REUSABLE SOFTWARE COMPONENTS

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This column consists of our yearly listing, since 1990, of sources for reusable software components. As always, no recommendation or guarantee by this column is implied.

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Ada Basis WWW Server

Ada Basis WWW Server is an archive of about 560Mbyte of public domain source code and documents mainly obtained from the Public Ada Library. The software has been classified into different application domains and presented in a hierarchical manner.

AdaBasis is an acronym for the German phrase "Bibliothek anwendungsbezogener Ada Software-Komponenten in Stuttgart" and is a repository of (mostly) free Ada Software, presented in a way that is (hopefully) easy to use and allows flexible access and effective searching.

The application domains include:

Artificial Intelligence	Compilers
Database Management	Documents
Text-Processing	Interfaces/Bindings
Mathematical Functions and Data Structures	Networking and Distributed Processing
Software Development Tools	

This repository has not been updated in several years, but is still a good source to obtain a large volume of working Ada code for testing Ada related tools.

CONTACT: adabasis@informatik.uni-stuttgart.de
http://www.informatik.uni-stuttgart.de/ifi/ps/ada-software/ada-software.html

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The Ada-Belgium Archive

One of the aims of the Ada-Belgium organization is to disseminate Ada-related information. So, in addition to the organization of seminars, workshops, etc., and the management of two mailing lists, it also has set up an Ada archive primarily for people and companies in Belgium. This enables everyone interested to consult and download a large variety of Ada software and documents using an ftp server in Belgium or elsewhere.

Key items:
* A disk copy of the latest version of the Ada and Software Engineering Library (ASE2, a 2 disk CD-ROM set): ftp://ftp.cs.kuleuven.ac.be/pub/Ada-Belgium/cdrom/index.html
* A directory with Free Ada Software provided by Belgian Ada users.
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/software/

The Ada-Belgium archive is primarily intended for the Belgian Ada community, but anyone interested is welcome to use it.
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/archive.html
ftp://ftp.cs.kuleuven.ac.be/pub/Ada-Belgium

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ACES

The Ada Compiler Evaluation System (ACES) Version 2.1 is a collection of performance tests, test management tools, analysis tools, and assessment procedures that permit users to collect and analyze data on performance and usability characteristics of Ada implementations.

Originally funded by the AJPO, the ACES is a merger of the Ada Compiler Evaluation Capability (ACEC) and the Ada Evaluation System (AES). Version 2.1 of the ACES includes over 100 tests for language features introduced by Ada95. Other improvements include the provision of default processing choices, selection of tests by performance issue, a set of default analysis reports, and a facility for the easy inclusion of user-defined benchmarks in the ACES test selection and analysis processes.

ACES information is available on the Internet at:
http://www.adaic.org/compilers/aces/aces-intro.html
This document contains overview information as well as instructions for obtaining the ACES files.

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AdaCore

AdaCore is the development force behind the GNAT technology providing GNAT Pro for commercial software development and GNAT GPL for academic and Free Software developers. The GNAT technology is the first to support all three ISO standards of the Ada programming language - Ada 83, Ada 95, and Ada 2005. GNAT Pro also comes with product support (provided by the developers of the toolset) and expert Ada consulting.

The GNAT technology includes:

GNAT Programming Studio IDE
Full Ada Compiler (Ada 83/Ada 95/Ada 2005) Utilities for Analysis, Testing and Code Navigation
Visual Debugger Libraries and Bindings Runtime Profiles

Add-on technologies:

GNATbench - Plug-In for Eclipse (GNAT Pro) GNATstack - Stack Analysis Tool (GNAT Pro) Ada Web Services - Web-Based Technologies GtkAda - Intuitive GUI Builder and Extensive Widget Set XML/Ada - XML library GLADE - Ada 95 Distributed Systems Annex Implementation PolyORB - Middleware ASIS-for-GNAT - Ada Semantic Analysis

For more information on GNAT Pro please visit http://www.adacore.com/ home/gnatpro or contact sales@adacore.com.

The GNAT Academic Program (GAP) was created to help bring Ada to the forefront of university study. It includes a comprehensive toolset and support package designed to give educators the tools they need to teach Ada. For more information, please visit http://www.adacore.com/ home/academia or contact gap-contact@adacore.com.

Free Software developers and students can download GNAT GPL from libre.adacore.com.

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Ada in Action

Ada in Action (with Practical Programming Examples) by Do-While Jones is now on the Internet. Thanks to the work of Chris Morgan, and the generosity of Dirk Craeynest and Ada-Belgium, Ada in Action, a classic textbook for using Ada, is on the web at
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/aia/contents.html

Ada in Action demonstrates the skills and techniques that make programmers more productive, progressing from simple to more complex examples.

Ada in Action includes:

- Utilities that express floating-point values in fixed-or floating-point notation, and convert free-form character input to floating-point values.
- Three portable user interfaces that give the application program complete cursor control, permit line editing and default responses, and support "help" messages.
- Three file utility programs (MORE, WRITE, and LINE) that demonstrate file I/O and user interface techniques.

CONTACT: Do-While Jones
do_while@ridgecrest.ca.us

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Ada Home

The Home of the Brave Ada Programmers (HBAP) supplies information and links to Ada resources.

The mission of the Ada Home Web site is to support Ada programming by providing systematic help to
* be productive with Ada (Resources),
* learn and teach Ada (Discovery),
* make and prove the case for Ada (Ammunition),
* tap into the Internet (Network)

SEE: http://www.adahome.com/
http://www.adahome.com/Resources/Tools/Non-Commercial.html

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Ada IC

The Ada Information Clearinghouse has been providing free information about Ada and software engineering for over fifteen years. Sponsored by the Ada Resource Assoc. (http://www.adaresource.com) a consortium of Ada tool vendors and developers, the AdaIC maintains close contact with the Ada community in order to obtain the latest information on a variety of topics. Visit their website, http://www.adaic.org, to see the latest in news, implementation guidelines, compilers and tools, reusable Ada code, education and training, Ada successes, and lessons learned by software developers.

The Ada-wide search engine indexes all known Ada content (more than 38,000 pages at last count). General search engines, such as Google, have too many references to the term “Ada” to make them practical for the purposes of the Ada community.

Please send any news you have on Ada to the Editorial Webmaster <webmaster@adaic.org>. The Ada News of the AdaIC sometimes transmits press releases about the programming language to about 500 technical journalists and editors, as well as citing it on the AdaIC Website, as a free service to its users.

A comprehensive collection of Ada articles, reports, textbooks, videos, and CD-ROMS is available for browsing on-line through the AdaIC website. Users may access older components at the Virtual Library (http://archive.adaic.com).

AJPO

The Ada Joint Project Office was closed on October 1998. For information on the AJPO see
http://sw-eng.falls-church.va.us/ajpofaq.html
http://sw-eng.falls-church.va.us/ajpo_databases/products_tools1.html

To obtain components previously available through PAL see
http://www.iste.uni-stuttgart.de/ps/AdaBasis/pal_1195/ada/ajpo/

Other PAL material can be found at
http://www.iste.uni-stuttgart.de/ps/AdaBasis/pal_1195/ada/
(see AdaBasis)

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Adalog

Adalog offers Ada utilities, Ada components, and Adapplets. These can be freely used and modified for any purpose, under the GMGPL license. Functions include Protection, Debugging, and OS_Services, among others.

The site also contains Adasubst/Adadep programs which are useful utilities for rearranging Ada programs, and AdaControl, a powerful utility for checking and enforcing style and coding rules.

These programs are built on top of ASIS and include valuable packages providing higher level queries for ASIS (package Thick_Queries). For example, look for the function called "Full_Name_Image," which returns the unique name of any Identifier.

SEE: http://www.adalog.fr
http://www.adalog.fr/compo2.htm
http://www.adalog.fr/compo1.htm (in French)

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AdaPower

AdaPower.com is a repository of information, links to resources, source code examples and packages for reuse. AdaPower.com can be divided into the following sections:

Articles and Links
Articles and Links to Ada Related Topics, Ada learning materials, and people in the Ada on-line community

The Ada Source Code Treasury
Source code examples of using Ada and Ada related bindings and tools for both beginner and advanced students of Ada

Packages for Reuse
An extensive repository of categorically arranged packages for download and links to packages available for reuse on the internet

Ada Projects and AdaPower.net
Listings and hosting for Active Ada projects on the net

AdaPower.com is database oriented, allowing for searches of the entire contents.

Please contact Ada Power with articles, links or package submissions, or for information on hosting your project on AdaPower.net see:
http://www.adapower.com/
http://www.adapower.com/index.php?Command=Class&ClassID=AdaLibs&Title=Ada+Libraries

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Ada Structured Library

Ada structured Library is a set of general containers, utilities, mathematical libraries, and other utilities. These containers are licensed under the same license as GNAT (see GNU, below), with some modifications to allow inclusion into a program without bringing the whole program under the GPL.

The library is stored at sourceforce.com, which hosts other open source components listed on these pages.
http://adasl.sourceforge.net/

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Booch Components

The Ada 95 Booch Components began in late 1994 when David Weller began a port of Grady Booch's C++ components to Ada95. They have since been taken over by Simon Wright and, at this time, include implementations of:

Bags		: UBDN
Collections		: UBDN
	(ordered)	: UBDN
Dequeues		: UBDN
Graphs	Directed	: U
	Undirected	: U
Lists	Single	: U
	Double	: U
Maps		: UBDN
Queues		: UBDN
	(ordered)	: UBDN
Rings		: UBDN
Sets		: UBDN
Stacks		: UBDN
Trees	AVL	: U
	Binary	: U
	Multiway	: U

U=Unbounded, B=Bounded, D=Dynamic, and N= Unmanaged refer to the storage allocation mechanisms available for the component. U and D use user-supplied storage pools, B doesn't use dynamic allocation at all, and N uses the default pool. Filtering and sorting operations are supported.

See: http://booch95.sourceforge.net/
CONTACT: Simon Wright simon@pushface.org

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Charles

Charles is a container library for Ada95, modeled closely on the C++ STL. Sequence containers (vectors, deques, and lists) store unordered elements, inserted at specified positions. Associative containers (sets and maps) order elements according to a key associated with each element; both sorted (tree-based) and hashed containers are provided. A separate iterator type associated with each container is used to visit container items and to effect direct modification of elements. Charles is flexible and efficient, and its design has been guided by the philosophy that a library should stay out of the programmer's way.

See: http://charles.tigris.org
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COSMIC

Open Channel Software entered into an agreement with the National Technology Transfer Center (NTTC) to publish the COSMIC software collection. This collection represents software created by NASA in a wide range of disciplines including engineering, chemistry, aerodynamics, and other areas. In years past, we featured COSMIC software when it was supported by the University of Georgia Research Foundation. Many of the COSMIC programs are available for "adoption." When you adopt an orphaned application at Open Channel, you agree to moderate user contributions to the application. You also take over the maintenance of the site for the application through a Content Management system.
http://www.openchannelfoundation.org/cosmic/

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DACS

The Data & Analysis Center for Software (DACS) is a Department of Defense (DoD) Information Analysis Center (IAC). The DACS is the DoD Software Information Clearinghouse serving as an authoritative source for state of the art software information and provides technical support to the DoD software community. Many of the links are outdated.

DACS: http://www.dacs.dtic.mil/
reuse: http://www.dacs.dtic.mil/databases/url/key.hts?keycode=15
Ada: http://www.dacs.dtic.mil/databases/url/key.hts?keycode=238:249&islowerlevel=1

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DATA FUSION LABORATORY

The Data Fusion Laboratory at Drexel University has made a release of its Ada 95 Matrix Math package available to the Ada95 community. This package targets vector and matrix math operations implemented natively in Ada95. Many operations, such as determinants, subvectors/matrices, singular value decompositions, inverses, eigenvalues/eigenvectors are supported.

Please refer to the Data Fusion Lab's web page at: http://dfl.ece.drexel.edu/

The matrix package is under Research, entitled "Ada95 Matrix Package."
http://dflwww.ece.drexel.edu/research/ada/

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DMOZ

DMOZ is a free, open directory project, with Ada components submitted and maintained by volunteers. Several of the items that are listed elsewhere in this column are included, as well as others.

Not all of the links are current.

http://dmoz.org/
http://dmoz.org/Computers/Programming/Languages/Ada/Bindings_and_Libraries/

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GNAVI.org

The GNU Ada Visual Interface - The Open Source answer to Delphi and Visual Basic

GNAVI is a project to construct an Open Source Rapid Application Development Environment similar to Delphi using Ada. Currently the following are available:

- GNATCOM - Ada bindings to COM/DCOM/ActiveX for Win32 (stable) GWindows Win32 - Windows binding and framework (stable) GWindows OSX - in early Alpha, OS X binding and framework (pre-alpha)
- GWindows GTK for Unix and Linux and GNAVI IDE - the GUI Application builder and RAD Environment are being developed.

For more information see http://www.gnavi.org and join the gnavi-list@gnavi.org
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GNADE

The Gnat Ada Database Environment (GNADE) open source project contains tools and packages for an Ada95 development environment integrating with relational databases and Ada95 database products.

GNADE contains packages for thin bindings to different RDBMS products like Oracle, PostgreSQL, MySQL using ODBC, Embedded SQL, native bindings to other RDBMS approaches such as sqlite, and object persistency.

See: http://gnade.sourceforge.net/#objective
http://gnade.sourceforge.net
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GNU

The Free Software Foundation is dedicated to eliminating restrictions on people's right to use, copy, modify, and redistribute computer programs. It promotes the development and use of free software and its documentation in all areas using computers. Specifically, it is maintaining a complete, integrated software system named "GNU". ("GNU" is pronounced "guh-new" and stands for "GNU's Not Unix".)

The word "free" in "Free Software Foundation" refers to freedom, not price. You may or may not pay money to get GNU software, but regardless you have two specific freedoms once you get it: first, the freedom to copy a program and give it away to your friends and co-workers; and second, the freedom to change a program as you wish, by having full access to source code. You can study the source and learn how such programs are written. You may then be able to port it, improve it, and share your changes with others. If you redistribute GNU software you may charge a distribution fee or give it away.
For the Free Software Definition, see: http://www.gnu.org/philosophy/free-sw.html

What is Copyleft?

The simplest way to make a program free is to put it in the public domain, uncopyrighted. But this permits proprietary modifications, denying others the freedom to use and freely redistribute improvements; it is contrary to the intent of increasing the total amount of free software. To prevent this, copyleft uses copyrights in a novel manner. Typically copyrights take away freedoms; copyleft preserves them. It is a legal instrument that requires those who pass on programs to include the rights to use, modify, and redistribute the code; the code and rights become legally inseparable.

The copyleft used by the GNU Project is made from the combination of a regular copyright notice and the "GNU General Public License." (http://www.gnu.org/copyleft/gpl.html) GPL is a

copying license which basically says that you have the aforementioned freedoms. An alternate form, the "GNU Lesser General Public License" applies particularly to certain GNU libraries. This license permits linking the libraries into proprietary executables under certain conditions. The appropriate license is included in all GNU source code distributions and many manuals.
See http://www.gnu.org/copyleft/copyleft.html
http://www.gnu.org/licenses/licenses.html

There are several GNU-associated Ada projects, located at https://libre2.adacore.com/ including

- The Ada for GNU/Linux Team (ALT)
- The Ada for SCO page.
- The Ada for NetBSDpage.

The GNAT Technology includes the implementation of the ASIS standard (Ada Semantic Interface Specification), GtkAda to build portable and efficient GUIs in Ada, AWS (Ada Web Server) the framework to develop Web-based applications in Ada, the XML/Ada library to process XML streams in Ada, GLADE to develop distributed applications following the Ada Distributed Systems Annex standards, and PolyORB to develop distributed applications following the CORBA standard.
http://www.gnat.com/home/

Free Software Foundation, Inc. +1 617 542 5942 x 23
59 Temple Place, Suite 330 +1 617 542 2652 (fax)
Boston, MA 02111-1307 USA email: info@fsf.org
See: http://member.fsf.org http://www.gnu.org
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Kazakov Objects

Dmitry Kazakov maintains a web site with the following free Ada components:
1. Objects and handles (smart pointers)
   1.1. Objects
   1.2. Handles to objects
   1.3. An example of use
   1.4. Bounded arrays of objects
   1.5. Unbounded arrays of objects
   1.6. Sets of objects
   1.7. Universal sets of objects
   1.8. Persistent objects
   1.9. Handles to persistent objects
   1.10. Persistent storage implementation example
   1.11. Abstract persistent storage
   1.12. Handles to persistent storage
   1.13. Persistent storage factory
   1.14. Persistent storage implementations
   1.15. Implementation of a new persistent storage
2. Sets and maps
   2.1. Sets
   2.2. Maps
3. Unbounded arrays
4. Unbounded arrays of pointers
5. Stacks
   5.1. Stacks based on abstract arrays
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5.2. Segmented stacks
6. Pools
6.1. Stack pool
6.2. Mark and release pool for controlled objects
7. Doubly-linked networks
7.1. Doubly-linked lists of networks (specialization)
7.2. Doubly-linked lists
8. Parsers
8.1. Example first, a small calculator
8.2. Basic considerations
8.3. The base package
8.4. Sources
8.5. Tokens
8.6. Lexers
8.7. Operations
8.8. Arguments
8.9. Parsing tree example. Ada 95 expression parser
9. Packages
9.1. Source packages
9.2. Tests and examples
10. Changes log
The license is GM GPL, where appropriate.

See: http://www.dmitry-kazakov.de/ada/components.htm
mailbox@dmitry-kazakov.de
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Leake Components

Stephen Leake maintains the following Ada components:
com ports: An Ada binding, based on Win32Ada, to the Win32 com port facilities.
Stephe's Ada Library: another entry in the Standard Ada Library sweepstakes
Auto_Text_IO: automatically generates Text_IO packages for Ada packages

http://stephe-leake.org/
stephen_leake@acm.org

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PragmAda Reusable Components

PragmAda Software Engineering provides the PragmAda Reusable Components, a library of over 60 of the world's finest quality components as free, open-source software available under the GNAT-modified GPL. The PragmARCs are Ada 95; some of the components will not compile with an Ada-07 compiler. The components are available at

http://pragmada.home.mchsi.com/pragmarc.htm

PragmAda Software Engineering will provide support for the library at very low prices.

CONTACT: 911 South Cedar Drive
Apache Junction, AZ 85220-8440
(480) 983-5634
http://pragmada.home.mchsi.com/pragmarc.htm

The PragmAda home page is at
http://pragmada.home.mchsi.com
with links to both the PragmARCs and the Mine Detector game. The e-mail address is pragmada@mchsi.com

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SIGAda

Be sure to check the web pages of SIGAda at
http://www.acm.org/sigs/sigada/

In particular, see SIGAda's links to software repositories and resources.
http://www.acm.org/sigs/sigada/resources/links.html

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Swiss Federal Institute of Technology

The Software Engineering Laboratory (LGL) at the Swiss Federal Institute of Technology at Lausanne (EPFL) maintains pointers to Ada Resources: These include:

- The Ada 95 Reference Manual
- LGL Ada Component Library
- GLADE Filter Add-Ons
- Ada 95 Pretty Printer based on ASIS
- GNAT User's Guide

See: http://lgl.epfl.ch/ada/index.html
http://lgl.epfl.ch/index.html

Also see Ada In Switzerland, http://www.ada-switzerland.org/, the web site of the interest group of the Swiss Informatics Society (SI)
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USAFA

The US Air Force Academy maintains an Ada software repository. USAFA mostly distributes Ada tools (such as A#, AdaGIDE and RAPID). More information on RAPID is in Ada Letters (proceedings of SIGAda '99). The GUI libraries are an example of reusable code. In addition, the USAFA repository includes the following software:

Parallel : A binding to use the parallel port under Windows 95/98.
Serial : A binding to use the serial port under Windows 95/98/NT.
Mcc-Sounds : A binding to play .WAV files under Windows 95/98/NT.
An elementary graphical replacement for Ada.Text_IO.
AdaGOOP: An automatic object-oriented parser generator
Adagraph : a modified version of Jerry van Dijk's Adagraph
Fortran to Ada Translator donated by Oliver Kellogg (DaimlerChrysler Aerospace, Ulm Germany), implemented as a perl script

AdaGide, a leading open-source IDE for Ada under Windows, now includes A#, an Ada compiler for the Microsoft .NET platform. A# also has been integrated into Visual Studio 2005.

See:
http://adagide.martincarlisle.com
http://www.martincarlisle.com/ada_stuff.html
http://asharp.martincarlisle.com
http://rapid.martincarlisle.com

CONTACT: Martin C. Carlisle,
Professor of Computer Science
US Air Force Academy
carlislem@acm.org

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Mats Weber's Component Library

The components in this library fall into four main categories. The most useful may be the data structures, which were written to be as versatile as possible.

- Data Structures (Bags, Tables, Queues, Stacks, Lists, etc.)
- Math (ZpZ_Field, Polynomials, Permutations, Linear_Programming, etc.)
- Ada Programming Tools (Makeup_Ada_File, Ada_Lexical_Analyzer, etc.)
- OS Interface (CPU, VMS_File_Names, etc.)

These components are for Ada 95 and generally will not compile with Ada 83, but if you need to use them in an Ada 83 environment, almost all you will have to do is remove the (<>) in generic formal types where appropriate.

CONTACT:
http://mats.weber.org/ada/mw_components.html
mats@weber.org