

NAME

B - The Perl Compiler

SYNOPSIS

```
use B;
```

DESCRIPTION

The `B` module supplies classes which allow a Perl program to delve into its own innards. It is the module used to implement the "backends" of the Perl compiler. Usage of the compiler does not require knowledge of this module: see the `O` module for the user-visible part. The `B` module is of use to those who want to write new compiler backends. This documentation assumes that the reader knows a fair amount about perl's internals including such things as SVs, OPs and the internal symbol table and syntax tree of a program.

OVERVIEW

The `B` module contains a set of utility functions for querying the current state of the Perl interpreter; typically these functions return objects from the `B::SV` and `B::OP` classes, or their derived classes. These classes in turn define methods for querying the resulting objects about their own internal state.

Utility Functions

The `B` module exports a variety of functions: some are simple utility functions, others provide a Perl program with a way to get an initial "handle" on an internal object.

Functions Returning `B::SV`, `B::AV`, `B::HV`, and `B::CV` objects

For descriptions of the class hierarchy of these objects and the methods that can be called on them, see below, *OVERVIEW OF CLASSES* and *SV-RELATED CLASSES*.

`sv_undef`

Returns the SV object corresponding to the C variable `sv_undef`.

`sv_yes`

Returns the SV object corresponding to the C variable `sv_yes`.

`sv_no`

Returns the SV object corresponding to the C variable `sv_no`.

`svref_2object(SVREF)`

Takes a reference to any Perl value, and turns the referred-to value into an object in the appropriate `B::OP`-derived or `B::SV`-derived class. Apart from functions such as `main_root`, this is the primary way to get an initial "handle" on an internal perl data structure which can then be followed with the other access methods.

`amagic_generation`

Returns the SV object corresponding to the C variable `amagic_generation`.

`init_av`

Returns the AV object (i.e. in class `B::AV`) representing INIT blocks.

`check_av`

Returns the AV object (i.e. in class `B::AV`) representing CHECK blocks.

`begin_av`

Returns the AV object (i.e. in class `B::AV`) representing BEGIN blocks.

end_av

Returns the AV object (i.e. in class B::AV) representing END blocks.

comppadlist

Returns the AV object (i.e. in class B::AV) of the global comppadlist.

regex_padav

Only when perl was compiled with ithreads.

main_cv

Return the (faked) CV corresponding to the main part of the Perl program.

Functions for Examining the Symbol Table

walksymtable(SYMREF, METHOD, RECURSE, PREFIX)

Walk the symbol table starting at SYMREF and call METHOD on each symbol (a B::GV object) visited. When the walk reaches package symbols (such as "Foo::") it invokes RECURSE, passing in the symbol name, and only recurses into the package if that sub returns true.

PREFIX is the name of the SYMREF you're walking.

For example:

```
# Walk CGI's symbol table calling print_subs on each symbol.
# Recurse only into CGI::Util::
walksymtable(\%CGI::, 'print_subs', sub { $_[0] eq 'CGI::Util::' },
             'CGI::');
```

print_subs() is a B::GV method you have declared. Also see *B::GV Methods*, below.

Functions Returning B::OP objects or for walking op trees

For descriptions of the class hierarchy of these objects and the methods that can be called on them, see below, *OVERVIEW OF CLASSES* and *OP-RELATED CLASSES*.

main_root

Returns the root op (i.e. an object in the appropriate B::OP-derived class) of the main part of the Perl program.

main_start

Returns the starting op of the main part of the Perl program.

walkoptree(OP, METHOD)

Does a tree-walk of the syntax tree based at OP and calls METHOD on each op it visits. Each node is visited before its children. If `walkoptree_debug` (see below) has been called to turn debugging on then the method `walkoptree_debug` is called on each op before METHOD is called.

walkoptree_debug(DEBUG)

Returns the current debugging flag for `walkoptree`. If the optional DEBUG argument is non-zero, it sets the debugging flag to that. See the description of `walkoptree` above for what the debugging flag does.

Miscellaneous Utility Functions

ppname(OPNUM)

Return the PP function name (e.g. "pp_add") of op number OPNUM.

hash(STR)

Returns a string in the form "0x..." representing the value of the internal hash function used by perl on string STR.

cast_I32(I)

Casts I to the internal I32 type used by that perl.

minus_c

Does the equivalent of the `-c` command-line option. Obviously, this is only useful in a BEGIN block or else the flag is set too late.

cstring(STR)

Returns a double-quote-surrounded escaped version of STR which can be used as a string in C source code.

perlstring(STR)

Returns a double-quote-surrounded escaped version of STR which can be used as a string in Perl source code.

class(OBJ)

Returns the class of an object without the part of the classname preceding the first " : : ". This is used to turn "B : : UNOP" into "UNOP" for example.

threadsv_names

In a perl compiled for threads, this returns a list of the special per-thread threadsv variables.

OVERVIEW OF CLASSES

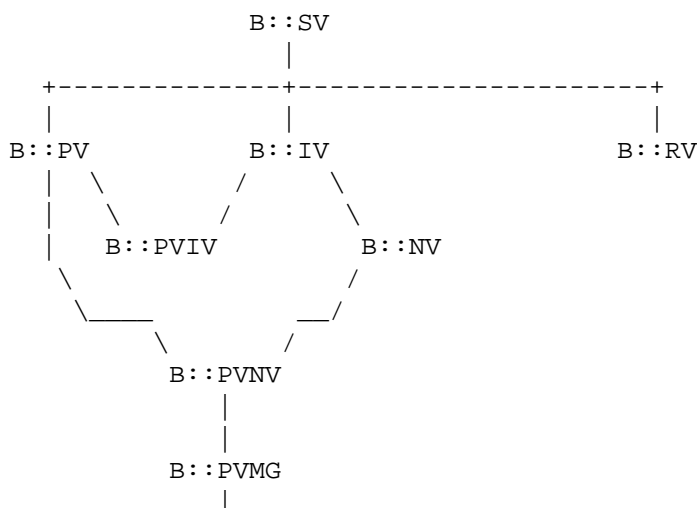
The C structures used by Perl's internals to hold SV and OP information (PVIV, AV, HV, ..., OP, SVOP, UNOP, ...) are modelled on a class hierarchy and the `B` module gives access to them via a true object hierarchy. Structure fields which point to other objects (whether types of SV or types of OP) are represented by the `B` module as Perl objects of the appropriate class.

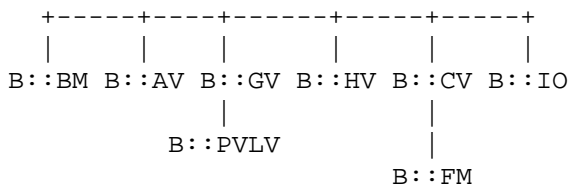
The bulk of the `B` module is the methods for accessing fields of these structures.

Note that all access is read-only. You cannot modify the internals by using this module.

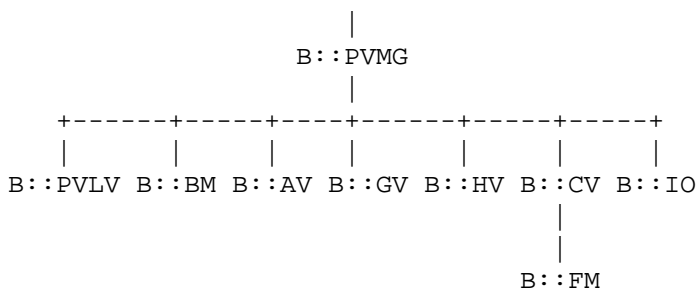
SV-RELATED CLASSES

B::IV, B::NV, B::RV, B::PV, B::PVIV, B::PVNV, B::PVMG, B::BM, B::PVLV, B::AV, B::HV, B::CV, B::GV, B::FM, B::IO. These classes correspond in the obvious way to the underlying C structures of similar names. The inheritance hierarchy mimics the underlying C "inheritance". For 5.9 and later this is:





For 5.8 and earlier, PVLV is a direct subclass of PVMG, so the base of this diagram is



Access methods correspond to the underlying C macros for field access, usually with the leading "class indication" prefix removed (Sv, Av, Hv, ...). The leading prefix is only left in cases where its removal would cause a clash in method name. For example, GvREFCNT stays as-is since its abbreviation would clash with the "superclass" method REF CNT (corresponding to the C function SvREFCNT).

B::SV Methods

REFCNT
 FLAGS
 object_2svref

Returns a reference to the regular scalar corresponding to this B::SV object. In other words, this method is the inverse operation to the svref_2object() subroutine. This scalar and other data it points at should be considered read-only: modifying them is neither safe nor guaranteed to have a sensible effect.

B::IV Methods

IV
 IVX
 UVX
 int_value

Returns the value of the IV, *interpreted as a signed integer*. This will be misleading if FLAGS & SVf_IVisUV. Perhaps you want the int_value method instead?

This method returns the value of the IV as an integer. It differs from IV in that it returns the correct value regardless of whether it's stored signed or unsigned.

needs64bits
 packiv

B::NV Methods

NV
 NVX

B::RV Methods

RV

B::PV Methods

PV

This method is the one you usually want. It constructs a string using the length and offset information in the struct: for ordinary scalars it will return the string that you'd see from Perl, even if it contains null characters.

RV

Same as B::RV::RV, except that it will die() if the PV isn't a reference.

PVX

This method is less often useful. It assumes that the string stored in the struct is null-terminated, and disregards the length information.

It is the appropriate method to use if you need to get the name of a lexical variable from a padname array. Lexical variable names are always stored with a null terminator, and the length field (SvCUR) is overloaded for other purposes and can't be relied on here.

B::PVMG Methods

MAGIC

SvSTASH

B::MAGIC Methods

MOREMAGIC

precomp

Only valid on r-magic, returns the string that generated the regexp.

PRIVATE

TYPE

FLAGS

OBJ

Will die() if called on r-magic.

PTR

REGEX

Only valid on r-magic, returns the integer value of the REGEX stored in the MAGIC.

B::PVLV Methods

TARGOFF

TARGLEN

TYPE

TARG

B::BM Methods

USEFUL

PREVIOUS

RARE

TABLE

B::GV Methods

is_empty

This method returns TRUE if the GP field of the GV is NULL.

NAME

SAFENAME

This method returns the name of the glob, but if the first character of the name is a control character, then it converts it to ^X first, so that *^G would return "^G" rather than "\cG".

It's useful if you want to print out the name of a variable. If you restrict yourself to globs which exist at compile-time then the result ought to be unambiguous, because code like `${" ^G" } = 1` is compiled as two ops - a constant string and a dereference (rv2gv) - so that the glob is created at runtime.

If you're working with globs at runtime, and need to disambiguate *^G from *{"^G"}, then you should use the raw NAME method.

STASH

SV

IO

FORM

AV

HV

EGV

CV

CVGEN

LINE

FILE

FILEGV

GvREFCNT

FLAGS

B::IO Methods

LINES

PAGE

PAGE_LEN

LINES_LEFT

TOP_NAME

TOP_GV

FMT_NAME

FMT_GV

BOTTOM_NAME

BOTTOM_GV

SUBPROCESS

IoTYPE

IoFLAGS

IsSTD

Takes one arguments ('stdin' | 'stdout' | 'stderr') and returns true if the IoIFP of the object is

equal to the handle whose name was passed as argument (i.e. `$io->IsSTD('stderr')` is true if `!oIFP($io) == PerLIO_stdin()`).

B::AV Methods

FILL
MAX
OFF
ARRAY
ARRAYelt

Like `ARRAY`, but takes an index as an argument to get only one element, rather than a list of all of them.

AvFLAGS

B::CV Methods

STASH
START
ROOT
GV
FILE
DEPTH
PADLIST
OUTSIDE
OUTSIDE_SEQ
XSUB
XSUBANY

For constant subroutines, returns the constant SV returned by the subroutine.

CvFLAGS
const_sv

B::HV Methods

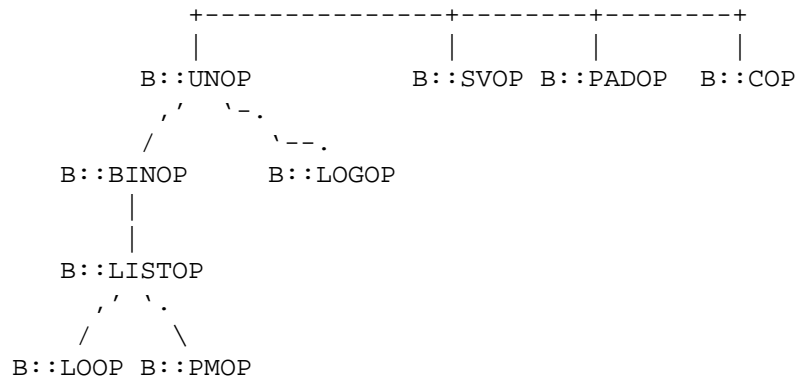
FILL
MAX
KEYS
RITER
NAME
PMROOT
ARRAY

OP-RELATED CLASSES

`B::OP`, `B::UNOP`, `B::BINOP`, `B::LOGOP`, `B::LISTOP`, `B::PMOP`, `B::SVOP`, `B::PADOP`, `B::PVOP`,
`B::LOOP`, `B::COP`.

These classes correspond in the obvious way to the underlying C structures of similar names. The inheritance hierarchy mimics the underlying C "inheritance":

```
B::OP
|
```



Access methods correspond to the underlying C structre field names, with the leading "class indication" prefix ("op_") removed.

B::OP Methods

These methods get the values of similarly named fields within the OP data structure. See top of `op.h` for more info.

next
sibling
name

This returns the op name as a string (e.g. "add", "rv2av").

ppaddr

This returns the function name as a string (e.g. "PL_ppaddr[OP_ADD]", "PL_ppaddr[OP_RV2AV]").

desc

This returns the op description from the global C `PL_op_desc` array (e.g. "addition" "array deref").

targ
type
opt
static
flags
private
spare

B::UNOP METHOD

first

B::BINOP METHOD

last

B::LOGOP METHOD

other

B::LISTOP METHOD

children

B::PMOP Methods

- pmreplroot
- pmreplstart
- pmnext
- pmregexp
- pmflags
- pmdynflags
- pmpermflags
- precomp
- pmoffset

Only when perl was compiled with ithreads.

B::SVOP METHOD

- sv
- gv

B::PADOP METHOD

- padix

B::PVOP METHOD

- pv

B::LOOP Methods

- redoop
- nextop
- lastop

B::COP Methods

- label
- stash
- stashpv
- file
- cop_seq
- arybase
- line
- warnings
- io

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