# Integrated Development Environments

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

- and possible other software development activities

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

The Components of an IDE (optional)
What would we like to see in an IDE?

- syntax highlighting & aid in editor
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- documentation (API) look-up
- flexible/configurable build
- packaging/deployment options

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
2  IDE Examples

emacs
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

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)
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• outdated interface
• high learning curve

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?

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
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- some packaging & deployment support
- integrates with most version control systems
- modular plug-in extensibility with a rich variety available

Eclipse is available here.