# GNU GLOBAL Source Code Tag System

Edition 5.8, for GNU GLOBAL version 5.8
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**by Tama Communications Corporation**

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This manual is for GNU GLOBAL (version 5.8, 5 February 2010), a source code tag system that works the same way across diverse environments.

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# 1 Overview of this tool

## 1.1 What is GNU GLOBAL?

GNU GLOBAL is a source code tag system that works the same way across diverse environments such as Emacs editor, Vi editor, Less viewer, Bash shell, various web browsers, etc. You can locate specified objects such as functions, macros, structs, classes in your source files and move there easily. It is useful for hacking large projects which contain many sub-directories, many `#ifdef` and many `main()` functions. It is similar to ctags or etags, but is different from them at the point of independence of any editor.

## 1.2 Concept of project

GNU GLOBAL can treat a source tree containing sub-directories as a project. Anywhere in the project, you can utilize high performance tag database. You need not specify where the database is. Instead, global(1) locates it by itself. Because of this feature, you can move freely in a project, and in and out of many projects.

## 1.3 Features

GNU GLOBAL has following features:

- support C, C++, Yacc, Java, PHP4 and assembly.
- work the same way across diverse environments like follows:
  - Shell command line
  - Bash shell
  - Vi editor (Nvi, Elvis, vim)
  - Less viewer
  - Emacs editor (Emacs, Mule, Xemacs)
  - Web browser
  - Doxygen documentation system
- find the locations of specified object quickly.
- locate not only object definitions but also object references.
- allows duplicate objects.
- locate path names which include specified pattern.
- hierarchical search is available.
- search not only in a source project but also in library projects.
- generate completion list for completing input method.
- support various output format.
- allows customizing of the set of candidate files to be tagged.
- understand POSIX 1003.2 regular expression.
- support idutils as an external search engine.
- tag files are independent of machine architecture.

- support incremental updating of tag files.
- plug-in parser is available to treat new language.
- support customizing with '`gtags.conf`'.
- generate a hypertext of source code.

# 2 Command line GLOBAL

You can use the tag facilities from shell command line. It is a big merit of GLOBAL compared with any other tag systems.

## 2.1 Preparation

First of all, you must execute gtags(1)(see Section 5.2 [gtags], page 34) at the root of source tree. For example, if you want to browse the source code of Vi editor in FreeBSD, please move to the source directory and invoke gtags(1).

```
$ cd /usr/src/usr.bin/vi
$ gtags
```

Gtags traverses sub-directories, picks up source files and makes four tag files at the current directory. After this, the whole files under this directory is treated as a project.

```
$ ls G*
GPATH   GRTAGS  GSYMS   GTAGS
```

- 'GTAGS' definition database
- 'GRTAGS' reference database
- 'GSYMS' symbol database
- 'GPATH' path name database

The 'GSYMS' is for the symbols which are not defined in 'GTAGS'.

You should prepare for considerable disk space for the tag files. For example, FreeBSD 7.0 kernel source code requires the following disk space.

```
source code(/usr/src/sys)       123MB

GPATH                             1MB
GTAGS                            26MB
GRTAGS                           22MB
GSYMS                            23MB
-------------------------------------
total of tag files               72MB
```

## 2.2 Basic usage

Consider the following source tree:

```
/home/user/
 |
 |-ROOT/       <- the root of source tree (GTAGS,GRTAGS,...)
    |
    |- README       .....    +---------------+
```

```
|                       |The function of|
|                       +---------------+
|- DIR1/
|  |
|  |- fileA.c   .....   +---------------+
|  |                    |main(){        |
|  |                    |       func1();|
|  |                    |       func2();|
|  |                    |}              |
|  |                    +---------------+
|  |
|  |- fileB.c   .....   +---------------+
|                       |func1(){ ... } |
|                       +---------------+
|- DIR2/
   |
   |- fileC.c   .....   +---------------+
                        |#ifdef X       |
                        |func2(){ i++; }|
                        |#else          |
                        |func2(){ i--; }|
                        |#endif         |
                        |func3(){       |
                        |       func1();|
                        |}              |
                        +---------------+
```

- Once you make tag files at the root directory of the source tree, you can execute global(1) from anywhere in the tree. By default, you get the relative path of the located files. You need not specify where the tag file is. Instead, global(1) locates it by itself.

```
$ cd /home/user/ROOT
$ global func1
DIR1/fileB.c            # func1() is defined in fileB.c
$ cd DIR1
$ global func1
fileB.c                 # relative path from DIR1
$ cd ../DIR2
$ global func1
../DIR1/fileB.c         # relative path from DIR2
```

Global command is possible to use only when you are in a project. If you are out of any project, it brings an error message like follows:

```
$ cd /home/user
```

```
$ global func1
global: GTAGS not found.
```

- The '`-r`' option locates object references.

```
$ global -r func2
../DIR1/fileA.c          # func2() is referred from fileA.c
```

- You can use POSIX regular expressions.

```
$ cd /home/user/ROOT
$ global 'func[1-3]'
DIR1/fileB.c             # func1, func2 and func3 are matched
DIR2/fileC.c
```

- The '`-x`' option shows the details. It is similar to the '`-x`' option in ctags(1).

```
$ global func2
DIR2/fileC.c
$ global -x func2
func2              2 DIR2/fileC.c       func2(){ i++; }
func2              4 DIR2/fileC.c       func2(){ i--; }
```

- The '`-a`' option produces the absolute path name.

```
$ global -a func1
/home/user/ROOT/DIR1/fileB.c
```

- The '`-s`' command locates symbols which are not defined in '`GTAGS`'.

```
$ global -xs X
X                  1 DIR2/fileC.c #ifdef X
```

- The '`-g`' command locates the lines which have specified pattern.

```
$ global -xg '#ifdef'
#ifdef             1 DIR2/fileC.c #ifdef X
```

It is similar to egrep(1) but is far more convenient for source code reading, because it allows you to search through a project, and only in the source files.

Additionally, you can use various options:

*-O* search only in the text files.

*-o* search in both the source files and text files.

`-l` search only under the current directory.

The `-e`, `-G` and `-i` options are available too. The usage is the same as egrep(1).

You can even change the output format of global(1) to the grep style using the '`--result=grep`' option. Of course, these options can be used even by other commands.

- The '`-P`' command locates path names which include specified pattern.

```
$ global -P fileB
DIR1/fileB.c
$ global -P '1/'
DIR1/fileA.c
DIR1/fileB.c
$ global -P '\.c$'
DIR1/fileA.c
DIR1/fileB.c
DIR2/fileC.c
```

- The '`-f`' command print a list of objects in specified file.

```
$ global -f DIR2/fileC.c
func2               2 DIR2/fileC.c   func2(){ i++; }
func2               4 DIR2/fileC.c   func2(){ i--; }
func3               6 DIR2/fileC.c   func3(){
```

- The '`-l`' option limits the range of the retrieval under the current directory.

```
$ cd DIR1
$ global -xl func[1-3]
func1        1 fileB.c      func1(){...}
```

## 2.3 Applied usage

- You can customize a set of candidate files to be tagged.

```
$ find . -type f -print >/tmp/list     # make a file set
$ vi /tmp/list                         # customize the file set
$ gtags -f /tmp/list
```

- If your source files are on a read-only device, such as CDROM, then you cannot make tag files at the root of the source tree. In such case, you can make tag files in another place using the `GTAGSROOT` environment variable.

```
$ mkdir /var/dbpath
$ cd /cdrom/src                  # the root of source tree
```

```
$ gtags /var/dbpath              # make tag files in /var/dbpath
$ export GTAGSROOT=‘pwd‘
$ export GTAGSDBPATH=/var/dbpath
$ global func
```

There is another method for it. Since global(1) locates tag files also in ‘`/usr/obj`’ + <current directory>, you can setup like follows:

```
$ cd /cdrom/src                  # the root of source tree
$ mkdir -p /usr/obj/cdrom/src
$ gtags /usr/obj/cdrom/src       # make tag files in /usr/obj/cdrom/src
$ global func
```

The value ‘`/usr/obj`’ can be changed by environment variable `MAKEOBJDIRPREFIX`. The ‘`-O, --objdir`’ option do it automatically instead of you.

- If you want to locate objects that are not defined in the source tree, then you can specify library directories with the `GTAGSLIBPATH` environment variable.

  You should execute gtags at each directory of the path. If ‘`GTAGS`’ is not found there, global ignores it.

```
$ pwd
/develop/src/mh                          # this is a source project
$ gtags
$ ls G*TAGS
GRTAGS  GTAGS
$ global mhl
uip/mhlsbr.c                             # mhl() is found
$ global strlen                          # strlen() is not found
$ (cd /usr/src/lib; gtags)               # library source
$ (cd /usr/src/sys; gtags)               # kernel source
$ export GTAGSLIBPATH=/usr/src/lib:/usr/src/sys
$ global strlen
../../../usr/src/lib/libc/string/strlen.c  # found in library
$ global access
../../../usr/src/sys/kern/vfs_syscalls.c   # found in kernel
```

Or, you can take a more straightforward way to do the same thing. In the following example, we treat as if the system library and the kernel are part of our project.

```
$ ln -s /usr/src/lib .
$ ln -s /usr/src/sys .
$ gtags
$ global strlen
lib/libc/string/strlen.c
$ global access
```

```
sys/kern/vfs_syscalls.c
```

- If you forget object names, you can use the '`-c`' (complete) command.

```
$ global -c kmem                # maybe k..k.. kmem..
kmem_alloc
kmem_alloc_pageable
kmem_alloc_wait
kmem_free
kmem_free_wakeup
kmem_init
kmem_malloc
kmem_suballoc                   # This is what I need!
$ global kmem_suballoc
../vm/vm_kern.c
```

- You can use the '`-c`' command with the complete command in the shell.
  In Bash:

```
$ funcs()
> {
>         local cur
>         cur=${COMP_WORDS[COMP_CWORD]}
>         COMPREPLY=(`global -c $cur`)
> }
$ complete -F funcs global
$ global kmem_TABTAB
kmem_alloc           kmem_alloc_wait      kmem_init
kmem_alloc_nofault   kmem_free            kmem_malloc
kmem_alloc_pageable  kmem_free_wakeup     kmem_suballoc
$ global kmem_sTAB
$ global kmem_suballoc
../vm/vm_kern.c
```

  In Tcsh:

```
% set funcs=(`global -c`)
% complete global 'n/*/$funcs/'
% global kmem_TAB
kmem_alloc          kmem_free_wakeup
kmem_alloc_pageable kmem_init
kmem_alloc_wait     kmem_malloc
kmem_free           kmem_suballoc
% global kmem_sTAB
% global kmem_suballoc
```

```
../vm/vm_kern.c
```

If you like input completion, you had better try globash(see Section 3.1 [GloBash], page 10). It support you in a suitable way without any preparation.

- You can edit all files which have specified objects by typing one command, for example:

```
$ vi ‘global func1‘     # edit fileB.c
```

- If you want to browse many files in order, do the following:

```
$ global -xr fork | awk ’{printf "view +%s %s\n",$2,$3}’
view +650 ../dev/aic7xxx/aic7xxx_asm.c
view +250 ibcs2/ibcs2_misc.c
view +401 linux/linux_misc.c
view +310 ../kern/init_main.c
view +318 ../kern/init_main.c
view +336 ../kern/init_main.c
view +351 ../kern/init_main.c
$ !! | sh            # from now on, go to next tag with ’ZZ’.
```

# 3 Various applications

## 3.1 Global facility for Bash

Special support for Bash is available.

### 3.1.1 Features

- Vi-like tag stack is available.
- Emacs-like tag name completion is available.
- Automatic invoking of editor.
- Tag mark facility is available.
- Yoo can manage a directory list by cookie facility.

### 3.1.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3. And you can invoke Bash(1) with '`--rcfile`' option.

```
$ bash --rcfile /usr/local/share/gtags/globash.rc
```

You will see a prompt like this:

```
[/usr/src/sys]/kern _
```

This prompt means that the current directory is '/usr/src/sys/kern' and the root directory of the project is '/usr/src/sys'. Tag and marker are valid only in a project.

When you try to go out of the project, globash warns like:

```
[/usr/src/sys] cd ..
You are going to get out of the current project.
Tag stack and marker will be removed. Sure? ([y]/n)_
```

If you answer *y* and *RET* or just *RET* in the above prompt then the tag stack and marker (described later) will be removed.

If you need help then please type *ghelp*.

### 3.1.3 Usage

- Almost global(1)(see Section 5.1 [global], page 30)'s command characters are available as a command.

```
[/usr/src/sys] x fork                <- (global -x fork)
>    1  fork              94 kern/kern_fork.c fork(p, uap)
[/usr/src/sys] r                     <- (global -xr fork)
>    1  fork              85 alpha/linux/linux_machdep.c
```

```
     2  fork             184 i386/linux/linux_machdep.c
[/usr/src/sys] s lbolt              <- (global -xs lbolt)
>    1  lbolt            1210 i386/isa/wd_cd.c     tsleep((cad
     2  lbolt            1211 i386/isa/wd_cd.c     tsleep((cad
     3  lbolt            709 i386/isa/wfd.c     tsleep ((caddr
...
[/usr/src/sys] g                    <- (global -xg lbolt)
>    1  lbolt            1210 i386/isa/wd_cd.c     tsleep((cad
...
[/usr/src/sys] P init               <- (global -xP init)
>    1  path    1 dev/hea/eni_init.c
     2  path    1 dev/hfa/fore_init.c
     3  path    1 i386/i386/initcpu.c
     4  path    1 kern/init_main.c
     5  path    1 kern/init_sysent.c
     6  path    1 kern/vfs_init.c
     7  path    1 vm/vm_init.c
[/usr/src/sys] _
```

If no argument is specified then the latest argument is used.

- Input completion facility is available. For each command, suitable completion is applied.

```
[/usr/src/sys] x kmem_TABTAB
kmem_alloc          kmem_free           kmem_malloc
kmem_alloc_nofault  kmem_free_wakeup    kmem_object
kmem_alloc_wait     kmem_init           kmem_suballoc
[/usr/src/sys] x kmem_sTAB
[/usr/src/sys] x kmem_suballoc
```

- You can select a tag by the *show* command.

```
[/usr/src/sys] x main
>    1  main             70 alpha/alpha/gensetdefs.c main(in
     2  main            1500 alpha/alpha/ieee_float.c main(i
     3  main            227 boot/alpha/boot1/boot1.c main()
....
[/usr/src/sys] show 3
(Load editor and show boot/alpha/boot1/boot1.c at line 227.)
```

The default editor is vi(1) but you can specify it statically by `EDITOR` environment variable or temporarily by options.

```
[/usr/src/sys] show -e 3
(Preloaded emacs show boot/alpha/boot1/boot1.c at line 227.)
[/usr/src/sys] show -l 3
```

```
(Load less and show boot/alpha/boot1/boot1.c at line 227.)
[/usr/src/sys] show -g 3
(Preloaded mozilla show boot/alpha/boot1/boot1.c at line 227.)
```

Otherwise, you can use the following commands (and abbreviated form):

`list (l)` print tag list.

`first` go to the first tag.

`last` go to the last tag.

`next (n)` go to next tag.

`prev (p)` go to previous tag.

`show n (1,2,3,..,999)`
go to nth tag

- You can use vi-like tag stack. You can return the previous tag list by the *pop* or *CTL-T* command.

```
[/usr/src/sys] x main
>    1  main             70 alpha/alpha/gensetdefs.c main(in
     2  main           1500 alpha/alpha/ieee_float.c main(i
     3  main            227 boot/alpha/boot1/boot1.c main()
....
[/usr/src/sys] show 3
(Load editor and show boot/alpha/boot1/boot1.c at line 227.)
[/usr/src/sys] x fork          <- push new tag on the tag stack.
>    1  fork             94 kern/kern_fork.c fork(p, uap)
[/usr/src/sys] pop             <- pop tag stack.
[/usr/src/sys] show
(Load editor and show boot/alpha/boot1/boot1.c at line 227.)
```

You can print the tag stack by *tags* command.

- You can memory tags using the *mark* command.

```
[/usr/src/sys] x fork
>    1  fork             94 kern/kern_fork.c fork(p, uap)
[/usr/src/sys] mark
[/usr/src/sys] x main
>    1  main             70 alpha/alpha/gensetdefs.c main(in
     2  main           1500 alpha/alpha/ieee_float.c main(i
     3  main            227 boot/alpha/boot1/boot1.c main()
....
[/usr/src/sys] mark -l             <- show marker list.
     1  fork             94 kern/kern_fork.c fork(p, uap)
[/usr/src/sys] mark 1              <- select a marker.
(Load editor and show kern/kern_fork.c at line 227.)
```

```
[/usr/src/sys] list
>    1  main              70 alpha/alpha/gensetdefs.c main(in
     2  main            1500 alpha/alpha/ieee_float.c main(i
     3  main             227 boot/alpha/boot1/boot1.c main()
....
```

Marked tags are valid until you go out of the current project or quit the current Bash session.

- You can memory directories using the *cookie* command, and return there using the *warp* command.

```
[/usr/src/sys] cookie               <- drop a cookie.
[/usr/src/sys] cd kern
[/usr/src/sys]/kern cookie          <- drop a cookie again.
[/usr/src/sys]/kern cd ../i386
[/usr/src/sys]/i386 cookie -l       <- show cookie list.
     1  /usr/src/sys/kern
     2  /usr/src/sys
[/usr/src/sys]/i386 warp 2          <- warp to the selected cookie.
[/usr/src/sys] _
```

Cookie directories are valid until you delete them.

## 3.2 Less using GLOBAL

You can use GLOBAL as the tag system of Less(1) viewer instead of ctags.

### 3.2.1 Features

- You can use most of GLOBAL's facilities from Less viewer.
- Less viewer support duplicated tag.

### 3.2.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3.

Second, to use global from Less, you need to set environment variable `LESSGLOBALTAGS` to "global".

```
$ export LESSGLOBALTAGS=global
```

### 3.2.3 Usage

- To go to func1, you can say

```
$ less -t func1
```

Please note that if '`tags`' exists in the current directory then Less use it. If you want to use '`GTAGS`' even if '`tags`' exists then please specify the tag file explicitly like this:

```
$ less -TGTAGS -t func1
```

- To go to the referenced point of func1, please specify '`GRTAGS`'.

```
$ less -TGRTAGS -t func1
```

  In the same way, you can use '`GTAGS`', '`GRTAGS`', '`GSYMS`', '`GPATH`' as tag files.
- If a number of objects are located, Less goes to the first tag. You can go to next tag by typing `t` and back by typing `T`.

  `t` go to next tag.

  `T` go to previous tag.
- In a Less session, you can use `:t` command to locate new symbol. But in this case, you cannot change tag file from one specified by '`-T`' option.
- With the '`-T-`' option, Less read standard input as a tag file. You can connect global and Less with a pipe. It is very convenient.

```
$ global -x func | less -T-
```

  In the same way, you can use the following command lines:

```
# pattern match with grep(1).
$ global -xg 'lseek(.*)' | less -T-

# pattern match with idutils(1).
$ global -xI func | less -T-

# all objects definitions in *.c.
$ global -f *.c | less -T-

# all files includes 'init' in its path.
$ global -Px init | less -T-
```

- If your editor doesn't support GLOBAL directly then you can use Less as a footstool.

```
# invoke less
$ less -t main
main(int argc, char **argv)
{
int i;
.....
[xxx/main.c (tag 1 of 55)]

# type 'v'(vi) command in less session.
```

```
v

# load vi and show the same position.
.....
main((int argc, char **argv)
{
int i;
.....
[xxx/main.c 313 lines, 7783 char]

# type 'ZZ' command in vi session.
ZZ

# exit vi and back to less session.
main(int argc, char **argv)
{
int i;
.....
[xxx/main.c (tag 1 of 55)]
```

## 3.3 Nvi-1.81.5 using GLOBAL

You can use GLOBAL as the tag system of Nvi editor instead of ctags.

### 3.3.1 Features

- You can use most of GLOBAL's facilities from Nvi.
- Intelligent recognition of the current token and its type.

### 3.3.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3.

Second, to use global from Nvi, you need write to '`.nexrc`' like this: It assumed that '`gtags.pl`' is put on '`$HOME/perl`'.

```
$HOME/.nexrc
+---------------------------
|perl use lib "$ENV{'HOME'}/perl"
|perl require 'gtags.pl'
|map ^P :tagprev^M
|map ^N :tagnext^M
|map ^] :perl tag^M
|ab gtag perl tag qw(
|ab gta perl tag qw(
|ab gt perl tag qw(
```

You must start Nvi in a project described in Section 2.1 [Preparation], page 3.

### 3.3.3 Usage

- To go to func1, you can say

```
:perl tag qw(func1)


Suggested .nexrc:
ab gtag perl tag qw(
ab gta perl tag qw(
ab gt perl tag qw(
```

- To go to the referenced point of func1, add the option '`-r`'

```
:perl tag qw(-r func1)
```

- If a number of objects are located, Nvi goes to the first tag. You can go to next tag by typing *`:tagnext`* and back by typing *`:tagprev`*.

```
Suggested .nexrc:
map ^N :tagnext^M
map ^P :tagprev^M
```

- If you don't specify any argument. ':perl tag' command do the followings:
  If the context of the current token is a definition then it is equivalent to *`:perl tag qw(-r current token)`*. Otherwise, if it is a reference to some definitions then it is equivalent to *`:perl tag qw(current token)`* else it is equivalent to *`:perl tag qw(-s current token)`*.

```
Suggested .nexrc:
map ^] :perl tag^M
```

  It is similar to *`CTL-]`* command.
- You can use the '`-s`' option. It locates symbols which are not defined in '`GTAGS`'.

```
:perl tag qw(-s pat)
```

- The '`-g`', '`-f`' and '`-P`' option are also available. It works like command line.

```
:perl tag qw(-g pat)
```

- When you want to locate objects the name of which start with "set" or "get", use:

```
:perl tag qw(^[sg]et)
```

- Other tag commands are also available:

  *CTL-T* returns to the most recent tag location.

  *:tagpop* returns to the most recent tag location.

  *:tagtop* returns to the top of the tag stack.

  *:display tags*
  display the tags stack.

## 3.4 Elvis using GLOBAL

Elvis 2.1 or the later has two variables, `tagprg` and `tagprgonce` for running an external tag search program. You can use them for GLOBAL.

### 3.4.1 Features

- You can use most of GLOBAL's facilities from Elvis.
- Mouse is supported.

### 3.4.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3.

Second, start Elvis and execute `set tagprg="global -t $1"` like this:

```
$ elvis
~
~
~
~
~
~
:set tagprg="global -t $1"
```

### 3.4.3 Usage

- To go to func1, you can say

  ```
  :tag func1
  ```

  It seems same as original Elvis, but Elvis execute `global -t func1` internally and read the output instead of tags file.
- To go to the referenced point of func1, add '`-r`' option.

  ```
  :tag -r func1
  ```

- To locate symbols which are not defined in '`GTAGS`', try this.

```
:tag -s lbolt
```

- To locate strings, try this.

```
:tag -g Copyright
```

- When a lot of results are expected, you had better use the browse command.

```
:browse -r fork
```

It brings a following selection list. You can select a tag line and go to the point.

```
Browse -r fork (2 matches)
+----------------+---------------+--------------------
| TAG NAME       | SOURCE FILE    | SOURCE LINE
+----------------+---------------+--------------------
|fork            |ux/linux_misc.c | (line 565)
|fork            |ern/init_main.c | (line 191)
+----------------+---------------+--------------------
```

- To get a list of objects in specified files, use '`-f`' command.

```
:browse -f main.c                <- locate definitions in main.c
```

- Other tag commands are also available:

| | |
|---|---|
| *CTL-]* | go to the definition of current token. |
| *CTL-T* | return to the most recent tag context. |
| *:tag* | without argument, go to the next tag. |
| *:pop* | return to the most recent tag context. |
| *:stack* | display the tags stack. |
| *:stag* | creates a new window and moves its cursor to the tag's definition point. |
| *:sbrowse* | same with *browse* but show in a new window. |

- You can use POSIX regular expressions.

```
:tag ^put_                     <- locate objects start with 'put_'

:browse -g 'fseek(.*L_SET)' <- locate fseek() using L_SET argument
```

- You can browse an object list of many files.

```
:browse -f *.c                  <- locate objects in *.c
```

- You can browse the files whose path includes specified pattern.

```
:browse -P /vm/                 <- under vm/ directory
:browse -P \.h$                 <- all include files
:browse -P init                 <- path including 'init'
```

- You can use mouse for tag operations.

  If you have a mouse, then you can use the left button to double-click on a word in the text, to have Elvis perform a *:tag* search on that word. Double-clicking the right button anywhere in the text will perform a *:pop* command.

  In the selection list by the *browse* command, you can use the left button to double-click on a tag name, to have Elvis select the tag. To come back, double-click on the right button.

## 3.5 Vim using GLOBAL

In Vim 6.2 or later, you can use '`gtags.vim`' script.

### 3.5.1 Features

- You can use most of GLOBAL's facilities from Vim.
- Intelligent recognition of the current token and its type.
- Special character '%', '#' and input completion are available.

To our regret, tag stack facility is not available. If you want to use the facility, please try gtags-cscope See Section 3.7 [Gtags-cscope (fake cscope)], page 24.

### 3.5.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3.

Second, copy '`gtags.vim`' to your plug-in directory or source it from your vimrc.

```
$ cp /usr/local/share/gtags/gtags.vim $HOME/.vim/plugin
```

### 3.5.3 Usage

- To go to main, you can say

```
:Gtags main
```

  Vim execute global(1), parse the output, list located objects in quickfix window and load the first entry. The quickfix windows is like this:

```
gozilla/gozilla.c|200| main(int argc, char **argv)
gtags-cscope/gtags-cscope.c|124| main(int argc, char **argv)
gtags-parser/asm_scan.c|2056| int main()
gtags-parser/gctags.c|157| main(int argc, char **argv)
gtags-parser/php.c|2116| int main()
gtags/gtags.c|152| main(int argc, char **argv)
[Quickfix List]
```

You can go to any entry using quickfix command.

*:cn* go to the next entry.

*:cp* go to the previous entry.

*:ccN* go to the N'th entry.

*:cl* list all entries.

You can see the help of quickfix like this:

```
:h quickfix

Suggested map:
map <C-n> :cn<CR>
map <C-p> :cp<CR>
```

- To go to the referenced point of func1, add '`-r`' option.

```
:Gtags -r func1
```

- To locate symbols which are not defined in '`GTAGS`', try this.

```
:Gtags -s lbolt
```

- To locate strings, try this.

```
:Gtags -g int argc

:Gtags -g "root"

:Gtags -ge -C <- locate '-C'
```

- To get a list of objects in specified files, use -f command.

```
:Gtags -f main.c                <- locate objects in main.c
```

If you are editing '`main.c`' itself, you can use '%' instead.

```
:Gtags -f %                    <- locate objects in main.c
```

- You can use POSIX regular expressions.

```
:Gtags ^put_                   <- locate objects start with 'put_'

:Gtags -g fseek(.*SEEK_SET)  <- locate fseek() using SEEK_SET
```

- Input completion is available.

  In the command line, press *CTL-D* after some typings and Vim will show a list of tag names that start with the string. Press *TAB* and Vim will complete the tag name.

```
:Gtags fuTAB

:Gtags func1                   <- 'nc1' is appended by vim
```

- You can browse files whose path includes specified pattern.

```
:Gtags -P /vm/                 <- under vm/ directory
:Gtags -P \.h$                 <- all include files
:Gtags -P init                 <- path including 'init'
```

- You can use all options of global(1) except for the -c, -n, -p, -q, -u, -v and all long name options. They are sent to global(1) as is. For example,

```
:Gtags -gi paTtern     <- match to both 'PATTERN' and 'pattern'.

:Gtags -POi make       <- match to Makefile but doesn't match to makeit.c.
```

  About the other options, please see See Section 5.1 [global], page 30.

- The GtagsCursor command brings you to the definition or reference of the current token.

  If the context of the current token is a definition then it is equivalent to *:Gtags -r current token*. Otherwise, if it is a reference to some definitions then it is equivalent to *:Gtags current token* else it is equivalent to *:Gtags -s current token*.

```
:GtagsCursor


Suggested map:
map <C-\>^] :GtagsCursor<CR>
```

  Though the mapping ':GtagsCursor' to '^]' seems suitable, it will bring an inconvenience in the help screen.

- If you have the hypertext generated by htags(1) then you can display the same part of the source code on the mozilla browser. Let's load mozilla and try this:

```
:Gozilla


Suggested map:
map <C-g> :Gozilla<CR>
```

- If you want to load Vim with all main()s then following command line is useful.

```
$ vim '+Gtags main'
```

## 3.6 Extended Emacs using GLOBAL

You can use GLOBAL as the tag system of Emacs editor instead of etags.

### 3.6.1 Features

- You can use most of GLOBAL's facilities from the editor.
- More intelligent recognition of the current token and its type.
- Tag completion is available for input tag name.
- Mouse is supported.

### 3.6.2 Preparation

First, do the preparation of global. See Section 2.1 [Preparation], page 3.

Second, to use global from Emacs, you need to load the '`gtags.el`' and execute gtags-mode function in it.

Write the call to autoload function to your '`$HOME/.emacs`', start Emacs and execute gtags-mode function. If you put '`gtags.el`' in a directory other than the standard macro directory, you need to add it to `load-path`.

```
$HOME/.emacs
+-------------------------------------------------
|(setq load-path (cons "/home/owner/global" load-path))
|(autoload 'gtags-mode "gtags" "" t)

$ emacs

|
|J_:-----Mule: *scratch*       (Lisp Interaction)--L16--All----
|M-x gtags-mode[RET]
+-------------------------------------------------
```

If you want to get into gtags-mode whenever you get into c-mode then you can append the following code to your '`$HOME/.emacs`'.

```
(setq c-mode-hook
    '(lambda ()
        (gtags-mode 1)
))
```

### 3.6.3 Usage

- To go to func1, invoke `gtags-find-tag` and you can see a prompt in the mini-buffer. Then input the tag name.

  ```
  Find tag: func1 <- 'Find tag: ' is a prompt
  ```

- To go to the referenced point of func1, invoke `gtags-find-rtag`.

  ```
  Find tag (reference): func1
  ```

- Tag name completion is available. You need to execute `gtags-make-complete-list` command before it.

  ```
  Find tag: fuTAB

  Find tag: func1                          <- 'nc1' is appended by emacs
  ```

- If a number of objects are located, Emacs goes into *GTAGS SELECT MODE* like this:

  ```
  +-------------------------------------------------------------
  |main             347 i386/isa/ultra14f.c main()
  |main             128 kern/init_main.c   main(framep)
  |main             104 netiso/clnp_debug.c main()
  |main             164 netiso/xebec/main.c main(argc, argv)
  |
  |
  |
  |
  |
  |J_:--%*-Mule: *scratch*       (Gtags Select)--L1--All----
  |[GTAGS SELECT MODE] 4 lines
  +-------------------------------------------------------------
  ```

  Please select a tag line by any Emacs command and press *RET*, and you can go to the tag's point. When you want to go to the next or the previous tag, please return to the above mode with `gtags-pop-stack` and reselect.

You can customize the path style in this mode by setting `gtags-path-style` variable.

`root` relative from the root of the project (Default)

`relative` relative from the current directory

`absolute` absolute (relative from the system root directory)

There are two method to set this variable:

- You can change it dynamically using the `customize` command of Emacs.
  You will find the entry in the Programming/Tools/Gtags group.
- You can change it when Emacs is loaded using '`.emacs`' file like this:

```
(setq gtags-mode-hook
  '(lambda ()
    (setq gtags-path-style 'relative)))
```

- `gtags-find-tag-from-here` command is available.
  If current token is a definition, it is equivalent to *Find tag (reference): current tokenRET*, otherwise it is equivalent to *Find tag: current tokenRET*.
- To locate symbols which are not defined in '`GTAGS`', try `gtags-find-symbol`.

```
Find symbol: lbolt <- 'Find symbol:' is a prompt
```

- To locate strings, try `gtags-find-with-grep`.

```
Find pattern: Copyright
```

- You can use POSIX regular expressions.

```
Find tag: ^put_                    <- locate tags start with 'put_'
```

- Mouse command is available.
  If you use X version Emacs, try the following:
  Move the mouse cursor to an object name and click the middle button, and you can go to the point of the definitions, or to its references, depending on the context. In 'GTAGS SELECT MODE', move the mouse cursor to a line and click the center button.
  To return to the previous position, click the right button.

## 3.7 Gtags-cscope (fake cscope)

You can use gtags-cscope(1) instead of cscope(1). For example, you can deceive Vim editor using the following commands:

```
:set csprg=gtags-cscope
:cs add GTAGS
```

After this, you can use built-in 'cs find' commands in the Vim editor. Though the deceit is not perfect ('cs find d' is not implemented), this method might be more convenient than '`gtags.vim`' in the point that you can use the tag stack facility of Vim.

## 3.8 Hypertext generator

You can use GLOBAL's facilities from web browsers.

### 3.8.1 Features

- Htags makes a hypertext from C, C++, Yacc and Java source files.
- Once the hypertext is generated, you need nothing other than a web browser.
- You can move the hypertext to anywhere. It is independent of the source code.
- You can use all of your browser's functions, such as search, history, bookmark, save, frames, windows, etc.

### 3.8.2 Preparation

At first, you must ensure that you have a lot of disk space for hypertext. For example, FreeBSD 7.0 kernel source code (123MB) requires disk space from 600 to 1200MB.

```
source code(/usr/src/sys)            123MB
GPATH,GTAGS,GRTAGS,GSYMS              72MB

hypertext (with no option)           645MB
hypertext (with -s option)          1168MB
hypertext (with -D option)           383MB
hypertext (with -s and -D option)    616MB
```

Please invoke gtags(1)(see Section 5.2 [gtags], page 34) and htags(1)(see Section 5.3 [htags], page 38) in order like this:

```
(at the root directory of your source project)
$ gtags                 # make tag files(GTAGS,GRTAGS,GSYMS)
$ htags                 # make hypertext(HTML/)
```

Then you will find a directory named '`HTML`' in the current directory.

Htags has rich options. If you are new on htags then you are recommended to use the '`--suggest`' option. This option makes some popular options effective, and invokes gtags(1) if there is no tag files.

```
$ htags --suggest
```

If HTTP server is available then the -D and -f option are also useful.

### 3.8.3 Usage

Please start a web browser like this:

```
$ lynx HTML/index.html
```

You will understand the usage by looking at the examples.

You can move the HTML directory to anywhere. It is independent of the source code as long as CGI facility is not used.

Using mozilla, you can also utilize the hypertext from your command line like this:

```
$ mozilla # load mozilla
$ global -x main
main        10 main.c main(int argc, char *argv[]) {
$ gozilla +10 main.c # usage is similar to vi editor.
(show main.c at 10 on mozilla's screen.)
```

But in this case, you must not move the HTML directory from the source directory.

## 3.9 Doxygen using GLOBAL

You can use GLOBAL as the source browser of Doxygen.

Doxygen Release 1.4.3 or later has config option USE_HTAGS. When enabled in combination with SOURCE_BROWSER=YES, htags(1) is used as the source browser instead of Doxygen's own.

Here is an example.

```
(in source directory)
$ doxygen -g
$ vi Doxyfile
+---------------------------------
|...
|INPUT                  = .
|RECURSIVE              = YES
|SOURCE_BROWSER         = YES
|USE_HTAGS              = YES
|...

$ doxygen
$ lynx html/index.html
```

# 4 Other topics

## 4.1 How to config GLOBAL

You can customize GLOBAL using configuration file.

```
# cp gtags.conf /etc/gtags.conf         # system wide config file.
# vi /etc/gtags.conf

$ cp gtags.conf $HOME/.globalrc         # personal config file.
$ vi $HOME/.globalrc
```

If '`$HOME/.globalrc`' exists then GLOBAL use it, else if '`/etc/gtags.conf`' exists then GLOBAL use it. Otherwise default value is used. The format of '`gtags.conf`' is resemble to termcap(5). By default, 'default' target is used. About the capabilities, please see each command manual. See Chapter 5 [Reference], page 30.

## 4.2 Plug-in parser

You can write new parser for gtags(1).

### 4.2.1 How to plug in a parser

Copy '`gtags.conf`' to '`/etc/gtags.conf`' or '`$HOME/.globalrc`'.

If you would like to use exuberant ctags included by Vim editor,

```
$ cd /vim source directory/src/ctags
$ cp Makefile.unix Makefile
$ make
# cp ctags /usr/local/bin/ctags-exuberant
$ export GTAGSLABEL=ctags-exuberant     # see gtags.conf
$ gtags
$ ls G*
GPATH   GTAGS
```

'`GRTAGS`' and '`GSYMS`' don't exist, simply because these parsers don't support the '`-r`' option and '`-s`' option like gtags-parser(1) does. If you prepare the parser which support both option, you can use all functions of global(1).

### 4.2.2 Requirement of plug-in parser

Plug-in parser must print tag information to standard output in the same style as `ctags -x`, ie.:

```
[1]    [2] [3]          [4]
-------------------------------------------------------------------
main    20 ./main.c     main(argc, argv)        /* xxx */
```

```
[1] tag name
[2] line number the tag appeared
[3] path name. It must be equal to argument path name.
[4] line image
```

Plug-in parser must process the files in the order they are given in the argument. In each file, any order is acceptable.

- Good example

  The following `good-prog` does correct operation as a plug-in parser.

```
$ good-prog a.c b.c         <= order: a.c -> b.c
             ~~~~~~~
main          25 a.c  main(int argc, char *argv[])
func          45 a.c  func(int a) {
sub2          20 b.c  sub2() {
sub1          10 b.c  sub1() {
                  ^
                  |
                 *** order: a.c -> b.c (Good!)
```

- Bad example

  The following `bad-prog` does wrong operation as a plug-in parser.

```
$ bad-prog a.c b.c         <= order: a.c -> b.c
main          25 a.c  main(int argc, char *argv[])
sub2          20 b.c  sub2() {
sub1          10 b.c  sub1() {
func          45 a.c  func(int a) {
                  ^
                  |
                 *** order: b.c -> a.c (BAD)
```

## 4.3 Incremental updating

Modifying some source files, you need not remake the whole tag files. Instead, you can use incremental updating facility ('`-u`' option).

```
$ gtags
$ cd kern
$ vi tty.c                              # modify tty.c
...
:wq
$ global -vu                            # -v means verbose
[Sun Dec  6 16:27:47 JST 1998] Gtags started
 Tag found in '/usr/src/sys'.
 Incremental update.
```

```
[Sun Dec  6 16:28:48 JST 1998] Updating 'GTAGS'.
 [1/1] deleting tags of kern/tty.c
 [1/1] adding tags of kern/tty.c
[Sun Dec  6 16:28:59 JST 1998] Updating 'GRTAGS'.
 [1/1] deleting tags of kern/tty.c
 [1/1] adding tags of kern/tty.c
[Sun Dec  6 16:28:14 JST 1998] Updating 'GSYMS'.
 [1/1] deleting tags of kern/tty.c
 [1/1] adding tags of kern/tty.c
 Global databases have been modified.
[Sun Dec  6 16:28:30 JST 1998] Done.
$ global -vu                              # try again
[Sun Dec  6 16:28:48 JST 1998] Gtags started
 Tag found in '/usr/src/sys'.
 Incremental update.
 Global databases are up to date.         # do nothing
[Sun Dec  6 16:28:52 JST 1998] Done.
```

# 5 Command References

## 5.1 global - print the locations of specified object.

### NAME

global - print the locations of specified object.

### SYNOPSIS

global [-aGilnqrstTvx][-e] pattern
global -c[qsv] prefix
global -f[anqrstvx] files
global -g[aGilnoOqtvx][-e] pattern
global -I[ailnqtvx][-e] pattern
global -P[aGilnoOqtvx][-e] pattern
global -p[qrv]
global -u[qv]

### DESCRIPTION

Global find the locations of specified object in C, C++, Yacc, Java, PHP and Assembly source files. Global can treat a source tree, that is, a directory that has sub-directories and source files as a project. You can get the relative path of objects from anywhere within the project. Global can locate not only object definitions but also object references and other symbols.

In advance of using this command, you must execute gtags(1) at the root directory of the project to make tag files. Then you can execute this command at anywhere in the project.

### COMMANDS

The following commands are available:

<no command> pattern
: Print object which match to the pattern. Extended regular expressions which are the same as those accepted by egrep(1) are available.

'-c', '--completion' [prefix]
: Print the candidates of object names which start with the specified prefix. Prefix is not specified, print all object names.

'-f', '--file' files
: Print all tags in the files. This option implies the -x option.

'-g', '--grep' pattern
: Print all lines which match to the pattern.

'--help' Show help.

‘`-I`’, ‘`--idutils`’ pattern
: Print all lines which match to the pattern. This function use idutils(1) as a search engine. To use this command, you need to install idutils(1) in your system and you must execute gtags(1) with the ‘`-I`’ option.

‘`-P`’, ‘`--path`’ [pattern]
: Print the paths which match to the pattern. If no pattern specified, print all paths in the project.

‘`-p`’, ‘`--print-dbpath`’
: Print the location of ‘`GTAGS`’.

‘`-u`’, ‘`--update`’
: Locate tag files and update them incrementally.

‘`--version`’
: Show version number.

## OPTIONS

The following options are available:

‘`-a`’, ‘`--absolute`’
: Print absolute path name. By default, print relative path name.

‘`--from-here`’ context
: Decide tag type by the context. The context must be ’lineno:path’. If this option is specified then the ‘`-s`’ and ‘`-r`’ are ignored. Regular expression is not allowed in the pattern. This option assumes use in conversational environments such as editors and IDEs.

‘`-e`’, ‘`--regexp`’ pattern
: Use pattern as the pattern; useful to protect patterns beginning with ‘`-`’.

‘`-G`’, ‘`--basic-regexp`’
: Interpret pattern as a basic regular expression. The default is extended regular expression.

‘`-i`’, ‘`--ignore-case`’
: ignore case distinctions in pattern.

‘`-l`’, ‘`--local`’
: Print just objects which exist under the current directory.

‘`-n`’, ‘`--nofilter`’
: Suppress sort filter and path conversion filter.

‘`-O`’, ‘`--only-other`’
: Search pattern only in other than source files like ‘`README`’. This option is valid only with ‘`-g`’ or ‘`-P`’ command. This option override the ‘`-o`’ option.

‘`-o`’, ‘`--other`’
: Search pattern in not only source files but also other files like ‘`README`’. This option is valid only with ‘`-g`’ or ‘`-P`’ command.

‘-q’, ‘--quiet’
: Quiet mode.

‘-r’, ‘--reference’, ‘--rootdir’
: Print the locations of object references. By default, print object definitions. With the ‘-p’ option, print the root directory of source tree.

‘--result’ format
: format may be ’path’, ‘ctags’, ‘ctags-x’, ‘grep’ or ’cscope’. The ‘--result=ctags’ and ‘--result=ctags-x’ are equivalent to the ‘-t’ and ‘-x’ respectively. The ‘--result’ option is given to priority more than the -t and -x option.

‘-s’, ‘--symbol’
: Print the locations of specified symbol other than definitions.

‘-T’, ‘--through’
: Go through all the tag files listed in *GTAGSLIBPATH*. By default, stop searching when tag is found. This option is ignored when either ‘-s’, ‘-r’ or ‘-l’ option is specified.

‘-t’, ‘--tags’
: Print with standard ctags format.

‘-v’, ‘--verbose’
: Verbose mode.

‘-x’, ‘--cxref’
: In addition to the default output, produce the line number and the line contents.

## EXAMPLES

```
$ ls -F
Makefile      src/    lib/
$ gtags
$ global main
src/main.c
$ global -x main
main              10 src/main.c  main (argc, argv) {
$ global -x '^[sg]et'
set_num           20 lib/util.c  set_num(values)
get_num           30 lib/util.c  get_num() {
$ global -rx '^[sg]et'
set_num          113 src/op.c            set_num(32);
set_num          225 src/opop.c               if (set_num(0) > 0) {
get_num           90 src/op.c            while (get_num() > 0) {
$ cd lib
$ global -rx '^[sg]et'
set_num          113 ../src/op.c            set_num(32);
set_num          225 ../src/opop.c               if (set_num(0) > 0) {
get_num           90 ../src/op.c            while (get_num() > 0) {
$ global strlen
```

```
$ (cd /usr/src/sys; gtags)
$ export GTAGSLIBPATH=/usr/src/sys
$ global strlen
../../../usr/src/sys/libkern/strlen.c
$ (cd /usr/src/lib; gtags)
$ GTAGSLIBPATH=/usr/src/lib:/usr/src/sys
$ global strlen
../../../usr/src/lib/libc/string/strlen.c
```

## FILES

'`GTAGS`' Tag file for object definitions.

'`GRTAGS`' Tag file for object references.

'`GSYMS`' Tag file for other symbols.

'`GPATH`' Tag file for path of source files.

'`GTAGSROOT`'
: If environment variable *GTAGSROOT* is not set and '`GTAGSROOT`' exist in the same directory with '`GTAGS`' then use the value as *GTAGSROOT*.

'`/etc/gtags.conf`', '`$HOME/.globalrc`'
: Configuration file.

## ENVIRONMENT

The following environment variables affect the execution of global:

*GTAGSROOT*
: The directory which is the root of source code.

*GTAGSDBPATH*
: The directory on which gtags database exist. This value is ignored when *GTAGSROOT* is not defined.

*GTAGSLIBPATH*
: If this variable is set, it is used as the path to search for library functions. If the specified object is not found in the source project, global also search in these paths. Since only '`GTAGS`' is targeted in the retrieval, this variable is ignored when the '`-r`' or '`-s`' is specified.

*GTAGSLABEL*
: If this variable is set, its value is used as the label of configuration file. The default is `default`.

*MAKEOBJDIRPREFIX*
: If this variable is set, '`$MAKEOBJDIRPREFIX<current directory>`' is used as the candidate directory for tag files. The default is '`/usr/obj`'.

## CONFIGURATION

The following configuration variables affect the execution of global:

`icase_path`(boolean)
: Ignore case distinctions in the pattern.

### DIAGNOSTICS

Global exits with a non 0 value if an error occurred, 0 otherwise.

### SEE ALSO

gtags-parser(1), gtags(1), htags(1), less(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

### AUTHOR

Shigio YAMAGUCHI, Hideki IWAMOTO and others.

### HISTORY

The global command appeared in FreeBSD 2.2.2.

## 5.2 gtags - create tag files for global.

### NAME

gtags - create tag files for global.

### SYNOPSIS

gtags [-ciIOqvw][-d tag-file][-f file][-n number][dbpath]

### DESCRIPTION

Gtags recursively collect the source files under the current directory, pickup symbols and write the cross-reference data into tag files (‘`GTAGS`’, ‘`GRTAGS`’, ‘`GSYMS`’ and ‘`GPATH`’). You should execute this command at the root of the source tree.

C, C++, yacc, java, PHP and Assembly source files are supported. Files whose names end in ‘`.c`’ or ‘`.h`’ are assumed to be C source files. Files whose names end in ‘`.c++`’ ‘`.cc`’ ‘`.cpp`’ ‘`.cxx`’ ‘`.hxx`’ ‘`.hpp`’ ‘`.C`’ ‘`.H`’ are assumed to be C++ source files. Files whose names end in ‘`.y`’ are assumed to be YACC source files. Files whose names end in ‘`.java`’ are assumed to be Java source files. Files whose names end in ‘`.php`’ ‘`.php3`’ ‘`.phtml`’ are assumed to be PHP source files. Files whose names end in ‘`.s`’ or ‘`.S`’ are assumed to be Assembly source files. Other files are assumed to be text files.

### OPTIONS

The following options are available:

‘`-c`’, ‘`--compact`’
: Make GTAGS in compact format. This option does not influence GRTAGS and GSYMS, because they are always made in compact format.

‘`--config`’[=name]
: Show the value of config variable name. If name is not specified then show whole of config entry.

‘`-d`’, ‘`--dump`’ tag-file
: Dump a tag file. The output format is ’key<tab>data’. This is for debugging.

‘`-f`’, ‘`--file`’ file
: Read from file a list of file names which should be considered as the candidate of source files. By default, all files under the current directory are considered as the candidate. If file is ‘`-`’, read from standard input. File names must be separated by newline.

‘`--gtagsconf`’ file
: Load user’s configuration from file.

‘`--gtagslabel`’ label
: label is used as the label of configuration file. The default is `default`.

‘`-I`’, ‘`--idutils`’
: Make index files for idutils(1) too.

‘`-i`’, ‘`--incremental`’
: Update tag files incrementally. You had better use global(1) with the -u option.

‘`-n`’, ‘`--max-args`’ number
: Maximum number of arguments for gtags-parser(1). By default, gtags invokes gtags-parser with arguments as many as possible to decrease the frequency of invoking.

‘`-O`’, ‘`--objdir`’
: Use objdir as dbpath. If ‘`$MAKEOBJDIRPREFIX`’ directory exists, gtags creates ‘`$MAKEOBJDIRPREFIX/<current directory>`’ directory and makes tag files in it. If dbpath is specified, this options is ignored.

‘`--single-update`’ file
: Update tag files for single file. It is considered that file was updated, and other files were not updated. The file must be relative path name from the current directory. This option implies the -i option. If the file is new then ‘`--single-update`’ is ignored, and the processing is automatically switched to the normal incremental updating.

‘`--statistics`’
: Print statistics information. This option is valid only for normal creation of tag files.

‘`-q`’, ‘`--quiet`’
: Quiet mode.

‘`-v`’, ‘`--verbose`’
: Verbose mode.

‘`-w`’, ‘`--warning`’
: Print warning messages.

dbpath
: The directory in which tag files are generated. The default is the current directory. It is useful when your source directory is on a read only device like CDROM.

## EXAMPLES

```
$ ls -F
Makefile      src/    lib/
$ gtags -v
$ global -x main
main              10 src/main.c  main (argc, argv) {
```

## FILES

'`GTAGS`' Tag file for object definitions.

'`GRTAGS`' Tag file for object references.

'`GSYMS`' Tag file for other symbols.

'`GPATH`' Tag file for path of source files.

'`/etc/gtags.conf`', '`$HOME/.globalrc`'
Configuration file.

## ENVIRONMENT

The following environment variables affect the execution of gtags:

*GTAGSCONF*
If this variable is set, its value is used as the configuration file. The default is '`$HOME/.globalrc`'.

*GTAGSLABEL*
If this variable is set, its value is used as the label of configuration file. The default is `default`.

*GTAGSCACHE*
If this variable is set, its value is used as the size of B-tree cache. The default is 50000000 (bytes).

*GTAGSFORCECPP*
If this variable is set, each file whose suffix is 'h' is treated as a C++ source file.

*MAKEOBJDIRPREFIX*
If this variable is set, '`$MAKEOBJDIRPREFIX`' is used as an object prefix directory. The default is '`/usr/obj`'.

## CONFIGURATION

The following configuration variables affect the execution of gtags. You can see the default value for each variable with the '`--config`' option.

`GTAGS`(string)
If this variable is set, its value is used as the command line of the parser for GTAGS. The default is '`gtags-parser %s`'.

`GRTAGS`(string)
If this variable is set, its value is used as the command line of the parser for GRTAGS. The default is '`gtags-parser -r %s`'.

`GSYMS`(string)
: If this variable is set, its value is used as the command line of the parser for GSYMS. The default is '`gtags-parser -s %s`'.

`icase_path`(boolean)
: Ignore case distinctions in the path. Suffixes check are affected by this capability.

`langmap`(comma separated list)
: Language mapping. Each comma-separated map consists of the language name, a colon, and a list of file extensions. Default mapping is 'c:.c.h,yacc:.y,asm:.s.S,java:.java,cpp:.c++.cc.cpp.cxx.hxx.hpp.C.H,php:.php.php3.phtml'.

`skip`(comma separated list)
: Gtags skips files which are listed in this list. As a special exception, gtags collect values from multiple `skip` variables. If the value ends with '/', it assumed as a directory and gtags skips all files under it. If the value start with '/', it assumed relative path from the root of source directory.

`suffixes`(comma separated list)
: Suffixes of target source file. As a special exception, gtags collect values from multiple `suffixes` variables. This variable is obsoleted. If the langmap variable is defined gtags no longer refers this.

`use_builtin_parser`(boolean)
: Use built-in parser instead of external command. The following restrictions are in incremental updating with built-in parser: If '`GRTAGS`' or '`GSYMS`' exists, both of them exist and the format should be the same.

## DIAGNOSTICS

Gtags exits with a non 0 value if an error occurred, 0 otherwise.

## MESSAGE FORMAT

Verbose message has important level. The most important level is 0, the second is 1 and so on. All the message has level numbers leading blanks.

## SEE ALSO

gtags-parser(1), global(1), htags(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

## BUG

'`GTAGS`', '`GRTAGS`' and '`GSYMS`' are very large. In advance of using this command, check the space of your disk.

Assembly support is far from complete. It extracts only ENTRY() and ALTENTRY() from source file. Probably valid only for FreeBSD and Linux kernel source.

There is no concurrency control about tag files.

## AUTHOR

Shigio YAMAGUCHI, Hideki IWAMOTO and others.

## HISTORY

The gtags command appeared in FreeBSD 2.2.2.

# 5.3 htags - generate hypertext from source code.

## NAME

htags - generate hypertext from source code.

## SYNOPSIS

htags [-acDfFghInosTvwx][-d dbpath][-m name][-S cgidir][-t title][dir]

## DESCRIPTION

Htags makes hypertext of C, C++, Yacc, Java, PHP and Assembly source code.

In advance of using this command, you must execute gtags(1) from the root directory of the source tree. Then you can execute htags from the same place. Htags makes an directory named '`HTML`' and generates hypertext in it. You can start browsing from '`HTML/index.html`'.

Since htags generates static hypertext as long as the '`-D`' or '`-f`' option is not specified, you can move it anywhere and browse it by any browser without web server.

You must use same parser for both gtags(1) and htags. If you use the default parser, it is not necessary to consider for it.

## OPTIONS

If you are new on htags, it is recommended to invoke with the '`--suggest`' option. With the option, htags use popular options instead of you.
The following options are available:

'`-a`', '`--alphabet`'
: Make an alphabetical function index which is suitable for a large project.

'`--caution`'
: Include caution message to prohibit downloading.

'`-c`', '`--compact`'
: Compress html files by gzip(1). You need to set up a web server so that gzip(1) is invoked for each compressed file. See '`HTML/.htaccess`' that is generated by htags.

'`--cvsweb`' url
: Include cvsweb URL. url is used as base of URL. When directory '`CVS`' exists in the root directory of source project, the content of '`CVS/Repository`' is used as the relative path from the base.

‘`--cvsweb-cvsroot`’ cvsroot
: Specifies cvsroot in cvsweb URL.

‘`-D`’, ‘`--dynamic`’
: Generate object lists dynamically using CGI program. By default, object lists are generated statically. Though this option decrease both the size and the generation time of the hypertext, you need to set up a web server, and you cannot move the hypertext from the source directory.

‘`-d`’, ‘`--dbpath`’ dbpath
: Specifies the directory in which ‘`GTAGS`’ and ‘`GRTAGS`’ exist. The default is the current directory.

‘`--disable-grep`’
: Disable grep in the search form(-f,–form).

‘`-F`’, ‘`--frame`’
: Use frame for each part of the contents.

‘`-f`’, ‘`--form`’
: Support search form using CGI program. You need to set up a web server, and you cannot move the hypertext from the source directory.

‘`--full-path`’
: List file names with full path in the file index. By default, list just the last component of a path.

‘`-g`’, ‘`--gtags`’
: Execute gtags(1) before creating hypertext. The ‘`-v`’, ‘`-w`’ and dbpath are passed to gtags.

‘`--gtagsconf`’ file
: Load user’s configuration from file.

‘`--gtagslabel`’ label
: label is used for the label of configuration file. The default is `default`.

‘`-h`’, ‘`--func-header`’[=position]
: Insert function header for each function. By default, htags doesn’t generates it. You can specify the position using position argument, which allows one of `before`, `right` and `after`. The default position is `after`.

‘`-I`’, ‘`--icon`’
: Use icons instead of text for some links.

‘`--insert-footer`’ file
: Insert custom footer derived from file before </body> tag.

‘`--insert-header`’ file
: Insert custom header derived from file after <body> tag.

‘`--item-order`’ spec
: Specify order of items in the top page. The spec is a string consists of item signs in order. Each sign means as follows: c: caution, s: search form, m: mains, d: definition, f: files. The default is csmdf.

‘`-m`’, ‘`--main-func`’ name
: Specify the main function name. The default is `main`.

‘`-n`’, ‘`--line-number`’[=columns]
: Print line numbers. By default, doesn’t print line numbers. The default value of columns is 4.

‘`--no-map-file`’
: Doesn’t generate ‘`MAP`’ and ‘`FILEMAP`’ file. By default, htags generates them.

‘`-o`’, ‘`--other`’
: Pick up not only source files but also other files except for binary files.

‘`-S`’, ‘`--secure-cgi`’ cgidir
: Write CGI programs into the cgidir to realize a centralised CGI program. Script alias is ‘`/cgi-bin`’ by default. You can overwrite this value using config variable `script_alias` in ‘`gtags.conf`’.

‘`-s`’, ‘`--symbol`’
: Make anchors not only for object definitions and references but also other symbols.

‘`--statistics`’
: Print statistics information.

‘`--suggest`’
: Htags selects popular options instead of beginners. It is equivalent to ’-afghInosTxv –show-position’ now.

‘`-T`’, ‘`--table-flist`’[=fields]
: Generate file list using <table> tag. The fields is used for field number in a line. The default is 5.

‘`-t`’, ‘`--title`’ title
: The title of this hypertext. The default is the last component of the current directory.

‘`--table-list`’
: List tags using <table> tag.

‘`--tabs number`’
: Tab stop. The default is 8.

‘`-v`’, ‘`--verbose`’
: Verbose mode.

‘`-w`’, ‘`--warning`’
: Print warning messages.

‘`-x`’, ‘`--xhtml`’[=version]
: Generate XHTML hypertext instead of HTML. If the ‘`--frame`’ option is specified then generate XHTML-1.0 Frameset for index.html and generate XHTML-1.0 Transitional for other files, else if version is `1.1` or config variable `xhtml_version` is set to `1.1` then generate XHTML-1.1 else XHTML 1.0 Transitional.

dir
: The directory in which hypertext is generated. The default is the current directory.

## EXAMPLES

```
$ gtags -v
$ htags -sanohITvt 'Welcome to XXX source tour!'
$ firefox HTML/index.html

$ htags --suggest
```

## FILES

'`GTAGS`' Tag file for object definitions.

'`GRTAGS`' Tag file for object references.

'`GSYMS`' Tag file for other symbols.

'`GPATH`' Tag file for path of source files.

'`/etc/gtags.conf`', '`$HOME/.globalrc`'
Configuration file.

'`HTML/index.html`'
Index file for hypertext.

'`HTML/MAP`'
Mapping file for converting tag into path of hypertext. External systems can utilize this file.

'`HTML/FILEMAP`'
Mapping file for converting file name into path of hypertext. External systems can utilize this file.

'`HTML/style.css`'
Style sheet file. This file is generated when the '`--xhtml`' option is specified.

## ENVIRONMENT

The following environment variables affect the execution of htags:

*TMPDIR* If this variable is set, its value is used as the directory to make temporary files. The default is '`/tmp`'.

*GTAGSCONF*
If this variable is set, its value is used as the configuration file. The default is '`$HOME/.globalrc`'.

*GTAGSLABEL*
If this variable is set, its value is used as the label of configuration file. The default is `default`.

*GTAGSCACHE*
If this variable is set, its value is used as the size of B-tree cache. The default is 50000000 (bytes).

*GTAGSFORCECPP*
If this variable is set, each file whose suffix is 'h' is treated as a C++ source file.

## CONFIGURATION

The following configuration variables affect the execution of htags: If the '`--xhtml`' option is specified then all definitions of HTML tag are ignored. Instead, you can customize the appearance using style sheet file ('`style.css`').

`body_begin`(string)
: Begin tag for body. The default is '<body text=#191970 bgcolor=#f5f5dc vlink=gray>'.

`body_end`(string)
: End tag for body. The default is '</body>'.

`brace_begin`(string)
: Begin tag for brace. The default is '<font color=red>'.

`brace_end`(string)
: End tag for brace. The default is '</font>'.

`colorize_warned_line`(boolean)
: Colorize warned line using `warned_line_begin` and `warned_line_end`. The default is false.

`comment_begin`(string)
: Begin tag for comments. The default is '<font color=green>'.

`comment_end`(string)
: End tag for comments. The default is '</font>'.

`copy_files`(boolean)
: Copy files instead of linking. When the '`-f`' option is used, htags make links of tag files in '`cgi-bin`' directory by default.

`datadir`(string)
: Shared data directory. The default is '/usr/local/share' but you can change the value using configure script. Htags look up template files in the 'gtags' directory in this data directory.

`definition_header`(no|before|right|after)
: Position of function header. The default is 'no'.

`disable_grep`(boolean)
: Disable grep in search form(-f,–form). The default is false.

`dynamic`(boolean)
: Generate object list dynamically.

`enable_idutils`(boolean)
: Enable idutils in search form(-f,–form). The default is false.

`flist_fields`(number)
: Field number of file index. The default is 5.

`full_path`(boolean)
: List file names with full path in file index. By default, list just the last component of a path.

`gzipped_suffix`(string)
: Suffix for compressed html file. The default is 'ghtml'.

`hr`(string) Horizontal rules. The default is '<hr>'.

`htags_options`(string)
: Default options for htags. This value is inserted into the head of arguments.

`include_file_suffixes`(comma separated list)
: Suffixes of include file. The default is 'h,hxx,hpp,H,inc.php'.

`langmap`(comma separated list)
: Language mapping. Each comma-separated map consists of the language name, a colon, and a list of file extensions. Default mapping is 'c:.c.h,yacc:.y,asm:.s.S,java:.java,cpp:.c++.cc.cpp.cxx.hxx.hpp.C.H,php:.php.php3.phtml'.

`ncol`(number)
: Columns of line number. The default is 4.

`normal_suffix`(string)
: Suffix for normal html file. The default is 'html'.

`no_map_file`(boolean)
: Doesn't generate '`MAP`' and '`FILEMAP`' file. The default is false.

`other_files`(boolean)
: File index includes not only source files but also other files. The default is false.

`position_begin`(string)
: Begin tag for position mark. The default is '<font color=gray>'.

`position_end`(string)
: End tag for position mark. The default is '</font>'.

`reserved_begin`(string)
: Begin tag for reserved word. The default is ''.

`reserved_end`(string)
: End tag for reserved word. The default is ''.

`script_alias`(string)
: Script alias for safe cgi script ('`-S`').

`sharp_begin`(string)
: Begin tag for 'define'. The default is '<font color=darkred>'.

`sharp_end`(string)
: End tag for 'define'. The default is '</font>'.

`show_position`(boolean)
: Show position per function definition. The default is false.

`table_begin`(string)
: Begin tag for table. The default is '<table>'.

`table_end`(string)
: End tag for table. The default is '</table>'.

`table_flist`(boolean)
: Use <table> tag for file index. The default is false.

`table_list`(boolean)
: List tags using <table> tag. The default is false.

`tabs`(number)
: Tab stop. The default is 8.

`title_begin`(string)
: Begin tag for Title. The default is '<h1><font color=#cc0000>'.

`title_end`(string)
: End tag for Title. The default is '</font></h1>'.

`warned_line_begin`(string)
: Begin tag for line which htags warned. The default is ''.

`warned_line_end`(string)
: End tag for line which htags warned. The default is ''.

`xhtml_version`(1.0|1.1)
: XHTML version. 1.0 and 1.1 are acceptable. The default is 1.0.

## DIAGNOSTICS

Htags exits with a non 0 value if an error occurred, 0 otherwise.

## MESSAGE FORMAT

Verbose message has important level. The most important level is 0, the second it 1 and so on. All the message has level numbers leading blanks.

## SEE ALSO

gtags-parser(1), global(1), gtags(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

## BUG

Generated hypertext is VERY LARGE. In advance, check the space of your disk.

PHP support is far from complete.

## AUTHOR

Shigio YAMAGUCHI, Hideki IWAMOTO and others.

## HISTORY

The htags command appeared in FreeBSD 2.2.2.

## 5.4 gtags-parser - print cross reference list for gtags.

### NAME

gtags-parser - print cross reference list for gtags.

### SYNOPSIS

gtags-parser [-bdenqrstvw] file ...

### DESCRIPTION

Gtags-parser print cross reference list for gtags(1) from the specified C, C++, yacc, java, PHP and Assembly source to standard output. Each line of output contains the object name, the line number which it appears, the file in which it is defined, and a line image separated by white-space. It's same with the output of ctags(1) with '`-x`' option.

Depending upon the options provided to gtags-parser, objects will consist of object definitions, object references and other symbols.

Files whose names end in '`.c`' or '`.h`' are assumed to be C source files. Files whose names end in '`.c++`' '`.cc`' '`.cpp`' '`.cxx`' '`.hxx`' '`.hpp`' '`.C`' '`.H`' are assumed to be C++ source files. Files whose names end in '`.y`' are assumed to be YACC source files. Files whose names end in '`.java`' are assumed to be Java source files. Files whose names end in '`.php`' '`.php3`' '`.phtml`' are assumed to be PHP source files. Files whose names end in '`.s`' or '`.S`' are assumed to be Assembly source files. Other files are searched for C style definitions.

Yacc files each have a special tag. yyparse is the start of the second section of the yacc file.

This command is the default parser of GLOBAL source code tag system.

### OPTIONS

The following options are available:

'`-b`', '`--begin-block`'
: Force level 1 block to begin when reach the left brace at the first column. (C only)

'`-e`', '`--end-block`'
: Force level 1 block to end when reach the right brace at the first column. (C only)

'`-n`', '`--no-tags`'
: Suppress output of tags. It is useful to use with '`-w`' option.

'`-q`', '`--quiet`'
: Quiet mode.

'`-r`', '`--reference`'
: Locate object references instead of object definitions. '`GTAGS`' is needed at the current directory. (C, C++ and Java source only) By default, locate object definitions.

‘`-s`’, ‘`--symbol`’
: Collect symbols other than object definitions and references. By default, locate object definitions.

‘`-v`’, ‘`--verbose`’
: Verbose mode.

‘`-w`’, ‘`--warning`’
: Print warning message.

‘`--langmap`’=map
: Language mapping. Each comma-separated map consists of the language name, a colon, and a list of file extensions. Default mapping is ’c:.c.h,yacc:.y,asm:.s.S,java:.java,cpp:.c++.cc.cpp.cxx.hxx.hpp.C.H,php:.php.php3.phtml’.

The ‘`-r`’ and ‘`-s`’ options override each other; the last one specified determines the method used.

## ENVIRONMENT

The following environment variables affect the execution of gtags-parser:

*GTAGSFORCECPP*
: If this variable is set, each file whose suffix is ’h’ is treated as a C++ source file.

## DIAGNOSTICS

Gtags-parser exits with a non 0 value if an error occurred, 0 otherwise. Duplicate objects are not considered errors.

## SEE ALSO

global(1), gtags(1), htags(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

## BUG

Gtags-parser relies on the input being well formed, and any syntactical errors will completely confuse it.

## AUTHOR

Shigio YAMAGUCHI, Hideki IWAMOTO and others.

## HISTORY

The gtags-parser(gctags) command appeared in FreeBSD 2.2.2.

# 5.5 gozilla - force mozilla to display specified source file.

## NAME

gozilla - force mozilla to display specified source file.

## SYNOPSIS

gozilla [-b browser][-p][+no] file
gozilla [-b browser][-p] -d name

## DESCRIPTION

Gozilla force mozilla to display specified source file as a hypertext. Gozilla can be used with other browsers like firefox and epiphany.

In advance of using this command, you must execute gtags(1) and htags(1) at the root directory of the source tree to make tag files. Then you can execute gozilla at anywhere in the source tree.

First form:
You can specify source file and the line number optionally.

Second form:
You can specify definition name directly. Definition name must exist in '`GTAGS`' tag file.

Some browsers require you to load it before executing gozilla. Whether or not gozilla waits for exiting of browser depends on browser.

## OPTIONS

The following options are available:

'`+no`' line number. It must be a line on which function definition or function reference is exist. If you execute htags(1) with '`-l`' option, you can specify any line.

'`-b`' browser
browser to use. By default, it is assumed mozilla.

'`-d`' name print function.

'`--help`' Show help.

'`-p`' just print generated target URL.

file path of source file or alias name.

'`-q`', '`--quiet`'
Quiet mode.

'`-v`', '`--verbose`'
Verbose mode.

'`--version`'
Show version number.

## FILES

'`HTML/`' hypertext of source tree.

'`GTAGS/`' tags file for function definitions.

'`$HOME/.gozillarc`'
alias file. Please read source code for the detail.

## ENVIRONMENT

*GTAGSROOT*
: The directory which is the root of source tree.

*GTAGSDBPATH*
: The directory on which gtags database exist. This value is ignored when *GTAGSROOT* is not defined.

*BROWSER*
: browser to use. By default, it is assumed mozilla.

## EXAMPLES

```
$ gtags
$ htags
$ global -x main
main              82 ctags.c          main(argc, argv)
$ mozilla &
$ gozilla +82 ctags.c

$ firefox &
$ gozilla -b firefox +82 ctags.c

$ setenv BROWSER 'epiphany --new-tab'
$ epiphany &
$ gozilla +82 ctags.c
```

## DIAGNOSTICS

Gozilla exits with a non 0 value if an error occurred, 0 otherwise.

## SEE ALSO

global(1), gtags(1), htags(1), firefox(1), epiphany(1), mozilla(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

## NOTES

Gozilla means 'Global for mozilla'.

## BUGS

Gozilla can treat not only source file but also normal file, directory, HTML file and even URL, because it is omnivorous.

## AUTHORS

Shigio YAMAGUCHI.

## HISTORY

The gozilla command appeared in FreeBSD 2.2.2 but did not installed by default.

## 5.6 gtags-cscope - pseudo cscope which implements the line-oriented interface

### NAME

gtags-cscope - pseudo cscope which implements the line-oriented interface

### SYNOPSIS

gtags-cscope [-Cqv]

### DESCRIPTION

Gtags-cscope is a pseudo cscope which implements the line-oriented interface. You can use this command for various clients instead of true cscope.

Since gtags-cscope is intended to make GLOBAL available through cscope interface, the output is not necessarily the same as cscope.

Command 2 is not available. This command is used as a internal command for context search.

### OPTIONS

The following options are available:

‘`-C`’, ‘`--ignore-case`’
: Ignore letter case when searching.

‘`-q`’, ‘`--quiet`’
: Quiet mode.

‘`-v`’, ‘`--verbose`’
: Verbose mode.

### EXAMPLES

```
$ gtags-cscope
>> help
0<arg>: Find this C symbol
1<arg>: Find this definition
2<arg>: <NA>(This command is used by gtags-cscope.vim internally)
3<arg>: Find functions calling this function
4<arg>: Find this text string
6<arg>: Find this egrep pattern
7<arg>: Find this file
8<arg>: Find files #including this file
c: Toggle ignore/use letter case
r: Rebuild the database
q: Quit the session
h: Show help
>> 1main
cscope: 9 lines
```

```
global/global.c main 158 main(int argc, char **argv)
gozilla/gozilla.c main 155 main(int argc, char **argv)
gtags-parser/gctags.c main 158 main(int argc, char **argv)
gtags-cscope/gtags-cscope.c main 115 main(int argc, char **argv)
gtags/gtags.c main 150 main(int argc, char **argv)
htags-refkit/htags_path2url.c main 281 main(int argc, char **argv)
htags/htags.c main 1400 main(int argc, char **argv)
libglibc/getopt.c main 704 main (argc, argv)
libglibc/getopt1.c main 93 main (argc, argv)
>> q
$ _
```

## DIAGNOSTICS

Gtags-cscope exits with a non 0 value if an error occurred, 0 otherwise.

## SEE ALSO

cscope(1), gtags-parser(1), gtags(1), global(1), htags(1).

GNU GLOBAL source code tag system
(http://www.gnu.org/software/global/).

## BUG

The second field of the output is almost <unknown> since GLOBAL doesn't recognize it.
Command 2 (Find functions called by this function) is not implemented.

## AUTHOR

Shigio YAMAGUCHI.

## HISTORY

The gtags-cscope command appeared in 2006.

# Appendix A Copying This Manual

## A.1 GNU Free Documentation License

Version 1.2, November 2002

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# Appendix B Business Model

## B.1 The BOKIN Model Definition

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### Introduction

*BOKIN Model* is a business model to obtain proceeds by widely collecting donations while developing and distributing free software. This model is constructed not to take away consumer's freedom of software.

The business which comply with the following criteria can be called *a business based on BOKIN Model*.

### Criteria

1. CORPORATION
   The person who start a business based on BOKIN Model must be a business corporation registered in the home country. (Herein after called *the corporation*)
2. FREE SOFTWARE
   The corporation develops free software. (Herein after called *the BOKINware*)
3. LICENSE
   The corporation distributes the BOKINware under GNU GPL (GNU General Public License) and GNU FDL (GNU Free Documentation License). Exceptionally, external packages which the BOKINware uses, small supporting files, short manuals and rough documentation can use simple all-permissive license, compatible with GNU GPL.
4. COPYRIGHT MANAGEMENT
   The corporation manages copyright on the BOKINware for consumers to keep on using it at ease.
   - Every file in the BOKINware should have a legally valid copyright notice and a license notice.
   - To include program which is assigned from another developer, the corporation receives a disclaimer paper or assignment paper signed by the author.
   - To include program which is not assigned, the corporation confirms its license is GNU GPL or compatible with GNU GPL, lists the files and authors in a file named '`AUTHORS`', and lists the license in a file named '`LICENSE`'. The BOKINware should contain these two files.
5. MAILING LIST
   The corporation maintains mailing lists for consumers to cooperate one another.

   The list members, including the corporation, don't owe any duty.

   The mailing lists should include the following two at least.

- Bug mailing list
  This list distributes, to the active maintainers of the BOKINware, bug reports and fixes for, and suggestions for improvements in the BOKINware. This list is also for user discussion.
- Help mailing list
  This list is the place for authors, users and installers of the BOKINware to ask for help.

The mailing lists can be replaced with a similar communication tool.

The corporation can decide the operation policy of the list, but must not obstruct the list members to cooperate one another.

6. COLLECTING DONATIONS
   The corporation collects donations widely as its proceeds.

   The corporation must not offer the donor an individual supply of profit.
7. DONOR LIST
   The corporation open the donor list to the public.

   The donor list includes the following information.

   - Date of donation (The date when the corporation received the donation)
   - Amount of donation (Amount which the corporation received)
   - Donor's name
   - Donor's nationality

   When donor's name and nationality are unknown or the donor prefers to remain anonymous, they are treated as *anonymous*.

   The BOKINware should contain the donor list as a file named '`DONORS`'. It is preferable that the list is open to the public even on the Internet.
8. BOKIN MODEL DEFINITION
   The BOKINware should contain the present definition as a file named '`BOKIN_MODEL`'.

## Renewal

The author may publish revised and/or new versions of the BOKIN Model Definition from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

## B.2 Frequently Asked Questions

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### BOKIN Model Frequently Asked Questions

1. What does *BOKIN* mean?
   *BOKIN* means collecting donations in Japanese. (*BO*=collect, *KIN*=money)
2. What is the purpose to require the person who start a BOKIN model business being a registered corporation?
   The purpose is to prevent people from donating to the person who does not exist actually.
3. Is annoying copyright management necessary?
   Yes, it is. Copyright management is absolutely necessary for consumers to keep on using the BOKINware at ease.

   It is dangerous to use the software whose copyright is not neatly managed. If you use such software, you might suddenly be prohibited to use it, or be claimed a license fee of high priced. These are not imaginary fears but troubles of reality.
4. Why is program license limited to GNU GPL?
   Because GNU GPL defends consumers in two points.
   - Copyleft License
     Since GNU GPL is copyleft license, it makes a program free, and requiring all modified and extended versions of the program to be free as well. As a result, consumer can keep on using the BOKINware at ease in the future.
   - Widely Known
     Since GNU GPL is widely known, and is explained frequently, it does not become the load to consumer. It is troublesome for consumer to understand new licenses.
5. What is the purpose of the donor list?
   There are two purposes.
   - To defend freedom of donation.
     The consumer can decide whether to donate after understanding the situation of the donation. If nothing being informed, freedom does not exist there. In BOKIN model, consumers are not isolated existence.
   - To praise donation.
     To praise donation brings new donors. Since BOKIN model owes all to people's free wills, we cannot praise the donation too much.
6. Is donation spent on the BOKINware?
   It depends on the management of the corporation. Since donations become the proceeds of the corporation, the corporation itself decides the usage under its freedom.
7. Is the donor list kept true?
   It is very difficult to mix lies in the public information, because it is checked by various methods.

- Donors can confirm whether they are listed.
- People can ask whether to have donated to the donors in the list.
- The tax office can examine the contradiction between the content of the list and the content of the declaration of the corporation's taxation business.

8. Why is the corporation prohibited from doing an individual supply of profit for the donors?
   When individual supply of profit becomes ordinary, donation fall into the payment for the profit. We cannot call it donation. BOKIN Model business should be supported only by people's free will.

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