REUSABLE SOFTWARE COMPONENTS

Trudy Levine
Fairleigh Dickinson University
Teaneck, NJ 07666
levine@fdu.edu
http://alpha.fdu.edu/~levine/reuse_course/columns

This column consists of our yearly listing of reuse sources. As always, no recommendation or guarantee by this column is implied.

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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.

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

Contact: Phil Brashear
EDS Conformance Testing Center
4646 Needmore Road, Bin 46
P.O. Box 24593
Dayton, OH 45424-0593
phil.brashear@eds.com
937 235 7712

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Act Europe

Act Europe supports Libre (free) Software. (See GNU and GNAT below.) Its tools support Ada95 and C, with most of these tools written in Ada95. Its components include:

Ada mode for Emacs
Ada web Server
AUnit (unit testing)
GNAT (Ada 95 compiler)
GNOME/Ada
GNU Visual Debugger
GtkAda (GUI development)
PolyORB
XML/Ada

Contact: http://libre.act-europe.fr/

Ada Basis WWW Server

Ada Basis WWW Server is a repository of about 560Mbyte of public domain source code and documents mainly taken from the Public Ada Library, although still expanding. The software has been classified and is presented in a hierarchical manner separated in different application domains, with a multi-faceted searching facility in some domains.

AdaBasis - an acronym for the german phrase "Bibliothek anwendungsbezogener Ada Software-Komponenten in Stuttgart" - 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 archive is organized into different domains, including:

Artificial Intelligence	Compilers
Database Management	Documents
Text-Processing	Interfaces/Bindings
Mathematical Functions and Data Structures	Networking and Distributed Processing
Software Development 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 for people and companies in Belgium. This enables everyone interested in downloading a large variety of Ada software and documents using an ftp server in Belgium or elsewhere.

See: http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/archive.html
And Free Ada Software Provided by Belgian Ada Users
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/software/

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.

Please send any news you have on Ada to "Editorial Webmaster <webmaster@adaic.org>." The Ada News of the AdaIC sometimes transmits press releases about the programming languageto 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 the Virtual Library via the AdaIC website and access some full-text documents and reports. The Virtual Library again can be accessed from the AdaIC Home Page:

CONTACT: http://www.adaic.org

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AdaGMP

AdaGMP is the first binding to the GNU multiprecision library (GMP) written for the GNAT Ada compiler, by Gisle Sælensminde. All the packages are related to "big" numbers that avoid the overflows encountered with hardware number implementations.

See: http://www.ii.uib.no/~gisle/adagmp/
http://www.chez.com/bignumber

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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 is now on the web at
http://www.cs.kuleuven.ac.be/~dirk/ada-belgium/aia/contents.html

The first edition of Ada in Action was published by John Wiley & Sons, Inc. in 1989. Initial sales were not sufficient to retain John Wiley's interest in it, and it went out of print after only 1500 copies were sold. It then became a cult classic, with a very small :-(but very loyal :-) following. There is said to be an unauthorized Chinese translation, and there have been reports that the asking price in Germany is double the cover price. If you have a copy of the first edition, take good care of it.

The only new material in the second edition is contained in the dedication, copyright notice, the Epilog (Chapter 7). The new copyright notice is much less restrictive than the previous one. The Epilog contains reflections on the first edition.

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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Adalog

Adalog offers Ada utilities, Ada components, and Adapplets. These can be freely used and modified for any purpose, provided you include the header comment. Functions include Protection, Debugging, and OS Services, among others. The site also contains Adasubst/Adadep programs, which include valuable packages providing higher level queries for ASIS. Look for the function called "Full_Name_Image," which returns the unique name of any Identifier.

CONTACT:
http://www.adalog.fr
http://www.adalog.fr/compo2.htm

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AdaPower

AdaPower is a repository of information, links to resources, and source code. Ada source code includes interfaces to popular Operating Systems, outputting packages, menus, and much more. Search for Software Reuse, and then Ada Source Code Packages for Reuse, or go directly to the reuse subdirectory. The Ada Source Code Treasury has been absorbed in the new site, www.AdaPower.com.

AdaPower's key projects include:

http://www.adapower.com
    AdaPower.com itself - a web resource for Ada 95
http://www.adapower.com/gnatcom
    GNATCOM - The Ada 95 COM/DCOM/ActiveX Framework and Tools
http://www.adapower.com/gwindows
    GWindows - The Open Source Ada 95 Windows GUI Framework with support for ActiveX and Database bound controls

If you would like to host your projects on www.AdaPower.com, have ideas for new features, or any other suggestion, please e-mail David@Botton.com

See: http://www.adapower.com/
http://www.adapower.com/reuse

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ASE2

The ASE2 Library is an organization of software and other resources (freeware and shareware) on topics related to both Ada and Software Engineering, and there are several special-interest sections, such as sections on Microsoft Technologies, best practices, the Software Engineering Institute Capability Maturity Models, and website links. It is a resource for the practicing software engineer (regardless of implementation language) and the practicing Ada developer:

For the Practicing Software Engineer:

The "Software Engineer's Bookshelf"
Best practices in Software Engineering
Index of useful web sites (with 17,000+ hyperlinks to them)
Systems Engineering Capability Maturity Model (SEI)
Systems Engineering Capability Model (EIA/IS 731)
Systems Security Engineering Capability Maturity Model
Software Capability Maturity Model
Software Acquisition Capability Maturity Model
People Capability Maturity Model
Jim Gray's Turing Lecture - A Dozen Information Technology Research Goals
Documents and tutorials on topics in Software Engineering, including Domain Engineering, Reuse Object-Oriented Analysis and Design, Object-Oriented Programming, Software Development Methodologies (Waterfall, Spiral, Rapid Application Development), Formal Methods, Cleanroom Complexity Analysis, Metrics, Capability Maturity, Six Sigma, Personal Software Process,
Team Software Process (including, new courseware on systems engineering, life cycles, requirements engineering, configuration management, risk management, reviews, and several other topics)
General-purpose tools (such as GRASP - Graphical Representation of Algorithms, Structures, and Processes - for Ada, C, C++, Java, and VHDL from Auburn University with funding from ARPA, NASA and NSF)
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For the Practicing Ada Developer:

The "Ada User's Bookshelf" - 100M+ bytes of hypertext documents, tutorials, and references on Ada, reuse, real-time software intensive systems and software engineering

Freeware Ada95 compilers and development environments for a variety of platforms, including Windows 95/98/NT and UNIX (such as GNAT Ada95 and C environment from Ada Core Technologies)

Freeware Software components and tools - RAPID, AdaGIDE, SCATC DSK, GWRL, and the Booch components

Ada Semantic Interface Specification (ASIS)

Support for Ada95 education, including tutorials and freeware tools (such as AdaGIDE from the United States Air Force Academy)

Ada Advocacy material - why Ada is the preferred language for Software Engineering

JGRASP, a GUI developed by Auburn University (http://eng.auburn.com/grasp)

See: http://unicoi.kennesaw.edu/ase/

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ASENTO

Ada Software Engineering Tools Project (ASENTO) consists of the tools, Ada Yacc (YACCA), which is an Ada version of the well-known Unix tool yacc, and Adaface, an interface generator for Ada programs and packages. Both programs are written in Ada 83 and produce Ada code. Programs are available on host ftp.cs.tut.fi (130.230.4.5) by anonymous ftp, directory pub/src/ASENTO. In case of problems, contact hmj@cs.tut.fi.

CONTACT: Hannu-Matti J^?rvinen (^? for umlaut-a)
Tampere University of Technology
P.O.Box 553
33101 Tampere, Finland

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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 are now supported by Simon Wright and include implementations of :

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

(U=Unbounded, B=Bounded and D=Dynamic refer to the storage allocation mechanism.)
Filtering and sorting operations are supported.

See: http://www.pushface.org/components/bc
http://www.adapower.com/booch

CONTACT: Simon Wright <simon@pushface.org>

CARDS

CARDS (Comprehensive Approach to Reusable Defense Software) was a DoD program, sponsored by the U.S. Air Force (USAF) Electronic Systems Center (ESC), dedicated to reducing the cost and time required to deliver high quality, software intensive systems, and to help maximize today's scarce resources by investigating, developing, and integrating systematic software reuse techniques and products. As part of the Air Force's PRISM program, CARDS built an operational, domain-specific, architecture-based reuse library from requirements, architecture, and component information defined in the PRISM Generic Command Center Architecture to maximize the reuse of existing COTS and GOTS components in command centers. Little information is available, but see:
http://www.infosys.tuwien.ac.at/Projects/ARES/public/AWS/publish/maymir.doc

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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.

The web site is at: http://home.earthlink.net/~matthewjheaney/charles
There is also a two page description of the library at the same location:
http://home.earthlink.net/~matthewjheaney/charles/charles.html

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COSMIC

Open Channel Software has 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. COSMIC software was previously supported by the University of Georgia Research Foundation.

See: http://www.openchannelfoundation.org/cosmic/

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DACS

The Data & Analysis Center for Software (DAC) is a Department of Defense (DOD) Information Analysis Center (IAC). 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 software community. Search for Reuse of Software Assets. Many of the links are outdated.

See: http://www.dacs.dtic.mil/
http://www.dacs.dtic.mil/databases/url/key.hts?keycode=15

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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 Ada 95 community. This package targets vector and matrix math operations implemented natively in Ada 95. Many operations, such as determinants, subvectors/matrices, singular value decompositions, inverses, eigenvalues/eigenvectors are supported.
See: http://dflwww.ece.drexel.edu/research/ada/

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ESTSC

The Energy Science and Technology Software Center (ESTSC) is the U.S. Department of Energy's (DOE) centralized software management facility. Operated by the DOE Office of Scientific and Technical Information (OSTI), the ESTSC licenses and distributes federally funded software developed by the national laboratories, other facilities and DOE contractors. This software represents the latest in Federal technology. In addition, the collection contains selected software from the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD).

CONTACT: Energy Science and Technology Software Center (ESTSC)
Mail: P.O. Box 1020
Oak Ridge, TN 37831-1020
E-mail: estsc@adonis.osti.gov ESTSCStaff@ccmail.osti.gov

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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 in all areas using computers. Specifically, it is putting together a complete, integrated software system named "GNU" that will be upwardly compatible with Unix. ("GNU" is pronounced "guh-new" and stands for "GNU's Not Unix".) Most parts of this system are already used and distributed as working software, and are in use worldwide as vital components in Linux or "GNU/Linux" systems.

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.

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." 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.

There are several GNU-associated Ada projects, located at www.gnuada.org/index.html

The Ada for GNU/Linux Team (ALT)
The Ada for SCO page
The Ada for NetBSD page

The GNU NYU Ada95 Translator (GNAT) Project can be obtained from:
http://www.gnat.com
http://wuarchive.wustl.edu/languages/ada/

Gnat for Dos is available at
http://www.mysunrise.ch/users/gdm/gnatdos.htm

CONTACT: Free Software Foundation, Inc. +1 617 542 5942
59 Temple Place, Suite 330 +1 617 542 2652 (fax)
Boston, MA 02111 USA http://www.gnu.org
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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.
Windex: a thick Ada binding to Windows

- Mandelplot: a Windex application that explores the fractal Mandelbrot set.
- Bitmap_Viewer: a Windex application that views .bmp files.
- Stephe's Ada Library: another entry in the Standard Ada Library sweepstakes
- Auto_Text_IO: automatically generates Text_IO packages for Ada packages

http://users.erols.com/leakstan/Stephe/
stephen_leake@acm.org
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Ohio State University

Components were developed under the RESOLVE discipline with Ada83 by Ohio State University in conjunction with West Virginia University. You can download RESOLVE/Ada implementations of RESOLVE specifications. Some components were specifically designed for a seamless (as possible) interface between ordinary Ada and RESOLVE/Ada.

CONTACT: ftp://ftp.cis.ohio-state.edu/pub/rsrg/Ada/
http://www.cis.ohio-state.edu/rsrg/RSRG-components.html
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PragmAda Software Engineering

PragmAda Software Engineering is a library of over 50 of the world's finest quality components as free, open-source software available under the GNAT-modified GPL. The components are available at
http://home.earthlink.net/~jrcarter010/pragmarc.htm
with a mirror at
http://www.adapower.com/
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
jrcarter@acm.org
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ReNews

ReNews is a website with current information on reuse books, tools and the next ICSR.
ReNews is affiliated with the International Society for the Advancement of Software Education, Inc. and contains links to back issues of the newsletter. The location is http://frakes.cs.vt.edu/renews.html

CONTACT: Bill Frakes
Computer Science Department
Virginia Tech
7054 Haycock Rd.
Falls Church VA 22043
703-538-8497 fax 703-538-8348
wfrakes@vt.edu http://frakes.cs.vt.edu
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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 education page at: www.acm.org/sigs/sigada/education
with links to different software repositories, including Washington University.
http://wuarchive.wustl.edu/languages/ada/

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SPC

The Software Productivity Consortium (SPC) helps its 100+ member companies and government affiliates develop the processes, methods, tools, and services needed to significantly improve the design and implementation of high-quality, software-intensive systems.

REUSE AT THE CONSORTIUM:
The ability to reuse significant portions of existing software assets (requirements, designs, code, test cases, plans, etc.) in new systems offers significant potential for increasing engineering productivity and system quality and decreasing the costs of building large, software-intensive systems. The Consortium approaches software reuse as a strategy for achieving business goals. Within the Consortium's Product Line Management & Engineering (PLME) product line, the Reuse Adoption Guidebook, the Domain Engineering Guidebook, and the Reuse-Driven Software Process guidebook address all aspects of institutionalizing effective reuse.
The Reuse Adoption Guidebook guides Consortium customers in implementing a reuse program and increasing organizational reuse capabilities, in direct support of their organizational objectives. The Domain Engineering Guidebook helps organizations define a reuse-driven software process for its specific domain(s). The Consortium also helps its members assess their readiness to adopt reuse practices and estimate the costs of planned reuse programs.

CONTACT: Greg Friedmann
Director, Public Relations and Communications
Software Productivity Consortium
2214 Rock Hill Road
Herndon, VA 22070
(703) 742-7158 FAX: (703) 742-7200
email: friedman@software.org

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STARS

The Software Technology for Adaptable, Reliable Systems (STARS) program is sponsored by the Defense Advanced Research Projects Agency (DARPA). The STARS goal is to increase software productivity, reliability, and quality by integrating support for modern software development processes and reuse concepts within software engineering environment (SEE) technology. STARS is focused on accelerating a change in the way software is developed within the DoD. This change represents a shift to a product line approach/technology paradigm that is process driven, domain specific, reuse based, and technology supported.

See: http://www.htc.honeywell.com/projects/dssa/dssa_relproj.html
http://www.dacs.dtic.mil/about/services/tats/tat-33.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
- The Ada 95 Rationale
- LGL Ada Component Library
- GLADE Filter Add-Ons
- Ada 95 Pretty Printer based on ASIS
- GNAT User's Guide

See: http://lglwww.epfl.ch/ada/home_page.html
http://lglwww.epfl.ch/home_page.html

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USAFA

The US Air Force Academy has an Ada software repository. USAFA mostly distributes Ada tools (such as 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.
See: http://www.usafa.af.mil/dfcs/bios/mcc_html/ada_stuff.html
ftp://ftp.usafa.af.mil/pub/dfcs/carlisle/usafa/graph110/index.html

CONTACT: Martin C. Carlisle, Assoc. Professor of Computer Science
US Air Force Academy
Martin.Carlisle@usafa.af.mil

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Max Weber's Components Library

The components in this library fall into these main categories:
- 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.)

The most useful may be the data structures, which were written to be as versatile as possible. These components are for Ada 95 and generally will not compile with Ada83, but if you need to use them in an Ada83 environment, almost all you have to do is remove the (<>) in generic formal types where appropriate.

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