

Java 程式語言

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Ans 1.

接觸過 Java 的人，一定會對 Java 兩個專用的 logo 印象深刻，一個就是 Java Cup，另一個就是叫作 Duke 的吉祥物了。這位可愛的 Duke 是由 Joe Palrang 在 1992 年時所創作出來的，Duke 當時在 Star 7 上所扮演的角色是類似 Office 2000 中小幫手的功能。

出處：[Java 專欄](#)

Oak 的程式設計語言，類庫及其硬體。最初的嘗試是面向一種類 PDA 裝置，被命名為 **Star7**，這種裝置有鮮豔的圖形介面和被稱為「Duke」的智能代理來幫助用戶。1992 年 12 月 3 日，這台裝置進行了展示。

出處：[Java - 維基百科](#)

相關資料連結：[Duke, the Java Mascot](#)、[creating_a_coffee_cup_in_javafx](#)

Ans 2.

JVM (英語：Java Virtual Machine，中文：Java 虛擬機)，一種能夠執行 Java bytecode 的虛擬機器，以堆疊結構機器來進行實做。最早由昇陽電腦所研發並實作第一個實作版本，是 Java 平臺的一部份，能夠執行以 Java 語言寫作的軟體程式。

出處：[Java 虛擬機 - 維基百科](#)

為了能夠執行跨平台的 Java 程式，Sun 必須提供每種機器相對應的虛擬機器(Virtual Machine)能夠將 Java 的.class 檔轉換成他平台上所了解的機器碼。

出處：[知識+](#)

Ans 3.

JAVA 先經過編譯的程序，將程式碼轉換成機器碼——即為「位元碼」(byte-codes)。透過 JAVA 的直譯器(interpreter)便可解譯並執行。

byte-codes 最大的好處就是跨平台，也就是只需撰寫一次，即可應用於任何作業環境，使其急速的普及。

參考資料：[知識+](#)

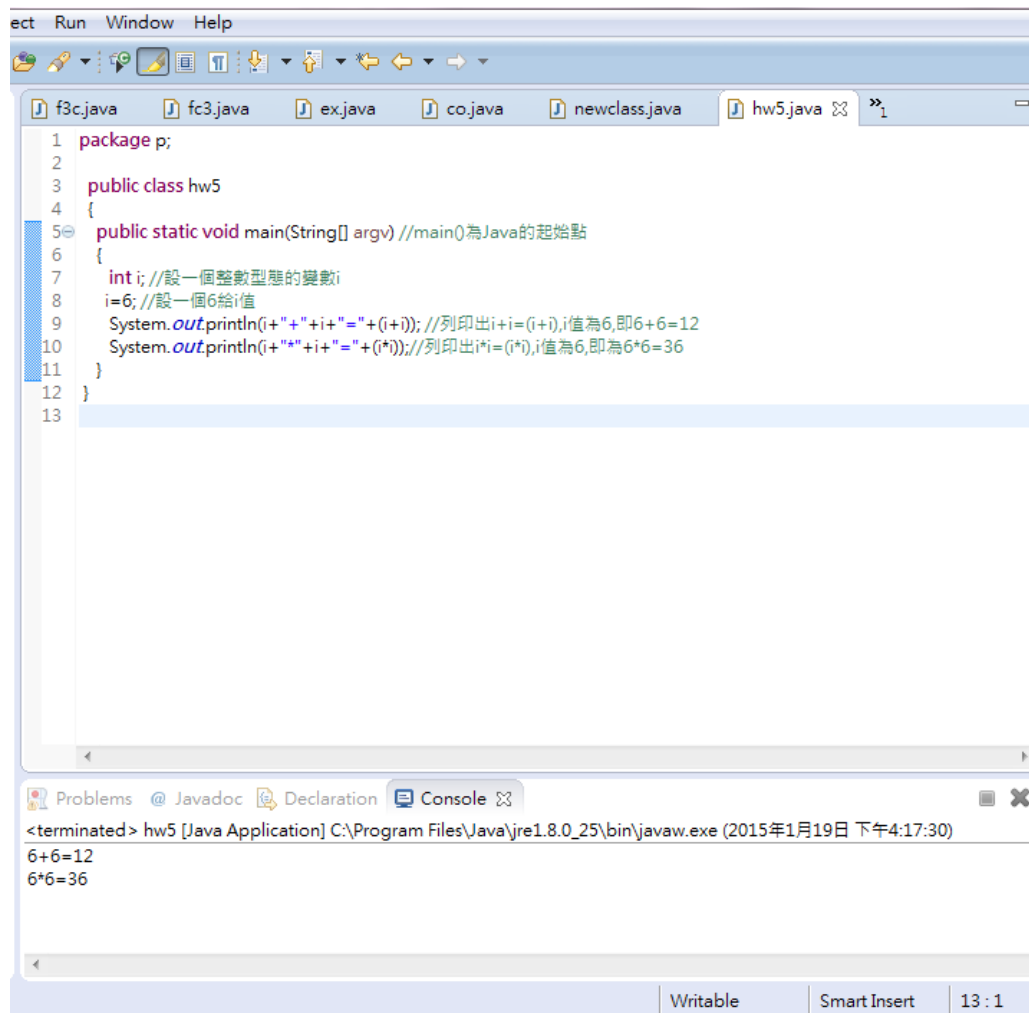
Ans 4.

"Write Once, Run Anywhere"是指 Java 的 byte-codes 可「撰寫一次，到處執行」。是 Sun Microsystem 為宣傳 Java 語言的跨平台特性而提出的口號。不管作業系統為何，皆可以在含有 JVM 的平台執行。

參考資料：[唐太宗的專欄](#)

Ans 5.

```
1 public class hw5
2 {
3     public static void main(String[] argv) //main()為Java的起始點
4     {
5         int i; //設一個整數型態的變數i
6         i=6; //設一個6給i值
7         System.out.println(i+" "+i+"="+i+i); //列印出i+i=(i+i),i值為6,即6+6=12
8         System.out.println(i+"*"+i+"="+i*i); //列印出i*i=(i*i),i值為6,即為6*6=36
9     }
10 }
```



The screenshot shows an IDE window with the following code in `hw5.java`:

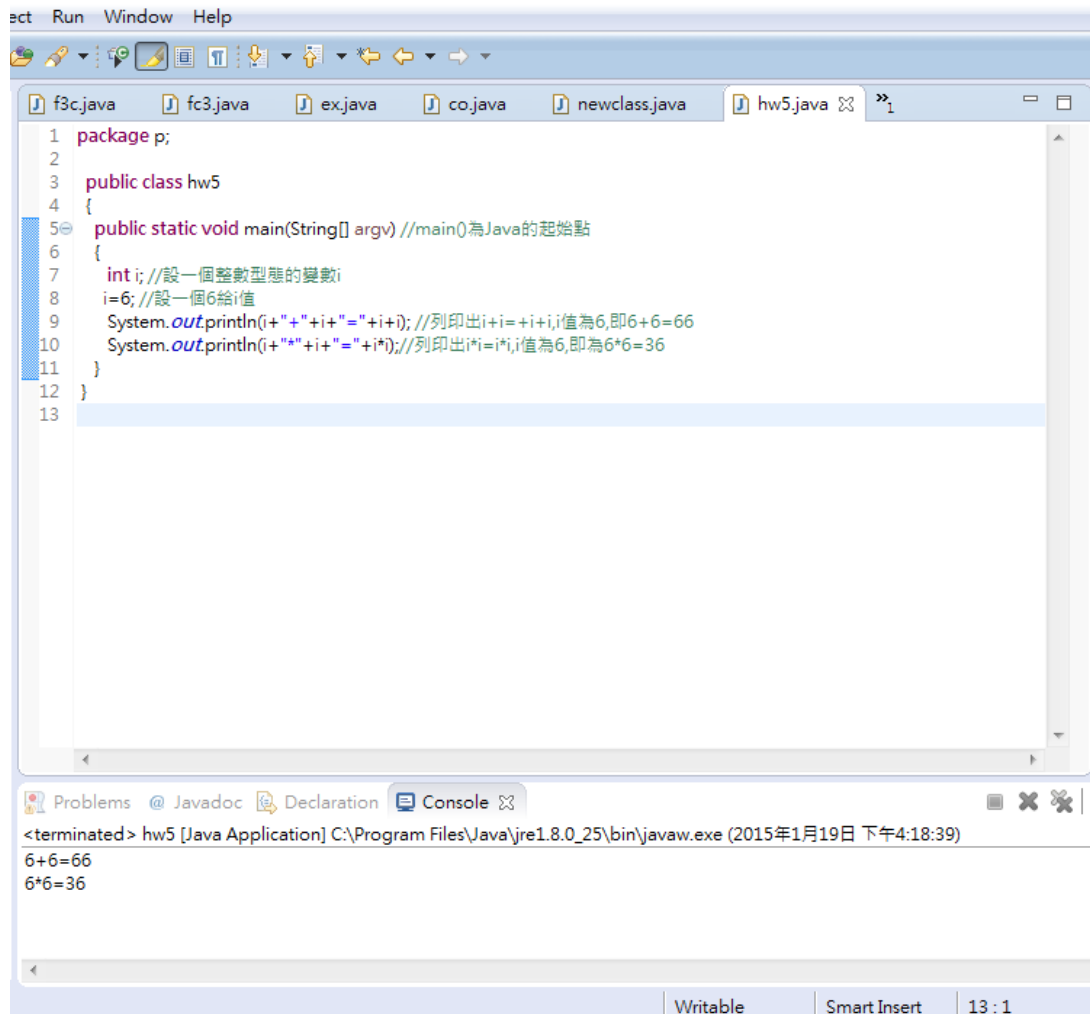
```
1 package p;
2
3 public class hw5
4 {
5     public static void main(String[] argv) //main()為Java的起始點
6     {
7         int i; //設一個整數型態的變數i
8         i=6; //設一個6給i值
9         System.out.println(i+" "+i+"="+i+i); //列印出i+i=(i+i),i值為6,即6+6=12
10        System.out.println(i+"*"+i+"="+i*i); //列印出i*i=(i*i),i值為6,即為6*6=36
11    }
12 }
13
```

The console output shows the following results:

```
<terminated> hw5 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午4:17:30)
6+6=12
6*6=36
```

Ans 6.

執行結果不相同。括號是強制運算順序，數學運算(+)的順序與字串連接運算子(+)的順序相同，且結合性都向左，故影響執行結果。



The screenshot shows an IDE window with a menu bar (File, Edit, Run, Window, Help) and a toolbar. The editor displays a Java file named `hw5.java` with the following code:

```
1 package p;  
2  
3 public class hw5  
4 {  
5     public static void main(String[] argv) //main()為Java的起始點  
6     {  
7         int i; //設一個整數型態的變數i  
8         i=6; //設一個6給i值  
9         System.out.println(i+"+"+i+"="+i+i); //列印出i+i=i+i,i值為6,即6+6=66  
10        System.out.println(i+"*"+i+"="+i*i); //列印出i*i=i*i,i值為6,即6*6=36  
11    }  
12 }  
13
```

Below the editor is a console window showing the output of the program:

```
<terminated> hw5 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午4:18:39)  
6+6=66  
6*6=36
```

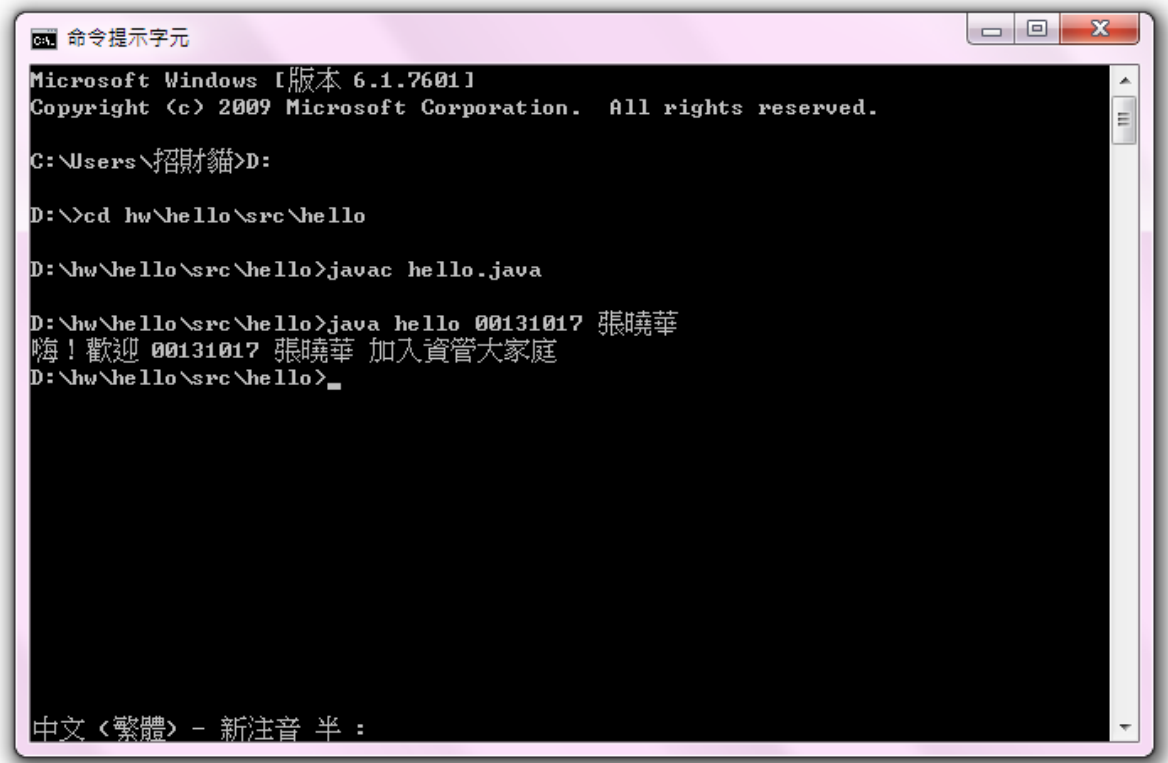
The status bar at the bottom indicates the file is writable, has smart insert enabled, and the cursor is at line 13, column 1.

Ans 7.

Java 的程式可以分為 1)Java application-應用程式 2)Java applet-應用在 www 上的程式。Java application 是可以在 Java 平台上獨立執行的程式。Java applet 則是內嵌 html 檔中，搭配瀏覽器執行。

參考資料：[知識+](#)

Ans 8.



```
Microsoft Windows [版本 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\招財貓>D:

D:\>cd hw\hello\src\hello

D:\hw\hello\src\hello>javac hello.java

D:\hw\hello\src\hello>java hello 00131017 張曉華
嗨！歡迎 00131017 張曉華 加入資管大家庭
D:\hw\hello\src\hello>
```

中文〈繁體〉 - 新注音 半：

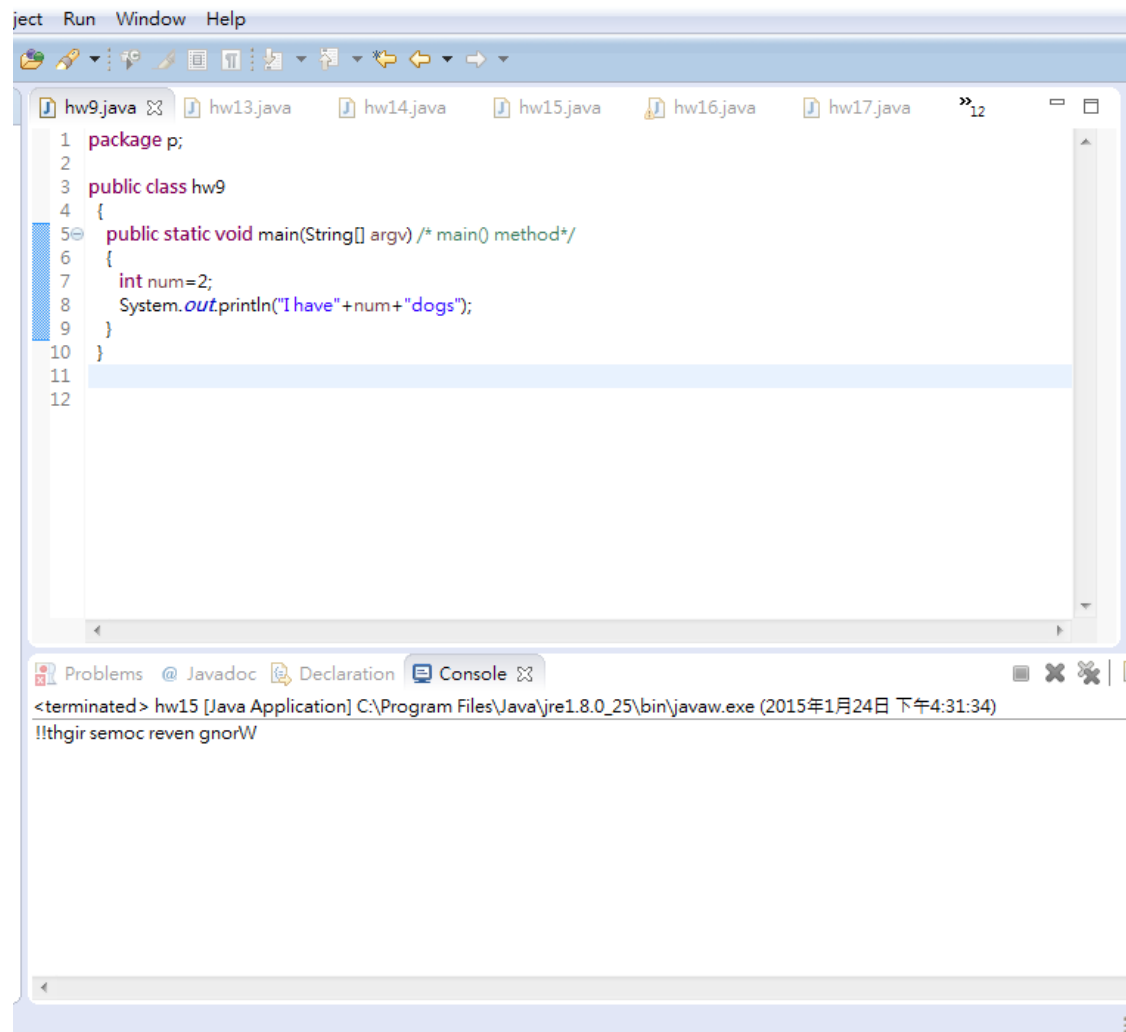
Ans 9.

第 3 行的註解`/**`是包覆整體區塊，而註解`//`是包覆在`//`之後的文字，故可以將`/*`改為`//`，也可在 `main() method` 之後加上`*/`。

第 6 行 `System` 字首要大寫，`Num` 的字首要小寫

Ans 10.

```
1 public class hw9{
2     public static void main(String[] argv) /* main() method*/{
3         int num=2;
4         System.out.println("I have"+num+"dogs");
5     }
6 }
```



Ans 11.

字串屬於非原始資料型態(參考資料型別)，因為這類的變數在宣告時並不會配置記憶體，必須使用 new 方式進行記憶體配置的動作。

參考資料：[知識+](#)

Ans 12.

型態	佔用空間	範圍
int	4 個位元組	-2147483648~2147483647
char	2 個位元組	0~65535
float	4 個位元組	$\pm 3.40282347\text{E}+38 \sim \pm 1.40239846\text{E}-45$
double	8 個位元組	$\pm 1.79769313486231570+308 \sim \pm 4.94065645841246544\text{E}-324$

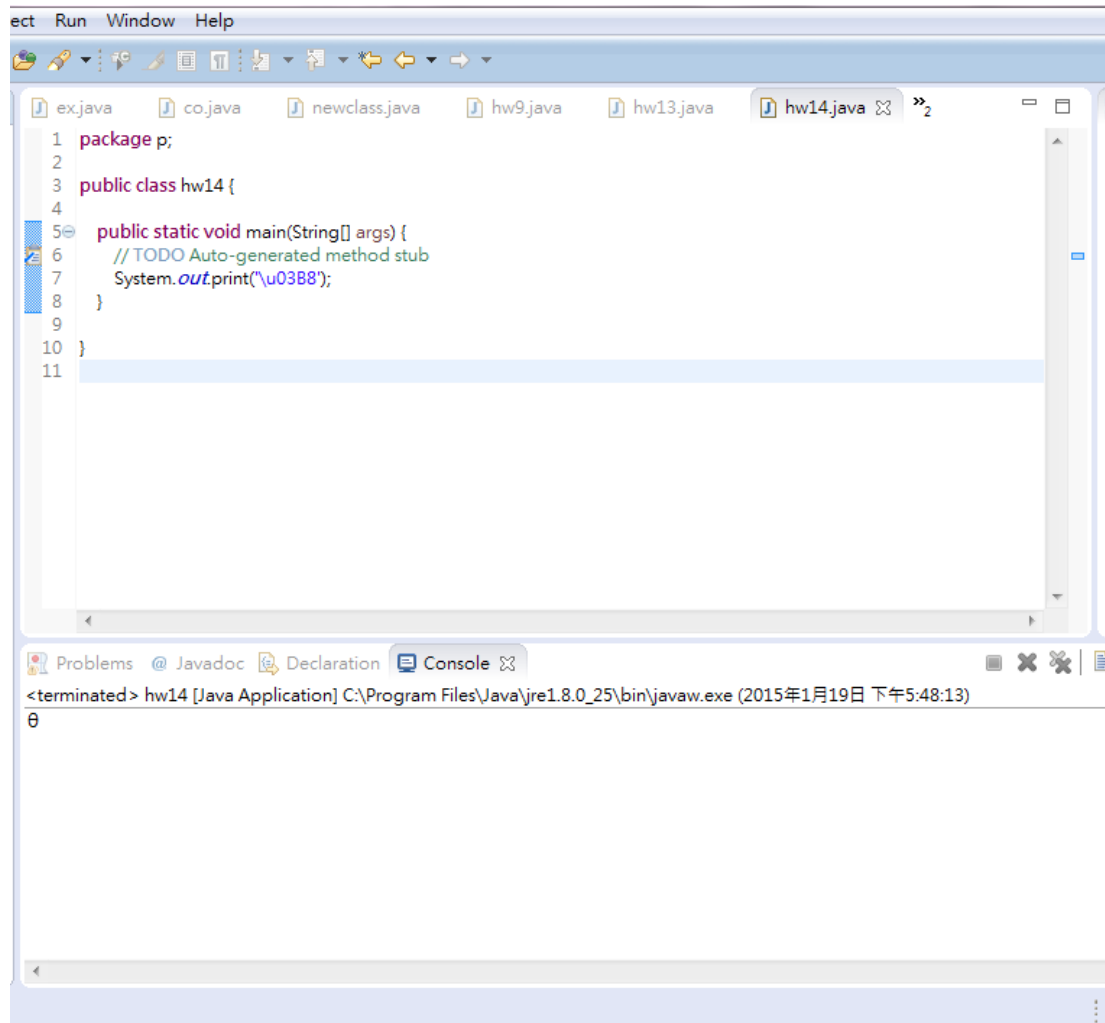
Ans 13.

```
1 public class hw13 {  
2     public static void main(String[] args) {  
3         float f= 6235.748f;  
4         int i=13;  
5         System.out.print("兩個變數值相加為" + (f+i) + "，兩個變數值相除" + (f/i));  
6     }  
7 }
```

```
ect Run Window Help  
f3c.java fc3.java ex.java co.java newclass.java hw13.java »  
1 package p;  
2  
3 public class hw13 {  
4  
5     public static void main(String[] args) {  
6         // TODO Auto-generated method stub  
7         float f= 6235.748f;  
8         int i=13;  
9         System.out.print("兩個變數值相加為" + (f+i) + "，兩個變數值相除" + (f/i));  
10    }  
11  
12 }  
13  
Problems Javadoc Declaration Console  
<terminated> hw13 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午5:44:52)  
兩個變數值相加為6248.748，兩個變數值相除479.6729  
Writable Smart Insert 13 : 1
```

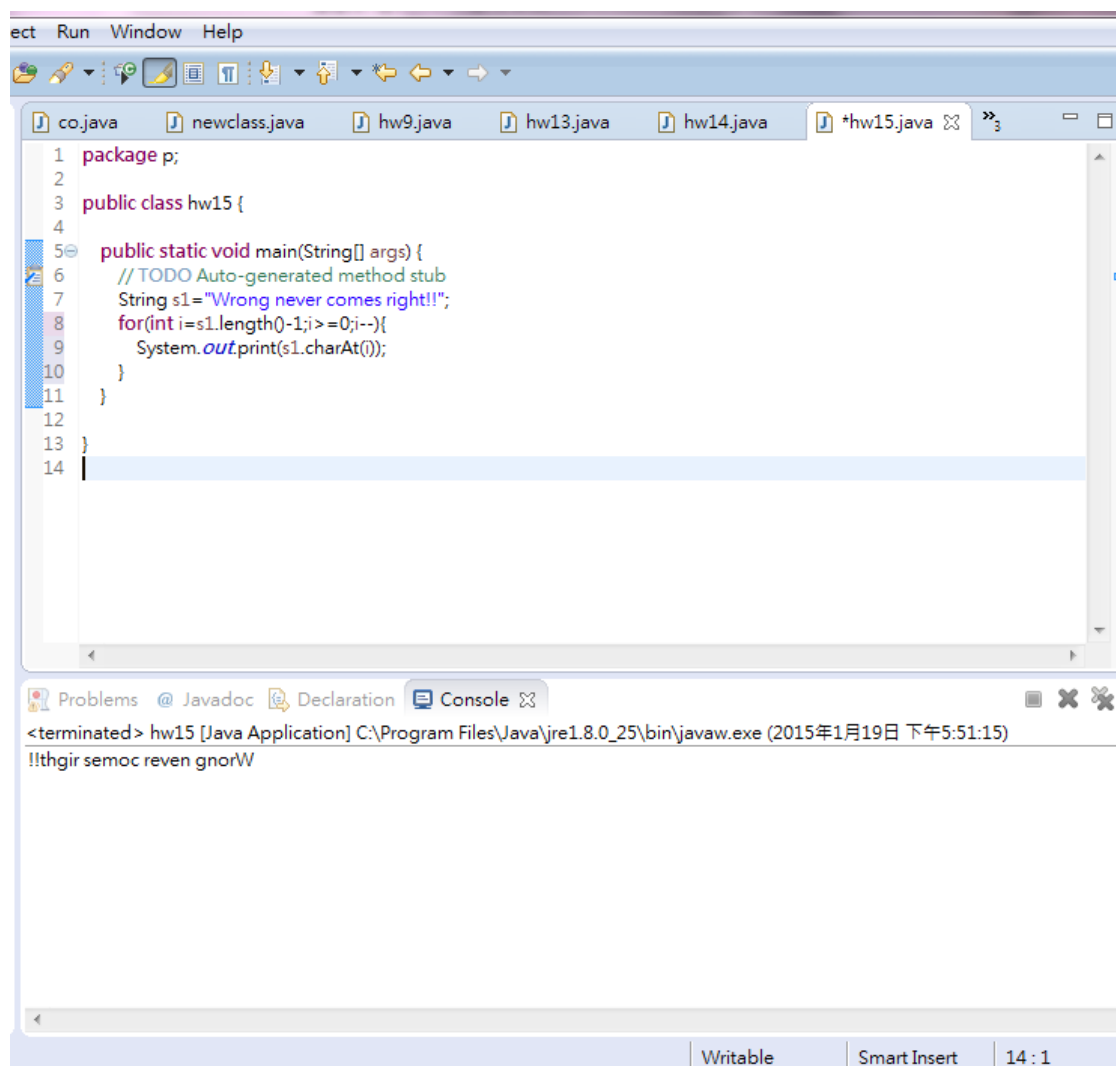
Ans 14.

```
1 public class hw14 {  
2     public static void main(String[] args) {  
3         System.out.print("\u03B8');  
4     }  
5 }
```



Ans 15.

```
1 public class hw15 {
2     public static void main(String[] args) {
3         String s1="Wrong never comes right!!!";
4         for(int i=s1.length()-1;i>=0;i--){
5             System.out.print(s1.charAt(i));
6         }
7     }
8 }
```



The screenshot shows an IDE window with the following code in the editor:

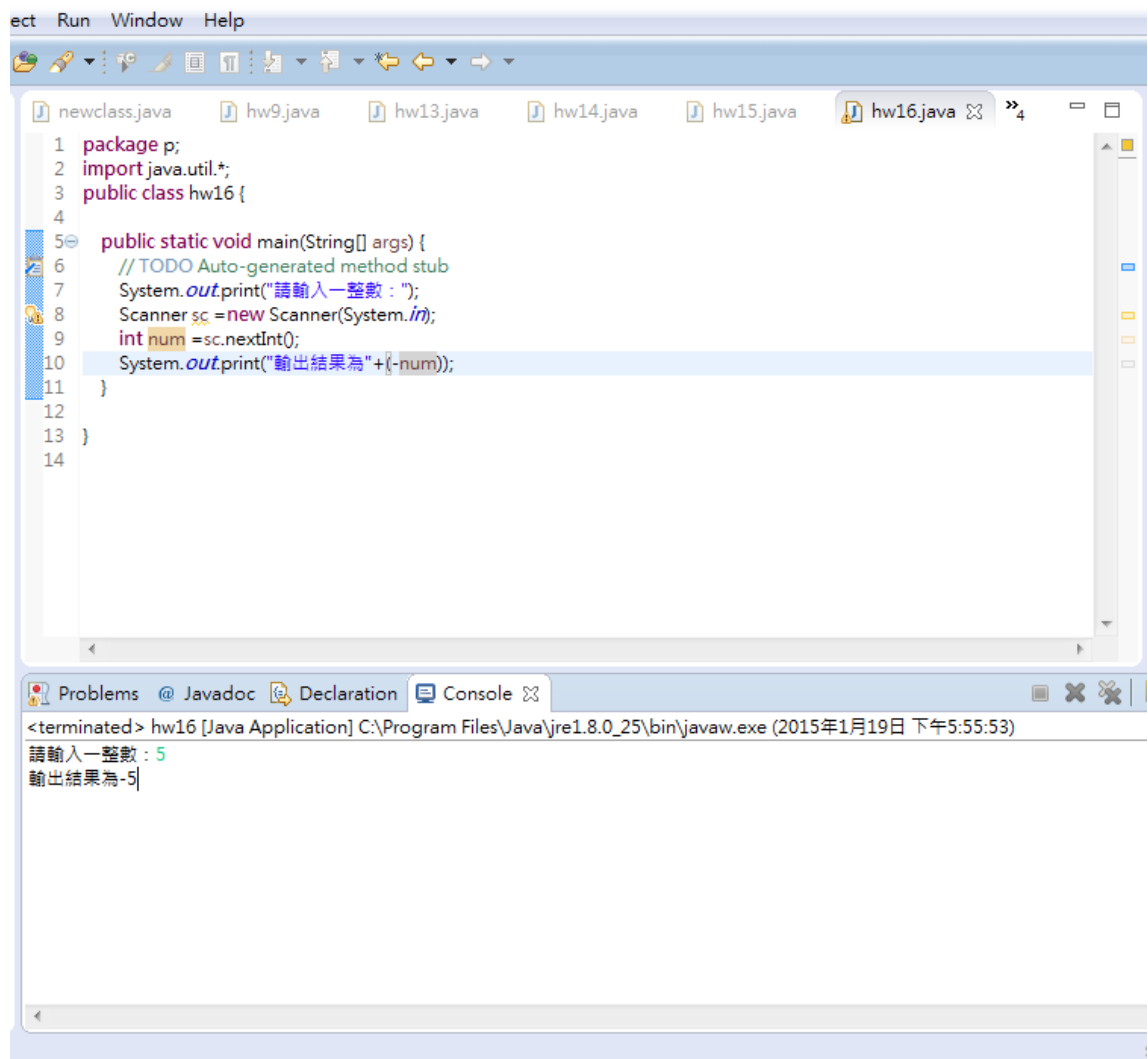
```
1 package p;
2
3 public class hw15 {
4
5     public static void main(String[] args) {
6         // TODO Auto-generated method stub
7         String s1="Wrong never comes right!!!";
8         for(int i=s1.length()-1;i>=0;i--){
9             System.out.print(s1.charAt(i));
10        }
11    }
12
13 }
14
```

The console output at the bottom shows the program execution details and the printed string:

```
<terminated> hw15 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午5:51:15)
!!thgir semoc reven gnorW
```

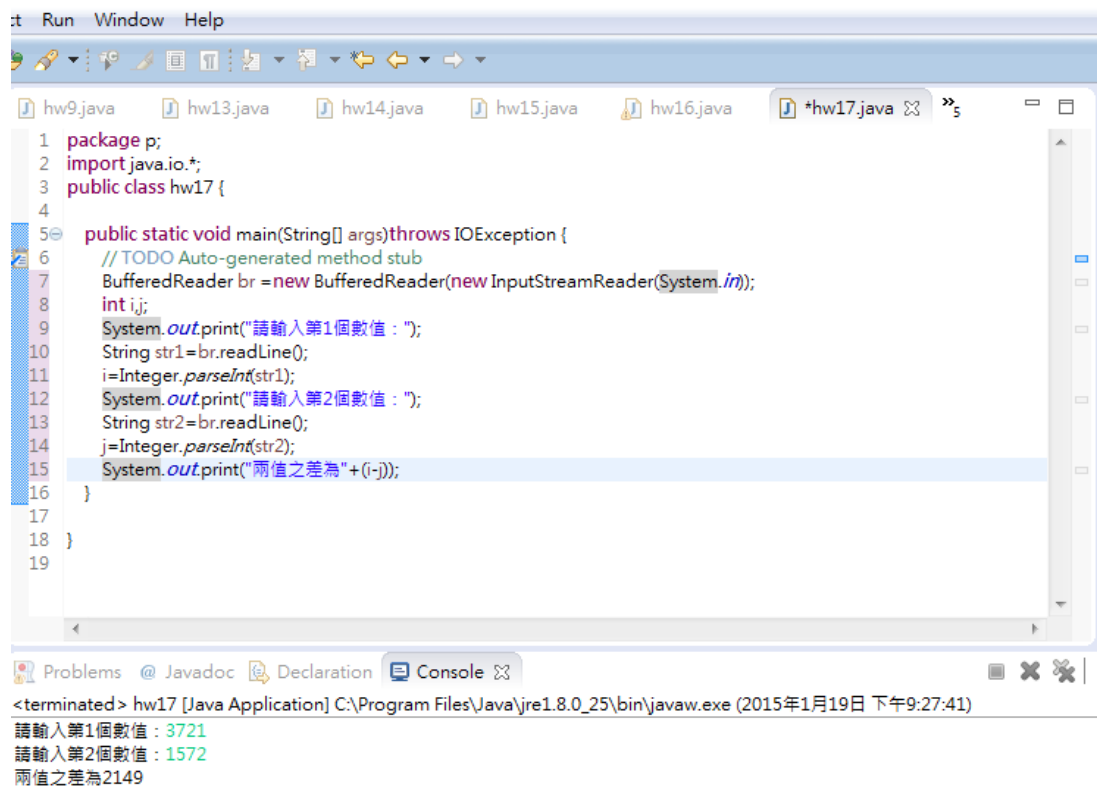
Ans 16.

```
1 import java.util.*;
2 public class hw16 {
3     public static void main(String[] args) {
4         System.out.print("請輸入一整數 : ");
5         Scanner sc = new Scanner(System.in);
6         int num = sc.nextInt();
7         System.out.print("輸出結果為" + (-num));
8     }
9 }
```



Ans 17.

```
1 import java.io.*;
2 public class hw17 {
3     public static void main(String[] args) throws IOException {
4         BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
5         int i, j;
6         System.out.print("請輸入第1個數值 : ");
7         String str1 = br.readLine();
8         i = Integer.parseInt(str1);
9         System.out.print("請輸入第2個數值 : ");
10        String str2 = br.readLine();
11        j = Integer.parseInt(str2);
12        System.out.print("兩值之差為" + (i - j));
13    }
14 }
```

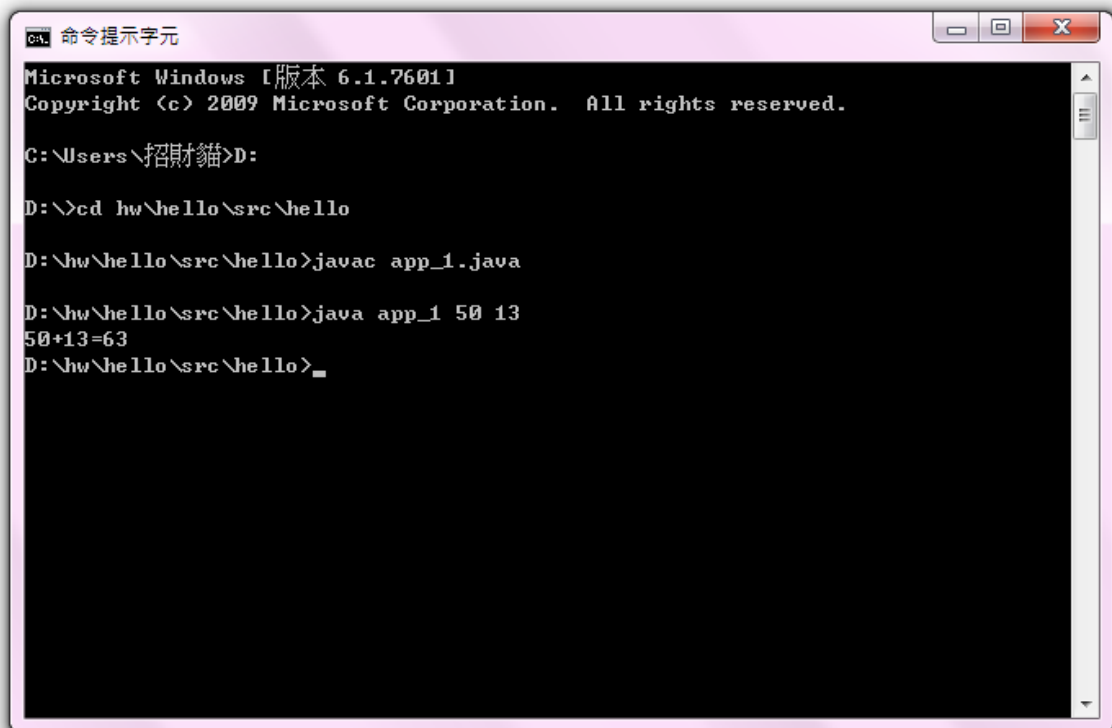


The screenshot shows an IDE window with the file `hw17.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program. The output shows the program prompts for two numbers, receives `3721` and `1572` as input, and prints the difference `2149`.

```
<terminated> hw17 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午9:27:41)
請輸入第1個數值 : 3721
請輸入第2個數值 : 1572
兩值之差為2149
```

Ans 18.

```
1 public class app_1 {  
2     public static void main(String[] args) {  
3         System.out.print(args[0]+" "+args[1]+"=");  
4         int x = Integer.parseInt(args[0]);  
5         int y = Integer.parseInt(args[1]);  
6         System.out.print(x+y);  
7     }  
8 }
```

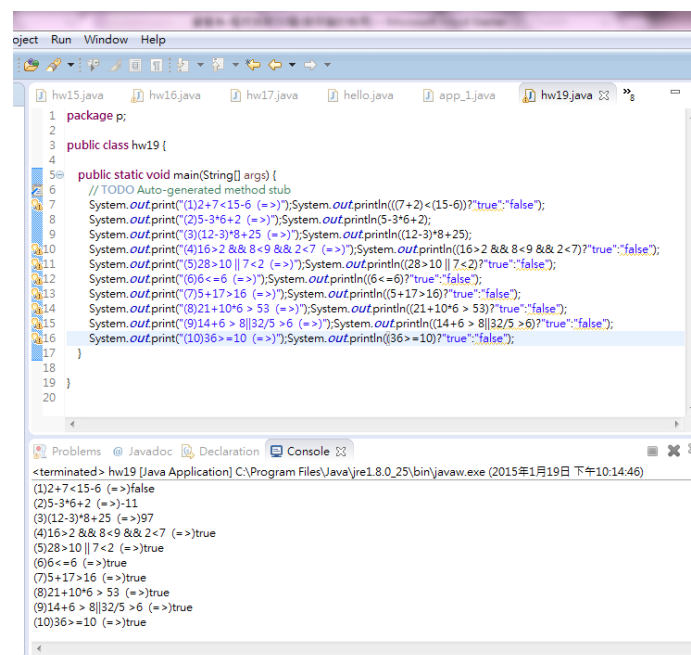


The screenshot shows a Windows Command Prompt window titled "命令提示字元". The text inside the window is as follows:

```
Microsoft Windows [版本 6.1.7601]  
Copyright (c) 2009 Microsoft Corporation. All rights reserved.  
  
C:\Users\招財貓>D:  
  
D:\>cd hw\hello\src\hello  
  
D:\hw\hello\src\hello>javac app_1.java  
  
D:\hw\hello\src\hello>java app_1 50 13  
50+13=63  
D:\hw\hello\src\hello>_
```

Ans 19.

```
1 public class hw19 {
2     public static void main(String[] args) {
3         System.out.print("(1)2+7<15-6  (=>)");
4         System.out.println(((7+2)<(15-6))?"true":"false");
5         System.out.print("(2)5-3*6+2  (=>)");System.out.println(5-3*6+2);
6         System.out.print("(3)(12-3)*8+25  (=>)");System.out.println((12-3)*8+25);
7         System.out.print("(4)16>2 && 8<9 && 2<7  (=>)");
8         System.out.println((16>2 && 8<9 && 2<7)?"true":"false");
9         System.out.print("(5)28>10 || 7<2  (=>)");
10        System.out.println((28>10 || 7<2)?"true":"false");
11        System.out.print("(6)6<=6  (=>)");
12        System.out.println((6<=6)?"true":"false");
13        System.out.print("(7)5+17>16  (=>)");
14        System.out.println((5+17>16)?"true":"false");
15        System.out.print("(8)21+10*6 > 53  (=>)");
16        System.out.println((21+10*6 > 53)?"true":"false");
17        System.out.print("(9)14+6 > 8||32/5 >6  (=>)");
18        System.out.println((14+6 > 8||32/5 >6)?"true":"false");
19        System.out.print("(10)36>=10  (=>)");
20        System.out.println((36>=10)?"true":"false");
21    }
22 }
```

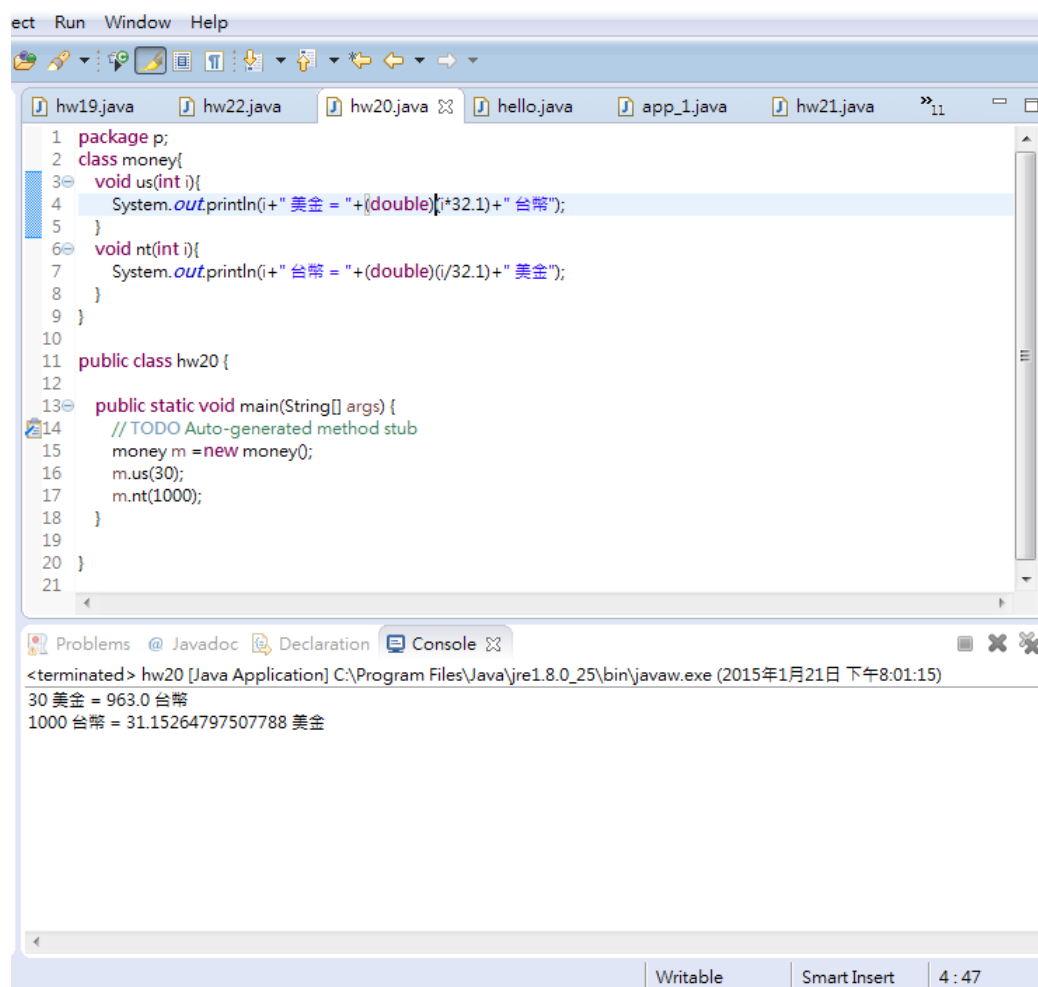


The screenshot shows an IDE window with the file `hw19.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program. The output shows the results of the logical expressions and arithmetic calculations for each line of the program.

```
<terminated> hw19 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月19日 下午10:14:46)
(1)2+7<15-6 (=>)false
(2)5-3*6+2 (=>)-11
(3)(12-3)*8+25 (=>)97
(4)16>2 && 8<9 && 2<7 (=>)true
(5)28>10 || 7<2 (=>)true
(6)6<=6 (=>)true
(7)5+17>16 (=>)true
(8)21+10*6 > 53 (=>)true
(9)14+6 > 8||32/5 >6 (=>)true
(10)36>=10 (=>)true
```

Ans 20.

```
1 class money{
2     void us(int i){
3         System.out.println(i+" 美金 = "+(double)(i*32.1)+" 台幣");
4     }
5     void nt(int i){
6         System.out.println(i+" 台幣 = "+(double)(i/32.1)+" 美金");
7     }
8 }
9 public class hw20 {
10     public static void main(String[] args) {
11         money m =new money();
12         m.us(30);
13         m.nt(1000);
14     }
15 }
```

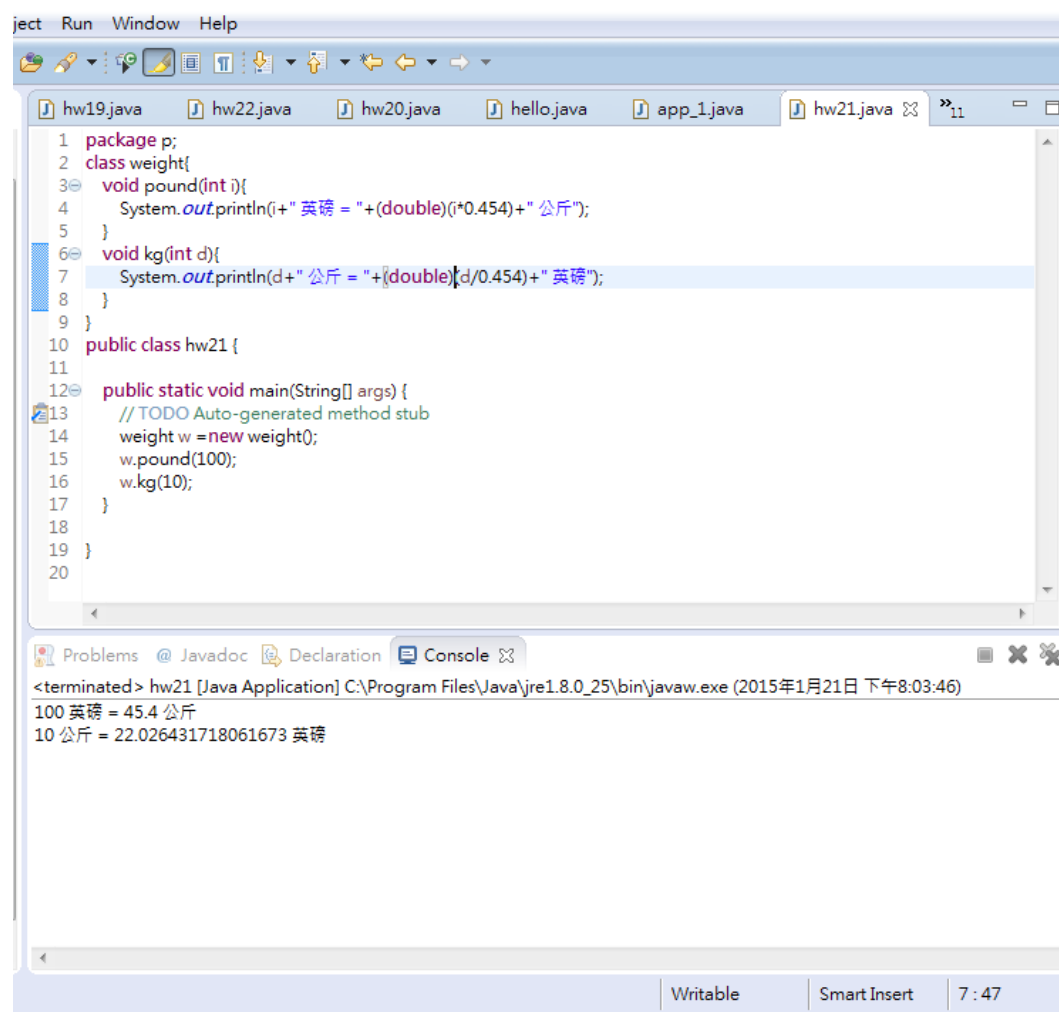


The screenshot shows an IDE window with the following components:

- File Explorer:** Lists files including hw19.java, hw22.java, hw20.java (selected), hello.java, app_1.java, and hw21.java.
- Editor:** Displays the Java code from the previous block, with line numbers 1 through 21. The code defines a `money` class with `us` and `nt` methods, and a `hw20` class with a `main` method.
- Console:** Shows the output of the program:
30 美金 = 963.0 台幣
1000 台幣 = 31.15264797507788 美金
- Status Bar:** Indicates the file is "Writable", "Smart Insert" is active, and the time is "4 : 47".

Ans 21.

```
1 class weight{
2     void pound(int i){
3         System.out.println(i+" 英磅 = "+(double)(i*0.454)+" 公斤");
4     }
5     void kg(int d){
6         System.out.println(d+" 公斤 = "+(double)(d/0.454)+" 英磅");
7     }
8 }
9 public class hw21 {
10     public static void main(String[] args) {
11         weight w =new weight();
12         w.pound(100);
13         w.kg(10);
14     }
15 }
```



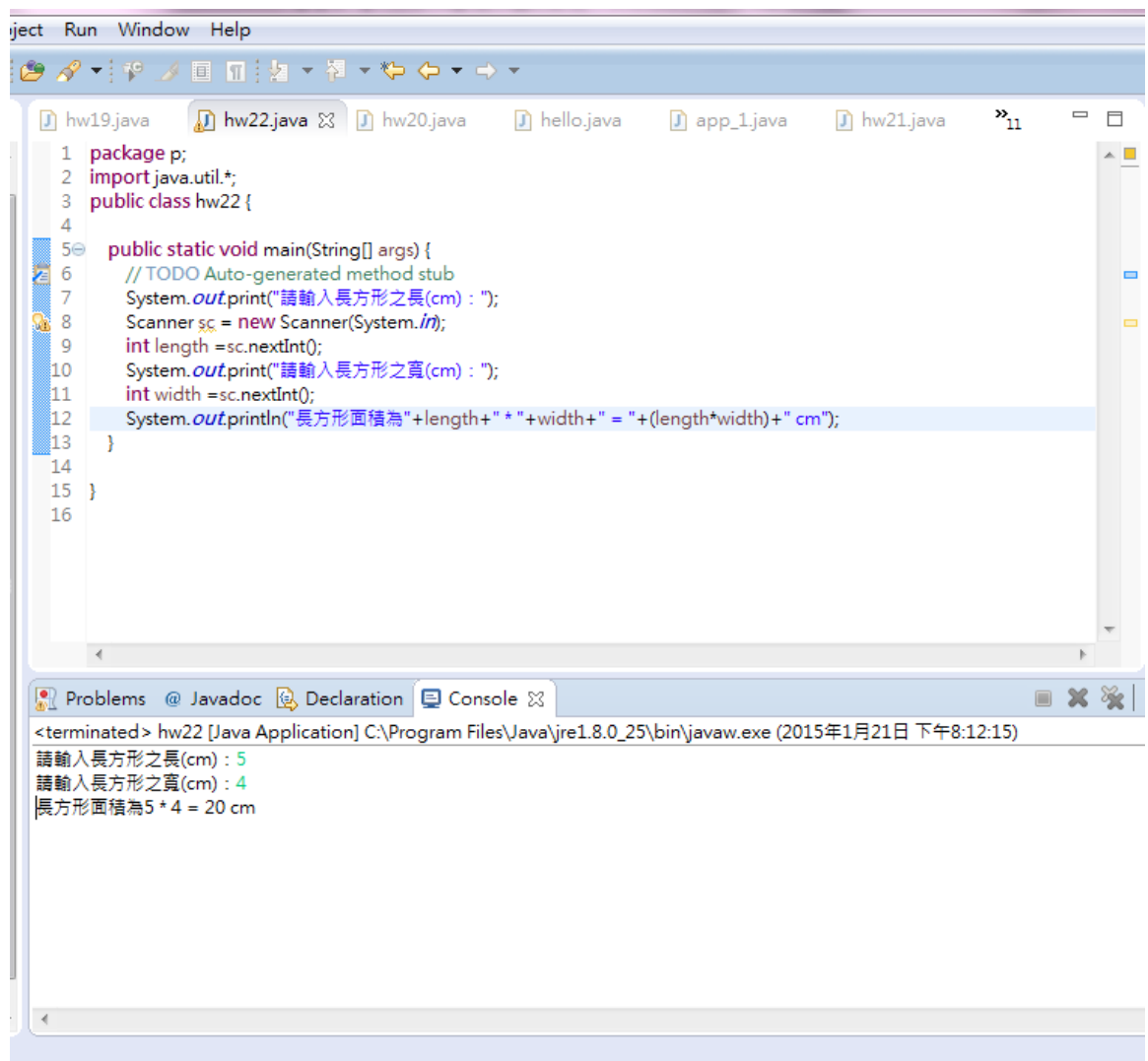
The screenshot shows an IDE window with the following components:

- File Explorer:** Shows several files including hw19.java, hw22.java, hw20.java, hello.java, app_1.java, and hw21.java (selected).
- Editor:** Displays the Java code for hw21.java, which is identical to the code provided in the previous block. The line numbers 1 through 20 are visible on the left margin.
- Console:** Shows the output of the program execution:

```
<terminated> hw21 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月21日 下午8:03:46)
100 英磅 = 45.4 公斤
10 公斤 = 22.026431718061673 英磅
```
- Status Bar:** At the bottom, it shows "Writable", "Smart Insert", and the time "7:47".

Ans 22.

```
1 import java.util.*;
2 public class hw22 {
3     public static void main(String[] args) {
4         System.out.print("請輸入長方形之長(cm) : ");
5         Scanner sc = new Scanner(System.in);
6         int length = sc.nextInt();
7         System.out.print("請輸入長方形之寬(cm) : ");
8         int width = sc.nextInt();
9         System.out.println("長方形面積為"+length+" * "+width+" = "+(length*width)+"
            cm");
10    }
11 }
```



The screenshot shows an IDE window with the file `hw22.java` open. The code is as follows:

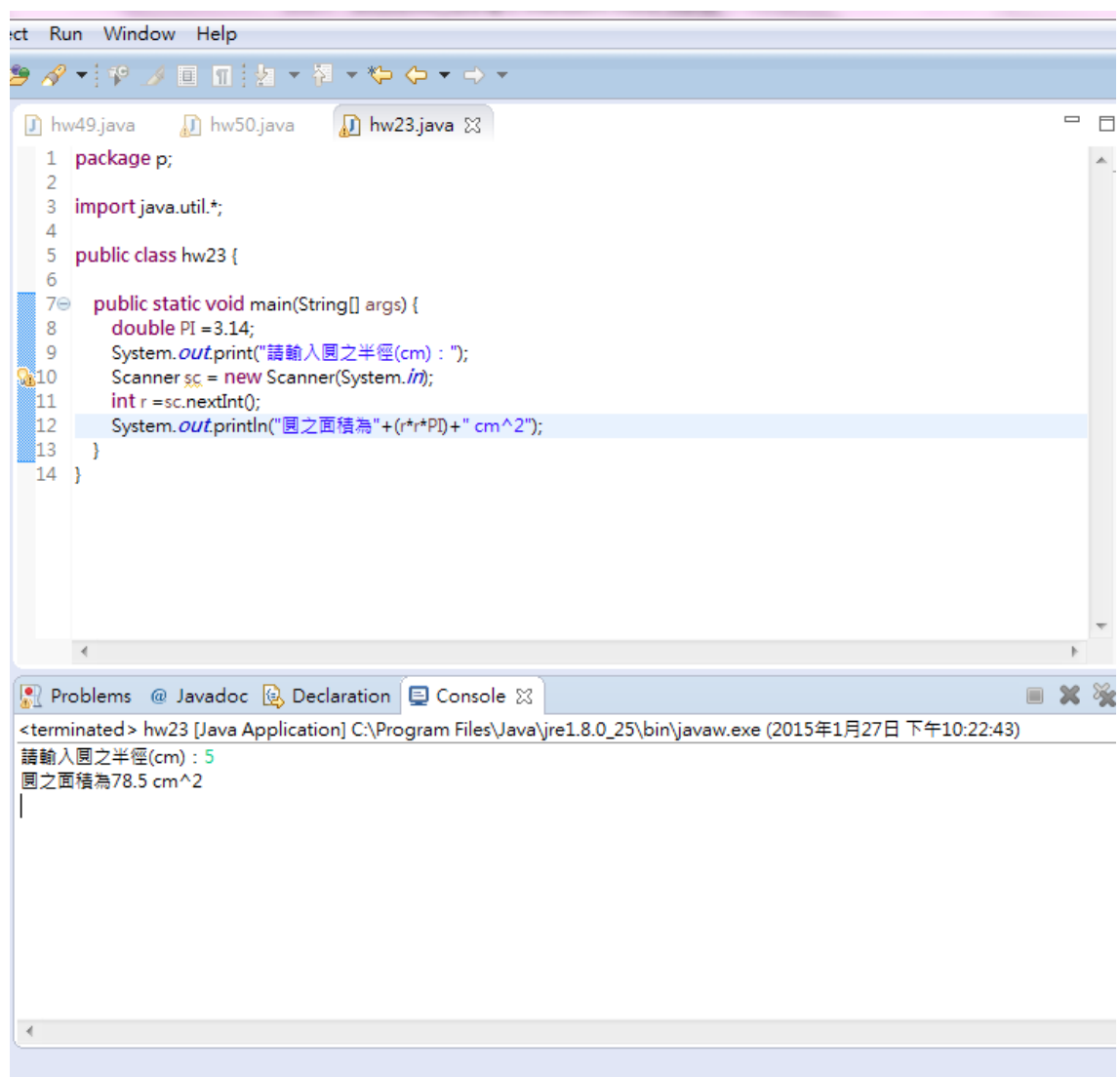
```
1 package p;
2 import java.util.*;
3 public class hw22 {
4
5     public static void main(String[] args) {
6         // TODO Auto-generated method stub
7         System.out.print("請輸入長方形之長(cm) : ");
8         Scanner sc = new Scanner(System.in);
9         int length = sc.nextInt();
10        System.out.print("請輸入長方形之寬(cm) : ");
11        int width = sc.nextInt();
12        System.out.println("長方形面積為"+length+" * "+width+" = "+(length*width)+" cm");
13    }
14
15 }
16
```

The console output shows the program's execution:

```
<terminated> hw22 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月21日 下午8:12:15)
請輸入長方形之長(cm) : 5
請輸入長方形之寬(cm) : 4
長方形面積為5 * 4 = 20 cm
```


Ans 23.

```
1 import java.util.*;
2 public class hw23 {
3     public static void main(String[] args) {
4         double PI = 3.14;
5         System.out.print("請輸入圓之半徑(cm) : ");
6         Scanner sc = new Scanner(System.in);
7         int r = sc.nextInt();
8         System.out.println("圓之面積為" + (r*r*PI) + " cm^2");
9     }
10 }
```



The screenshot shows an IDE window with the file `hw23.java` open. The code is as follows:

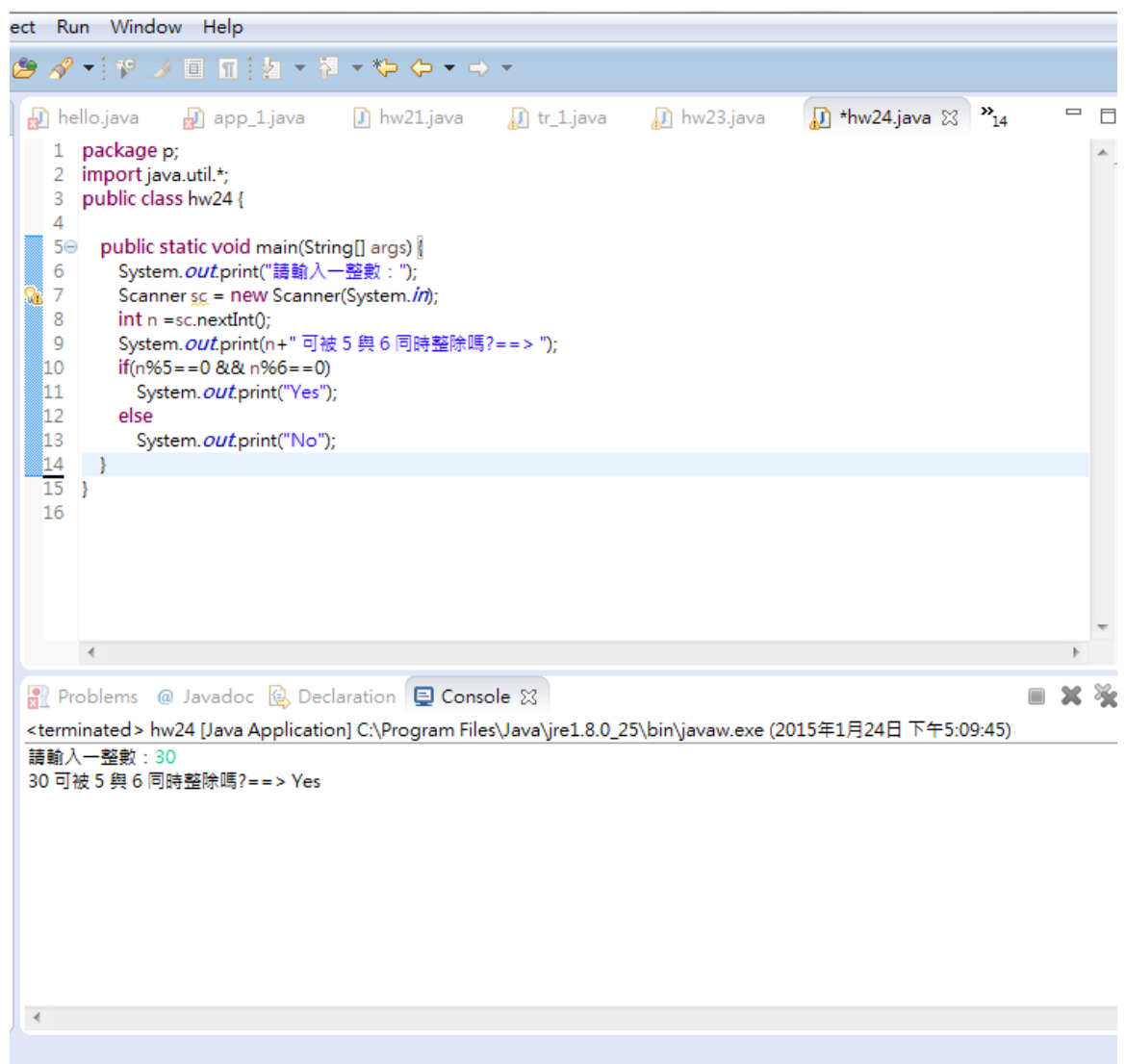
```
1 package p;
2
3 import java.util.*;
4
5 public class hw23 {
6
7     public static void main(String[] args) {
8         double PI = 3.14;
9         System.out.print("請輸入圓之半徑(cm) : ");
10        Scanner sc = new Scanner(System.in);
11        int r = sc.nextInt();
12        System.out.println("圓之面積為" + (r*r*PI) + " cm^2");
13    }
14 }
```

Below the code editor, the `Console` tab is active, showing the execution output:

```
<terminated> hw23 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午10:22:43)
請輸入圓之半徑(cm) : 5
圓之面積為78.5 cm^2
|
```

Ans 24.

```
1 import java.util.*;
2 public class hw24 {
3     public static void main(String[] args) {
4         System.out.print("請輸入一整數 : ");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         System.out.print(n+" 可被 5 與 6 同時整除嗎?==> ");
8         if(n%5==0 && n%6==0)
9             System.out.print("Yes");
10        else
11            System.out.print("No");
12    }
13 }
```

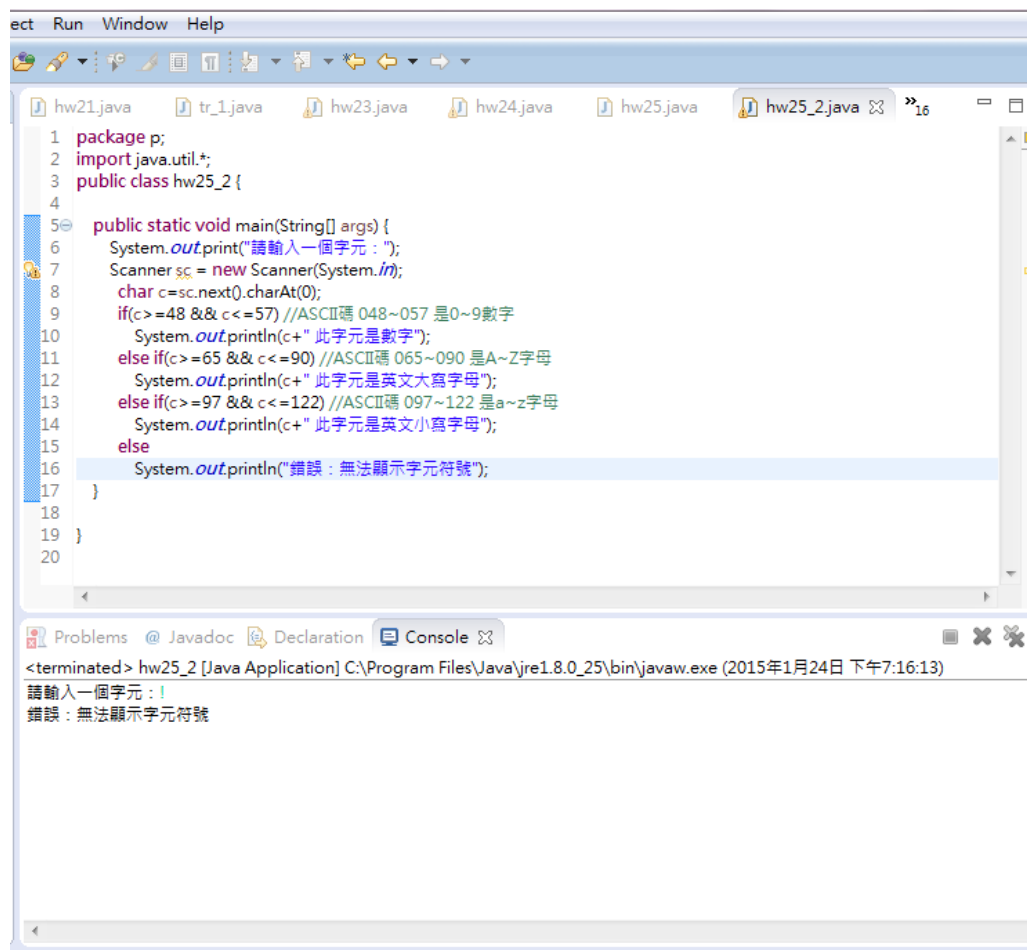


The screenshot shows an IDE window with the following tabs: hello.java, app_1.java, hw21.java, tr_1.java, hw23.java, and *hw24.java. The code in the editor is identical to the one provided. The console output at the bottom shows the execution of the program:

```
<terminated> hw24 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月24日 下午5:09:45)
請輸入一整數 : 30
30 可被 5 與 6 同時整除嗎?==> Yes
```

Ans 25.

```
1 import java.util.*;
2 public class hw25 {
3     public static void main(String[] args) {
4         System.out.print("請輸入一個字元 : ");
5         Scanner sc = new Scanner(System.in);
6         char c=sc.next().charAt(0);
7         if(c>=48 && c<=57) //ASCII碼 048~057 是0~9數字
8             System.out.println(c+" 此字元是數字");
9         else if(c>=65 && c<=90) //ASCII碼 065~090 是A~Z字母
10            System.out.println(c+" 此字元是英文大寫字母");
11        else if(c>=97 && c<=122) //ASCII碼 097~122 是a~z字母
12            System.out.println(c+" 此字元是英文小寫字母");
13        else
14            System.out.println("錯誤：無法顯示字元符號");
15    }
16 }
```

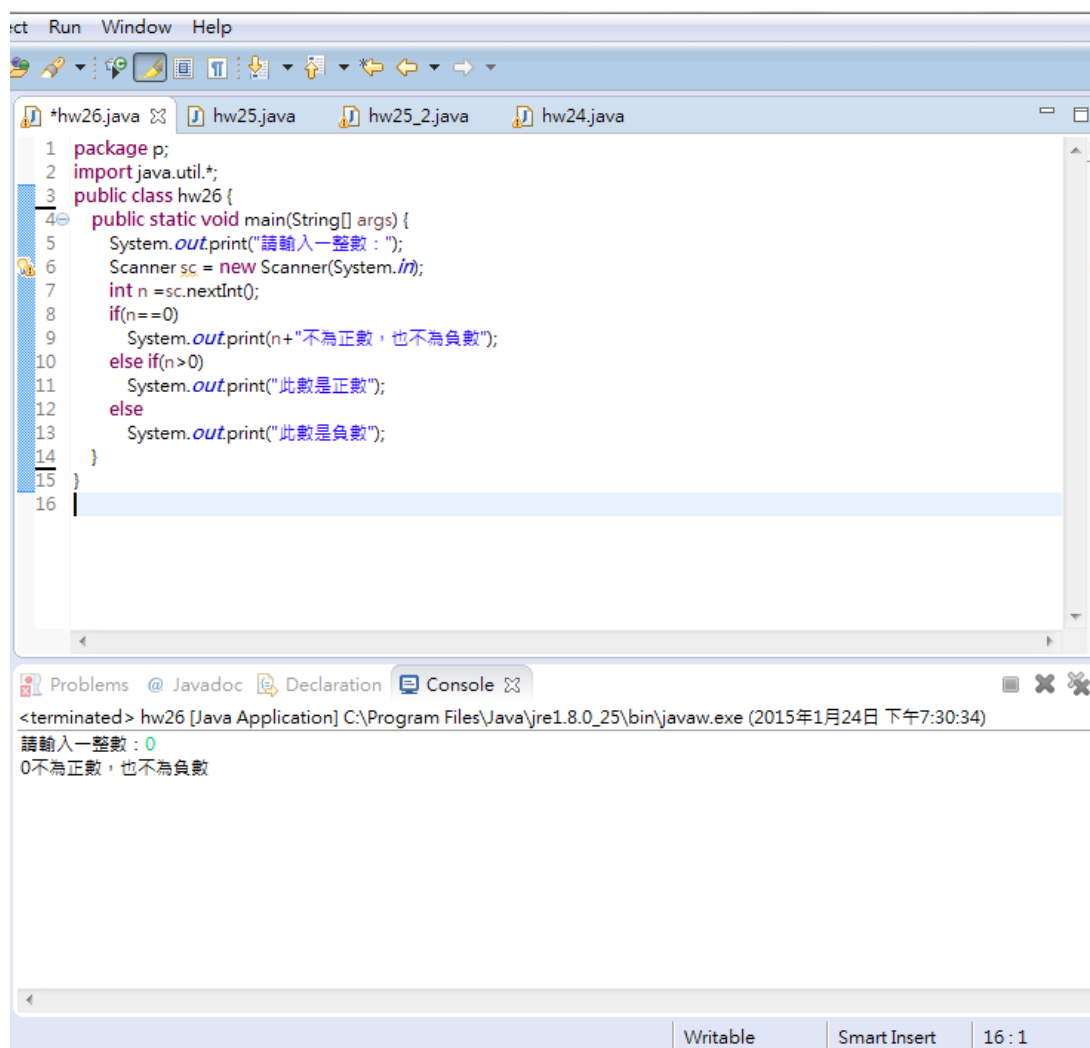


The screenshot shows an IDE window with the file `hw25_2.java` open. The code is identical to the one provided in the previous block. The console output at the bottom shows the program's execution:

```
<terminated> hw25_2 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月24日 下午7:16:13)
請輸入一個字元 : !
錯誤：無法顯示字元符號
```

Ans 26.

```
1 import java.util.*;
2 public class hw26 {
3     public static void main(String[] args) {
4         System.out.print("請輸入一整數：");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         if(n==0)
8             System.out.print(n+"不為正數，也不為負數");
9         else if(n>0)
10            System.out.print("此數是正數");
11        else
12            System.out.print("此數是負數");
13    }
14 }
```



The screenshot shows an IDE window with the following tabs: *hw26.java, hw25.java, hw25_2.java, and hw24.java. The code in hw26.java is as follows:

```
1 package p;
2 import java.util.*;
3 public class hw26 {
4     public static void main(String[] args) {
5         System.out.print("請輸入一整數：");
6         Scanner sc = new Scanner(System.in);
7         int n = sc.nextInt();
8         if(n==0)
9             System.out.print(n+"不為正數，也不為負數");
10        else if(n>0)
11            System.out.print("此數是正數");
12        else
13            System.out.print("此數是負數");
14    }
15 }
16
```

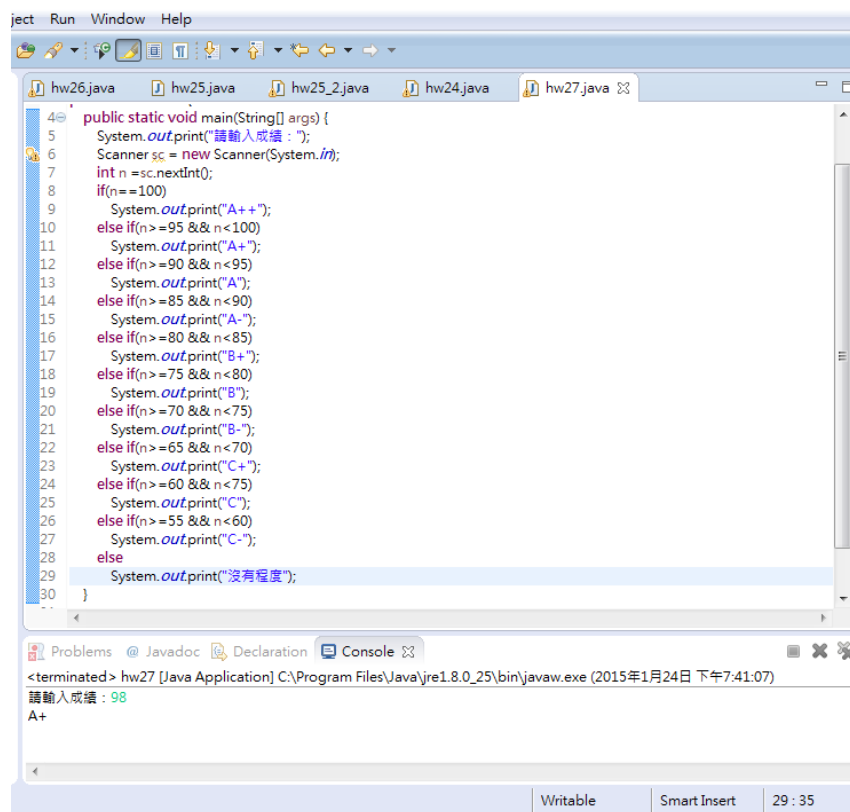
The console output shows the program execution:

```
<terminated> hw26 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月24日 下午7:30:34)
請輸入一整數：0
0不為正數，也不為負數
```

The status bar at the bottom indicates the file is Writable, Smart Insert is enabled, and the cursor is at line 16, column 1.

Ans 27.

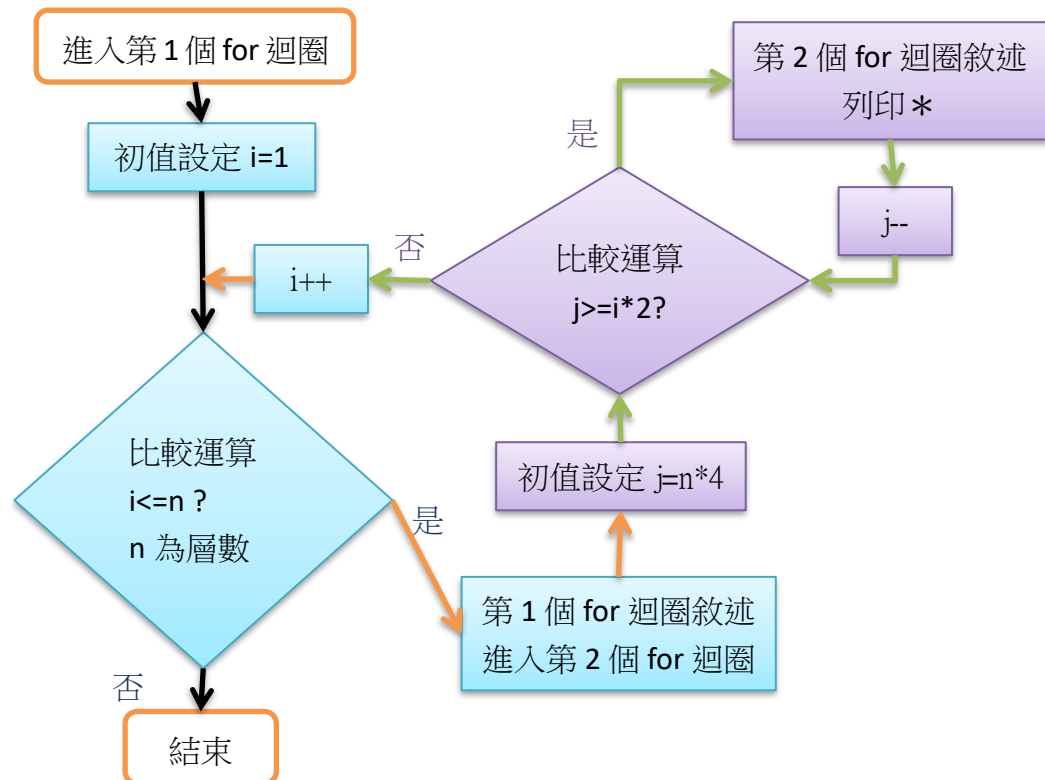
```
1 import java.util.*;
2 public class hw27 {
3     public static void main(String[] args) {
4         System.out.print("請輸入成績 : ");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         if(n==100)      System.out.print("A++");
8         else if(n>=95 && n<100)  System.out.print("A+");
9         else if(n>=90 && n<95)   System.out.print("A");
10        else if(n>=85 && n<90)   System.out.print("A-");
11        else if(n>=80 && n<85)   System.out.print("B+");
12        else if(n>=75 && n<80)   System.out.print("B");
13        else if(n>=70 && n<75)   System.out.print("B-");
14        else if(n>=65 && n<70)   System.out.print("C+");
15        else if(n>=60 && n<75)   System.out.print("C");
16        else if(n>=55 && n<60)   System.out.print("C-");
17        else System.out.print("沒有程度");
18    }
19 }
```



The screenshot shows an IDE window with the file 'hw27.java' open. The code is identical to the one provided in the text above. Below the code editor, the 'Console' tab is active, displaying the output of the program. The prompt '請輸入成績 : ' is followed by the user input '98', and the program outputs 'A+'. The status bar at the bottom indicates the file is 'Writable', 'Smart Insert' is enabled, and the cursor is at line 29, column 35.

```
<terminated> hw27 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月24日 下午7:41:07)
請輸入成績 : 98
A+
```

Ans 28.



```
1 public class hw28 {
2     public static void main(String[] args) {
3         int n =4;
4         for (int i = 1; i <= n; i++){
5             for (int j = n*2; j >= i * 2; j--){
6                 System.out.print("*"); }
7             System.out.println("");
8         }
9     }
10 }
```

```
package p;
public class hw28 {
    public static void main(String[] args) {
        int n =4;
        for (int i = 1; i <= n; i++){
            for (int j = n*2; j >= i * 2; j--){
                System.out.print("*"); }
            System.out.println("");
        }
    }
}
```

Problems | Javadoc | Declaration | Console

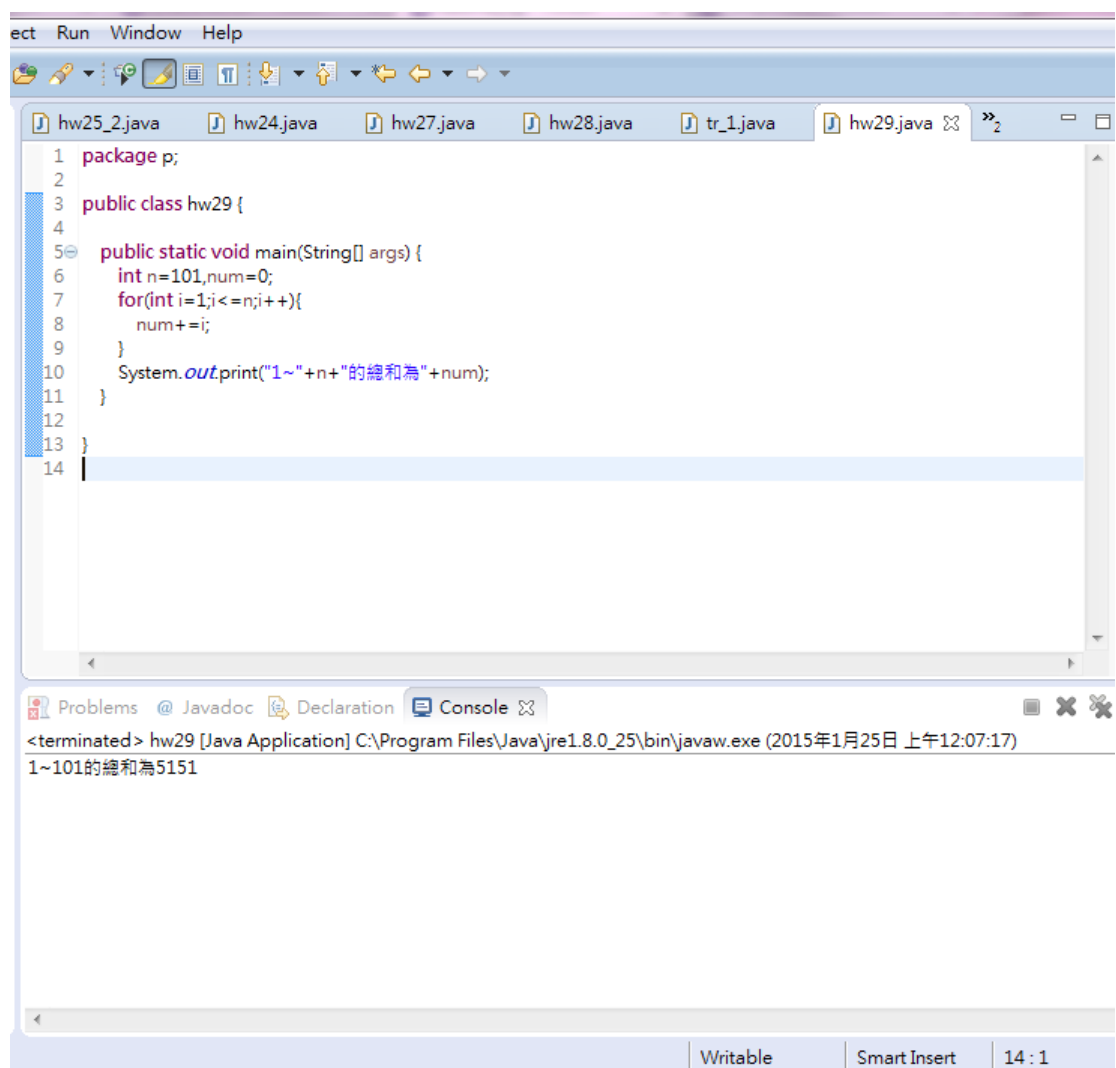
<terminated> hw28 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月24日 下午8:03:31)

*

Writable | Smart Insert | 16:1

Ans 29.

```
1 public class hw29 {
2     public static void main(String[] args) {
3         int n=101,num=0;
4         for(int i=1;i<=n;i++){
5             num+=i;
6         }
7         System.out.print("1~"+n+"的總和為"+num);
8     }
9 }
```

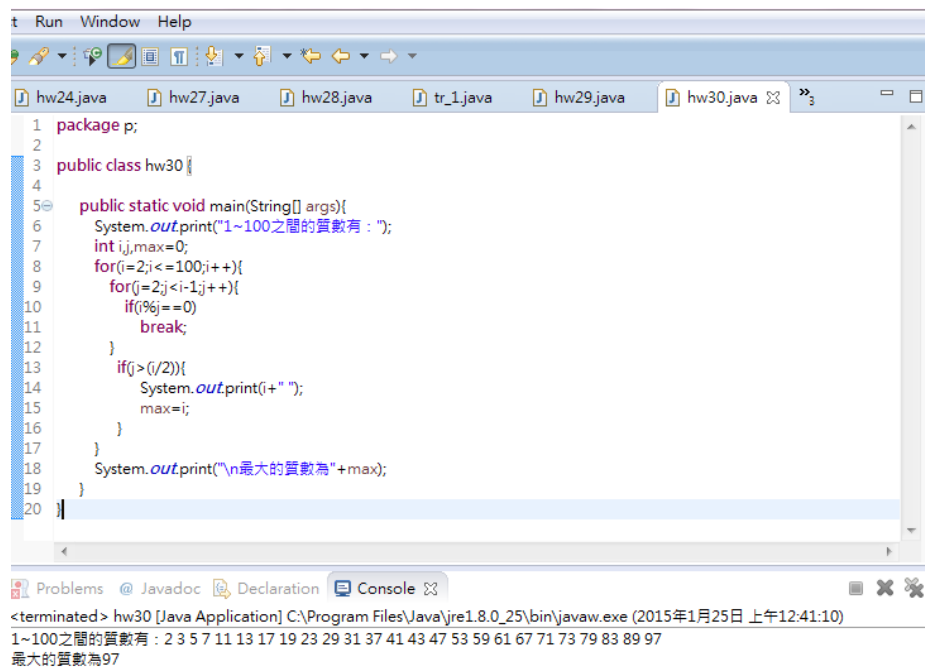


The screenshot shows an IDE window with the following components:

- File Explorer:** Displays several Java files: hw25_2.java, hw24.java, hw27.java, hw28.java, tr_1.java, and hw29.java. The file hw29.java is selected.
- Editor:** Contains the Java code for hw29.java, which is identical to the code provided in the previous block. The code calculates the sum of integers from 1 to 101 and prints the result.
- Console:** Shows the output of the program. The first line indicates the program was terminated: `<terminated> hw29 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月25日 上午12:07:17)`. The second line shows the output: `1~101的總和為5151`.
- Status Bar:** Located at the bottom right, it shows the text "Writable", "Smart Insert", and "14 : 1".

Ans 30.

```
1 public class hw30 {
2     public static void main(String[] args){
3         System.out.print("1~100之間的質數有 : ");
4         int i,j,max=0;
5         for(i=2;i<=100;i++){
6             for(j=2;j<i-1;j++){
7                 if(i%j==0)
8                     break;
9             }
10            if(j>(i/2)){
11                System.out.print(i+" ");
12                max=i;
13            }
14        }
15        System.out.print("\n最大的質數為"+max);
16    }
17 }
```

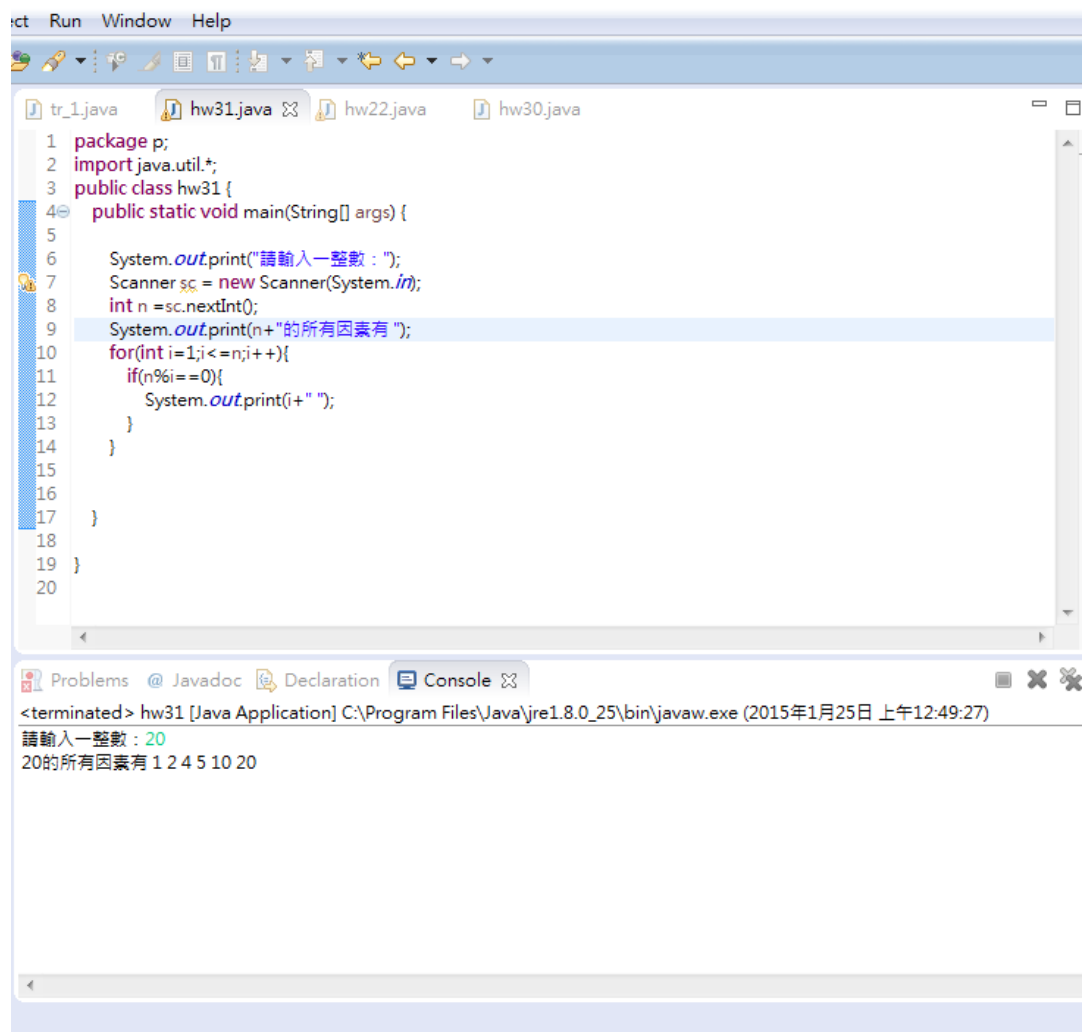


The screenshot shows an IDE window with the file `hw30.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program. The output shows the prime numbers from 1 to 100, followed by the largest prime number, 97.

```
<terminated> hw30 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月25日 上午12:41:10)
1~100之間的質數有 : 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
最大的質數為97
```


Ans 31.

```
1 import java.util.*;
2 public class hw31 {
3     public static void main(String[] args) {
4         System.out.print("請輸入一整數 : ");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         System.out.print(n+"的所有因素有 ");
8         for(int i=1;i<=n;i++){
9             if(n%i==0){
10                 System.out.print(i+" ");
11             }
12         }
13     }
14 }
```

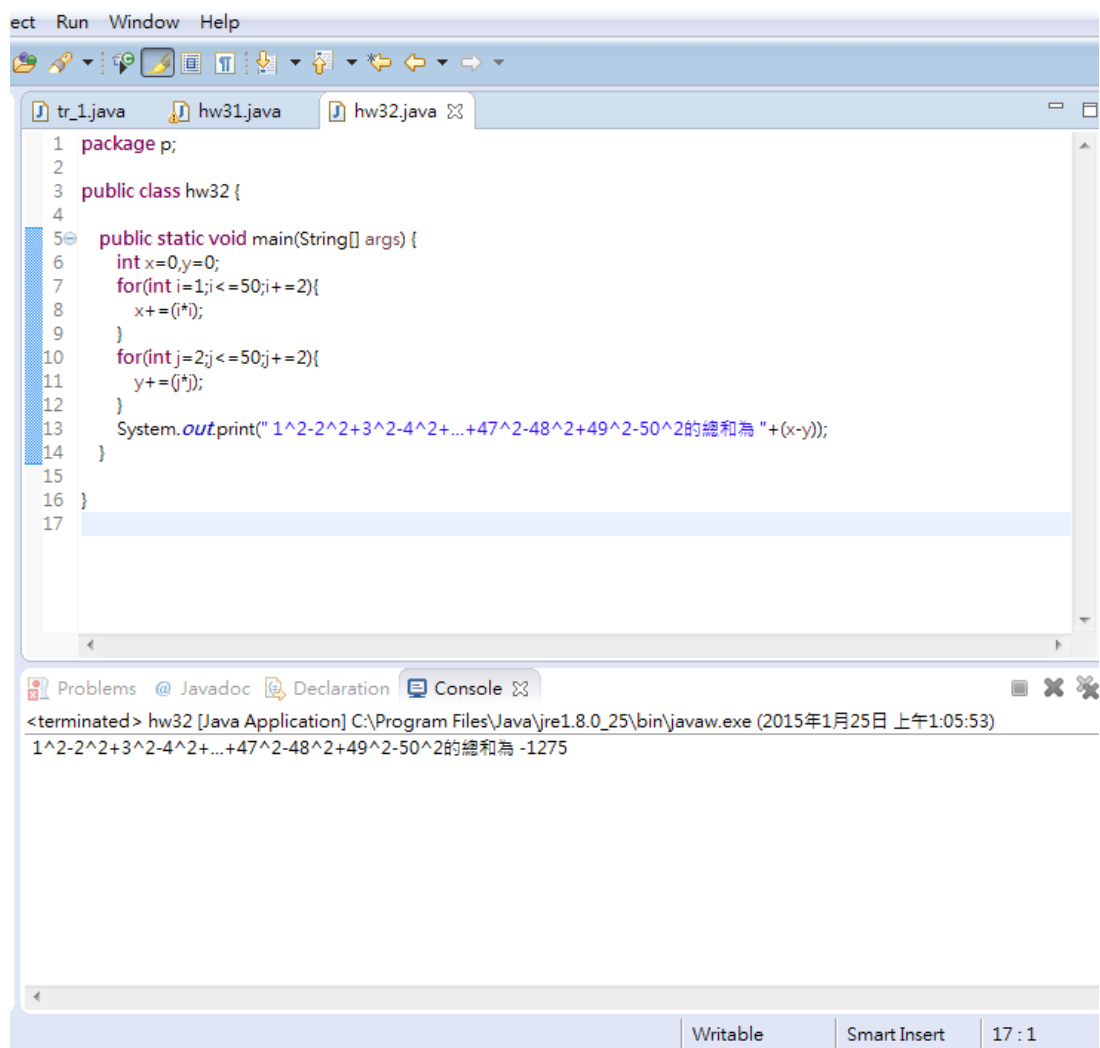


The screenshot shows an IDE window with the file `hw31.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the program's output. The output shows the prompt "請輸入一整數 : " followed by the user input "20", and then the result "20的所有因素有 1 2 4 5 10 20".

```
<terminated> hw31 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月25日 上午12:49:27)
請輸入一整數 : 20
20的所有因素有 1 2 4 5 10 20
```

Ans 32.

```
1 public class hw32 {
2     public static void main(String[] args) {
3         int x=0,y=0;
4         for(int i=1;i<=50;i+=2){
5             x+=(i*i);
6         }
7         for(int j=2;j<=50;j+=2){
8             y+=(j*j);
9         }
10        System.out.print
11        (" 1^2-2^2+3^2-4^2+...+47^2-48^2+49^2-50^2的總和為 "+(x-y));
12    }
13 }
```



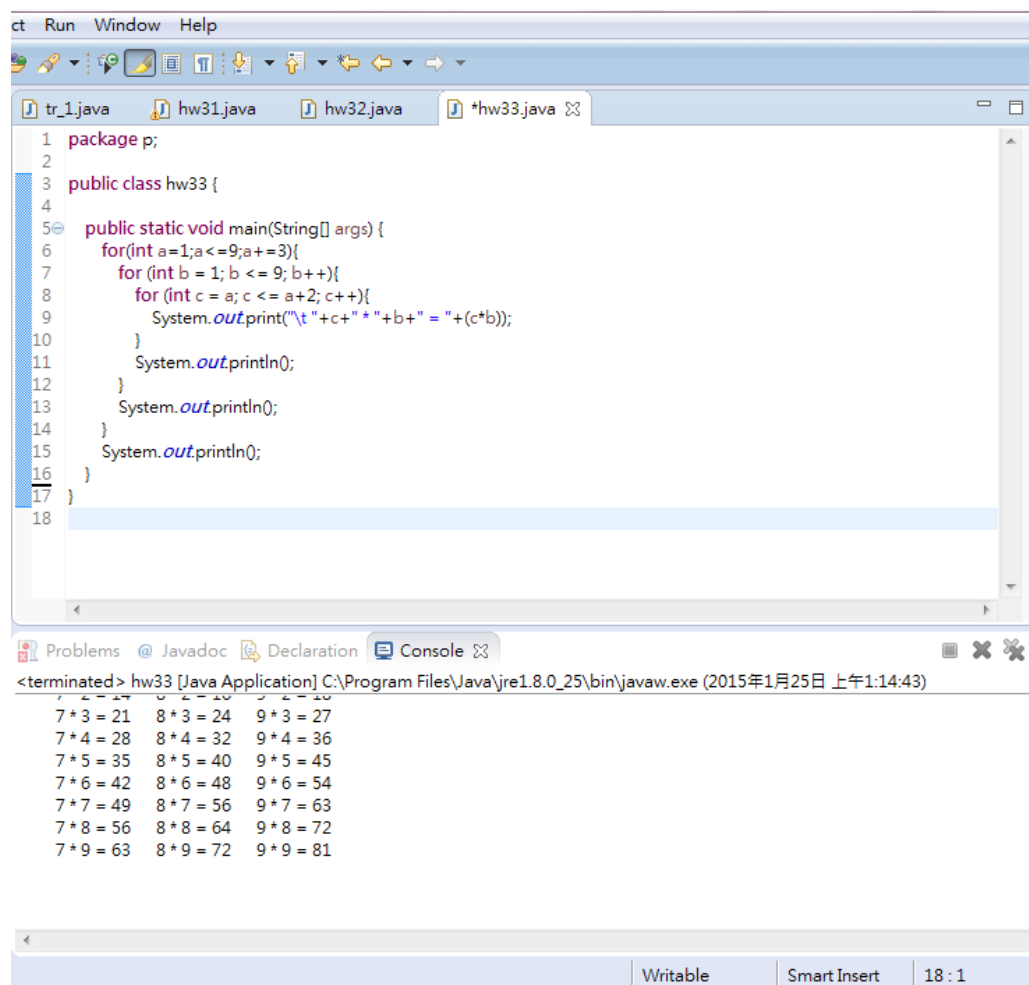
The screenshot shows an IDE window with three tabs: tr_1.java, hw31.java, and hw32.java. The hw32.java tab is active, displaying the same code as shown in the previous block. Below the code editor, the Console window is open, showing the output of the program. The output is: 1^2-2^2+3^2-4^2+...+47^2-48^2+49^2-50^2的總和為 -1275. The status bar at the bottom indicates the file is Writable, Smart Insert is enabled, and the cursor is at line 17, column 1.

```
1 package p;
2
3 public class hw32 {
4
5     public static void main(String[] args) {
6         int x=0,y=0;
7         for(int i=1;i<=50;i+=2){
8             x+=(i*i);
9         }
10        for(int j=2;j<=50;j+=2){
11            y+=(j*j);
12        }
13        System.out.print(" 1^2-2^2+3^2-4^2+...+47^2-48^2+49^2-50^2的總和為 "+(x-y));
14    }
15 }
16 }
17 }
```

<terminated> hw32 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月25日 上午1:05:53)
1^2-2^2+3^2-4^2+...+47^2-48^2+49^2-50^2的總和為 -1275

Ans 33.

```
1 public class hw33 {
2     public static void main(String[] args) {
3         for(int a=1;a<=9;a+=3){
4             for (int b = 1; b <= 9; b++){
5                 for (int c = a; c <= a+2; c++){
6                     System.out.print("\t "+c+" * "+b+" = "+(c*b));
7                 }
8                 System.out.println();
9             }
10            System.out.println();
11        }
12        System.out.println();
13    }
14 }
```



The screenshot shows an IDE window with the following tabs: tr_1.java, hw31.java, hw32.java, and *hw33.java. The code in hw33.java is as follows:

```
1 package p;
2
3 public class hw33 {
4
5     public static void main(String[] args) {
6         for(int a=1;a<=9;a+=3){
7             for (int b = 1; b <= 9; b++){
8                 for (int c = a; c <= a+2; c++){
9                     System.out.print("\t "+c+" * "+b+" = "+(c*b));
10                 }
11                 System.out.println();
12             }
13             System.out.println();
14         }
15         System.out.println();
16     }
17 }
18
```

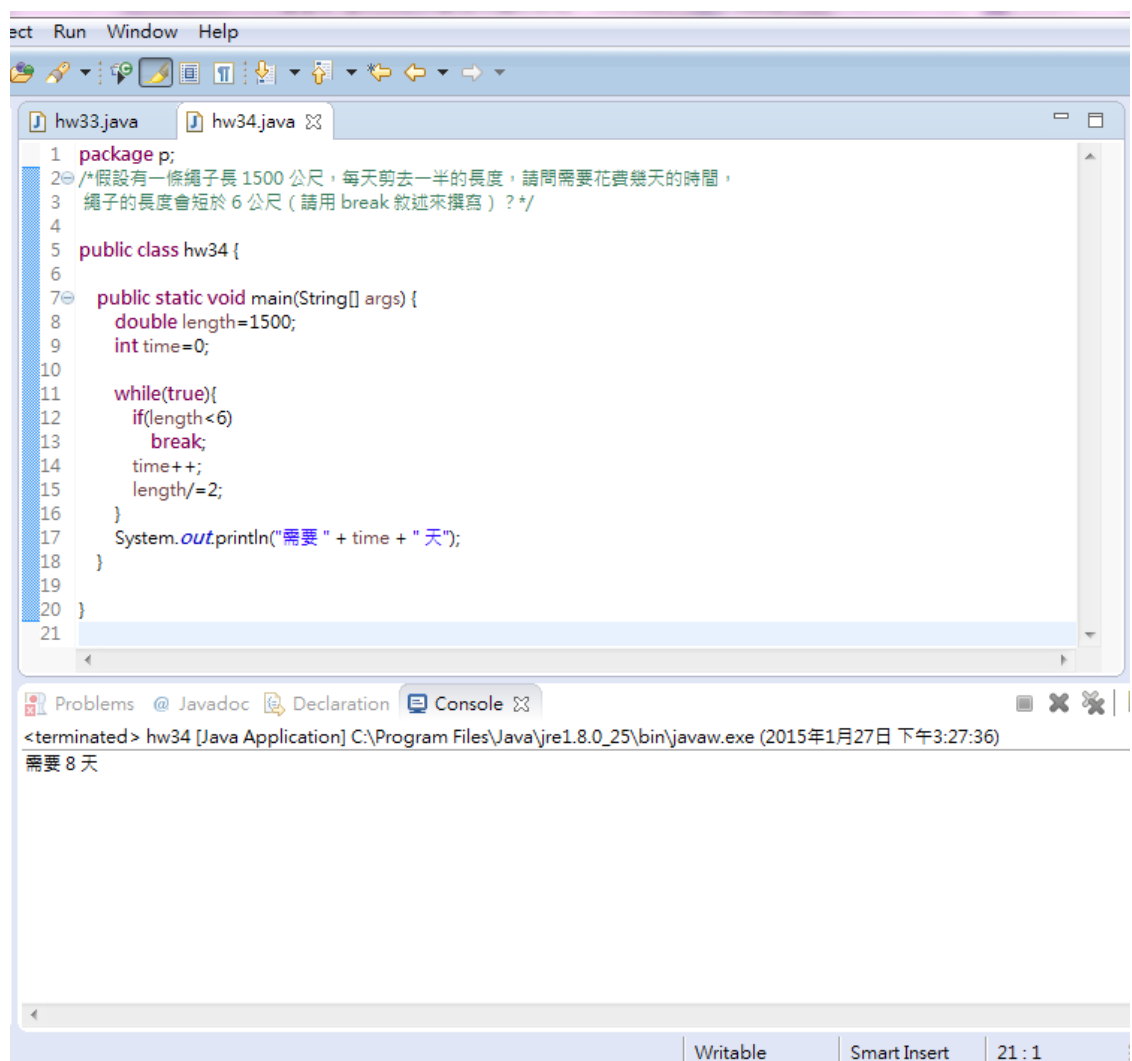
The console output is as follows:

```
<terminated> hw33 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月25日 上午1:14:43)
7 * 3 = 21    8 * 3 = 24    9 * 3 = 27
7 * 4 = 28    8 * 4 = 32    9 * 4 = 36
7 * 5 = 35    8 * 5 = 40    9 * 5 = 45
7 * 6 = 42    8 * 6 = 48    9 * 6 = 54
7 * 7 = 49    8 * 7 = 56    9 * 7 = 63
7 * 8 = 56    8 * 8 = 64    9 * 8 = 72
7 * 9 = 63    8 * 9 = 72    9 * 9 = 81
```

The IDE interface includes a menu bar (File, Edit, Run, Window, Help), a toolbar, and a status bar at the bottom with the text "Writable", "Smart Insert", and "18 : 1".

Ans 34.

```
1 public class hw34 {
2     public static void main(String[] args) {
3         double length=1500;
4         int time=0;
5         while(true){
6             if(length<6)
7                 break;
8             time++;
9             length/=2;
10        }
11        System.out.println("需要 " + time + " 天");
12    }
13 }
```



The screenshot shows an IDE window with two tabs: hw33.java and hw34.java. The hw34.java tab is active, displaying the following code:

```
1 package p;
2 /*假設有一條繩子長 1500 公尺，每天剪去一半的長度，請問需要花費幾天的時間，
3 繩子的長度會短於 6 公尺（請用 break 敘述來撰寫）？*/
4
5 public class hw34 {
6
7     public static void main(String[] args) {
8         double length=1500;
9         int time=0;
10
11         while(true){
12             if(length<6)
13                 break;
14             time++;
15             length/=2;
16         }
17         System.out.println("需要 " + time + " 天");
18     }
19 }
20
21
```

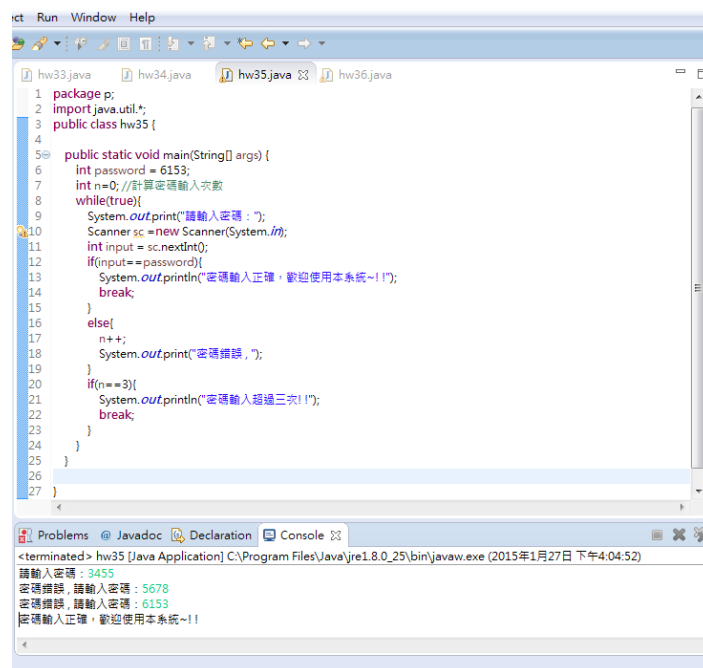
Below the code editor, the Console tab is active, showing the output of the program:

```
<terminated> hw34 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午3:27:36)
需要 8 天
```

The status bar at the bottom of the IDE indicates "Writable", "Smart Insert", and "21 : 1".

Ans 35.

```
1 import java.util.*;
2 public class hw35 {
3     public static void main(String[] args) {
4         int password = 6153;
5         int n=0; //計算密碼輸入次數
6         while(true){
7             System.out.print("請輸入密碼 : ");
8             Scanner sc = new Scanner(System.in);
9             int input = sc.nextInt();
10            if(input==password){
11                System.out.println("密碼輸入正確 · 歡迎使用本系統~!!");
12                break; }
13            else{
14                n++;
15                System.out.print("密碼錯誤 , ");
16            }
17            if(n==3){
18                System.out.println("密碼輸入超過三次! !");
19                break; }
20        }
21    }
22 }
```

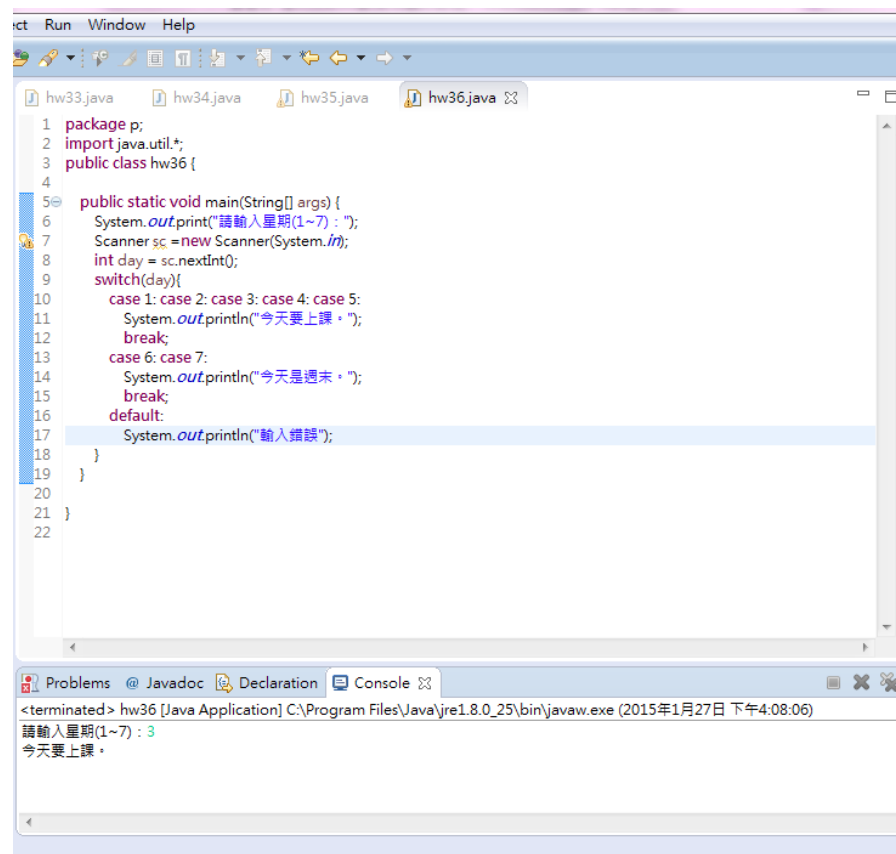


The screenshot shows an IDE window with the file 'hw35.java' open. The code is identical to the one provided in the previous block. Below the code editor, the 'Console' tab is active, displaying the output of the program. The output shows the program running successfully, with the user entering the password '6153' and receiving the message '密碼輸入正確 · 歡迎使用本系統~!!'.

```
<terminated> hw35 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午4:04:52)
請輸入密碼 : 3455
密碼錯誤, 請輸入密碼 : 5678
密碼錯誤, 請輸入密碼 : 6153
密碼輸入正確 · 歡迎使用本系統~!!
```

Ans 36.

```
1 import java.util.*;
2 public class hw36 {
3     public static void main(String[] args) {
4         System.out.print("請輸入星期(1~7) : ");
5         Scanner sc = new Scanner(System.in);
6         int day = sc.nextInt();
7         switch(day){
8             case 1: case 2: case 3: case 4: case 5:
9                 System.out.println("今天要上課。");
10                break;
11            case 6: case 7:
12                System.out.println("今天是週末。");
13                break;
14            default:
15                System.out.println("輸入錯誤");
16        }
17    }
18 }
```

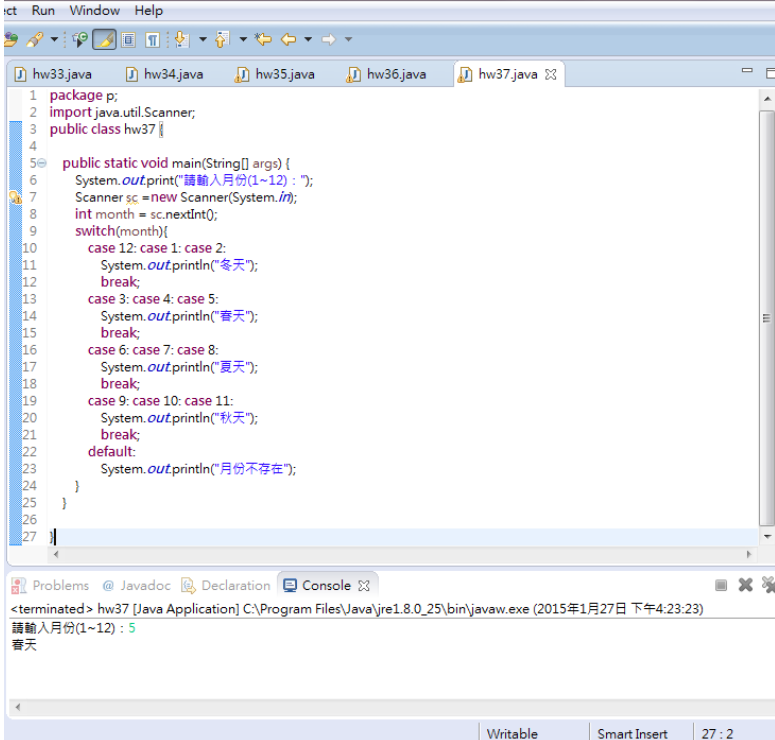


The screenshot shows an IDE window with the file 'hw36.java' open. The code is identical to the one provided in the previous block. Below the code editor, the 'Console' tab is active, displaying the output of the program. The output shows the prompt '請輸入星期(1~7) : ' followed by the user input '3', and then the program's response '今天要上課。'.

```
<terminated> hw36 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午4:08:06)
請輸入星期(1~7) : 3
今天要上課。
```

Ans 37.

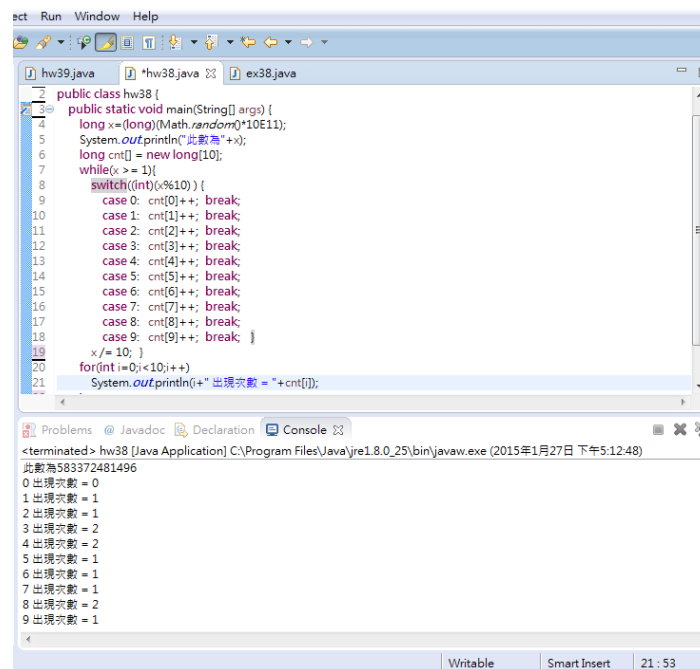
```
1 import java.util.Scanner;
2 public class hw37 {
3     public static void main(String[] args) {
4         System.out.print("請輸入月份(1~12) : ");
5         Scanner sc = new Scanner(System.in);
6         int month = sc.nextInt();
7         switch(month){
8             case 12: case 1: case 2:
9                 System.out.println("冬天"); break;
10            case 3: case 4: case 5:
11                System.out.println("春天"); break;
12            case 6: case 7: case 8:
13                System.out.println("夏天"); break;
14            case 9: case 10: case 11:
15                System.out.println("秋天"); break;
16            default:
17                System.out.println("月份不存在");
18        }
19    }
20 }
```



The screenshot shows an IDE window with the file 'hw37.java' open. The code is identical to the one provided in the text block above. Below the code editor, the 'Console' tab is active, displaying the output of the program. The output shows the prompt '請輸入月份(1~12) : ' followed by the user input '5', and then the program output '春天' (Spring). The status bar at the bottom indicates the file is 'Writable', 'Smart Insert' is enabled, and the cursor is at line 27, column 2.

Ans 38.

```
1 public class hw38 {
2     public static void main(String[] args) {
3         long x=(long)(Math.random()*10E11);
4         System.out.println("此數為"+x);
5         long cnt[] = new long[10];
6         while(x >= 1){
7             switch((int)(x%10) ) {
8                 case 0: cnt[0]++; break;
9                 case 1: cnt[1]++; break;
10                case 2: cnt[2]++; break;
11                case 3: cnt[3]++; break;
12                case 4: cnt[4]++; break;
13                case 5: cnt[5]++; break;
14                case 6: cnt[6]++; break;
15                case 7: cnt[7]++; break;
16                case 8: cnt[8]++; break;
17                case 9: cnt[9]++; break;    }
18            x /= 10;    }
19        for(int i=0;i<10;i++)
20            System.out.println(i+" 出現次數 = "+cnt[i]);
21    }
22 }
```



The screenshot shows an IDE window with the following code in the editor:

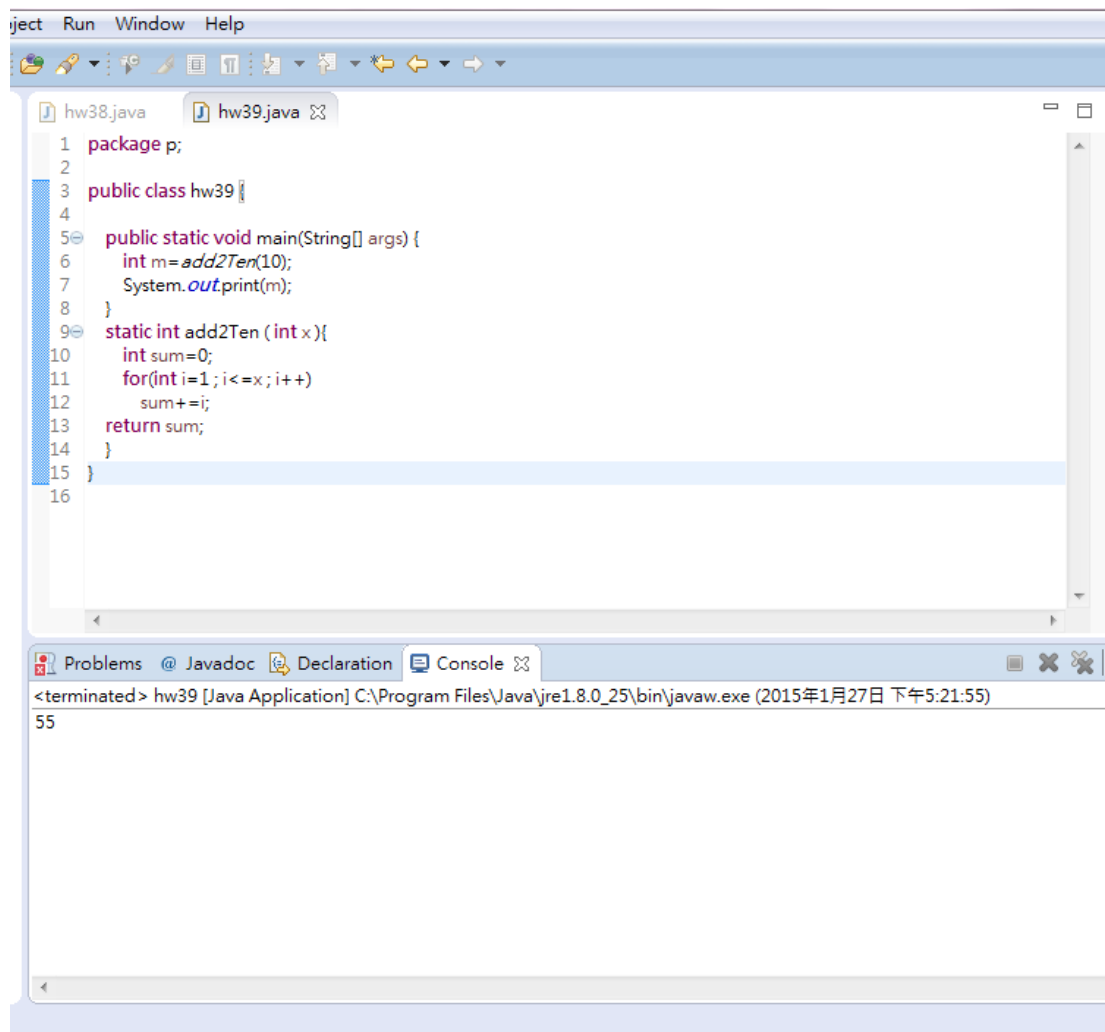
```
1 public class hw38 {
2     public static void main(String[] args) {
3         long x=(long)(Math.random()*10E11);
4         System.out.println("此數為"+x);
5         long cnt[] = new long[10];
6         while(x >= 1){
7             switch((int)(x%10) ) {
8                 case 0: cnt[0]++; break;
9                 case 1: cnt[1]++; break;
10                case 2: cnt[2]++; break;
11                case 3: cnt[3]++; break;
12                case 4: cnt[4]++; break;
13                case 5: cnt[5]++; break;
14                case 6: cnt[6]++; break;
15                case 7: cnt[7]++; break;
16                case 8: cnt[8]++; break;
17                case 9: cnt[9]++; break;    }
18            x /= 10;    }
19        for(int i=0;i<10;i++)
20            System.out.println(i+" 出現次數 = "+cnt[i]);
21    }
22 }
```

The console output shows the following results:

```
<terminated> hw38 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午5:12:48)
此數為583372481496
0 出現次數 = 0
1 出現次數 = 1
2 出現次數 = 1
3 出現次數 = 2
4 出現次數 = 2
5 出現次數 = 1
6 出現次數 = 1
7 出現次數 = 1
8 出現次數 = 2
9 出現次數 = 1
```

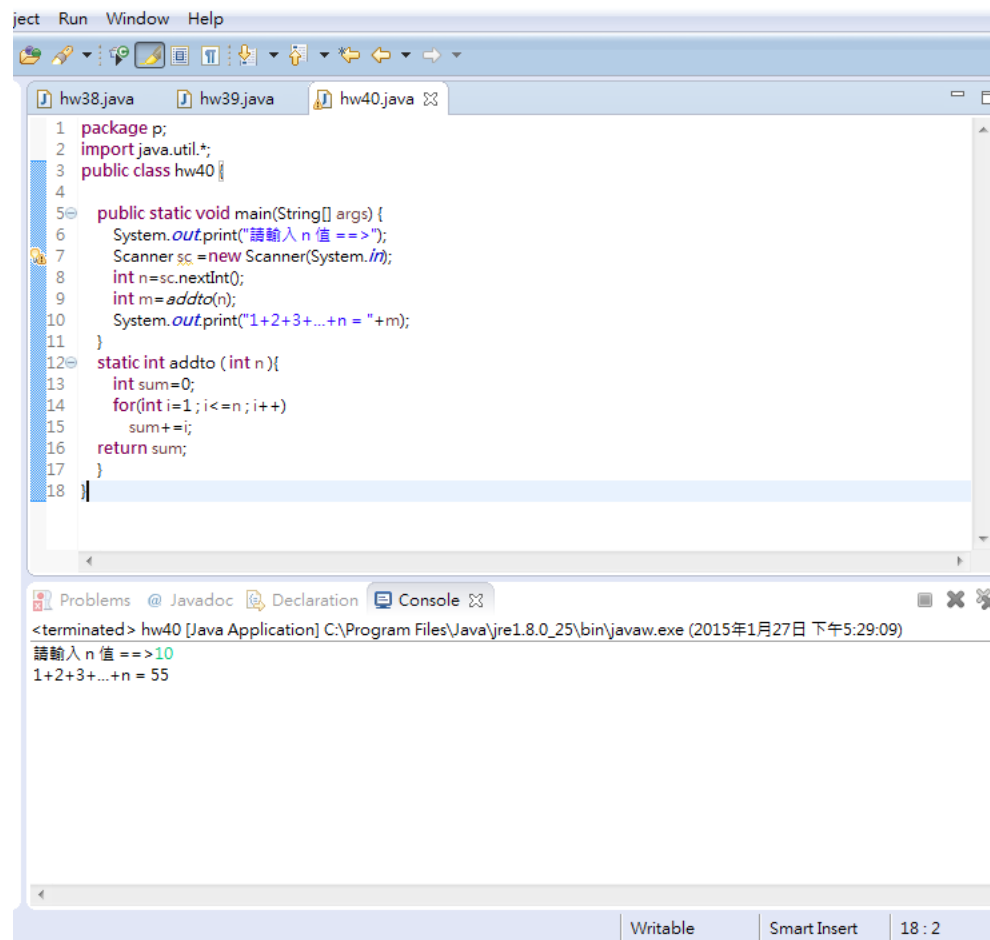

Ans 39.

```
1 public class hw39 {
2     public static void main(String[] args) {
3         int m=add2Ten(10);
4         System.out.print(m);
5     }
6     static int add2Ten ( int x){
7         int sum=0;
8         for(int i=1; i<=x; i++)
9             sum+=i;
10        return sum;
11    }
12 }
```



Ans 40.

```
1 import java.util.*;
2 public class hw40 {
3     public static void main(String[] args) {
4         System.out.print("請輸入 n 值 ==>");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         int m = addto(n);
8         System.out.print("1+2+3+...+n = "+m);
9     }
10    static int addto ( int n ){
11        int sum=0;
12        for(int i=1; i<=n; i++)
13            sum+=i;
14        return sum;
15    }
16 }
```

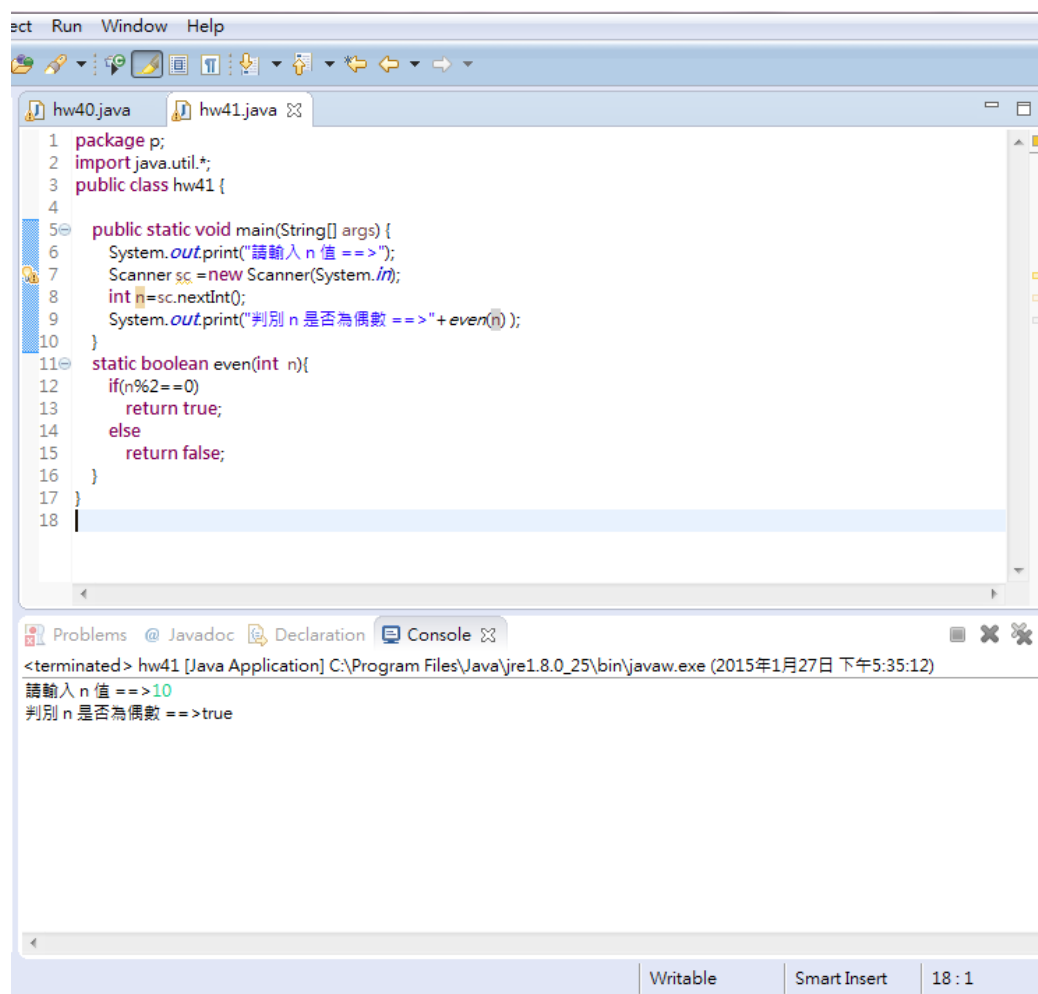


The screenshot shows an IDE window with the file `hw40.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program. The output shows the prompt "請輸入 n 值 ==>" followed by the user input "10", and then the result "1+2+3+...+n = 55". The IDE's status bar at the bottom indicates "Writable", "Smart Insert", and "18 : 2".

```
<terminated> hw40 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午5:29:09)
請輸入 n 值 ==>10
1+2+3+...+n = 55
```

Ans 41.

```
1 import java.util.*;
2 public class hw41 {
3     public static void main(String[] args) {
4         System.out.print("請輸入 n 值 ==>");
5         Scanner sc = new Scanner(System.in);
6         int n=sc.nextInt();
7         System.out.print("判別 n 是否為偶數 ==>" + even(n) );
8     }
9     static boolean even(int n){
10         if(n%2==0)
11             return true;
12         else
13             return false;
14     }
15 }
```

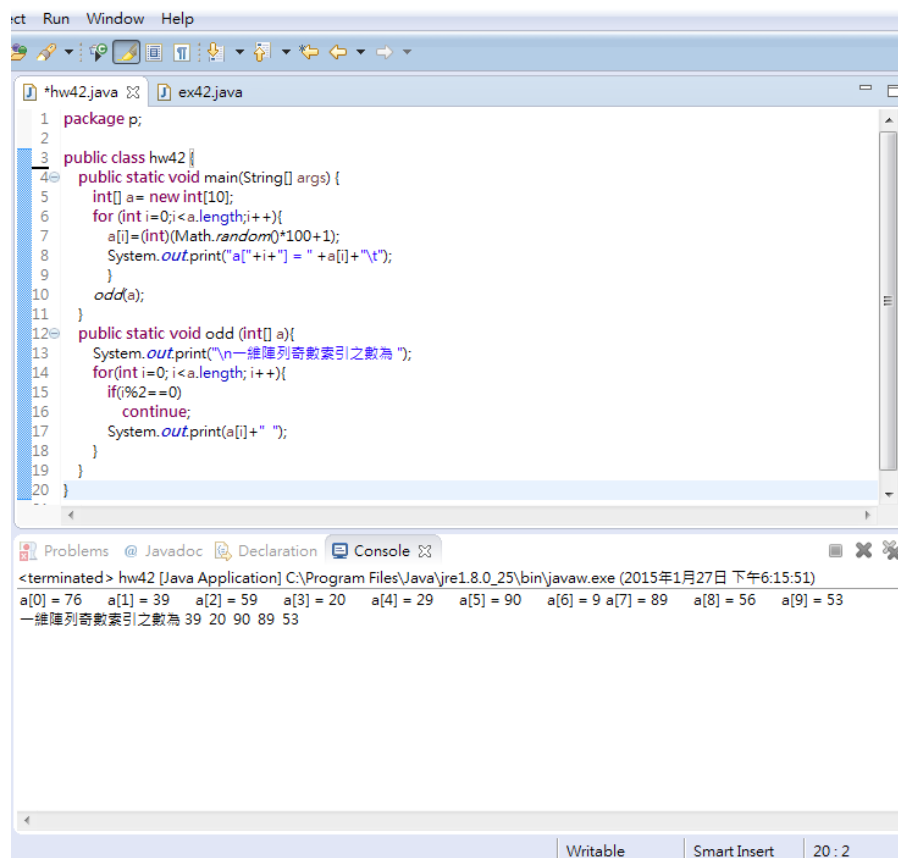


The screenshot shows an IDE window with two tabs: hw40.java and hw41.java. The hw41.java tab is active, displaying the code from the previous block. Below the code editor is a console window showing the execution output. The output indicates that the program was terminated, and the user input was 10, resulting in the output "判別 n 是否為偶數 ==>true".

```
<terminated> hw41 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午5:35:12)
請輸入 n 值 ==>10
判別 n 是否為偶數 ==>true
```

Ans 42.

```
1 public class hw42 {
2     public static void main(String[] args) {
3         int[] a= new int[10];
4         for (int i=0;i<a.length;i++){
5             a[i]=(int)(Math.random()*100+1);
6             System.out.print("a["+i+"] = " +a[i]+"\\t");
7         }
8         odd(a);
9     }
10    public static void odd (int[] a){
11        System.out.print("\\n一維陣列奇數索引之數為 ");
12        for(int i=0; i<a.length; i++){
13            if(i%2==0)
14                continue;
15            System.out.print(a[i]+" ");
16        }
17    }
18 }
```

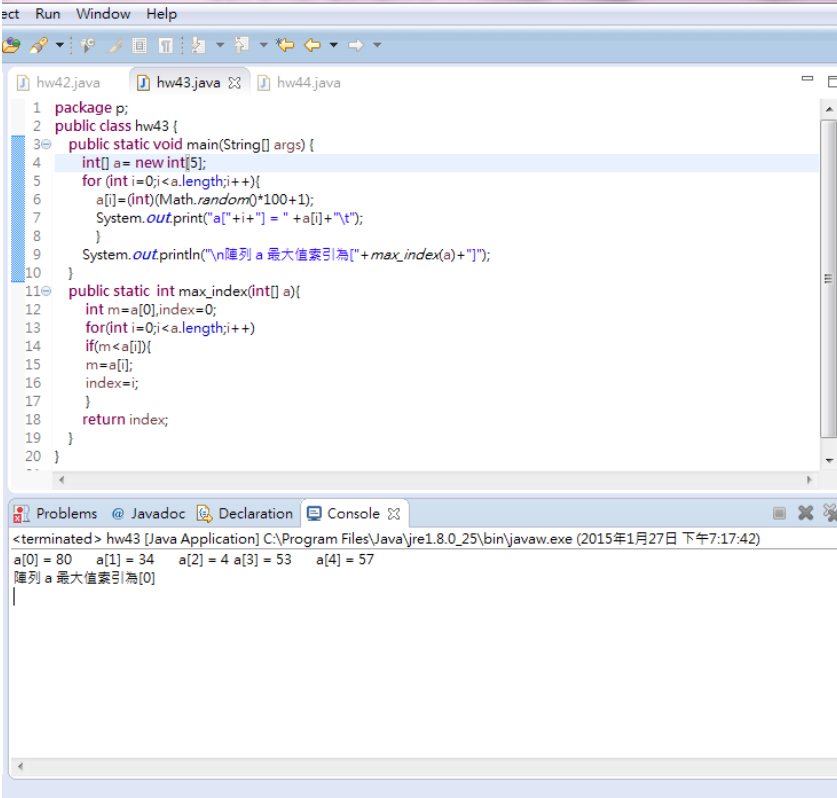


The screenshot shows an IDE window with two tabs: `*hw42.java` and `ex42.java`. The `hw42.java` tab is active, displaying the same Java code as shown in the previous block. Below the code editor, there is a `Console` tab showing the output of the program. The output consists of two lines: the first line displays the array elements `a[0]` through `a[9]` with their values, and the second line displays the odd-indexed elements of the array.

```
<terminated> hw42 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午6:15:51)
a[0] = 76 a[1] = 39 a[2] = 59 a[3] = 20 a[4] = 29 a[5] = 90 a[6] = 9 a[7] = 89 a[8] = 56 a[9] = 53
一維陣列奇數索引之數為 39 20 90 89 53
```

Ans 43.

```
1 public class hw43 {
2     public static void main(String[] args) {
3         int[] a= new int[5];
4         for (int i=0;i<a.length;i++){
5             a[i]=(int)(Math.random()*100+1);
6             System.out.print("a["+i+"] = " +a[i]+"\\t");
7         }
8         System.out.println("\\n陣列 a 最大值索引為["+max_index(a)+""]");
9     }
10    public static int max_index(int[] a){
11        int m=a[0],index=0;
12        for(int i=0;i<a.length;i++)
13            if(m<a[i]){
14                m=a[i];
15                index=i;
16            }
17        return index;
18    }
19 }
```



The screenshot shows an IDE window with the following content:

hw43.java

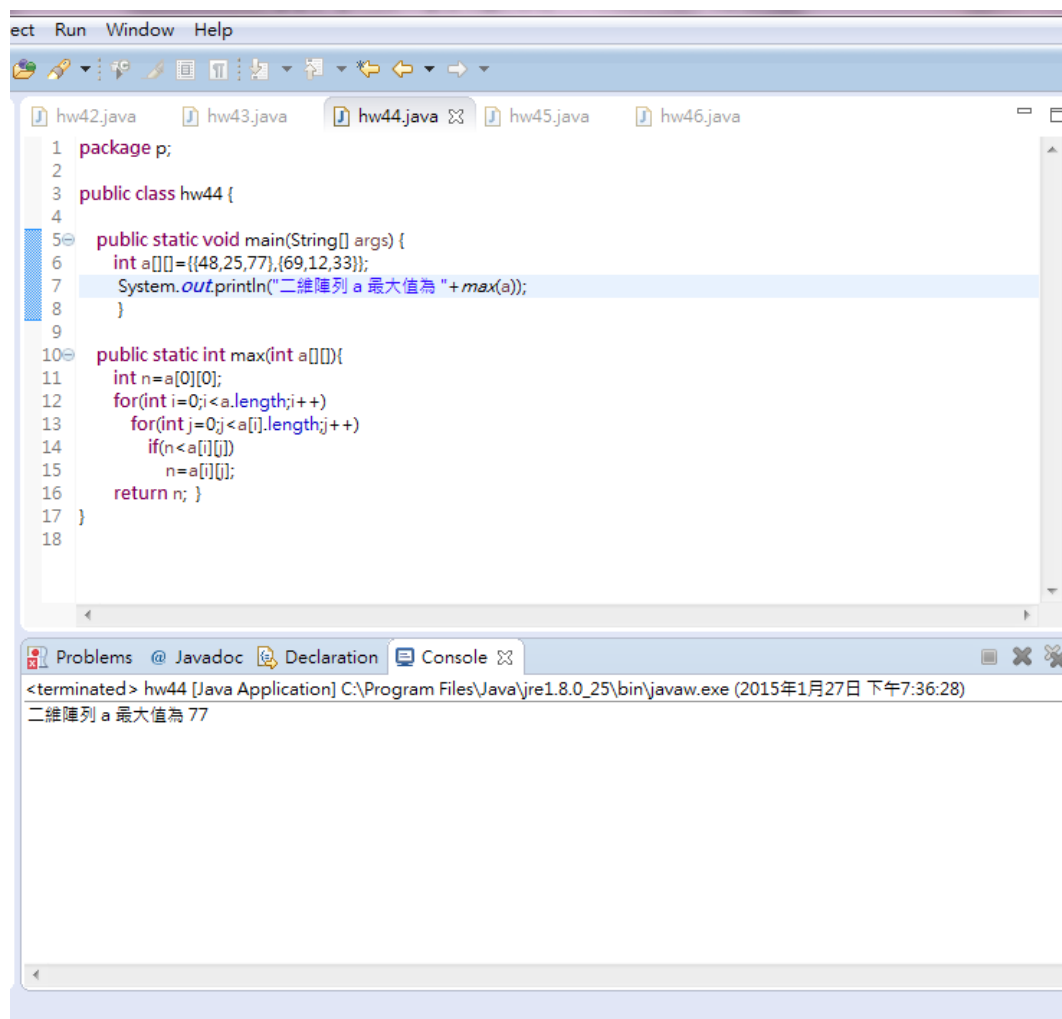
```
1 package p;
2 public class hw43 {
3     public static void main(String[] args) {
4         int[] a= new int[5];
5         for (int i=0;i<a.length;i++){
6             a[i]=(int)(Math.random()*100+1);
7             System.out.print("a["+i+"] = " +a[i]+"\\t");
8         }
9         System.out.println("\\n陣列 a 最大值索引為["+max_index(a)+""]");
10    }
11    public static int max_index(int[] a){
12        int m=a[0],index=0;
13        for(int i=0;i<a.length;i++)
14            if(m<a[i]){
15                m=a[i];
16                index=i;
17            }
18        return index;
19    }
20 }
```

Console

```
<terminated> hw43 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午7:17:42)
a[0] = 80 a[1] = 34 a[2] = 4 a[3] = 53 a[4] = 57
陣列 a 最大值索引為[0]
```

Ans 44.

```
1 public class hw44 {
2     public static void main(String[] args) {
3         int a[][]={{48,25,77},{69,12,33}};
4         System.out.println("二維陣列 a 最大值為 "+max(a));
5     }
6
7     public static int max(int a[][]){
8         int n=a[0][0];
9         for(int i=0;i<a.length;i++)
10             for(int j=0;j<a[i].length;j++)
11                 if(n<a[i][j])
12                     n=a[i][j];
13         return n; }
14 }
```



The screenshot shows an IDE window with the following content:

File Explorer: hw42.java, hw43.java, **hw44.java** (selected), hw45.java, hw46.java

Code Editor:

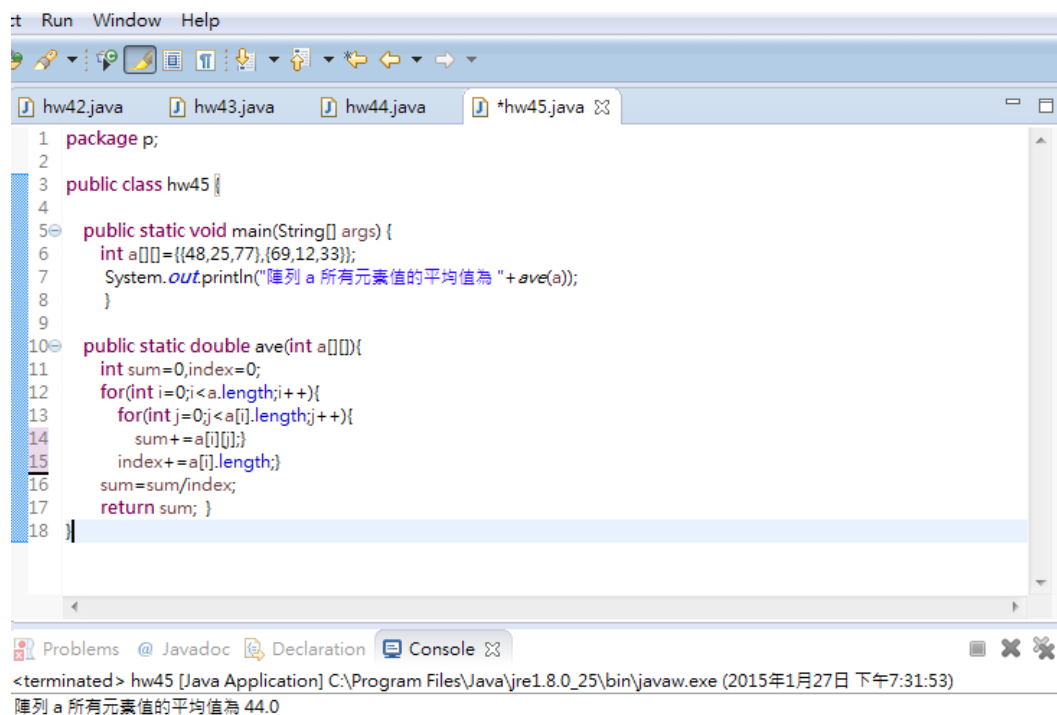
```
1 package p;
2
3 public class hw44 {
4
5     public static void main(String[] args) {
6         int a[][]={{48,25,77},{69,12,33}};
7         System.out.println("二維陣列 a 最大值為 "+max(a));
8     }
9
10    public static int max(int a[][]){
11        int n=a[0][0];
12        for(int i=0;i<a.length;i++)
13            for(int j=0;j<a[i].length;j++)
14                if(n<a[i][j])
15                    n=a[i][j];
16        return n; }
17    }
18 }
```

Console:

```
<terminated> hw44 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午7:36:28)
二維陣列 a 最大值為 77
```

Ans 45.

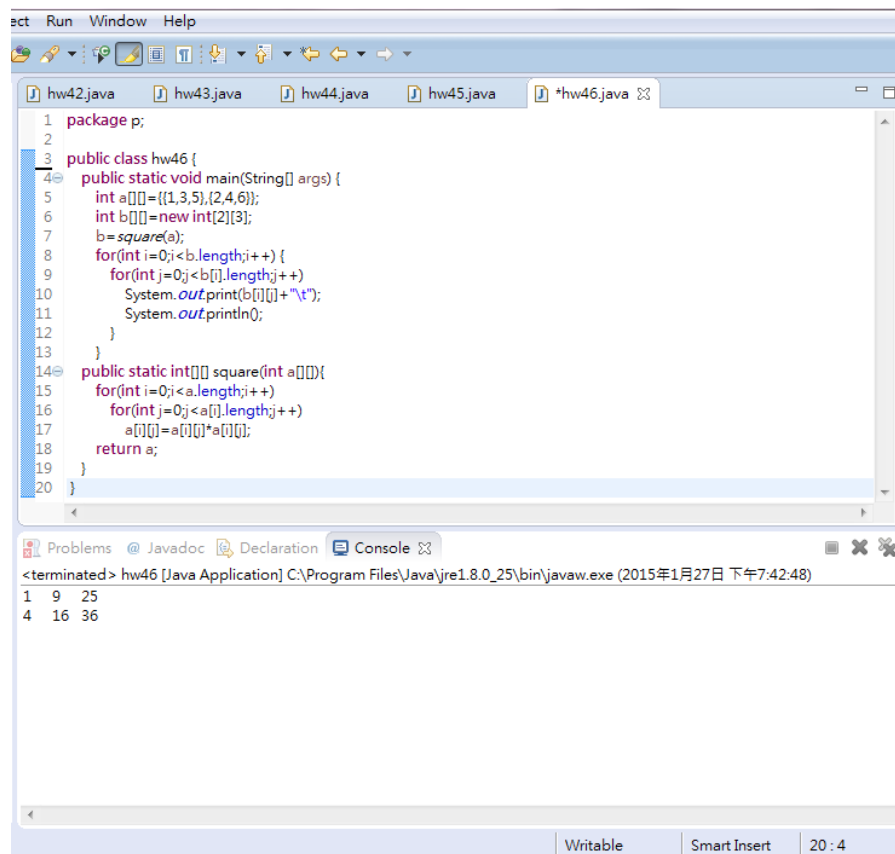
```
1 public class hw45 {
2     public static void main(String[] args) {
3         int a[][]={{48,25,77},{69,12,33}};
4         System.out.println("陣列 a 所有元素值的平均值為 "+ave(a));
5     }
6     public static double ave(int a[][]){
7         int sum=0,index=0;
8         for(int i=0;i<a.length;i++){
9             for(int j=0;j<a[i].length;j++){
10                 sum+=a[i][j];
11                 index+=a[i].length;
12             }
13             sum=sum/index;
14         }
15     }
16 }
```



The screenshot shows an IDE window with the file `hw45.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program: `<terminated> hw45 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午7:31:53) 陣列 a 所有元素值的平均值為 44.0`.

Ans 46.

```
1 public class hw46 {
2     public static void main(String[] args) {
3         int a[][]={{1,3,5},{2,4,6}};
4         int b[][]=new int[2][3];
5         b=square(a);
6         for(int i=0;i<b.length;i++) {
7             for(int j=0;j<b[i].length;j++)
8                 System.out.print(b[i][j]+" ");
9                 System.out.println();
10        }
11    }
12    public static int[] square(int a[][]){
13        for(int i=0;i<a.length;i++)
14            for(int j=0;j<a[i].length;j++)
15                a[i][j]=a[i][j]*a[i][j];
16        return a;
17    }
18 }
```



The screenshot shows an IDE window with the file `hw46.java` open. The code is identical to the one provided in the previous block. Below the editor, the `Console` tab is active, displaying the output of the program. The output consists of two lines: the first line contains the numbers 1, 9, and 25 separated by spaces, and the second line contains the numbers 4, 16, and 36 separated by spaces. The status bar at the bottom indicates the file is `Writable`, `Smart Insert` is enabled, and the time is `20:4`.

```
1 package p;
2
3 public class hw46 {
4     public static void main(String[] args) {
5         int a[][]={{1,3,5},{2,4,6}};
6         int b[][]=new int[2][3];
7         b=square(a);
8         for(int i=0;i<b.length;i++) {
9             for(int j=0;j<b[i].length;j++)
10                 System.out.print(b[i][j]+" ");
11                 System.out.println();
12        }
13    }
14    public static int[] square(int a[][]){
15        for(int i=0;i<a.length;i++)
16            for(int j=0;j<a[i].length;j++)
17                a[i][j]=a[i][j]*a[i][j];
18        return a;
19    }
20 }
```

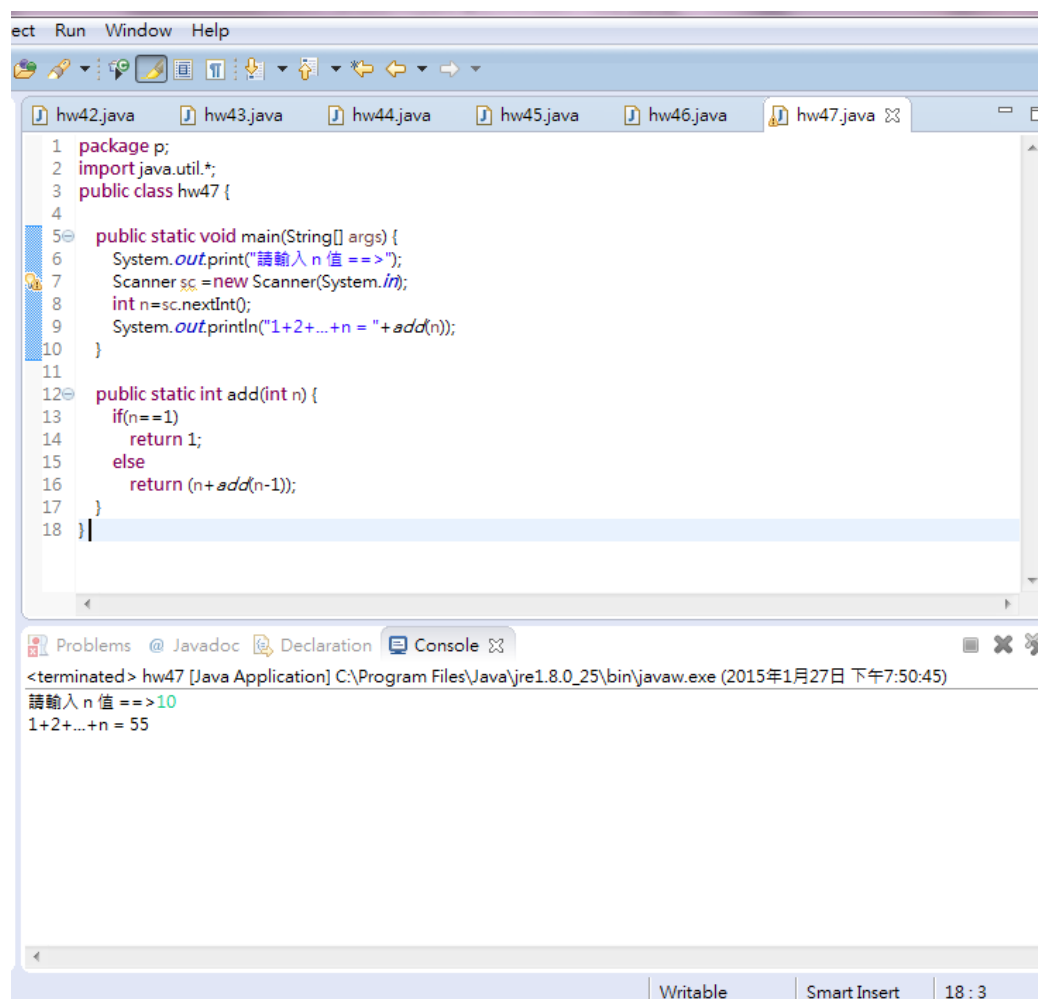
<terminated> hw46 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午7:42:48)

```
1 9 25
4 16 36
```

Writable Smart Insert 20:4

Ans 47.

```
1 import java.util.*;
2 public class hw47 {
3     public static void main(String[] args) {
4         System.out.print("請輸入 n 值 ==>");
5         Scanner sc = new Scanner(System.in);
6         int n = sc.nextInt();
7         System.out.println("1+2+...+n = "+add(n));
8     }
9     public static int add(int n) {
10        if(n==1)
11            return 1;
12        else
13            return (n+add(n-1));
14    }
15 }
```



The screenshot shows an IDE window with the file `hw47.java` open. The code is as follows:

```
1 package p;
2 import java.util.*;
3 public class hw47 {
4
5     public static void main(String[] args) {
6         System.out.print("請輸入 n 值 ==>");
7         Scanner sc = new Scanner(System.in);
8         int n = sc.nextInt();
9         System.out.println("1+2+...+n = "+add(n));
10    }
11
12    public static int add(int n) {
13        if(n==1)
14            return 1;
15        else
16            return (n+add(n-1));
17    }
18 }
```

The console output shows the program execution:

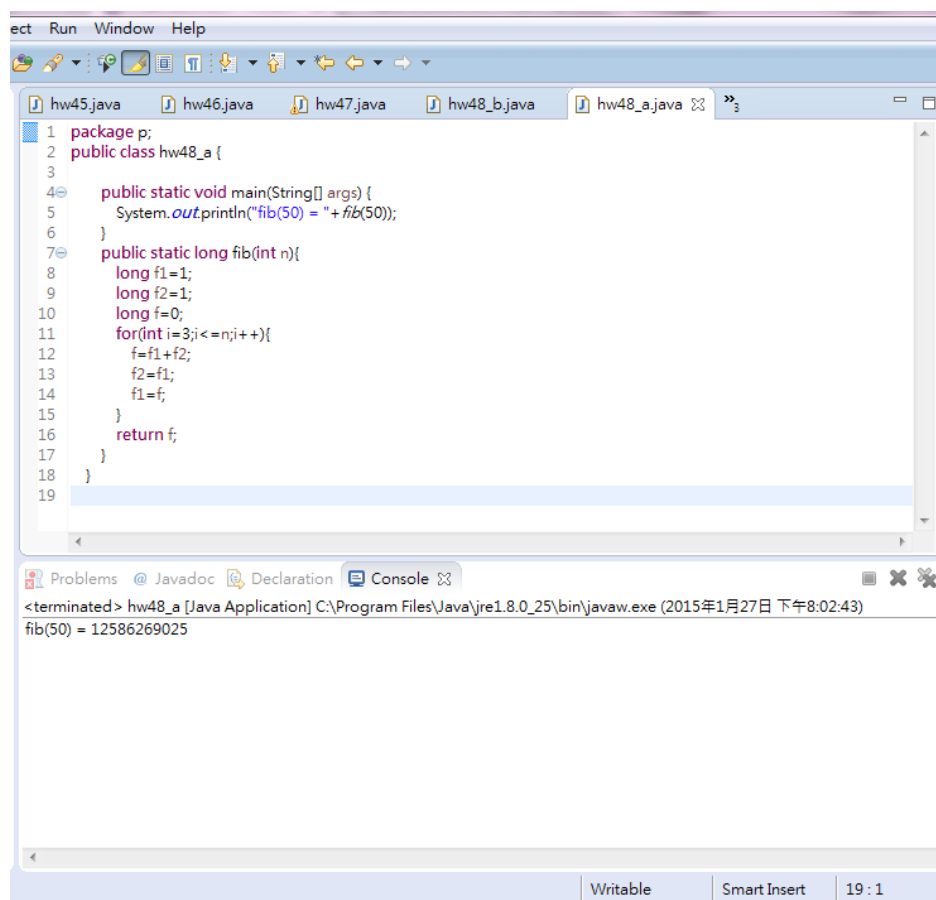
```
<terminated> hw47 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午7:50:45)
請輸入 n 值 ==>10
1+2+...+n = 55
```

The status bar at the bottom indicates the file is `Writable`, `Smart Insert` is enabled, and the time is `18:3`.

Ans 48.

(A).

```
1 public class hw48_a {
2     public static void main(String[] args) {
3         System.out.println("fib(50) = " + fib(50));
4     }
5     public static long fib(int n){
6         long f1=1;
7         long f2=1;
8         long f=0;
9         for(int i=3;i<=n;i++){
10             f=f1+f2;
11             f2=f1;
12             f1=f;
13         }
14         return f;
15     }
16 }
```

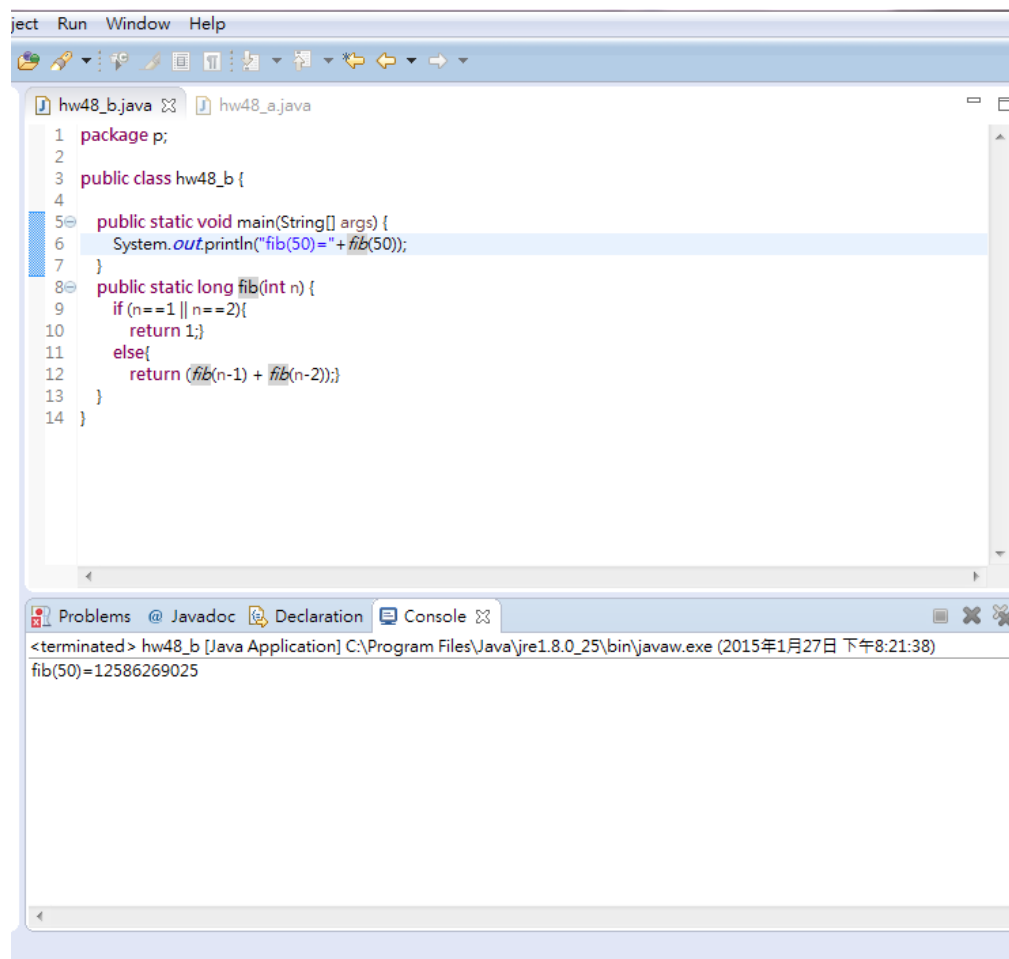


The screenshot shows an IDE window with the following tabs: hw45.java, hw46.java, hw47.java, hw48_b.java, and hw48_a.java. The code in the editor is the same as the one provided. The console output at the bottom shows the execution of the program, resulting in the output: fib(50) = 12586269025.

```
<terminated> hw48_a [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午8:02:43)
fib(50) = 12586269025
```

(B).

```
1 public class hw48_b {  
2     public static void main(String[] args) {  
3         System.out.println("fib(50) = " + fib(50));  
4     }  
5     public static long fib(int n){  
6         if (n==1 || n==2){  
7             return 1;}  
8         else{  
9             return (fib(n-1) + fib(n-2));}  
10    }  
11 }
```



```
1 package p;  
2  
3 public class hw48_b {  
4  
5     public static void main(String[] args) {  
6         System.out.println("fib(50)= "+ fib(50));  
7     }  
8     public static long fib(int n) {  
9         if (n==1 || n==2){  
10            return 1;}  
11        else{  
12            return (fib(n-1) + fib(n-2));}  
13        }  
14    }  
15 }
```

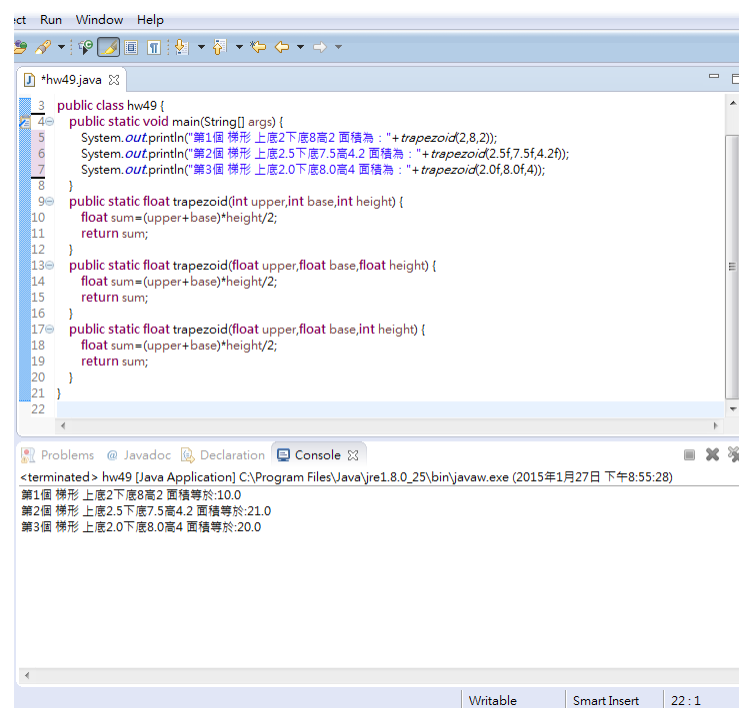
<terminated> hw48_b [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午8:21:38)
fib(50)=12586269025

(C).

採用遞迴的方式會重複計算相當多次的遞迴,導致輸入的數值愈大,需要計算的時間也就愈長(當 n 值為 50 時,透過遞迴的方式得知執行時間明顯增長),因此對於費氏數列而言,採用迴圈,可以獲得較佳的計算效率。

Ans 49.

```
1 public class hw49 {
2     public static void main(String[] args) {
3         System.out.println("第1個 梯形 上底2下底8高2 面積為 : "+trapezoid(2,8,2));
4         System.out.println
5             ("第2個 梯形 上底2.5下底7.5高4.2 面積為 : "+trapezoid(2.5f,7.5f,4.2f));
6         System.out.println
7             ("第3個 梯形 上底2.0下底8.0高4 面積為 : "+trapezoid(2.0f,8.0f,4));
8     }
9     public static float trapezoid(int upper,int base,int height) {
10         float sum=(upper+base)*height/2;
11         return sum;
12     }
13     public static float trapezoid(float upper,float base,float height) {
14         float sum=(upper+base)*height/2;
15         return sum;
16     }
17     public static float trapezoid(float upper,float base,int height) {
18         float sum=(upper+base)*height/2;
19         return sum;
20     }
21 }
22 }
```



The screenshot shows an IDE window with the file `hw49.java` open. The code is identical to the one provided in the previous block. Below the code editor, the `Console` tab is active, displaying the output of the program. The output shows three lines of text, each representing the area of a trapezoid calculated by the `trapezoid` method. The first line is "第1個 梯形 上底2下底8高2 面積等於:10.0", the second is "第2個 梯形 上底2.5下底7.5高4.2 面積等於:21.0", and the third is "第3個 梯形 上底2.0下底8.0高4 面積等於:20.0". The status bar at the bottom indicates the file is writable, has smart insert enabled, and the cursor is at line 22, column 1.

```
<terminated> hw49 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月27日 下午8:55:28)
第1個 梯形 上底2下底8高2 面積等於:10.0
第2個 梯形 上底2.5下底7.5高4.2 面積等於:21.0
第3個 梯形 上底2.0下底8.0高4 面積等於:20.0
```

Ans 50.

```
1 import java.util.*;
2 import java.io.*;
3 public class hw50 {
4     public static void main(String[] args) throws IOException {
5         BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
6         while(true){
7             System.out.print("請輸入您的換幣金額：");
8             Scanner sc = new Scanner(System.in);
9             int crush = sc.nextInt();
10            if (crush>100){
11                System.out.println("抱歉!!本系統只接受100(含)以下的零錢兌換。");
12                System.out.print("要繼續嗎(Y/N) ==>");
13                String str=br.readLine();
14                if("n".equals(str)||"N".equals(str)){
15                    System.out.print("謝謝您的使用 · 歡迎再度光臨");
16                    break; }
17                if ("y".equals(str) || "Y".equals(str)){
18                    continue; }
19            }
20            else{
21                System.out.print
22                (" 1.)    系動自動兌換 \n 2.)  手動選擇兌換 \n 請選擇要操作的項目：");
23                int item = sc.nextInt();
24                if(item==1){
25                    System.out.print("您可以兌換的零錢為");
26                    Automatic_money(crush);
27                    System.out.print("\n確定請按Y,取消請按N ==>");
28                    String str2=br.readLine();
29                    if("n".equals(str2)||"N".equals(str2)){
30                        break;}
31                    if ("y".equals(str2) || "Y".equals(str2)){
32                        System.out.print
33                        ("您兌換的金額"+crush+"圓 · 兌換的零錢為");
34                        Automatic_money(crush);
35                        System.out.print("\n請問還要繼續操作嗎(Y/N)?");
36                        String str3=br.readLine();
37                        if("n".equals(str3)||"N".equals(str3)){
```

```

36         System.out.print("謝謝您的使用 · 歡迎再度光臨");
37         break;}
38     if ("y".equals(str3)|"Y".equals(str3)){
39         continue; }
40     }
41 }
42 else if(item==2){
43     while(true){
44         System.out.print("您可以兌換的零錢須幾枚50圓：");
45         int fifty=sc.nextInt();
46         System.out.print("您可以兌換的零錢須幾枚10圓：");
47         int ten=sc.nextInt();
48         System.out.print("您可以兌換的零錢須幾枚5圓：");
49         int five=sc.nextInt();
50         System.out.print("您可以兌換的零錢須幾枚1圓：");
51         int one=sc.nextInt();
52         if((fifty*50+ten*10+five*5+one)>crush){
53             System.out.println
54             ("錯誤！兌換的總金額不得超過投入的金額。");
55             System.out.print
56             ("是否要重新輸入各個零錢所需數目(Y/N)？");
57             String str4=br.readLine();
58             if ("y".equals(str4)|"Y".equals(str4)){
59                 continue; }
60             if("n".equals(str4)|"N".equals(str4)){
61                 break; }
62         }
63         else{
64             System.out.print("確定請按Y,取消請按N ==>");
65             String str5=br.readLine();
66             if("n".equals(str5)|"N".equals(str5)){
67                 continue;}
68             if ("y".equals(str5)|"Y".equals(str5)){
69                 System.out.print
70                 ("您兌換的金額"+crush+"圓 · 兌換的零錢為");
71                 Manual_monay(fifty,ten,five,one);
72                 System.out.println();
73                 break; }

```

```

71         }
72     }
73     System.out.print("請問還要繼續操作嗎(Y/N)?");
74     String str6=br.readLine();
75     if("n".equals(str6)|"N".equals(str6)){
76         System.out.print("謝謝您的使用 · 歡迎再度光臨");
77         break;}
78     if ("y".equals(str6)|"Y".equals(str6)){
79         continue; }
80     }
81     }
82     }
83 }
84 public static void Automatic_money(int crush){
85     int fifty =crush/50;
86     int surplus =crush%50;    int ten =surplus/10;
87     surplus=surplus%10; int five =surplus/5;
88     surplus=surplus%5;    int one =surplus;
89     System.out.print
90     ("50圓"+fifty+"枚,10圓的"+ten+"枚,5圓的"+five+"枚,1圓的"+one+"枚");
91 }
92 public static void Manual_monay(int fifty,int ten,int five,int one){
93     System.out.print
94     ("50圓"+fifty+"枚,10圓的"+ten+"枚,5圓的"+five+"枚,1圓的"+one+"枚");}}

```

The screenshot shows a Java IDE window with the following content:

- Problems:** 1 terminated > hw50_1 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月28日 上午12:18:12)
- Console:**

```

<terminated> hw50_1 [Java Application] C:\Program Files\Java\jre1.8.0_25\bin\javaw.exe (2015年1月28日 上午12:18:12)
您輸入的金額只接受100(含)以下的零錢兌換：
要繼續嗎(Y/N) ==> y
請輸入您的換幣金額：100
1) 系統自動兌換
2) 手動選擇兌換
請選擇要操作的項目：1
您可以兌換的零錢為50圓2枚,10圓的0枚,5圓的0枚,1圓的0枚
確定請按Y,取消請按N ==> y
您兌換的金額100圓，兌換的零錢為50圓2枚,10圓的0枚,5圓的0枚,1圓的0枚
請問還要繼續操作嗎(Y/N)?y
請輸入您的換幣金額：85
1) 系統自動兌換
2) 手動選擇兌換
請選擇要操作的項目：1
您可以兌換的零錢為50圓1枚,10圓的3枚,5圓的1枚,1圓的0枚
確定請按Y,取消請按N ==> y
您兌換的金額85圓，兌換的零錢為50圓1枚,10圓的3枚,5圓的1枚,1圓的0枚
請問還要繼續操作嗎(Y/N)?y
請輸入您的換幣金額：8
1) 系統自動兌換
2) 手動選擇兌換
請選擇要操作的項目：2
您可以兌換的零錢為50圓0枚：0
您可以兌換的零錢為10圓0枚：8
您可以兌換的零錢為5圓0枚：0
您可以兌換的零錢為1圓0枚：5
確定請按Y,取消請按N ==> n
您可以兌換的零錢為50圓0枚：0
您可以兌換的零錢為10圓0枚：8
您可以兌換的零錢為5圓0枚：1
您可以兌換的零錢為1圓0枚：0
確定請按Y,取消請按N ==> y
您兌換的金額8圓，兌換的零錢為50圓0枚,10圓的0枚,5圓的1枚,1圓的0枚
請問還要繼續操作嗎(Y/N)?n
謝謝您的使用，歡迎再度光臨

```