Nimrod Standard Library 0.8.15

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Contents

"The good thing about reinventing the wheel is that you can get a round one."

Though the Nimrod Standard Library is still evolving, it is already quite usable. It is divided into *pure libraries*, *impure libraries* and *wrappers*.

Pure libraries do not depend on any external `*.dll` or `lib*.so` binary while impure libraries do. A wrapper is an impure library that is a very low-level interface to a C library.

Read this document for a quick overview of the API design.

1 Pure libraries

1.1 Core

- system Basic procs and operators that every program needs. It also provides IO facilities for reading and writing text and binary files. It is imported implicitly by the compiler. Do not import it directly. It relies on compiler magic to work.
- threads Nimrod thread support. **Note**: This is part of the system module. Do not import it explicitely.
- channels Nimrod message passing support for threads. **Note**: This is part of the system module. Do not import it explicitely.
- locks Locks and condition variables for Nimrod.
- macros Contains the AST API and documentation of Nimrod for writing macros.
- typeinfo Provides (unsafe) access to Nimrod's run time type information.
- actors Actor support for Nimrod; implemented as a layer on top of the threads and channels modules.

1.2 Collections and algorithms

- tables Nimrod hash table support. Contains tables, ordered tables and count tables.
- sets Nimrod hash and bit set support.
- lists Nimrod linked list support. Contains singly and doubly linked lists and circular lists ("rings").
- queues Implementation of a queue. The underlying implementation uses a `seq`.
- intsets Efficient implementation of a set of ints as a sparse bit set.
- critbits This module implements a *crit bit tree* which is an efficient container for a set or a mapping of strings.
- sequtils This module implements operations for the built-in seq type which were inspired by functional programming languages.

1.3 String handling

- strutils This module contains common string handling operations like changing case of a string, splitting a string into substrings, searching for substrings, replacing substrings.
- parseutils This module contains helpers for parsing tokens, numbers, identifiers, etc.
- strtabs The `strtabs` module implements an efficient hash table that is a mapping from strings to strings. Supports a case-sensitive, case-insensitive and style-insensitive mode. An efficient string substitution operator `%` for the string table is also provided.
- unicode This module provides support to handle the Unicode UTF-8 encoding.

- encodings Converts between different character encodings. On UNIX, this uses the `iconv` library, on Windows the Windows API.
- pegs This module contains procedures and operators for handling PEGs.
- ropes This module contains support for a *rope* data type. Ropes can represent very long strings efficiently; especially concatenation is done in O(1) instead of O(n).
- unidecode This module provides Unicode to ASCII transliterations: It finds the sequence of ASCII characters that is the closest approximation to the Unicode string.
- matchers This module contains various string matchers for email addresses, etc.
- subexes This module implements advanted string substitution operations.

1.4 Generic Operating System Services

- os Basic operating system facilities like retrieving environment variables, reading command line arguments, working with directories, running shell commands, etc.
- osproc Module for process communication beyond `os.execShellCmd`.
- times The `times` module contains basic support for working with time.
- dynlib This module implements the ability to access symbols from shared libraries.
- streams This module provides a stream interface and two implementations thereof: the *PFileStream* and the *PStringStream* which implement the stream interface for Nimrod file objects (*TFile*) and strings. Other modules may provide other implementations for this standard stream interface.
- marshal Contains procs for serialization and deseralization of arbitrary Nimrod data structures.
- terminal This module contains a few procedures to control the *terminal* (also called *console*). The implementation simply uses ANSI escape sequences and does not depend on any other module.
- memfiles This module provides support for memory mapped files (Posix's `mmap`) on the different operating systems.

1.5 Math libraries

- math Mathematical operations like cosine, square root.
- complex This module implements complex numbers and their mathematical operations.

1.6 Internet Protocols and Support

- cgi This module implements helpers for CGI applications.
- scgi This module implements helpers for SCGI applications.
- sockets This module implements a simple portable type-safe sockets layer.
- asyncio This module implements an asynchronous event loop for sockets.
- browsers This module implements procs for opening URLs with the user's default browser.
- httpserver This module implements a simple HTTP server.
- httpclient This module implements a simple HTTP client.
- smtp This module implement a simple SMTP client.
- irc This module implements an asynchronous IRC client.
- ftpclient This module implements an FTP client.
- cookies This module contains helper procs for parsing and generating cookies.

1.7 Parsers

- parseopt The `parseopt` module implements a command line option parser. This supports long and short command options with optional values and command line arguments.
- parsecfg The `parsecfg` module implements a high performance configuration file parser. The configuration file's syntax is similar to the Windows `.ini` format, but much more powerful, as it is not a line based parser. String literals, raw string literals and triple quote string literals are supported as in the Nimrod programming language.
- parsexml The `parsexml` module implements a simple high performance XML/HTML parser. The only encoding that is supported is UTF-8. The parser has been designed to be somewhat error correcting, so that even some "wild HTML" found on the Web can be parsed with it.
- parsecsv The `parsecsv` module implements a simple high performance CSV parser.
- parsesql The `parsesql` module implements a simple high performance SQL parser.
- json High performance JSON parser.
- lexbase This is a low level module that implements an extremely efficient buffering scheme for lexers and parsers. This is used by the diverse parsing modules.

1.8 XML Processing

- xmldom This module implements the XML DOM Level 2.
- xmldomparser This module parses an XML Document into a XML DOM Document representation.
- xmltree A simple XML tree. More efficient and simpler than the DOM. It also contains a macro for XML/HTML code generation.
- xmlparser This module parses an XML document and creates its XML tree representation.
- htmlparser This module parses an HTML document and creates its XML tree representation.
- htmlgen This module implements a simple XML and HTML code generator. Each commonly used HTML tag has a corresponding macro that generates a string with its HTML representation.

1.9 Cryptography and Hashing

- hashes This module implements efficient computations of hash values for diverse Nimrod types.
- md5 This module implements the MD5 checksum algorithm.
- base64 This module implements a base64 encoder and decoder.

1.10 Multimedia support

- colors This module implements color handling for Nimrod. It is used by the `graphics` module.

1.11 Miscellaneous

- events This module implements an event system that is not dependant on external graphical toolkits.
- oids An OID is a global ID that consists of a timestamp, a unique counter and a random value. This combination should suffice to produce a globally distributed unique ID. This implementation was extracted from the Mongodb interface and it thus binary compatible with a Mongo OID.
- endians This module contains helpers that deal with different byte orders.

1.12 Database support

- redis This module implements a redis client. It allows you to connect to a redis-server instance, send commands and receive replies.

1.13 Modules for JS backend

- dom Declaration of the Document Object Model for the ECMAScript backend.

2 Impure libraries

2.1 Regular expressions

- re This module contains procedures and operators for handling regular expressions. The current implementation uses PCRE.

2.2 Database support

- db_postgres A higher level PostgreSQL database wrapper. The same interface is implemented for other databases too.
- db_mysql A higher level MySQL database wrapper. The same interface is implemented for other databases too.
- db_sqlite A higher level SQLite database wrapper. The same interface is implemented for other databases too.
- db_mongo A higher level **mongodb** wrapper.
- mongodb Lower level wrapper for the **mongodb** client C library.

2.3 Other

- graphics This module implements graphical output for Nimrod; the current implementation uses SDL but the interface is meant to support multiple backends some day.
- dialogs This module implements portable dialogs for Nimrod; the implementation builds on the GTK interface. On Windows, native dialogs are shown if appropriate.
- zipfiles This module implements a zip archive creator/reader/modifier.
- web This module contains simple high-level procedures for dealing with the Web like loading the contents of a Web page from an URL.
- ssl This module provides an easy to use sockets-style Nimrod interface to the OpenSSL library.
- rdstdin This module contains code for reading from stdin. On UNIX the GNU readline library is wrapped and set up.
- zmq Nimrod 0mq wrapper. This file contains the low level C wrappers as well as some higher level constructs.

3 Wrappers

The generated HTML for some of these wrappers is so huge that it is not contained in the distribution. You can then find them on the website.

3.1 Windows specific

- windows Contains a wrapper for the Win32 API.
- ole2 Contains GUIDs for OLE2 automation support.
- shellapi Contains a wrapper for the `shellapi.h` header.
- shfolder Contains a wrapper for the `shfolder.h` header.
- mmsystem Contains a wrapper for the `mmsystem.h` header.
- nb30 This module contains the definitions for portable NetBIOS 3.0 support.

3.2 UNIX specific

- posix Contains a wrapper for the POSIX standard.
- cursorfont Part of the wrapper for X11.
- keysym Part of the wrapper for X11.
- x Part of the wrapper for X11.
- xatom Part of the wrapper for X11.
- xcms Part of the wrapper for X11.
- xf86dga Part of the wrapper for X11.
- xf86vmode Part of the wrapper for X11.
- xi Part of the wrapper for X11.
- xinerama Part of the wrapper for X11.
- xkb Part of the wrapper for X11.
- xkblib Part of the wrapper for X11.
- xlib Part of the wrapper for X11.
- xrandr Part of the wrapper for X11.
- xrender Part of the wrapper for X11.
- xresource Part of the wrapper for X11.
- xshm Part of the wrapper for X11.
- xutil Part of the wrapper for X11.
- xv Part of the wrapper for X11.
- xvlib Part of the wrapper for X11.
- readline Part of the wrapper for the GNU readline library.
- history Part of the wrapper for the GNU readline library.
- rltypedefs Part of the wrapper for the GNU readline library.

3.3 Regular expressions

- pcre Wrapper for the PCRE library.
- tre Wrapper for the TRE library.

3.4 Graphics libraries

- cairo Wrapper for the cairo library.
- cairoft Wrapper for the cairoft library.
- cairowin32 Wrapper for the cairowin32 library.
- cairoxlib Wrapper for the cairoxlib library.
- sdl Part of the wrapper for SDL.
- sdl_gfx Part of the wrapper for SDL.
- sdl_image Part of the wrapper for SDL.
- sdl_mixer Part of the wrapper for SDL.
- sdl_net Part of the wrapper for SDL.
- sdl_ttf Part of the wrapper for SDL.
- smpeg Part of the wrapper for SDL.
- gl Part of the wrapper for OpenGL.
- glext Part of the wrapper for OpenGL.
- glu Part of the wrapper for OpenGL.
- glut Part of the wrapper for OpenGL.
- glx Part of the wrapper for OpenGL.
- wingl Part of the wrapper for OpenGL.
- opengl New wrapper for OpenGL supporting up to version 4.2.

3.5 GUI libraries

- atk Wrapper for the atk library.
- gdk2 Wrapper for the gdk2 library.
- gdk2pixbuf Wrapper for the gdk2pixbuf library.
- gdkglext Wrapper for the gdkglext library.
- glib2 Wrapper for the glib2 library.
- gtk2 Wrapper for the gtk2 library.
- gtkglext Wrapper for the gtkglext library.
- gtkhtml Wrapper for the gtkhtml library.
- libglade2 Wrapper for the libglade2 library.
- pango Wrapper for the pango library.
- pangoutils Wrapper for the pangoutils library.
- iup Wrapper of the IUP GUI library.

3.6 Database support

- postgres Contains a wrapper for the PostgreSQL API.
- mysql Contains a wrapper for the mySQL API.
- sqlite3 Contains a wrapper for SQLite 3 API.
- odbcsql interface to the ODBC driver.
- sphinx Nimrod wrapper for `shpinx`.

3.7 XML Processing

- expat Wrapper of the expat XML parser.

3.8 Network Programming and Internet Protocols

- libuv Wrapper for the libuv library used for async I/O programming.
- joyent_http_parser Wrapper for the joyent's high-performance HTTP parser.
- libcurl Wrapper for the libcurl library.
- openssl Wrapper for OpenSSL.

3.9 Scripting languages

- lua Part of the wrapper for Lua.
- lualib Part of the wrapper for Lua.
- lauxlib Part of the wrapper for Lua.
- tcl Wrapper for the TCL programming language.
- python Wrapper for the Python programming language.

3.10 Data Compression and Archiving

- zlib Wrapper for the zlib library.
- libzip Interface to the lib zip library by Dieter Baron and Thomas Klausner.

3.11 Scientific computing

- libsvm Low level wrapper for lib svm.