

# Integrated Development Environments

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## Contents

**1 The Components of an IDE**

**3**

<b>2 IDE Examples</b>	<b>6</b>
<b>3 Eclipse</b>	<b>13</b>



### IDEs

*Integrated Develop Environments* (IDEs) are software packages that attempt to provide comprehensive support for programming

- and possible other software development activities

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## 1 The Components of an IDE

### The Components of an IDE (minimal)

What's the minimum that we expect in an IDE?

- editor



- build
  - maybe no more than compiler invocation
  - with error messages captured/interpreted/walked by editor
- run/execute
- debugger

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### **The Components of an IDE (optional)**

What would we like to see in an IDE?

- syntax highlighting & aid in editor



- documentation (API) look-up
- flexible/configurable build
- packaging/deployment options

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### **The Components of an IDE (deluxe)**

What makes us giddy in an IDE?

- smart feedback in the editor
  - learns API of new code
  - suggestions



- coding aids in editor
  - templates
  - common refactoring (transformations)
- documentation generation
- test integration
- integration with version ctrl

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## 2 IDE Examples

**emacs**

CS795

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The \*nix swiss army knife of editors, *emacs* has long functioned as a basic IDE:

- syntax-highlighting editor
- build support (invokes \*nix **make**)
  - parses error messages from compilers & other tools
- debugger interface
- works directly with many version control systems

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References, if you are unfamiliar with this:

- Compiling in emacs
- emacs Debugging mode (CS252)



### emacs Strengths and Weaknesses

- highly portable
- supports virtually any language you would have a compiler for
- even in windowed mode, leans toward keyboard rather than mouse
  - (not sure if that's a pro or a con)
- outdated interface
- high learning curve

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### Microsoft Visual

#### Visual Studio

- syntax-highlighting editor
    - background compilation provides quick feedback on simple errors
  - built-in build manager
    - limited configurability
  - debugger interface
  - some designer tools (e.g., design classes in UML)
- .....



### Visual Strengths and Weaknesses

- wide variety of languages (but Microsoft processors)
- single-OS
- closely integrated with Microsoft compilers
- modern, mouse-oriented interface
  - What will Windows 8 do to that?

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I've never been fond of Visual, but that comes more from my opinion of the MS compilers. MS C++ had recurring issues with basic standards conformance and std library implementation. And MS's support of Java was perpetually luke-warm.



### NetBeans

Free IDE originally distributed by Sun as “the” development platform for Java.

- Still largely Java centric, though some support for other languages
    - particularly web-related languages like Javascript, CSS, XSL
  - Portable (written in Java)
  - Tends to track the trends and hot topics in the Java world promptly
  - editor, build manager, debugger
  - moderately extensible
- .....



Netbeans and Visual clearly stole interface ideas from one another.

(Then Eclipse came along and stole from them both.)

I have not used NetBeans in a long time. I remember it as being incredibly sluggish even on reasonably high-powered desktops.

My enduring impression is that Eclipse seemed to do everything NetBeans wanted to do, did it about 6 months later, but did it better.

### Single-Language IDEs

The open source community has produced numerous single-language IDEs.

Many are focused on educational use.

Examples:

**C++** Bloodshed Dev-C++, Code::Blocks

**Java** BlueJ, Dr. Java, jGrasp



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### 3 Eclipse

#### Eclipse

Probably the hottest IDE in the open source world:

- syntax-highlighting editor, multi-language support
  - strong hinting, API, interface aid
  - templates and refactoring
- build support
  - easily configured or switched to other build tools



- background compilation for quick detection of language errors
- integrated \*unit testing support
- solid debugger, intuitive handling of threads
- some packaging & deployment support
- integrates with most version control systems
- modular plug-in extensibility with a rich variety available

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Eclipse is available here.

