Linux Standard Base Languages Specification 4.0

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LSB Languages Specification

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Foreword

This is version 4.0 of the LSB Languages specification. This version is a preliminary version for review only. Conclusion of work on this version will result in version 3.2 of the LSB Languages specification.

Implmentations may not claim conformance to this version.

Introduction

The LSB Languages specification defines the runtime language components that are required to be present on a conforming system.

This document should be used in conjunction with the documents it references. Information referenced in this way is as much a part of this document as is the information explicitly included here.

I Introductory Elements

1 Scope

The LSB Languages specification defines components for runtime languages which are found on an LSB conforming system.

2 Normative References

The specifications listed below are referenced in whole or in part by the LSB Languages specification. Such references may be normative or informative; a reference to specification shall only be considered normative if it is explicitly cited as such. The LSB Languages specification may make normative references to a portion of these specifications (that is, to define a specific function or group of functions); in such cases, only the explicitly referenced portion of the specification is to be considered normative.

Table 2-1 Informative References

Name	Title	URL
Perl Core Modules	Perl 5.8.8 Core Modules	http://perldoc.perl.org /5.8.8/index-modules-A.html
Perl Functions	Perl 5.8.8 Functions	http://perldoc.perl.org /5.8.8/perlfunc.html
Perl Language Reference	Perl 5.8.8 Language Reference	http://perldoc.perl.org /5.8.8/index-language.html
Perl Manual	Perl 5.8.8 Manual Page	http://perldoc.perl.org /5.8.8/perlrun.html
Perl Operators	Perl 5.8.8 Operators and Precedence	http://perldoc.perl.org /5.8.8/perlop.html
Perl Syntax	Perl 5.8.8 Syntax	http://perldoc.perl.org /5.8.8/perlsyn.html
Python Library Reference	Python Library Reference Release 2.4.2	http://www.python.or g/doc/2.4.2/lib/lib.ht ml
Python Reference Manual	Python Reference Manual Release 2.4.2	http://www.python.or g/doc/2.4.2/ref/ref.ht ml

3 Requirements

This specification describes runtime language interpreters which shall be found in specified locations. It also defines a number of runtime modules which shall be in an implementation-defined directory which the interpreters shall search by default.

4 Definitions

For the purposes of this document, the following definitions, as specified in the *ISO/IEC Directives, Part 2, 2001, 4th Edition*, apply:

can

> be able to; there is a possibility of; it is possible to

cannot

> be unable to; there is no possibility of; it is not possible to

may

> is permitted; is allowed; is permissible

need not

> it is not required that; no...is required

shall

> is to; is required to; it is required that; has to; only...is permitted; it is necessary

shall not

> is not allowed [permitted] [acceptable] [permissible]; is required to be not; is required that...be not; is not to be

should

> it is recommended that; ought to

should not

> it is not recommended that; ought not to

5 Terminology

For the purposes of this document, the following terms apply:

implementation-defined

> Describes a value or behavior that is not defined by this document but is selected by an implementor. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence of the value or behavior. An application that relies on such a value or behavior cannot be assured to be portable across conforming implementations. The implementor shall document such a value or behavior so that it can be used correctly by an application.

Shell Script

> A file that is read by an interpreter (e.g., awk). The first line of the shell script includes a reference to its interpreter binary.

undefined

> Describes the nature of a value or behavior not defined by this document which results from use of an invalid program construct or invalid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

unspecified

> Describes the nature of a value or behavior not specified by this document which results from use of a valid program construct or valid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

II Python Interpreter

6 Python Interpreter

6.1 Introduction

The Python intrepreter API is described in the <u>Python Library Reference</u>, with the following requirements for an LSB conforming runtime.

6.2 Python Interpreter Location

The Python interpreter binary, or a link to the binary, shall exist at `/usr/bin/python`.

6.3 Python Interpreter Version

The default installed Python version shall be 2.4.2 or greater.

6.4 Operators and Functions

Core Python operators, subroutines, and built-in functions shall be present and shall operate as defined in <u>Python Reference Manual</u>.

6.5 Python Modules

An LSB conforming implementation shall provide the Python modules as described in <u>Table 6-1</u> with at least the behavior described as mandatory in the referenced underlying specification

Table 6-1 Python Modules

array [1]	csv [1]	itertools [1]	random [1]	thread [1]
audioop [1]	datetime [1]	locale [1]	re [1]	time [1]
binascii [1]	errno [1]	marshal [1]	resource [1]	unicodedata [1]
bisect [1]	exceptions [1]	mmap [1]	select [1]	weakref [1]
cPickle [1]	fcntl [1]	operator [1]	signal [1]	zipimport [1]
cStringIO [1]	gc [1]	os [1]	socket [1]	zlib [1]
cmath [1]	grp [1]	ossaudiodev [1]	string [1]	
codecs [1]	heapq [1]	parser [1]	sys [1]	
collections [1]	hotshot [1]	posix [1]	syslog [1]	
crypt [1]	imp [1]	pwd [1]	termios [1]	

Referenced Specification(s)

[1]. <u>Python Reference Manual</u>

6.6 Python Interpreter Command

This section contains a description of the **python** command.

PYTHON

Name

python — an interpreted, interactive, object-oriented programming language

Synopsis

python [-d] [-E] [-h] [-i] [-m *module-name*] [-O] [-Q *argument*] [-S] [-t] [-u] [-v] [-V] [-W *argument*] [-x] [-c *command* | *script* | -] [*arguments*]

DESCRIPTION

Python is an interpreted, interactive, object-oriented programming language that combines remarkable power with very clear syntax. For an introduction to programming in Python you are referred to the Python Tutorial. The Python Library Reference documents built-in and standard types, constants, functions and modules. Finally, the Python Reference Manual describes the syntax and semantics of the core language in (perhaps too) much detail. (These documents may be located via the INTERNET RESOURCES below; they may be installed on your system as well.)

Python's basic power can be extended with your own modules written in C or C++. On most systems such modules may be dynamically loaded. Python is also adaptable as an extension language for existing applications. See the internal documentation for hints.

Documentation for installed Python modules and packages can be viewed by running the *pydoc* program.

COMMAND LINE OPTIONS

-c *command*

> Specify the command to execute (see next section). This terminates the option list (following options are passed as arguments to the command).

-d

> Turn on parser debugging output (for wizards only, depending on compilation options).

-E

> Ignore environment variables like PYTHONPATH and PYTHONHOME that modify the behavior of the interpreter.

-h

> Prints the usage for the interpreter executable and exits.

-i

> When a script is passed as first argument or the -c option is used, enter interactive mode after executing the script or the command. It does not read the $PYTHONSTARTUP file. This can be useful to inspect global variables or a stack trace when a script raises an exception.

-m *module-name*

Searches *sys.path* for the named module and runs the corresponding .py file as a script.

-O

Turn on basic optimizations. This changes the filename extension for compiled (bytecode) files from .pyc to .pyo. Given twice, causes docstrings to be discarded.

-Q *argument*

Division control; see PEP 238. The argument must be one of "old" (the default, int/int and long/long return an int or long), "new" (new division semantics, i.e. int/int and long/long returns a float), "warn" (old division semantics with a warning for int/int and long/long), or "warnall" (old division semantics with a warning for all use of the division operator). For a use of "warnall", see the Tools/scripts/fixdiv.py script.

-S

Disable the import of the module *site* and the site-dependent manipulations of *sys.path* that it entails.

-t

Issue a warning when a source file mixes tabs and spaces for indentation in a way that makes it depend on the worth of a tab expressed in spaces. Issue an error when the option is given twice.

-u

Force stdin, stdout and stderr to be totally unbuffered. On systems where it matters, also put stdin, stdout and stderr in binary mode. Note that there is internal buffering in xreadlines(), readlines() and file-object iterators ("for line in sys.stdin") which is not influenced by this option. To work around this, you will want to use "sys.stdin.readline()" inside a "while 1:" loop.

-v

Print a message each time a module is initialized, showing the place (filename or built-in module) from which it is loaded. When given twice, print a message for each file that is checked for when searching for a module. Also provides information on module cleanup at exit.

-V

Prints the Python version number of the executable and exits.

-W *argument*

Warning control. Python sometimes prints warning message to *sys.stderr*. A typical warning message has the following form: *file:line: category: message.* By default, each warning is printed once for each source line where it occurs. This option controls how often warnings are printed. Multiple -W options may be given; when a warning matches more than one option, the action for the last matching option is performed. Invalid -W options are ignored (a warning message is printed about invalid options when the first warning is issued). Warnings can also be controlled from within a Python program using the *warnings* module.

The simplest form of *argument* is one of the following *action* strings (or a unique abbreviation): *ignore* to ignore all warnings; *default* to explicitly request the default behavior (printing each warning once per source line); *all* to print a warning each time it occurs (this may generate many messages if a warning is triggered repeatedly for the same source line, such as inside a loop); *module* to print each warning only only the first time it occurs in each module; *once* to print each warning only the first time it occurs in the program; or *error* to raise an exception instead of printing a warning message.

The full form of *argument* is *action:message:category:module:line.* Here, *action* is as explained above but only applies to messages that match the remaining fields. Empty fields match all values; trailing empty fields may be omitted. The *message* field matches the start of the warning message printed; this match is case-insensitive. The *category* field matches the warning category. This must be a class name; the match test whether the actual warning category of the message is a subclass of the specified warning category. The full class name must be given. The *module* field matches the (fully-qualified) module name; this match is case-sensitive. The *line* field matches the line number, where zero matches all line numbers and is thus equivalent to an omitted line number.

`-x`

Skip the first line of the source. This is intended for a DOS specific hack only. Warning: the line numbers in error messages will be off by one!

INTERPRETER INTERFACE

The interpreter interface resembles that of the UNIX shell: when called with standard input connected to a tty device, it prompts for commands and executes them until an EOF is read; when called with a file name argument or with a file as standard input, it reads and executes a *script* from that file; when called with `-c` `command`, it executes the Python statement(s) given as *command.* Here *command* may contain multiple statements separated by newlines. Leading whitespace is significant in Python statements! In non-interactive mode, the entire input is parsed before it is executed.

If available, the script name and additional arguments thereafter are passed to the script in the Python variable *sys.argv* , which is a list of strings (you must first *import sys* to be able to access it). If no script name is given, *sys.argv[0]* is an empty string; if `-c` is used, *sys.argv[0]* contains the string *'-c'*. Note that options interpreted by the Python interpreter itself are not placed in *sys.argv.*

In interactive mode, the primary prompt is >>>; the second prompt (which appears when a command is not complete) is .... The prompts can be changed by assignment to *sys.ps1* or *sys.ps2.* The interpreter quits when it reads an EOF at a prompt. When an unhandled exception occurs, a stack trace is printed and control returns to the primary prompt; in non-interactive mode, the interpreter exits after printing the stack trace. The interrupt signal raises the *KeyboardInterrupt* exception; other UNIX signals are not caught (except that SIGPIPE is sometimes ignored, in favor of the *IOError* exception). Error messages are written to stderr.

FILES AND DIRECTORIES

These are subject to difference depending on local installation conventions; $
{prefix} and ${exec_prefix} are installation-dependent and should be interpreted
as for GNU software; they may be the same. The default for both is `/usr/local`.

${exec_prefix}/bin/python

   Recommended location of the interpreter.

${prefix}/lib/python<version> ${exec_prefix}/lib/python<version>

Recommended locations of the directories containing the standard modules.

${prefix}/include/python<version> ${exec_prefix}/include/python<version>

Recommended locations of the directories containing the include files needed for developing Python extensions and embedding the interpreter.

`~/.pythonrc.py`

User-specific initialization file loaded by the *user* module; not used by default or by most applications.

ENVIRONMENT VARIABLES

PYTHONHOME

Change the location of the standard Python libraries. By default, the libraries are searched in ${prefix}/lib/python<version> and ${exec_prefix}/lib/python<version>, where ${prefix} and ${exec_prefix} are installation-dependent directories, both defaulting to `/usr/local`. When $PYTHONHOME is set to a single directory, its value replaces both ${prefix} and ${exec_prefix}. To specify different values for these, set $PYTHONHOME to ${prefix}:${exec_prefix}.

PYTHONPATH

Augments the default search path for module files. The format is the same as the shell's $PATH: one or more directory pathnames separated by colons. Non-existent directories are silently ignored. The default search path is installation dependent, but generally begins with ${prefix}/lib/python<version> (see PYTHONHOME above). The default search path is always appended to $PYTHONPATH. If a script argument is given, the directory containing the script is inserted in the path in front of $PYTHONPATH. The search path can be manipulated from within a Python program as the variable *sys.path* .

PYTHONSTARTUP

If this is the name of a readable file, the Python commands in that file are executed before the first prompt is displayed in interactive mode. The file is executed in the same name space where interactive commands are executed so that objects defined or imported in it can be used without qualification in the interactive session. You can also change the prompts *sys.ps1* and *sys.ps2* in this file.

PYTHONY2K

Set this to a non-empty string to cause the *time* module to require dates specified as strings to include 4-digit years, otherwise 2-digit years are converted based on rules described in the *time* module documentation.

PYTHONOPTIMIZE

If this is set to a non-empty string it is equivalent to specifying the `-O` option. If set to an integer, it is equivalent to specifying `-O` multiple times.

PYTHONDEBUG

If this is set to a non-empty string it is equivalent to specifying the `-d` option. If set to an integer, it is equivalent to specifying `-d` multiple times.

PYTHONINSPECT

If this is set to a non-empty string it is equivalent to specifying the `-i` option.

PYTHONUNBUFFERED

If this is set to a non-empty string it is equivalent to specifying the `-u` option.

PYTHONVERBOSE

If this is set to a non-empty string it is equivalent to specifying the -v option. If set to an integer, it is equivalent to specifying -v multiple times.

AUTHOR

The Python Software Foundation: http://www.python.org/psf

INTERNET RESOURCES

Main website: http://www.python.org/ Documentation: http://docs.python.org/ Community website: http://starship.python.net/ Developer resources: http://www.python.org/dev/ FTP: ftp://ftp.python.org/pub/python/ Module repository: http://www.vex.net/parnassus/ Newsgroups: comp.lang.python, comp.lang.python.announce

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III Perl Interpreter

7 Perl Interpreter

7.1 Introduction

The Perl intrepreter API is described in the [Perl Language Reference](#), with the following requirements for an LSB conforming runtime.

7.2 Perl Interpreter Location

The Perl interpreter binary, or a link to the binary, shall exist at /usr/bin/perl.

7.3 Perl Interpreter Version

The default installed Perl version shall be 5.8.8 or greater.

7.4 Perl Operators and Functions

Core Perl operators, subroutines, and built-in functions shall be present and shall operate as defined in [Perl Syntax](#), [Perl Operators](#) and [Perl Functions](#).

7.5 Perl Modules

An LSB conforming implementation shall provide the Perl modules as described in [Table 7-1](#) with at least the behavior described as mandatory in the referenced underlying specification

Table 7-1 Perl Modules

AnyDBM_File [1]	Encode::Encoding [1]	I18N::Collate [1]	Net::netent [1]	Test::More [1]
Attribute::Handlers [1]	Encode::Guess [1]	I18N::LangTags [1]	Net::protoent [1]	Test::Simple [1]
AutoLoader [1]	Encode::JP [1]	I18N::LangTags::Detect [1]	Net::servent [1]	Text::Abbrev [1]
AutoSplit [1]	Encode::JP::H2Z [1]	I18N::LangTags::List [1]	O [1]	Text::Balanced [1]
B::Concise [1]	Encode::JP::JIS7 [1]	I18N::Langinfo [1]	Opcode [1]	Text::ParseWords [1]
B::Debug [1]	Encode::KR [1]	IO [1]	POSIX [1]	Text::Soundex [1]
B::Deparse [1]	Encode::KR::2022_KR [1]	IO::Dir [1]	PerlIO [1]	Text::Tabs [1]
B::Lint [1]	Encode::MIME::Header [1]	IO::File [1]	PerlIO::encoding [1]	Text::Wrap [1]
B::Showlex [1]	Encode::Symbol [1]	IO::Handle [1]	PerlIO::scalar [1]	Tie::Array [1]
B::Terse [1]	Encode::TW [1]	IO::Pipe [1]	PerlIO::via [1]	Tie::File [1]
B::Xref [1]	Encode::Uni	IO::Poll [1]	PerlIO::via::	Tie::Handle

			QuotedPrint [1]	[1]
Benchmark [1]	Encode::Unicode::UTF7 [1]	IO::Seekable [1]	Pod::Checker [1]	Tie::Hash [1]
CGI [1]	English [1]	IO::Select [1]	Pod::Find [1]	Tie::Memoize [1]
CGI::Apache [1]	Env [1]	IO::Socket [1]	Pod::Functions [1]	Tie::RefHash [1]
CGI::Carp [1]	Exporter [1]	IO::Socket::INET [1]	Pod::Html [1]	Tie::Scalar [1]
CGI::Cookie [1]	Exporter::Heavy [1]	IO::Socket::UNIX [1]	Pod::InputObjects [1]	Tie::SubstrHash [1]
CGI::Fast [1]	ExtUtils::Command [1]	IPC::Msg [1]	Pod::LaTeX [1]	Time::HiRes [1]
CGI::Pretty [1]	ExtUtils::Command::MM [1]	IPC::Open2 [1]	Pod::Man [1]	Time::Local [1]
CGI::Push [1]	ExtUtils::Install [1]	IPC::Open3 [1]	Pod::ParseLink [1]	Time::gmtime [1]
CGI::Switch [1]	ExtUtils::Installed [1]	IPC::Semaphore [1]	Pod::ParseUtils [1]	Time::localtime [1]
CGI::Util [1]	ExtUtils::Liblist [1]	IPC::SysV [1]	Pod::Parser [1]	Time::tm [1]
CPAN [1]	ExtUtils::Liblist::Kid [1]	List::Util [1]	Pod::Perldoc::ToChecker [1]	Unicode::Collate [1]
CPAN::FirstTime [1]	ExtUtils::MM_Unix [1]	Locale::Constants [1]	Pod::Perldoc::ToMan [1]	Unicode::Normalize [1]
CPAN::Nox [1]	ExtUtils::MY [1]	Locale::Country [1]	Pod::Perldoc::ToNroff [1]	Unicode::UCD [1]
Carp [1]	ExtUtils::MakeMaker [1]	Locale::Currency [1]	Pod::Perldoc::ToPod [1]	User::grent [1]
Carp::Heavy [1]	ExtUtils::MakeMaker::Config [1]	Locale::Language [1]	Pod::Perldoc::ToRtf [1]	User::pwent [1]
Class::ISA [1]	ExtUtils::MakeMaker::bytes [1]	Locale::Maketext [1]	Pod::Perldoc::ToText [1]	attributes [1]
Class::Struct [1]	ExtUtils::Manifest [1]	Locale::Script [1]	Pod::Perldoc::ToTk [1]	autouse [1]
Cwd [1]	ExtUtils::Mkbootstrap [1]	MIME::Base64 [1]	Pod::Perldoc::ToXml [1]	base [1]
DB [1]	ExtUtils::Mksymlists [1]	MIME::QuotedPrint [1]	Pod::PlainText [1]	bigint [1]
DBM_Filter	ExtUtils::Pac	Math::BigFlo	Pod::Plainer	bignum [1]

[1]	klist [1]	at [1]	[1]	
DBM_Filter::compress [1]	ExtUtils::testlib [1]	Math::BigInt [1]	Pod::Select [1]	bigrat [1]
DBM_Filter::encode [1]	Fatal [1]	Math::BigInt::Calc [1]	Pod::Text [1]	blib [1]
DBM_Filter::int32 [1]	Fcntl [1]	Math::BigInt::CalcEmu [1]	Pod::Text::Color [1]	bytes [1]
DBM_Filter::null [1]	File::Basename [1]	Math::BigRat [1]	Pod::Text::Overstrike [1]	charnames [1]
DBM_Filter::utf8 [1]	File::CheckTree [1]	Math::Complex [1]	Pod::Text::Termcap [1]	constant [1]
Data::Dumper [1]	File::Compare [1]	Math::Trig [1]	Pod::Usage [1]	diagnostics [1]
Devel::DProf [1]	File::Copy [1]	Memoize [1]	SDBM_File [1]	fields [1]
Devel::PPPort [1]	File::DosGlob [1]	Memoize::AnyDBM_File [1]	Safe [1]	filetest [1]
Devel::Peek [1]	File::Find [1]	Memoize::Expire [1]	Scalar::Util [1]	if [1]
Devel::SelfStubber [1]	File::Glob [1]	Memoize::ExpireFile [1]	Search::Dict [1]	integer [1]
Digest [1]	File::Path [1]	Memoize::ExpireTest [1]	SelectSaver [1]	less [1]
Digest::MD5 [1]	File::Spec [1]	Memoize::SDBM_File [1]	SelfLoader [1]	locale [1]
Digest::base [1]	File::Spec::Functions [1]	Memoize::Storable [1]	Shell [1]	open [1]
Digest::file [1]	File::Spec::Unix [1]	NEXT [1]	Socket [1]	overload [1]
DirHandle [1]	File::Temp [1]	Net::Cmd [1]	Storable [1]	re [1]
Dumpvalue [1]	File::stat [1]	Net::Config [1]	Sys::Hostname [1]	sigtrap [1]
Encode [1]	FileCache [1]	Net::Domain [1]	Sys::Syslog [1]	sort [1]
Encode::Alias [1]	FileHandle [1]	Net::FTP [1]	Term::ANSIColor [1]	strict [1]
Encode::Byte [1]	Filter::Simple [1]	Net::NNTP [1]	Term::Complete [1]	subs [1]
Encode::CJKConstants [1]	Filter::Util::Call [1]	Net::Netrc [1]	Term::ReadLine [1]	utf8 [1]
Encode::CN [1]	FindBin [1]	Net::POP3 [1]	Test::Builder [1]	warnings [1]

Encode::CN::HZ [1]	GDBM_File [1]	Net::Ping [1]	Test::Builder::Module [1]	warnings::register [1]
Encode::Config [1]	Getopt::Long [1]	Net::SMTP [1]	Test::Builder::Tester [1]	
Encode::EBCDIC [1]	Getopt::Std [1]	Net::Time [1]	Test::Builder::Tester::Color [1]	
Encode::Encoder [1]	Hash::Util [1]	Net::hostent [1]	Test::Harness [1]	

Referenced Specification(s)

[1]. Perl Language Reference

7.6 Perl Interpreter Command

The **perl** command is described in Perl Manual.

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