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Version 2.0, January 2004

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Version 3.0, 18 August 2009

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## Broadcom Common Firmware Environment (CFE)

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## CHASHTABLE Readme

<https://github.com/ryantenney/chashtable/blob/master/README>

C Hashtable Implementation by Christopher Clark

<http://www.cl.cam.ac.uk/~cwc22/hashtable/>

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smdb string hash function

<http://www.cse.yorku.ca/~oz/hash.html>

Source code for a hash table data structure in C

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Christopher Clark, January 2005.

Defined functions

create\_hashtable

hashtable\_insert

hashtable\_search

hashtable\_remove

hashtable\_count

hashtable\_destroy

## Example of use

```
struct hashtable *h;

struct some_key *k;

struct some_value *v;

static unsigned int      hash_from_key_fn( void *k );
static int               keys_equal_fn ( void *key1, void *key2 );

h = create_hashtable(16, hash_from_key_fn, keys_equal_fn);

insert_key  = (struct some_key *) malloc(sizeof(struct some_key));
retrieve_key = (struct some_key *) malloc(sizeof(struct some_key));

v = (struct some_value *) malloc(sizeof(struct some_value));

    (You should initialise insert_key, retrieve_key and v here)

if (! hashtable_insert(h,insert_key,v) )
{   exit(-1);   }

if (NULL == (found = hashtable_search(h,retrieve_key) ))
{   printf("not found!");   }

if (NULL == (found = hashtable_remove(h,retrieve_key) ))
{   printf("Not found\n");   }

hashtable_destroy(h,1); /* second arg indicates "free(value)" */
```

## Description

The table will increase in size as elements are added, to keep the ratio of elements to table size below a threshold. The table is sized by selecting a prime number of appropriate magnitude, to ensure best distribution of the contents.

For improved type safety, macros have been defined and may be used to define type-safe(r) hashtable access functions, with methods specialized to take known key and value types as parameters. Example: Insert this at the start of your file:

```
DEFINE_HASHTABLE_INSERT(insert_some, struct some_key, struct some_value);

DEFINE_HASHTABLE_SEARCH(search_some, struct some_key, struct some_value);

DEFINE_HASHTABLE_REMOVE(remove_some, struct some_key, struct some_value);
```

This defines the functions 'insert\_some', 'search\_some' and 'remove\_some'. These operate just like hashtable\_insert etc., with the same parameters, but their function signatures have 'struct some\_key \*' rather than 'void \*', and hence can generate compile time errors if your program is supplying incorrect data as a key (and similarly for value).

Note that the hash and key equality functions passed to create\_hashtable still take 'void \*' parameters instead of 'some key \*'. This shouldn't be a serious issue as they're only defined and passed once, and the other functions will ensure that only valid keys are supplied to them.

The cost for this checking is increased code size and runtime overhead - if performance is important, it may be worth switching back to the unsafe methods once your program has been debugged with the safe methods.

## Iterator

The iterator is a simple one-way iterator over the hashtable contents, providing assessors for the key and value at the current element.

```
Iterator constructor only returns a valid iterator if
the hashtable is not empty */
```

```
if (hashtable_count(h) > 0)
{
itr = hashtable_iterator(h);
do {
k = hashtable_iterator_key(itr);
v = hashtable_iterator_value(itr);

/* here (k,v) are a valid (key, value) pair */
/* We could call 'hashtable_remove(h,k)' - and this operation
'free's k and returns v.
However, after the operation, the iterator is broken.
```

```
    /  
    } while (hashtable_iterator_advance(itr));  
    }  
    free(itr);
```

## Notes

If hashing strings, remember that strcmp is not a boolean comparison function directly suitable for keys\_equal\_fn.

Archived copy of the original hashtable implementation, where table size is a power of two, rather than prime. [ hashtable\_powers.c ]

C Hash Table

## Credits

Thanks to Glenn Lawyer for pointing out a Makefile fix for the tester example code.

Thanks to Holger Schemel for reminding me to actually free the hashtable in the destroy function. Also for the hashtable\_change function, now found in the hashtable utility source.

Thanks to John Muehlhausen for the iterator bug report - fixed 2003-03-19.

Thanks to Leonid Nilva for feedback.

Thanks to Mark Seneski for thoroughly reviewing my code, catching some of my slips from best practice, and prompting me to finally get around to sizing the table using prime numbers.

Thanks due to Aaron Krowne for his table of prime numbers used to do this.

<http://planetmath.org/encyclopedia/GoodHashTablePrimes.html>

Thanks to A. B. M. Omar Faruk for spotting the bug in the sample code on the web page, where the same key struct was used for insertion into the hashtable, and then also for retrieval. Ownership of the key is claimed when it is inserted.

Christopher Clark

Updated 29th April, 2007.

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## arundel / freebsd-head

<https://github.com/arundel/freebsd-head>

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### tools/shhopt.c, tools/shhopt.h:

Title: shhopt - library for parsing command line options.

Version: 1.1.2

Entered-date: 23MAR97

Description: C-functions for parsing command line options, both traditional one-character options, and GNU'ish--long-options.

Keywords: programming, library, lib, commandline, options



Author: s.h.huseby@usit.uio.no (Sverre H. Huseby)

Primary-site: <http://www.ifi.uio.no/~sverrehu/pub-unix/>

Alternate-site: [sunsite.unc.edu/pub/Linux/libs](http://sunsite.unc.edu/pub/Linux/libs)

shhopt-1.1.2.tar.gz

Platforms: Requires ANSI C-compiler.

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## ncurses\_examples

[https://github.com/zdennis/ncurses\\_examples/](https://github.com/zdennis/ncurses_examples/)

These examples are based on the book Programmer's Guide to nCurses by Dan Gookin. The book by Gookin was written targeted for C, and these examples are targeted for the Ncurses wrapper library in Ruby.

These are not to explain or introduce nCurses or its ruby library. I am simply sharing my journey of learning about nCurses with you by providing the examples free of charge. In my search for using nCurses I have seen a lot of questions asked and not very many answers given. Perhaps these examples will help provide some clarification.

If they do provide help for you I'd love to know!

[zach.dennis@gmail.com](mailto:zach.dennis@gmail.com)

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
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2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
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2.6.3	2.6.2	2009	PSF	yes
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