
    System.out.println("i="+i);  
} //while  
System.out.println("i="+i);
```

無窮迴圈?
空迴圈?

追蹤迴圈1-2



```
j=0;
```

```
a=10;
```

```
System.out.println("j="+j);
```

```
while (a>=30) {
```

```
    j=j+1;
```

```
    System.out.println("j="+j);
```

```
}//while
```

```
System.out.println("j="+j);
```

```
// while (false) { //cause compile error
```

```
//     System.out.println("loop-4");
```

```
// }//while
```

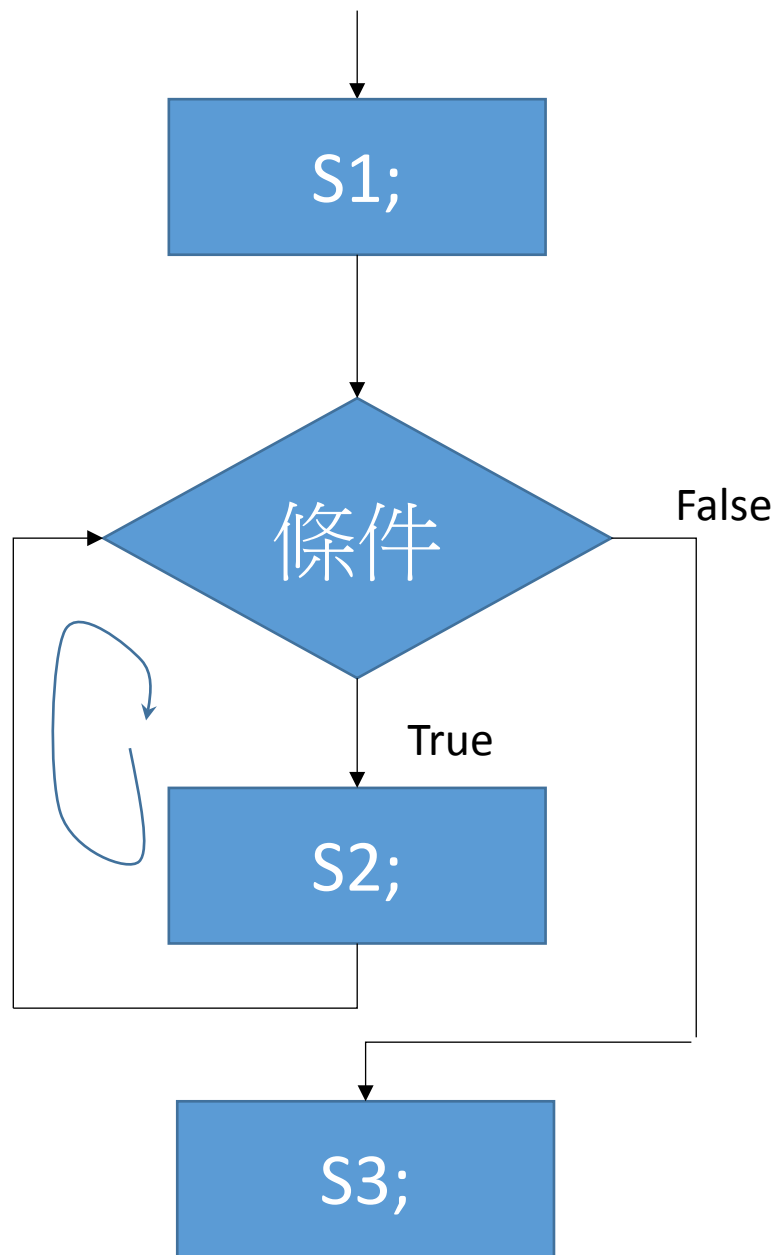
```
//main
```

```
}//class
```

無窮迴圈?

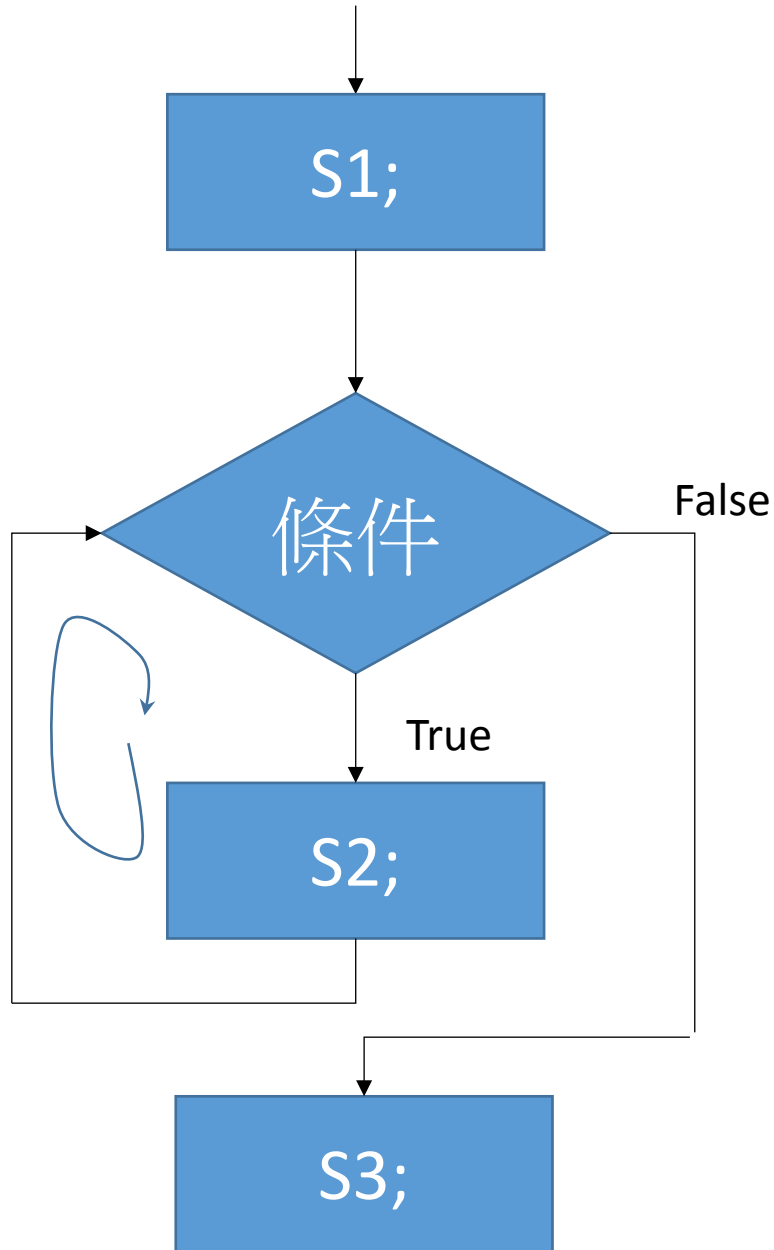
空迴圈?

追蹤迴圈1



```
public class loop_1a {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 20;  
        int i=0, j=0;  
        System.out.println("i="+i);  
        while (a>b) {  
            i=i+1;  
            System.out.println("i="+i);  
        }//while  
        System.out.println("i="+i);  
  
        System.out.println("j="+j);  
        while (a>=30) {  
            j=j+1;  
            System.out.println("j="+j);  
        }//while  
        System.out.println("j="+j);  
  
        // while (false) { //cause compile error  
        //     System.out.println("loop-4");  
        // }//while  
        }//main  
    }//class
```

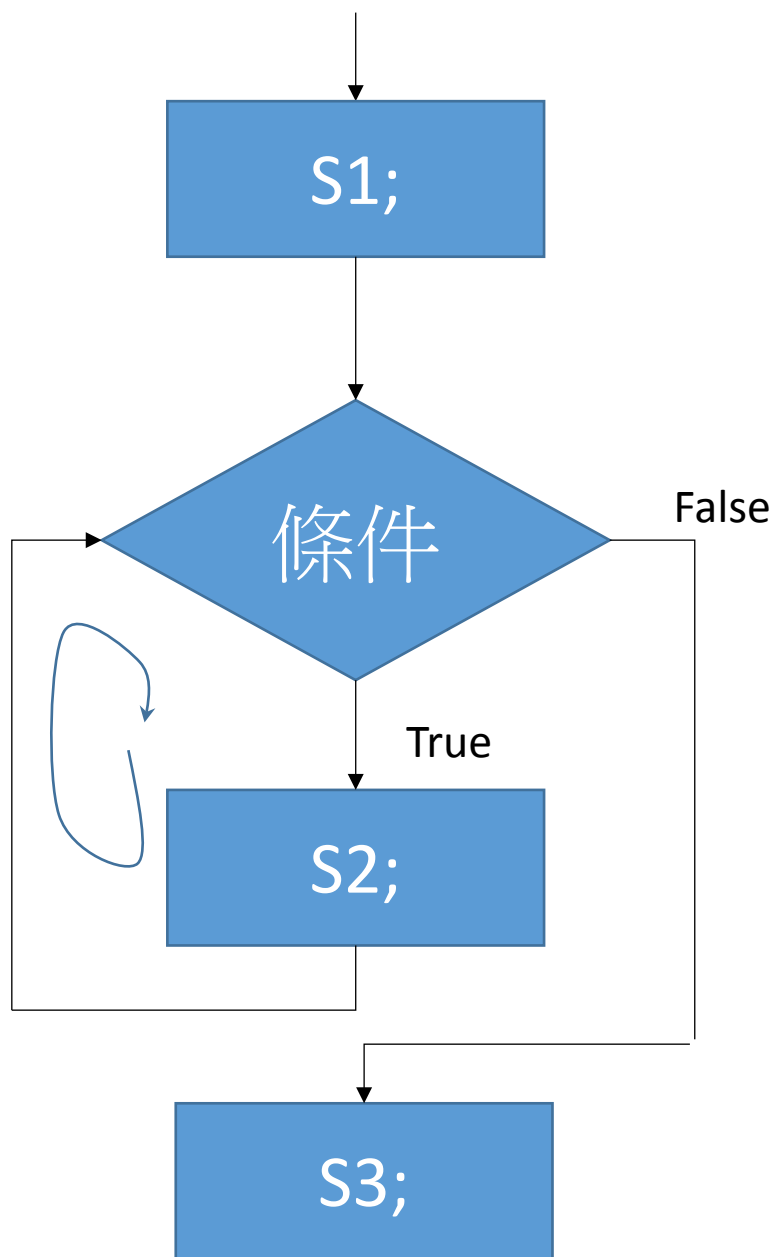
追蹤迴圈2



```
public class loop_lb {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 20;  
        int i=0;  
        System.out.println("i="+i);  
        while (true) {  
            i=i+1;  
            System.out.println("i="+i);  
        }//while  
        //System.out.println("i="+i);//cause c  
        }//main  
    }//class
```

- true: 邏輯常數 “真”
- false: 邏輯常數 “偽”

追蹤迴圈3

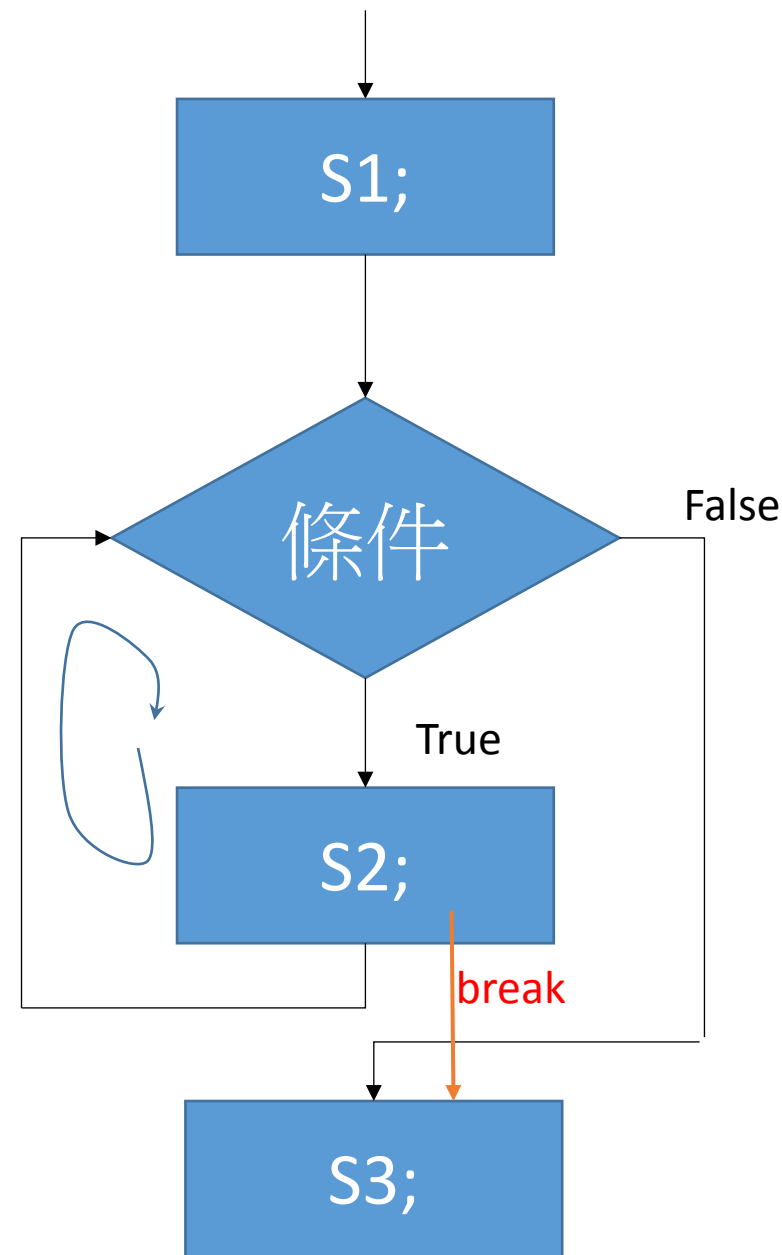


```
public class loop_lc {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 20;  
        int i=0;  
        System.out.println("i="+i);  
        while (b>a) {  
            i=i+1;  
            System.out.println("i="+i);  
            if (i>=500) break;  
        } //while  
        System.out.println("i="+i);  
    } //main  
} //class
```

- `if (i>=500) break;` //跳出迴圈
- `System.exit(-1);` //跳出整個程式

追蹤迴圈4

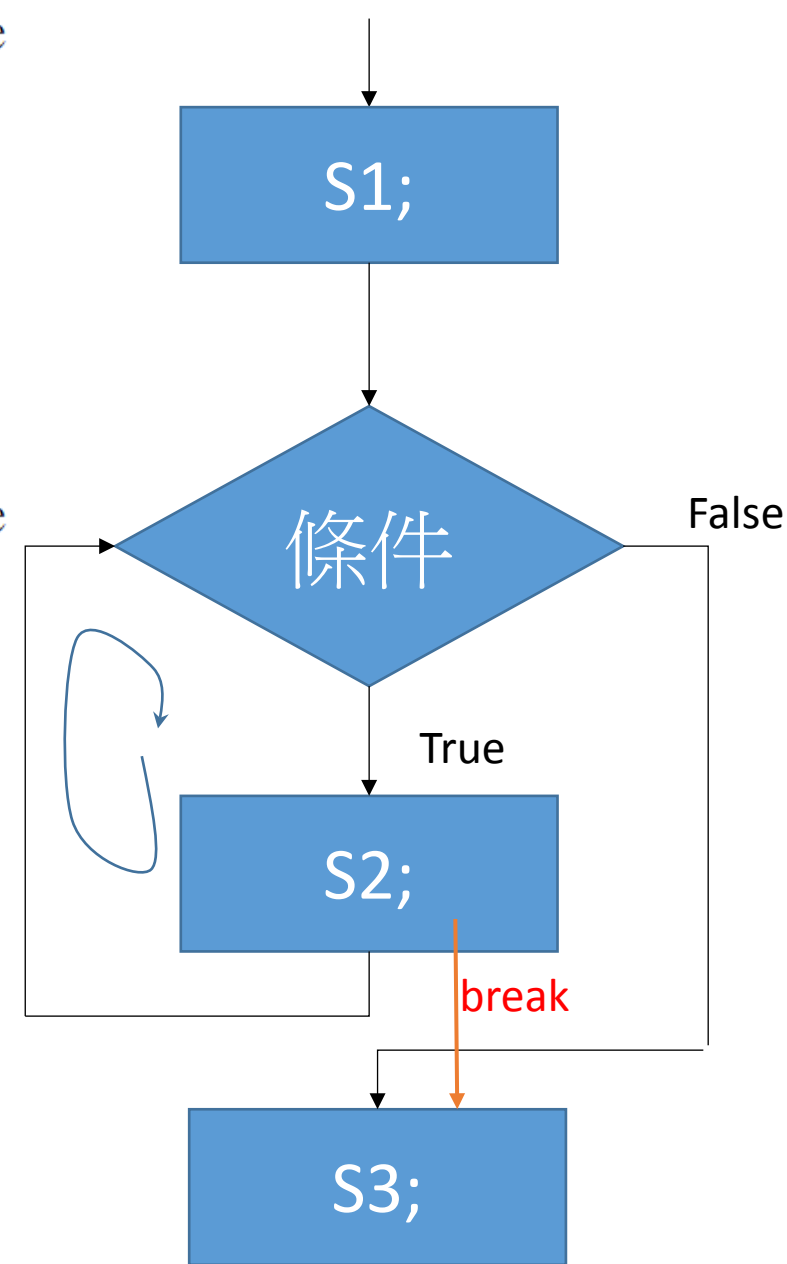
```
public class loop_1d {  
    public static void main(String[] args) {  
        int i=0;  
        System.out.println("i="+i);  
        while (true) {  
            i=i+1;  
            System.out.println("i="+i);  
            if (i>=500) break;  
        } //while  
        System.out.println("i="+i);  
    } //class
```



追蹤迴圈5

```
public class loop_1e {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 20;  
        System.out.print("before loop: a="+a+" ,");  
        System.out.println((b>a));  
        while (b>a) {  
            a++;  
            System.out.print("inside loop:a="+a+" ,");  
            System.out.println((b>a));  
        }  
        System.out.print("after loop:a="+a+" ,");  
        System.out.println((b>a));  
    }  
}
```

```
before loop: a=10 ,true  
inside loop:a=11 ,true  
inside loop:a=12 ,true  
inside loop:a=13 ,true  
inside loop:a=14 ,true  
inside loop:a=15 ,true  
inside loop:a=16 ,true  
inside loop:a=17 ,true  
inside loop:a=18 ,true  
inside loop:a=19 ,true  
inside loop:a=20 ,false  
after loop:a=20 ,false
```



迴圈結束方式二

```
E:\java-2017\9-29>javac BMI_4.java
```

```
E:\java-2017\9-29>java BMI_4
```

```
=====歡迎量測體位=====
```

```
輸入身高：1.8
```

```
輸入體重：66
```

```
BMI：20.37，狀態：正常Normal
```

```
(繼續(Y/N)：y
```

```
輸入身高：1.68
```

```
輸入體重：75
```

```
BMI：26.57，狀態：過重Overweight
```

```
(繼續(Y/N)：N
```

```
=====bye bye=====
```

String常用函數

- 比較字串是否相等
 - equals :字串物件之函數
 - A.equals(B) :字串A是否相等字串B
 - true 或 false
- 將字串轉換為大寫(UpperCase)
 - A.toUpperCase()
- 將字串轉換為小寫(LowerCase)
 - B.toLowerCase()

```
import java.util.Scanner;

public class case_1 {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.print("輸入字串A : ");

        String A = input.nextLine();

        System.out.print("輸入字串B : ");

        String B = input.nextLine();

        System.out.print("A:" + A + "\nB:" + B + "\n\n");

        System.out.print("A equals to B ? " + A.equals(B) + "\n" );

        System.out.print("將A轉換為大寫、B轉換為小寫\n");

        A = A.toUpperCase();

        B = B.toLowerCase();

        System.out.print("A:" + A + "\nB:" + B + "\n\n");

        System.out.print("A equals to B ? " + A.equals(B) );

    } //main

} //class
```

迴圈加入計算BMI

```
import java.util.Scanner;

public class BMI_3 {
    public static void main(String[] args) {
        String ok="Y";
        System.out.println("=====歡迎量測體位=====");
        Scanner input = new Scanner(System.in);
        double height, weight;
        while (ok.toUpperCase().equals("Y")) {
            System.out.print("輸入身高：");
            height = input.nextDouble();
            System.out.print("輸入體重：");
            weight = input.nextDouble();
            double bmi = Math.round((weight/ (height*height) )* 100) / 100.0;
            String status;

            if (bmi < 18.5) {
                status = "體重過輕Underweight";
            }
            else if (bmi < 24) { //(bmi>=18.5 && bmi < 24)
                status = "正常Normal";
            }
            else
                status = "過重Overweight";

            System.out.println("BMI : "+bmi+"，狀態: "+status);
            System.out.print("(繼續(Y/N)：");
            ok= input.next().toUpperCase();
        } //while
        System.out.println("=====bye bye=====");
    } //main
} //class
```

Example: 亂數加法練習 (個位數)

(1)出10題個位數加法測驗(一次一題)，不管對錯都出下一題，直到答對為止；

目標: 亂數函數運用、判斷敘述、迴圈

Example: 亂數加法練習 (個位數) 二

- 答錯不出下一題，直到答對為止
- 出**10**題
- 顯示題次: 如第**3**題
- 計分:
 - 第二次答對，得**10-1**分
 - 第**3**次答對，得**10-2**分

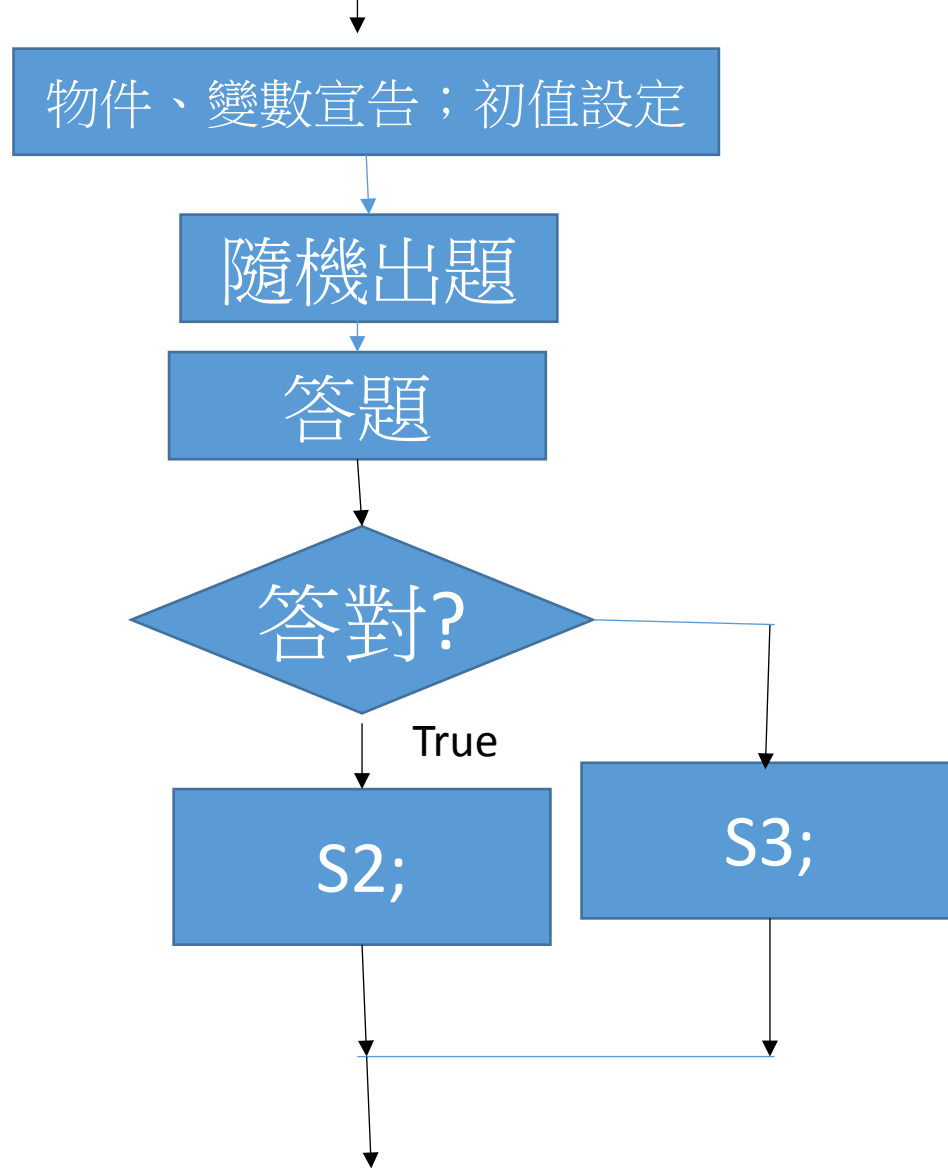
[illegible]

只出一題

```
import java.security.SecureRandom;
import java.util.Scanner;

public class add_drill_1 {
    public static void main(String[] args) {
        SecureRandom sr = new SecureRandom();
        Scanner input = new Scanner(System.in);
        int n1=0,n2= 0;
        int ans= 0;

        n1 = sr.nextInt(10);
        n2 = sr.nextInt(10);
        System.out.print(""+n1+"+"+n2+"="); //present question
        ans = input.nextInt();
        if (ans== n1+n2) ✚
            System.out.println("答對，GREAT!!\n");
        else
            System.out.println("答錯，加油!");
        } //main
    } //class
```



```
public class add_drill_2 {  
    public static void main(String[] args) {  
        SecureRandom sr = new SecureRandom();  
        Scanner input = new Scanner(System.in);  
        int n1=0,n2= 0;  
        int ans= 0, score=0, i=1;  
        while (i<=10) {  
            n1 = sr.nextInt(10);  
            n2 = sr.nextInt(10);  
            System.out.print(""+n1+" "+n2+"="); //present question  
            ans = input.nextInt();  
            if (ans== n1+n2) {  
                score=score+10;  
                System.out.println("答對， GREAT!!");  
            }  
            else  
                System.out.println("答錯， 加油!");  
        } //while  
    } //main  
} //class
```

What's wrong?

```
public class add_drill_2 {  
    public static void main(String[] args) {  
        SecureRandom sr = new SecureRandom();  
        Scanner input = new Scanner(System.in);  
        int n1=0,n2= 0;  
        int ans= 0, score=0, i=1;  
        while (i<=10) {  
            //i=i+1;  
            n1 = sr.nextInt(10);  
            n2 = sr.nextInt(10);  
            System.out.print(""+n1+" "+n2+"="); //present question  
            ans = input.nextInt();  
            if (ans== n1+n2) {  
                score=score+10;  
                System.out.println("答對， GREAT!! 分數:"+score+"分.");  
            }  
            else  
                System.out.println("答錯， 加油! 分數:"+score+"分.");  
            i=i+1;  
        } //while  
    } //main  
} //class
```

不管對錯都出下一題，直到答**10**題為止

```
Scanner input = new Scanner(System.in);
int n1=0,n2=0, cnt=0;
int ans= 0, score=0, i=1;
n1 = sr.nextInt(10);
n2 = sr.nextInt(10);
while (i<=10) {
    //i=i+1;
    System.out.print("第"+i+"題: "+n1+" "+n2+"="); //present question
    ans = input.nextInt();
    if (ans== n1+n2) {
        score=score+(10-cnt);
        System.out.println("答對，GREAT!! 分數:"+score+"分.");
        n1 = sr.nextInt(10);
        n2 = sr.nextInt(10);
        i=i+1;
    }
    else {
        System.out.println("答錯，加油！ 分數:"+score+"分.");
        cnt++; //cnt=cnt+1;
    }
}

} //while
```

Where is the bug? How to revise?

```

public class add_drill_3a {
    public static void main(String[] args) {
        SecureRandom sr = new SecureRandom();
        Scanner input = new Scanner(System.in);
        int n1=0,n2=0, cnt=0;
        int ans= 0, score=0, i=1;
        n1 = sr.nextInt(10);
        n2 = sr.nextInt(10);
        while (i<=10) {
            //i=i+1;
            System.out.print("第"+i+"題: "+n1+"+"+n2+"="); //present question
            ans = input.nextInt();
            if (ans== n1+n2) {
                score=score+(10-cnt);
                System.out.println("答對，GREAT!! 分數:"+score+"分.");
                n1 = sr.nextInt(10);
                n2 = sr.nextInt(10);
                i=i+1;
                cnt=0;
            }
            else {
                System.out.println("答錯，加油！ 分數:"+score+"分.");
                cnt++; //cnt=cnt+1;
            }
        } //while
    } //main
} //class

```

- 答錯不出下一題，直到答對為止
- 第二次答對，得**10-1**分
- 第**3**次答對，得**10-2**分

第八周習題:亂數減法、除法練習

- 亂數減法、除法練習出n題：
 - 十位數減法出5題：不可小減大，每題10分
 - 十位數除以個位數出5題：只能整除或需輸入商和餘數，每題10分
 - 練習結束可再繼續，分數重算
 - 可以加入:答錯不出下一題，直到答對為止
 - 只完成減法、除法之一，也可繳交
 - 繳交設計歷程檔及.java

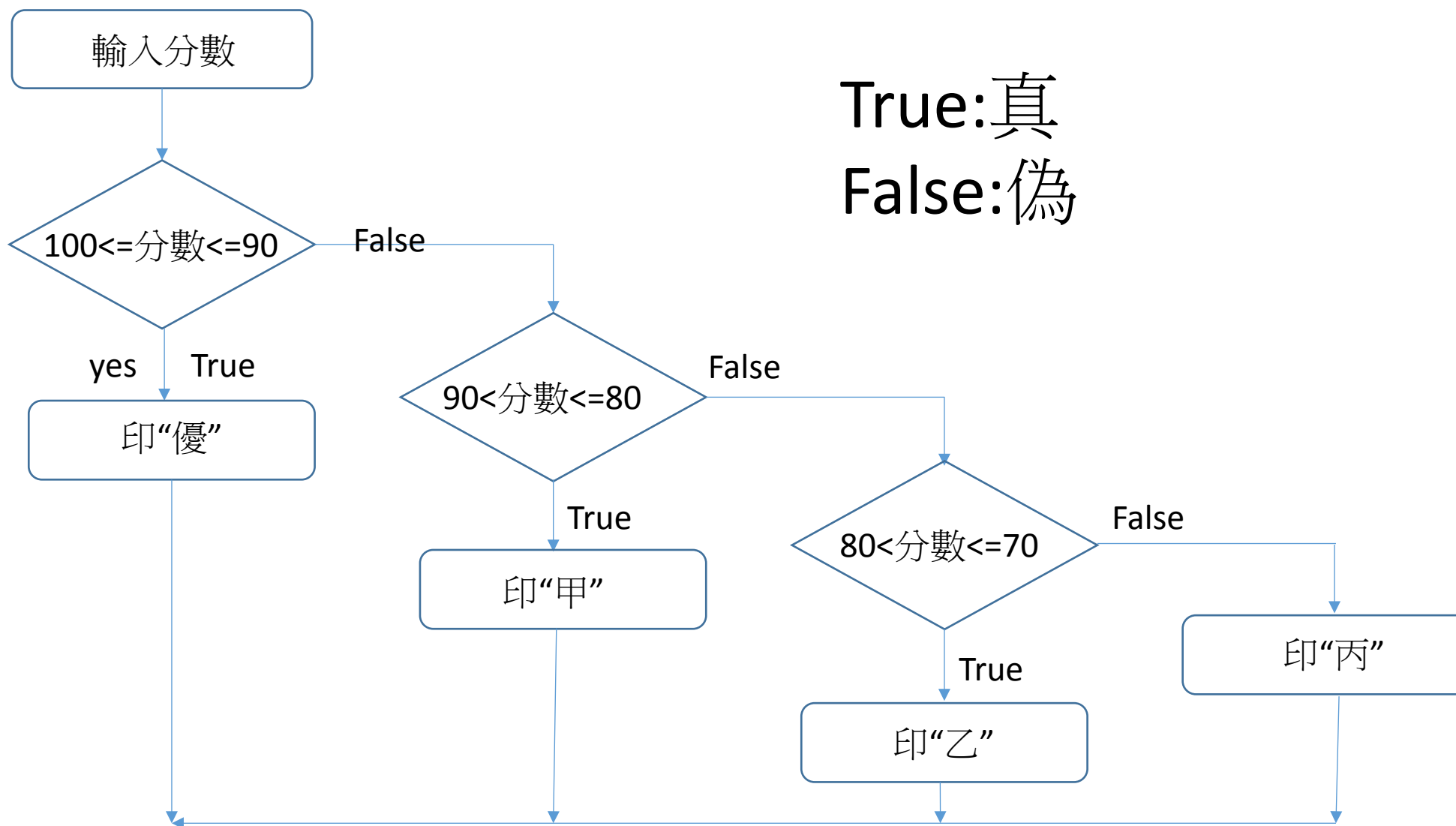
再談分支/選擇結構

成績相對應的等第判定

- 輸入分數
- 利用if ...else if...else 判斷並印出相對應的等第
- 或 switch case

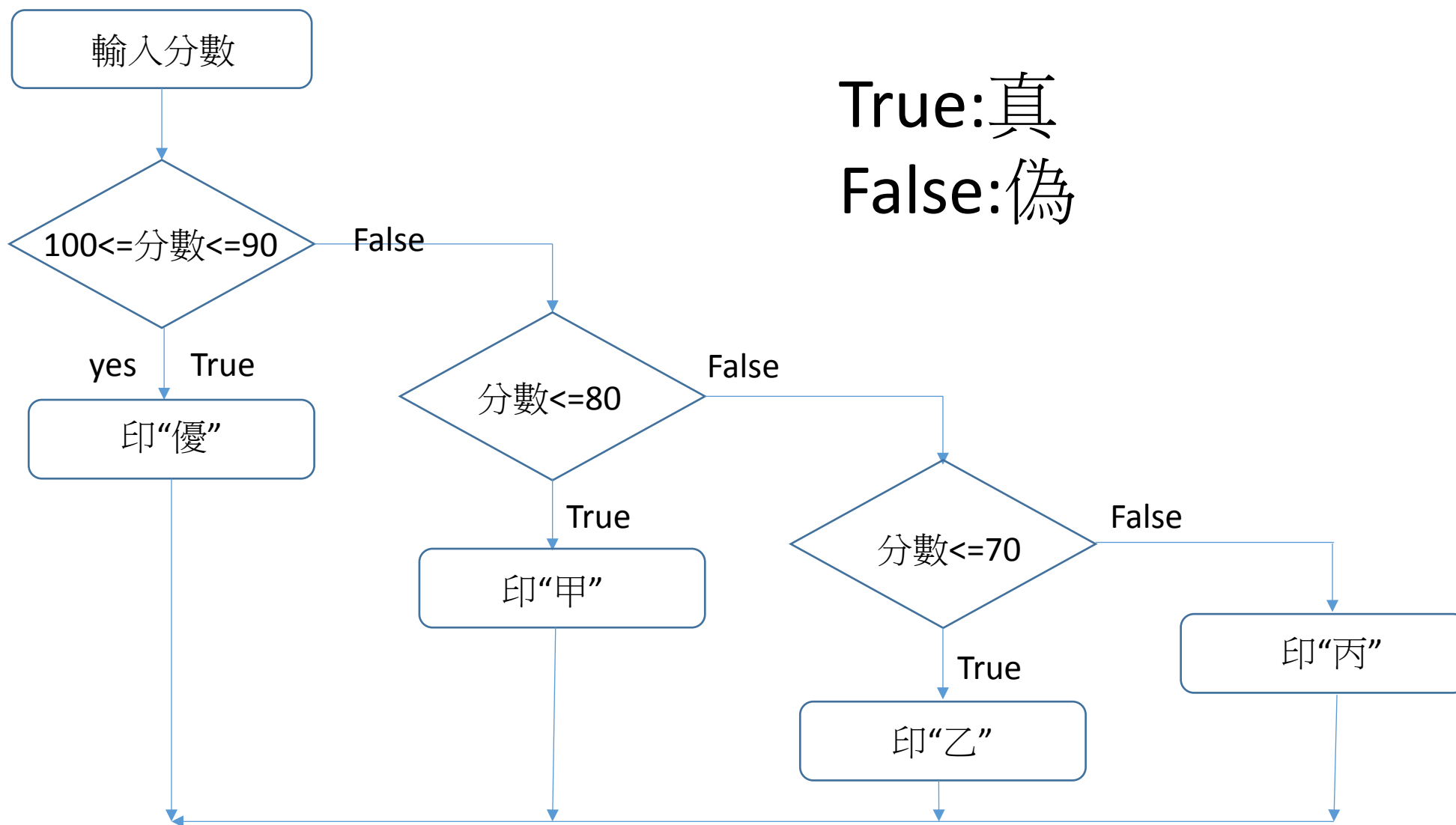
多重分支(multi-way if)

True:真
False:偽



多重分支(multi-way if)

True:真
False:偽



```

if (score<=100 && score>=90) {
    printf("等第：優\n");
}
else if (score <90 && score >= 80) {
    printf("等第：甲\n");
}
else if (score <80 && score >= 70) {
    printf("等第：乙\n");
}
else if (score <70 && score >= 60) {
    printf("等第：丙\n");
}
else if (score <60 && score >= 50) {
    printf("等第：丁\n");
}
else if (score <50 && score >= 40) {
    printf("等第：戊\n");
}
else if (score <40 && score >= 30) {
    printf("等第：己\n");
}
else if (score <30 && score >= 20) {
    printf("等第：庚\n");
}
else if (score <20 && score >= 10) {
    printf("等第：辛\n");
}
else if (score <10 && score >0) {
    printf("等第：壬\n");
}
else if (score == 0) {
    printf("等第：癸\n");
}
//若不符和上面區間，告知"無法判讀"
else{
    printf("無法判讀\n");
}

```

Single statement

去除{ }



```

if (score<=100 && score>=90)
    System.out.println("等第：優\n");
else if (score >= 80)
    System.out.println("等第：甲\n");
else if (score >= 70)
    System.out.println("等第：乙\n");
else if (score >= 60)
    System.out.println("等第：丙\n");
else if (score >= 50)
    System.out.println("等第：丁\n");
else if (score >= 40)
    System.out.println("等第：戊\n");
else if (score <40 && score >= 30)
    System.out.println("等第：己\n");
else if (score >= 20)
    System.out.println("等第：庚\n");
else if (score >= 10)
    System.out.println("等第：辛\n");
else if (score >0)
    System.out.println("等第：壬\n");
else if (score == 0)
    System.out.println("等第：癸\n");
//若不符和上面區間，告知"無法判讀"
else
    System.out.println("無法判讀\n");

```

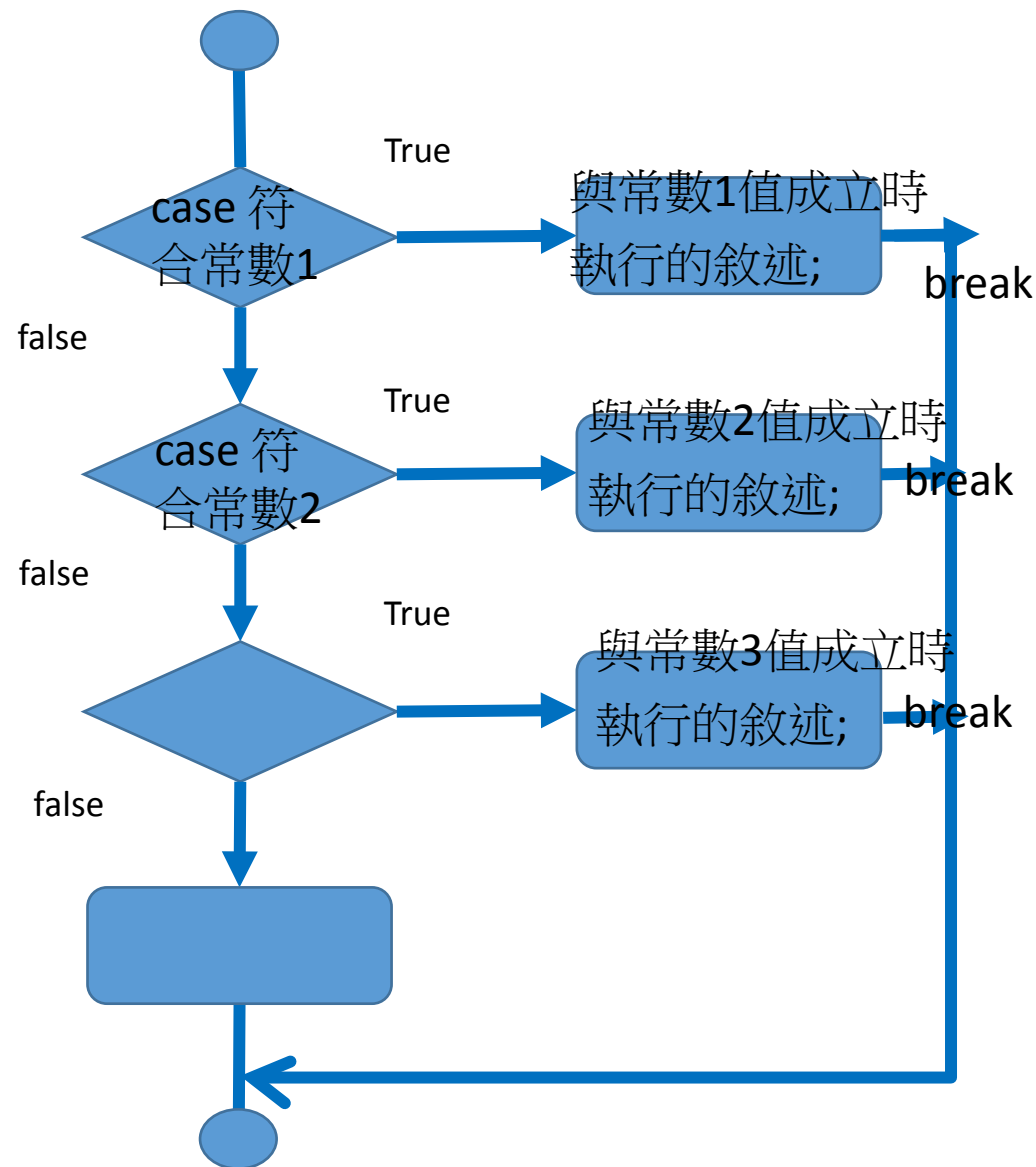
switch case
成績判定

多重選擇另一種形式：Switch case

- Switch : 原意為開關、切換
- CASE: 案例
- Default: 預設

switch小括弧內為一運算式，計算出常數值。若與其後 case 的常數值相符，就會執行該 case 的陳述。

```
switch (變數名稱或運算式) {  
    case 符合常數1或字元1:  
        與常數1值成立時執行的敘述;  
        ;//結束執行switch判斷;  
    case 常數2或字元2 :  
        與常數2值成立時執行的敘述;  
        break;//結束執行switch判斷;  
    default:  
        與上述case常數值均不成立時執行的敘述;  
        break;//結束執行switch判斷;  
}
```



主題：成績判定 – switch case

- 100~90優 / 89~80甲 / 79~70乙 / 69~60丙 / 59~50丁 / 49~40戊 / 39~30己 / 29~20庚 / 19~10辛 / 9~1壬 / 0癸
- 利用switch case判斷使用者輸入的成績位於哪個區間，並印出相對應的等第。
- 利用score/10的結果來判斷分數屬於哪個case，
- 由於9~0除10結果均為0，但9~1 & 0屬不同等地，因此判斷後才印出。

執行結果

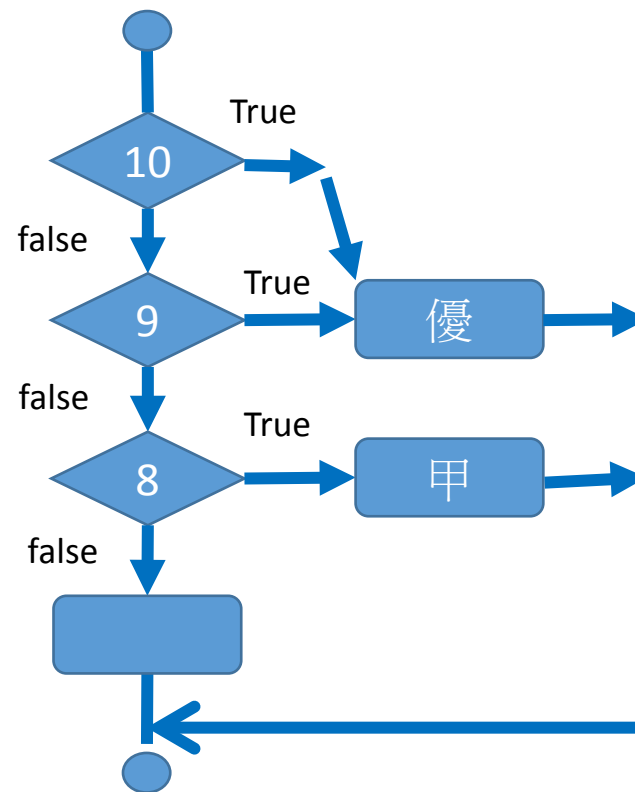
輸入分數(整數)：89
等第：甲

```
switch (score / 10) {  
    //由於100~90都為(10~9)優等，因此兩case印出相同  
    case 10:  
    case 9:  
        printf("等第：優\n");  
        break; //結束執行，break switch判斷;  
    case 8:  
        printf("等第：甲\n");  
        break;  
    case 7:  
        printf("等第：乙\n");  
        break;  
    case 6:  
        printf("等第：丙\n");  
        break;  
    case 5:  
        printf("等第：丁\n");  
        break;  
    case 4:  
        printf("等第：戊\n");  
        break;  
    case 3:  
        printf("等第：己\n");  
        break;  
    case 2:  
        printf("等第：庚\n");  
        break;  
    case 1:  
        printf("等第：辛\n");  
        break;  
    case 0:  
        //由於9~0除10結果均為0，但9~1 & 0屬不同等地，因此判斷後才印出  
        if (score != 0)  
            printf("等第：壬\n");  
        else  
            printf("等第：癸\n");  
        break;  
    //若不和上面區間，告知"無法判讀"  
    default:  
        printf("無法判讀\n");  
        break;  
}
```

```

switch (score / 10) {
    //由於100~90都為(10~9)優等，因此兩case印出相同
    case 10:
    case 9:
        printf("等第：優\n");
        break; //結束執行，break switch判斷;
    case 8:
        printf("等第：甲\n");
        break;
    case 7:
        printf("等第：乙\n");
        break;
    case 6:
        printf("等第：丙\n");
        break;
    case 5:
        printf("等第：丁\n");
        break;
    case 4:
        printf("等第：戊\n");
        break;
    case 3:
        printf("等第：己\n");
        break;
    case 2:
        printf("等第：庚\n");
        break;
    case 1:
        printf("等第：辛\n");
        break;
    case 0:
        //由於9~0除10結果均為0，但9~1 & 0屬不同等地，因此判斷後才印出
        if (score != 0)
            printf("等第：壬\n");
        else
            printf("等第：癸\n");
        break;
    //若不符和上面區間，告知"無法判讀"
    default:
        printf("無法判讀\n");
        break;
}

```



Debug

```
import java.util.Scanner;
public class scorerank_error {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int score = 0;
        while (score >= 0) {
            System.out.print("輸入分數(整數):");
            score = input.nextInt();
            if (score >= 0) {
                //將分數除10，由於是int除int，所以結果仍為int(10~0)。
                switch (score / 10) {
                    //由於100~90都為(10~9)優等，因此兩case印出相同
                    case 10:
                    case 9:
                        System.out.print("等第：優\n");
                    case 8:
                        System.out.print("等第：甲\n");
                    case 7:
                        System.out.print("等第：乙\n");
                    case 6:
                        System.out.print("等第：丙\n");
                    case 5:
                        System.out.print("等第：丁\n");
                    case 4:
                        System.out.print("等第：戊\n");
                    case 3:
                        System.out.print("等第：己\n");
                    case 2:
                        System.out.print("等第：庚\n");
                    case 1:
                        System.out.print("等第：辛\n");
                    case 0: //由於9~0除10結果均為0，但9~1 & 0屬不同
                        if (score != 0)
                            System.out.print("等第：壬\n");
                        else
                            System.out.print("等第：癸\n");
                    default: // >100
                        System.out.print("無法判讀\n");
                } //switch
            } //if
            else {
                System.out.print("bye\n");
                break;
            } //switch
        } //while
    } //main
} //class
```

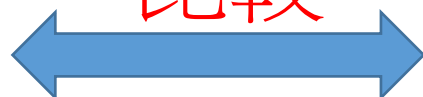
- Bug在何處? Syntax error?
 - 請回答!!
- How to handle?
- Let's compile & run

```

if (score<=100 && score>=90) {
    printf("等第：優\n");
}
else if (score <90 && score >= 80) {
    printf("等第：甲\n");
}
else if (score <80 && score >= 70) {
    printf("等第：乙\n");
}
else if (score <70 && score >= 60) {
    printf("等第：丙\n");
}
else if (score <60 && score >= 50) {
    printf("等第：丁\n");
}
else if (score <50 && score >= 40) {
    printf("等第：戊\n");
}
else if (score <40 && score >= 30) {
    printf("等第：己\n");
}
else if (score <30 && score >= 20) {
    printf("等第：庚\n");
}
else if (score <20 && score >= 10) {
    printf("等第：辛\n");
}
else if (score <10 && score >0) {
    printf("等第：壬\n");
}
else if (score == 0) {
    printf("等第：癸\n");
}
//若不符和上面區間，告知"無法判讀"
else{
    printf("無法判讀\n");
}

```

比較



```

switch (score / 10) {
    //由於100~90都為(10~9)優等，因此兩case印出相同
    case 10:
    case 9:
        printf("等第：優\n");
        break; //結束執行，break switch判斷;
    case 8:
        printf("等第：甲\n");
        break;
    case 7:
        printf("等第：乙\n");
        break;
    case 6:
        printf("等第：丙\n");
        break;
    case 5:
        printf("等第：丁\n");
        break;
    case 4:
        printf("等第：戊\n");
        break;
    case 3:
        printf("等第：己\n");
        break;
    case 2:
        printf("等第：庚\n");
        break;
    case 1:
        printf("等第：辛\n");
        break;
    case 0:
        //由於9~0除10結果均為0，但9~1 & 0屬不同等地，因此判斷後才印出
        if (score != 0)
            printf("等第：壬\n");
        else
            printf("等第：癸\n");
        break;
    //若不符和上面區間，告知"無法判讀"
    default:
        printf("無法判讀\n");
        break;
}

```

}

Example 2: 輸入星期幾?得英文

```
E:\java-2017\9-29>java weekname_1
輸入星期幾?1
Monday
輸入星期幾?2
Tuesday
輸入星期幾?3
Wednesday
輸入星期幾?4
Thursday
輸入星期幾?5
Friday
輸入星期幾?7
Sunday
輸入星期幾?0
Sunday
輸入星期幾?-1
無法判讀
```

```
import java.util.Scanner;

public class weekname_1 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int week = 0;
        while (week >= 0) {
            System.out.print("輸入星期幾?");
            week = input.nextInt();
            if (week >= 0 && week <= 7) {
                switch (week) {
                    case 0:
                    case 7:
                        System.out.print("Sunday\n");
                        break;
                    case 1:
                        System.out.print("Monday\n");
                        break;
                    case 2:
                        System.out.print("Tuesday\n");
                        break;
                    case 3:
                        System.out.print("Wednesday\n");
                        break;
                    case 4:
                        System.out.print("Thursday\n");
                        break;
                    case 5:
                        System.out.print("Friday\n");
                        break;
                    case 6:
                        System.out.print("Saturday\n");
                        break;
                } //switch
            } //if
            else
                System.out.print("無法判讀\n");
        } //while
    } //main
} //class
```

case要按大小順序?