第一章　Ruby 細說從頭

OOP with Ruby

本章內容

- 什麼是 Ruby?
- Ruby 的發展歷史
- 如何安裝 Ruby?
- 如何執行 Ruby?
- Ruby 的參考文件： 使用 rubydoc 和 ri
- 免費的整合開發環境 RDE
- 第一個程式： 基本輸出入

什麼是 **Ruby?**

- Ruby is "an interpreted scripting language for quick and easy object-oriented programming"
  - *Interpreted scripting language*
    - ability to make operating system calls directly
    - powerful string operations and regular expressions
    - immediate feedback during development
  - *Quick and easy*
    - variable declarations are unnecessary
    - variables are not typed
    - syntax is simple and consistent
    - memory management is automatic

什麼是 **Ruby? (2)**

- *Object-oriented programming*
  - everything is an object
  - classes, methods, inheritance, etc.
  - singleton methods
  - "mixin" functionality by module
  - iterators and closures
- *Also*
  - multiple precision integers
  - convenient exception processing
  - dynamic loading
  - threading support

什麼是 Ruby? (3)

- Ruby is a dynamic, reflective, general purpose object-oriented programming language
  - Dynamic: do the following things at runtime
    - Adding new code
    - Extending objects and definitions
    - Modifying the type system
  - Reflective: observe and modify its own structure/behavior
    - Normally, 'instructions' are 'executed' and 'data' is 'processed‘
    - Treat instructions as data and therefore make reflective modifications
    - Most common in high-level virtual machine programming languages like Smalltalk

Ruby 的發展歷史

- 1993, February 24: Yukihiro Matsumoto ("Matz") started to work on Ruby.
- 1993, Summer: First "Hello, world!" program works.
- 1995, December: First release 0.95.
- 1996, December: 1.0 is released.
- 1999: Supposedly overtakes Python in Japan.
- 2000: The first official newsgroup.
- 2000-2001: Several books and magazine articles published.
- 2003, August 4: 1.8.0 is released.
- 2004, July - Web application framework Ruby on Rails released
- 2007, March - Ruby 1.8.6 was released
- 2007, December 25 - Ruby 1.9 (experimental version) was released

Ruby 的特徵

- Variables have no type (dynamic typing)
- No primitive types (everything is an object)
- No list context (everything returns object)
- No prior declaration needed, but initialization is often essential
- No user-level memory management (garbage collection)
- Classes, Mix-ins, Per-object methods
- Iterators for loop abstraction
- Text processing and regular expression
- Dynamic loading
- Closures, Bignums, Exception handling, system calls...

如何安裝 Ruby?

- Ruby on Windows: one-click installer
  - http://rubyforge.org/frs/download.php/29263/ruby186-26.exe
- Ruby on Linux: one command installation
  - % sudo apt-get install ruby irb rdoc
- Ruby on OSX: use MacPorts
  - % port install ruby

如何執行 **Ruby?**

- irb: interactive Ruby session

```
irb(main):001:0>
```

```
irb(main):001:0> "Hello World"
=> "Hello World"
```

```
irb(main):003:0> 3+2
=> 5
```

```
irb(main):004:0> 3*2
=> 6
```

```
irb(main):005:0> 3**2
=> 9
```

```
irb(main):006:0> Math.sqrt(9)
=> 3.0
```

如何執行 Ruby? (2)

- ruby: Ruby interpreter
  - Write your program in a text file with ".rb" extension

```
% ruby myprog.rb
```

Ruby 的參考文件

- Ruby standard library contains more than 9000 methods
- Online Ruby document usually use RDoc
  - RDoc is able to extract documentation from Ruby source code
  - In both HTML and ri format

如何使用 ri

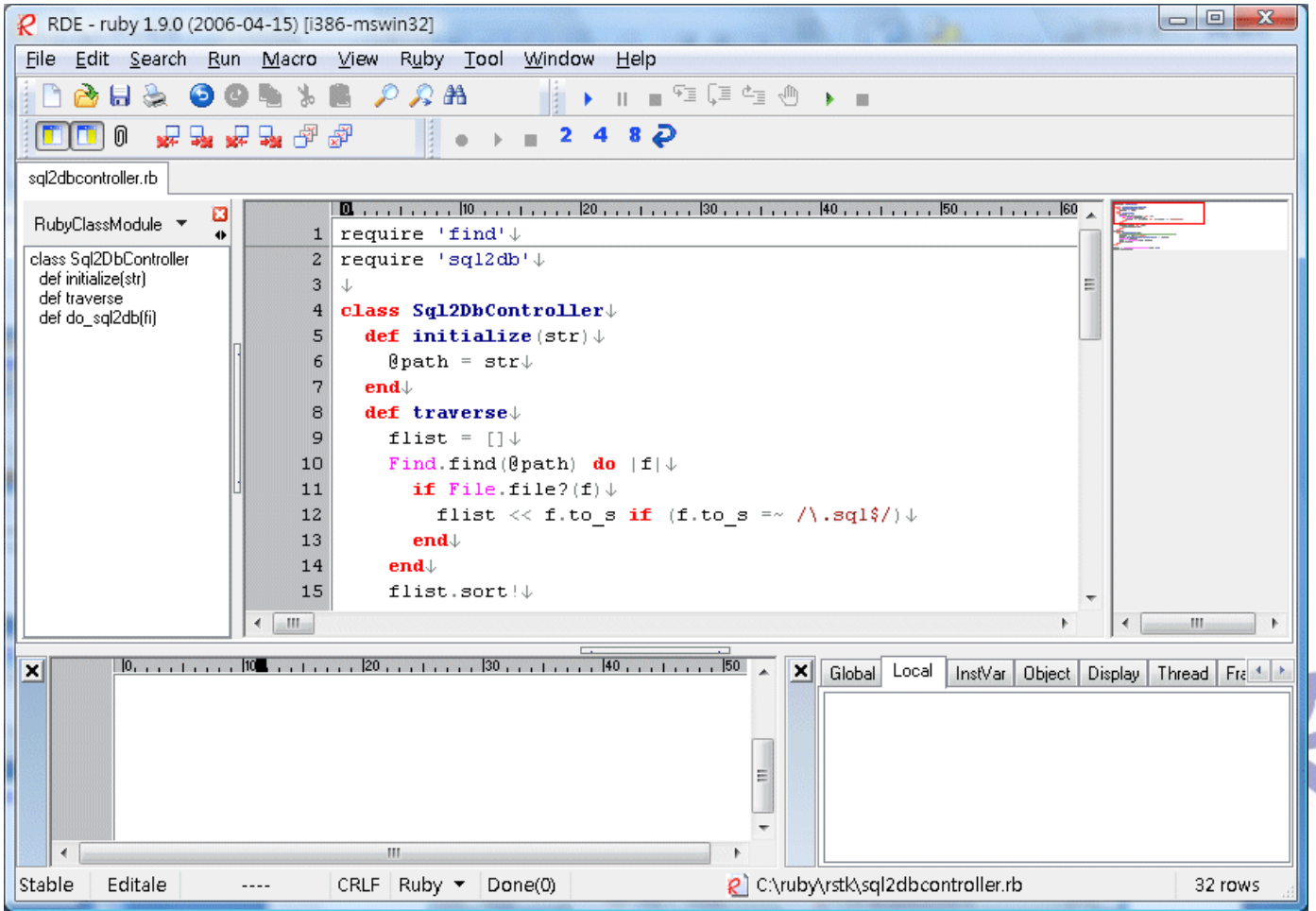
```
% ri GC
------------------------------------------------------------ Class: GC
     The GC module provides an interface to Ruby's mark and sweep
     garbage collection mechanism. Some of the underlying methods are
     also available via the ObjectSpace module.
------------------------------------------------------------------------

Class methods:
     disable, enable, start

Instance methods:
     garbage_collect


% ri enable
---------------------------------------------------------- GC::enable
     GC.enable    => true or false
------------------------------------------------------------------------
     Enables garbage collection, returning true if garbage collection
     was previously disabled.

        GC.disable   #=> false
        GC.enable    #=> true
        GC.enable    #=> false
```

免費的整合開發環境 RDE

- Ruby is a console application
  - This is a weak point for Windows users, because GUI applications are popular on Windows
- You can use Ruby like a GUI applications on RDE
  - RDE = Ruby Development Environment
  - RDE is a better tool to use and study Ruby on Windows
- RDE is an open source project
  - http://sourceforge.net/projects/rubyde/
  - Current version 1.1.1
  - Ruby environment should be installed first

RDE GUI

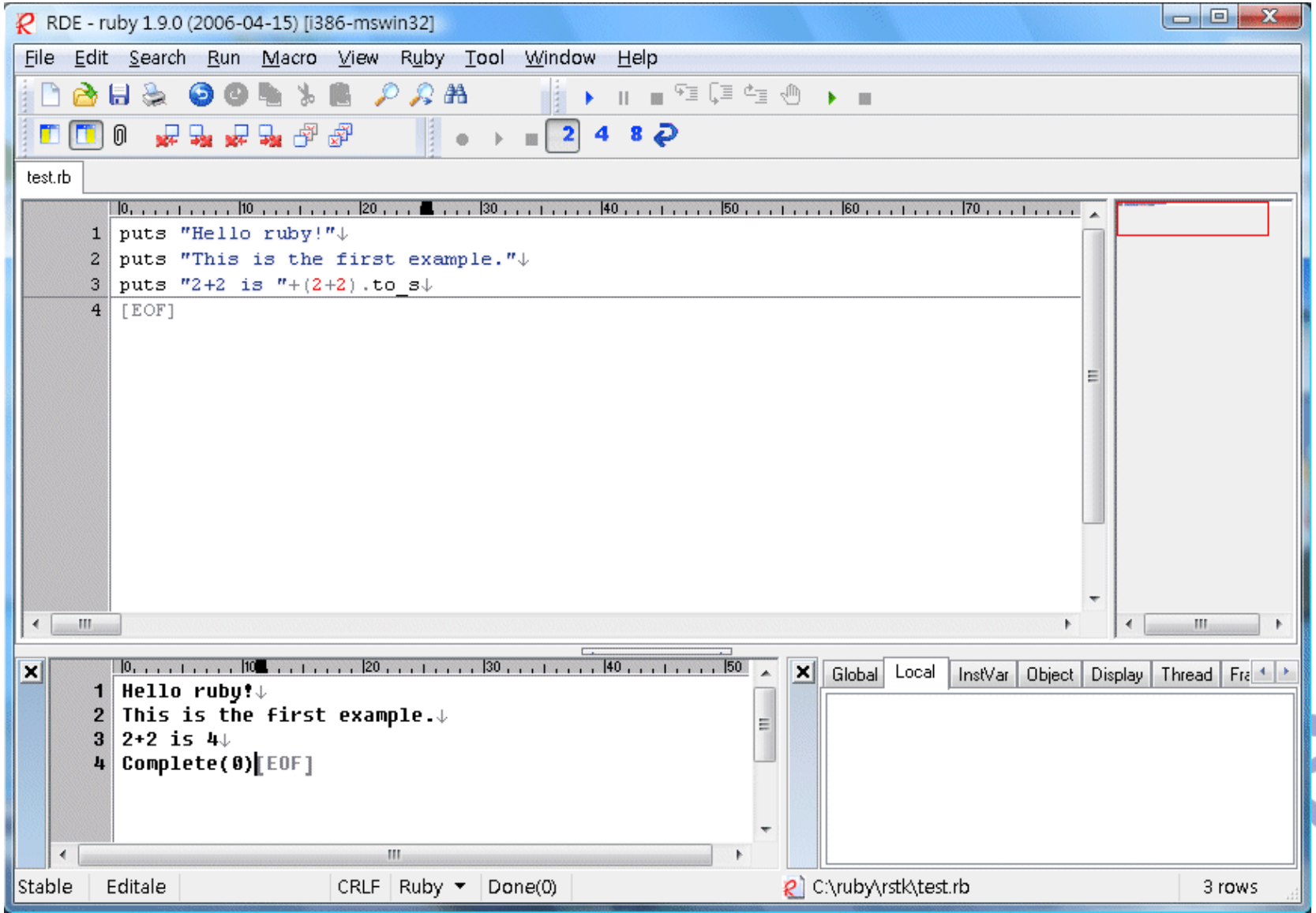
- RDE: Ruby Development Environment
  - Windows-based, made in Delphi



RDE 簡易操作

- Access to the ruby's help file by pressing [F1]
- Do not need to save the script with a filename, just press [F5] for run the script
  - Output is shown in the Console Window
- If the script fail to run, you need to debug it
  - You can move to the place which any errors occured by double click on error messages in the Console Window
  - Modify the source and run again
- If the errors stay on the script, you can debug it by debugger by pressing [F9] and start debug

第一個程式：基本輸出入


RDE - ruby 1.9.0 (2006-04-15) [i386-mswin32]
File Edit Search Run Macro View Ruby Tool Window Help
test.rb
1 puts "Hello ruby!"
2 puts "This is the first example."
3 puts "2+2 is "+(2+2).to_s
4 [EOF]
1 Hello ruby!
2 This is the first example.
3 2+2 is 4
4 Complete(0)[EOF]
Global Local InstVar Object Display Thread
Stable Editale CRLF Ruby Done(0)
C:\ruby\rstk\test.rb
3 rows

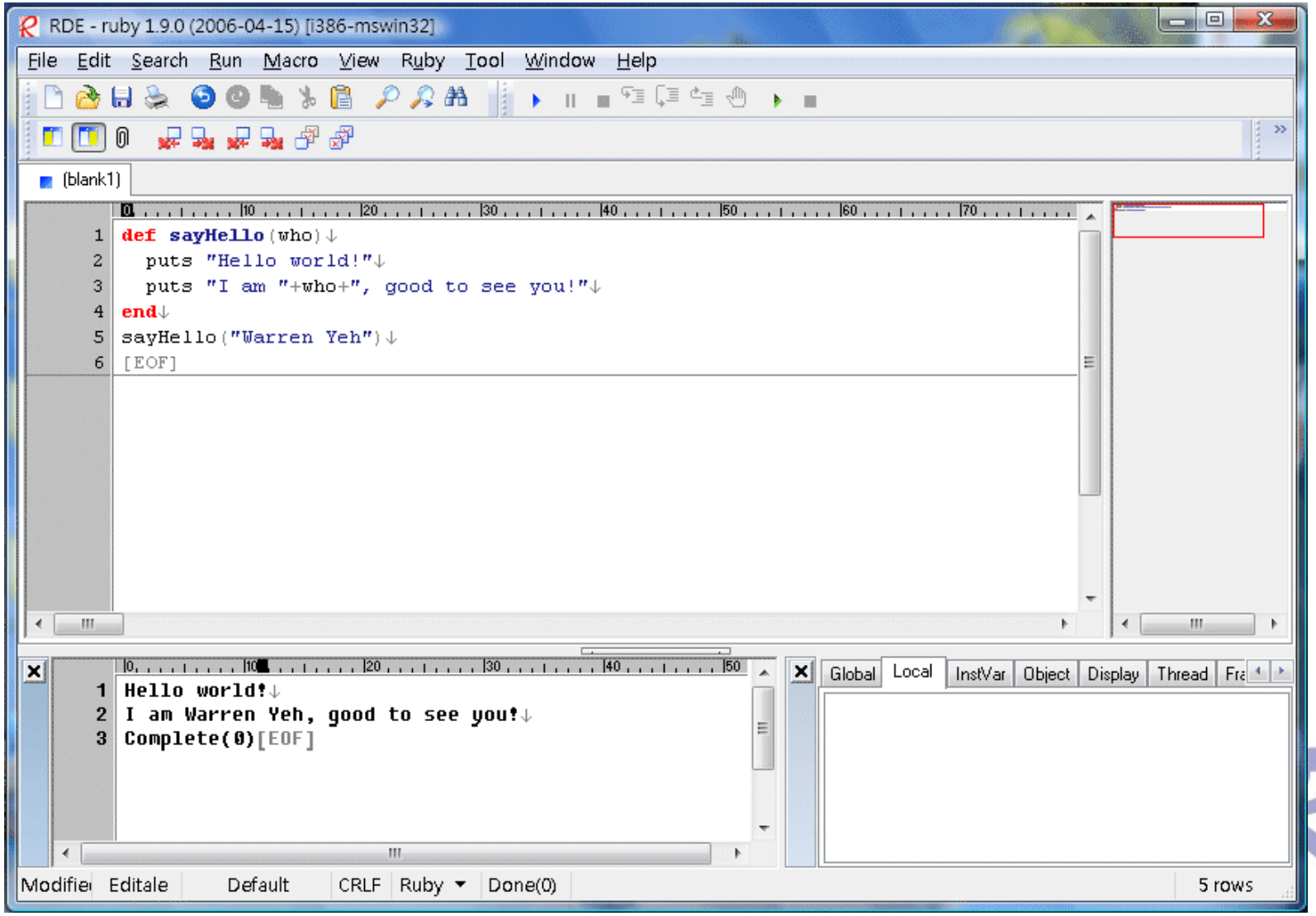
Ruby 程式特徵

- No “main” method
  - The program starts from the first line other than functions of the program file.
- User is able to make function module within program file.
- No compilation, Ruby is a script language

基本輸出：puts

- Ruby use puts to do console output

第二個程式：定義函數


RDE - ruby 1.9.0 (2006-04-15) [i386-mswin32]
File Edit Search Run Macro View Ruby Tool Window Help
(blank1)
1 def sayHello(who)↓
2 puts "Hello world!"↓
3 puts "I am "+who+", good to see you!"↓
4 end↓
5 sayHello("Warren Yeh")↓
6 [EOF]
1 Hello world!↓
2 I am Warren Yeh, good to see you!↓
3 Complete(0)[EOF]
Global Local InstVar Object Display Thread
Modifie Editale Default CRLF Ruby Done(0)
5 rows

函數的定義：def

- Use “def” to declare function
- Argument of the function has no type
  - Ruby has no type declaration

本章回顧