A Brief Introduction to Java

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Outline

1. Computer language
2. An overview of Java
3. Data structure and control flow
4. HTML and Applet basics
5. GUI
1. Computer language

- Machine language / code – what the computer can only understand (0&1)
  - TOO difficult for us
- Source code – can be easily understood by human beings
  - Needs compilation / interpretation
1.1 A common process of compilation

Diagram: A flowchart showing the process of compiling a program. It includes steps such as writing an application in a programming language, compiling it into machine code, creating an EXE file, and running the file on a computer.
1.2 Compilation/Interpretation of Java
2.1 Features of Java

- Simple
- Object oriented
- Distributed
- Multithreaded
- Dynamic
- Architecture neutral
- Portable
- High performance
- Robust
- Secure

Source: http://java.sun.com/docs/books/tutorial/getStarted/intro.definition.html
2.2 JVM

class HelloWorldApp {
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}

Java Program
2.3 JRE & JDK

Sun Microsystems provides two principal software products in the Java Platform, Standard Edition (Java SE) family:

- **Java SE Runtime Environment (JRE)**
  - The JRE provides the libraries, Java virtual machine, and other components necessary for you to run applets and applications written in the Java programming language.

- **Java SE Development Kit (JDK)**
  - The JDK includes the JRE plus command-line development tools such as compilers and debuggers that are necessary or useful for developing applets and applications.
2.4 Configurations
2.4 Configurations (cont'd)

GTK_BASEPATH%\bin;C:\PROGRA~1\CTeX\LOCALT~1\ty\bin;C:\PROGRA~1\CTeX\LOCALT~1\cct\bin;C:\PROGRA~1\CTeX\texmf\miktex\bin;C:\PROGRA~1\CTeX\gs\gs8.51\bin;C:\PROGRA~1\CTeX\WinEdt;%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\Program Files\Java\jdk1.6.0_01\BIN
2.5 Code Editor

- Any text editor is OK (e.g. notepad)
- Eclipse (free)
- Tinn-R
3. Data structure and control flow

- Data type
- Control flow
3.1 Data Type & Creating Variables

Data types:
- byte short int long float double
- char
- boolean
- String StringBuffer Arrays

Creating variables:
- type variable;
- type variable = expression;
3.2 Basic output

- System.out.println();
- System.out.print();
3.3 Basic input

- `System.in.read();`
- Type transferring:
  - `(type) expression;`
  - e.g.
    - `(char) input_data;`
    - `(char) System.in.read()`
- `throws java.io.IOException`
3.4 Arithmetic Operators

- +
- -
- *
- /
- %

Special: ++, --, +=, etc
3.5 Arrays & String

- `int[] number = new int[100];`
  - from `number[0]` to `number[99]`
- `String message = new String();`
  - `message = "Hello, I'm Java string!";`
- `String[] args`
  - `args[0], args[1], ...`
3.6 StringBuffer

- StringBuffer var = new StringBuffer();
- StringBuffer var = new StringBuffer(40);
- StringBuffer var = new StringBuffer("Hi");
- var.append();
- var.insert();
3.7 Control flow

- **Operators**
  - `==; <; >; <=; >=; !=;`
  - `&&; ||;`

- **Conditional execution**
  - `if (test)`
    - `{statement(s);}`
  - `else`
    - `{statements(s);}"
3.7 Control flow (cont'd)

if (test1)
    {statement(s);}
else if (test2)
    {statement(s);}
...
else
    {statement(s);}
3.7 Control flow (cont'd)

- switch(var)
  
  { case value1: statement(s); break;  
  case value2: statement(s); break;  
  ...  
  default: statement(s); break;  
  }

Repetitive execution

- for (var = start_value; end_test; change)
  {statement(s);}
- for (counter = 0; counter<10; counter++)
- while(test)
  {statement(s);}
- do
  {statement(s);}
  while(test);
3.8 Method & Function

- public static void somefun(par, ...)  
- public static int somefun(par, ...)  
  - return sth;
4. HTML and Applet basics

- Hyper Text Mark-up Language
  - `<tag></tag>`
    - `<html></html>`
    - `<body></body>`
    - `<table></table>`
    - ...

- Applet
4.1 Basic methods

- init()
- start()
- stop()
- paint()

```java
public void paint(Graphics g) {
}
```
4.2 Show texts

- `g.drawString(sometext, top, left)`
- Font
- Color
- Mouse Control
  - `public boolean mouseDown(Event e, int x, int y)`
  - `public boolean mouseDrag(Event e, int x, int y)`
4.3 Applet Parameters

```html
<html>
<body>
    <applet code=StartStop.class
            width="500" height="300">
        <param name="***" value="***">
        <param name="***" value="***">
    </applet>
</body>
</html>
```
5. GUI

- Button, Canvas, Checkbox, CheckboxGroup, Choice, Label, List, TextField, TextArea, Layout, Panel, ...
- drawLine(), drawRect, fillRect(), drawOval(), fillOval(), drawPolygon(), fillPolygon(), drawPolyline(), fillArc(), drawArc(), ...
Thanks!