Integrated Development Environments

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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

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- outdated interface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)

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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

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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.