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Julian Seward, Cambridge, UK.

[jseward@acm.org](mailto:jseward@acm.org)

bzip2/libbzip2 version 1.0.2 of 30 December 2001

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```
/*
```

```
minibz2
```

```
libbz2.dll test program.
```

```
by Yoshioka Tsuneo (tsuneo@rr.iij4u.or.jp)
```

```
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```

```
usage: minibz2 [-d] [-{1,2,..9}] [[srcfilename] destfilename]
```

```
*/
```

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 */
```

```
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```

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- \*/

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Version 2.1, February 1999

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Received: from localhost (localhost [127.0.0.1])  
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Mime-Version: 1.0  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit  
References: <Pine.LNX.4.44.0603012011250.6386-100000@lnx.bridge.intra>  
To: mps@bridge.intra  
Subject: Re: testregex licensing question  
X-GMX-Antivirus: -1 (not scanned, may not use virus scanner)  
X-GMX-Antispam: 0 (Mail was not recognized as spam)  
X-GMX-UID: IJF3ZO9DeSEkJ2TcbHQhaXN1IGRvb0Ca  
X-Virus-Scanned: by amavisd-new at localhost  
Status: RO  
X-Status:  
X-Keywords:  
  
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using # comment style to be complete

let me know how it works with your libc  
also pass on any new tests you cook up

On Wed, 1 Mar 2006 20:15:02 +0100 (CET) Peter S. Mazinger wrote:

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> Is it allowed to use the code there, or should I accomodate the testsuite  
> to download the needed files from the original site each time it is ran?

> Thanks, Peter

> --

> Peter S. Mazinger <ps dot m at gmx dot net> ID: 0xA5F059F2  
> Key fingerprint = 92A4 31E1 56BC 3D5A 2D08 BB6E C389 975E A5F0 59F2  
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## 1.4 libpcap 1.8.1

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Ty Coon, President of Vice  
That`s all there is to it!

```
/* number.c: Implements arbitrary precision numbers. */  
/*
```

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\*\*\*\*\*/

```
#include <stdio.h>
#include <config.h>
#include <number.h>
#include <assert.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h> /* Prototypes needed for external utility routines. */
```

```
#define bc_rt_warn rt_warn
#define bc_rt_error rt_error
#define bc_out_of_memory out_of_memory
```

```
_PROTOTYPE(void rt_warn, (char *mesg ,...));
_PROTOTYPE(void rt_error, (char *mesg ,...));
_PROTOTYPE(void out_of_memory, (void));
```

```
/* Storage used for special numbers. */
```

```
bc_num _zero_;
bc_num _one_;
bc_num _two_;
```

```
static bc_num _bc_Free_list = NULL;
```

```
/* new_num allocates a number and sets fields to known values. */
```

```
bc_num
bc_new_num (length, scale)
    int length, scale;
{
    bc_num temp;

    if (_bc_Free_list != NULL) {
        temp = _bc_Free_list;
        _bc_Free_list = temp->n_next;
    } else {
        temp = (bc_num) malloc (sizeof(bc_struct));
        if (temp == NULL) bc_out_of_memory ();
    }
}
```

```

}
temp->n_sign = PLUS;
temp->n_len = length;
temp->n_scale = scale;
temp->n_refs = 1;
temp->n_ptr = (char *) malloc (length+scale);
if (temp->n_ptr == NULL) bc_out_of_memory();
temp->n_value = temp->n_ptr;
memset (temp->n_ptr, 0, length+scale);
return temp;
}

/* "Frees" a bc_num NUM. Actually decreases reference count and only
   frees the storage if reference count is zero. */

```

```

void
bc_free_num (num)
    bc_num *num;
{
    if (*num == NULL) return;
    (*num)->n_refs--;
    if ((*num)->n_refs == 0) {
        if ((*num)->n_ptr)
            free ((*num)->n_ptr);
        (*num)->n_next = _bc_Free_list;
        _bc_Free_list = *num;
    }
    *num = NULL;
}

```

```

/* Initialize the number package! */

```

```

void
bc_init_numbers ()
{
    _zero_ = bc_new_num (1,0);
    _one_ = bc_new_num (1,0);
    _one_->n_value[0] = 1;
    _two_ = bc_new_num (1,0);
    _two_->n_value[0] = 2;
}

```

```

/* Make a copy of a number! Just
   increments the reference count! */

```

```

bc_num

```

```

bc_copy_num (num)
    bc_num num;
{
    num->n_refs++;
    return num;
}

```

/\* Initialize a number NUM by making it a copy of zero. \*/

```

void
bc_init_num (num)
    bc_num *num;
{
    *num = bc_copy_num (_zero_);
}

```

/\* For many things, we may have leading zeros in a number NUM.
 \_bc\_rm\_leading\_zeros just moves the data "value" pointer to the
 correct place and adjusts the length. \*/

```

static void
_bc_rm_leading_zeros (num)
    bc_num num;
{
    /* We can move n_value to point to the first non zero digit! */
    while (*num->n_value == 0 && num->n_len > 1) {
        num->n_value++;
        num->n_len--;
    }
}

```

/\* Compare two bc numbers. Return value is 0 if equal, -1 if N1 is less
 than N2 and +1 if N1 is greater than N2. If USE\_SIGN is false, just
 compare the magnitudes. \*/

```

static int
_bc_do_compare (n1, n2, use_sign, ignore_last)
    bc_num n1, n2;
    int use_sign;
    int ignore_last;
{
    char *n1ptr, *n2ptr;
    int count;

    /* First, compare

```

```

signs. */
if (use_sign && n1->n_sign != n2->n_sign)
{
    if (n1->n_sign == PLUS)
return (1); /* Positive N1 > Negative N2 */
    else
return (-1); /* Negative N1 < Positive N1 */
}

/* Now compare the magnitude. */
if (n1->n_len != n2->n_len)
{
    if (n1->n_len > n2->n_len)
{
        /* Magnitude of n1 > n2. */
        if (!use_sign || n1->n_sign == PLUS)
            return (1);
        else
            return (-1);
    }
    else
{
        /* Magnitude of n1 < n2. */
        if (!use_sign || n1->n_sign == PLUS)
            return (-1);
        else
            return (1);
    }
}

/* If we get here, they have the same number of integer digits.
   check the integer part and the equal length part of the fraction. */
count = n1->n_len + MIN (n1->n_scale, n2->n_scale);
n1ptr = n1->n_value;
n2ptr = n2->n_value;

while ((count > 0) && (*n1ptr == *n2ptr))
{
    n1ptr++;
    n2ptr++;
    count--;
}
if (ignore_last && count == 1 && n1->n_scale == n2->n_scale)
    return (0);
if (count !=
0)
{
    if (*n1ptr > *n2ptr)

```

```

{
/* Magnitude of n1 > n2. */
if (!use_sign || n1->n_sign == PLUS)
    return (1);
else
    return (-1);
}
else
{
/* Magnitude of n1 < n2. */
if (!use_sign || n1->n_sign == PLUS)
    return (-1);
else
    return (1);
}
}

/* They are equal up to the last part of the equal part of the fraction. */
if (n1->n_scale != n2->n_scale)
{
    if (n1->n_scale > n2->n_scale)
    {
        for (count = n1->n_scale-n2->n_scale; count>0; count--)
            if (*n1ptr++ != 0)
            {
                /* Magnitude of n1 > n2. */
                if (!use_sign || n1->n_sign == PLUS)
                    return (1);
                else
                    return (-1);
            }
    }
    else
    {
        for (count = n2->n_scale-n1->n_scale; count>0; count--)
            if (*n2ptr++ != 0)
            {
                /* Magnitude of n1 < n2. */
                if (!use_sign || n1->n_sign == PLUS)
                    return (-1);
                else
                    return (1);
            }
    }
}
}

/* They must be equal! */
return (0);

```

```

}

/* This is the "user callable" routine to compare numbers
N1 and N2. */

int
bc_compare (n1, n2)
    bc_num n1, n2;
{
    return _bc_do_compare (n1, n2, TRUE, FALSE);
}

/* In some places we need to check if the number is negative. */

char
bc_is_neg (num)
    bc_num num;
{
    return num->n_sign == MINUS;
}

/* In some places we need to check if the number NUM is zero. */

char
bc_is_zero (num)
    bc_num num;
{
    int count;
    char *nptr;

    /* Quick check. */
    if (num == _zero_) return TRUE;

    /* Initialize */
    count = num->n_len + num->n_scale;
    nptr = num->n_value;

    /* The check */
    while ((count > 0) && (*nptr++ == 0)) count--;

    if (count != 0)
        return FALSE;
    else
        return TRUE;
}

/* In some places we need to check if the number NUM is almost zero.

```

Specifically, all but the last digit is 0 and the last digit is 1.

Last digit is defined by scale. \*/

```
char
bc_is_near_zero (num, scale)
    bc_num num;
    int scale;
{
int count;
char *nptr;

/* Error checking */
if (scale > num->n_scale)
    scale = num->n_scale;

/* Initialize */
count = num->n_len + scale;
nptr = num->n_value;

/* The check */
while ((count > 0) && (*nptr++ == 0)) count--;

if (count != 0 && (count != 1 || *--nptr != 1))
    return FALSE;
else
    return TRUE;
}

/* Perform addition: N1 is added to N2 and the value is
returned. The signs of N1 and N2 are ignored.
SCALE_MIN is to set the minimum scale of the result. */

static bc_num
_bc_do_add (n1, n2, scale_min)
    bc_num n1, n2;
    int scale_min;
{
    bc_num sum;
    int sum_scale, sum_digits;
    char *n1ptr, *n2ptr, *sumptr;
    int carry, n1bytes, n2bytes;
    int count;

/* Prepare sum. */
sum_scale = MAX (n1->n_scale, n2->n_scale);
sum_digits = MAX (n1->n_len, n2->n_len) + 1;
sum = bc_new_num (sum_digits, MAX(sum_scale, scale_min));
```

```

/* Zero extra digits made by scale_min. */
if (scale_min > sum_scale)
{
    sumptr = (char *) (sum->n_value + sum_scale + sum_digits);
    for (count = scale_min - sum_scale; count > 0; count--)
*sumptr++
= 0;
}

/* Start with the fraction part. Initialize the pointers. */
n1bytes = n1->n_scale;
n2bytes = n2->n_scale;
n1ptr = (char *) (n1->n_value + n1->n_len + n1bytes - 1);
n2ptr = (char *) (n2->n_value + n2->n_len + n2bytes - 1);
sumptr = (char *) (sum->n_value + sum_scale + sum_digits - 1);

/* Add the fraction part. First copy the longer fraction.*/
if (n1bytes != n2bytes)
{
    if (n1bytes > n2bytes)
while (n1bytes > n2bytes)
    { *sumptr-- = *n1ptr--; n1bytes--; }
    else
while (n2bytes > n1bytes)
    { *sumptr-- = *n2ptr--; n2bytes--; }
}

/* Now add the remaining fraction part and equal size integer parts. */
n1bytes += n1->n_len;
n2bytes += n2->n_len;
carry = 0;
while ((n1bytes > 0) && (n2bytes > 0))
{
    *sumptr = *n1ptr-- + *n2ptr-- + carry;
    if (*sumptr > (BASE-1))
    {
        carry = 1;
        *sumptr -= BASE;
    }
    else
carry = 0;
    sumptr--;
    n1bytes--;
    n2bytes--;
}

/* Now add carry the

```



```

longer integer part. */
if (n1bytes == 0)
    { n1bytes = n2bytes; n1ptr = n2ptr; }
while (n1bytes-- > 0)
    {
        *sumptr = *n1ptr-- + carry;
        if (*sumptr > (BASE-1))
        {
            carry = 1;
            *sumptr -= BASE;
        }
        else
            carry = 0;
        sumptr--;
    }

/* Set final carry. */
if (carry == 1)
    *sumptr += 1;

/* Adjust sum and return. */
_bc_rm_leading_zeros (sum);
return sum;
}

/* Perform subtraction: N2 is subtracted from N1 and the value is
returned. The signs of N1 and N2 are ignored. Also, N1 is
assumed to be larger than N2. SCALE_MIN is the minimum scale
of the result. */

static bc_num
_bc_do_sub (n1, n2, scale_min)
    bc_num n1, n2;
    int scale_min;
{
    bc_num diff;
    int diff_scale, diff_len;
    int min_scale, min_len;
    char *n1ptr, *n2ptr, *diffptr;
    int borrow, count, val;

/* Allocate temporary storage. */
diff_len = MAX (n1->n_len, n2->n_len);
diff_scale = MAX (n1->n_scale, n2->n_scale);
min_len = MIN (n1->n_len, n2->n_len);
min_scale = MIN (n1->n_scale, n2->n_scale);
diff = bc_new_num (diff_len, MAX(diff_scale, scale_min));

```

```

/* Zero extra digits made by scale_min. */
if (scale_min > diff_scale)
{
    diffptr = (char *) (diff->n_value + diff_len + diff_scale);
    for (count = scale_min - diff_scale; count > 0; count--)
*diffptr++ = 0;
}

/* Initialize the subtract. */
n1ptr = (char *) (n1->n_value + n1->n_len + n1->n_scale - 1);
n2ptr = (char *) (n2->n_value + n2->n_len + n2->n_scale - 1);
diffptr = (char *) (diff->n_value + diff_len + diff_scale - 1);

/* Subtract the numbers. */
borrow = 0;

/* Take care of the longer scaled number. */
if (n1->n_scale != min_scale)
{
    /* n1 has the longer scale */
    for (count = n1->n_scale - min_scale; count > 0; count--)
*diffptr-- = *n1ptr--;
}
else
{
    /* n2 has the longer scale */
    for (count = n2->n_scale - min_scale; count > 0; count--)
{
        val = - *n2ptr-- - borrow;
        if (val < 0)

        {
            val += BASE;
            borrow = 1;
        }
        else
            borrow = 0;
        *diffptr-- = val;
    }
}

/* Now do the equal length scale and integer parts. */

for (count = 0; count < min_len + min_scale; count++)
{
    val = *n1ptr-- - *n2ptr-- - borrow;
    if (val < 0)

```

```

{
    val += BASE;
    borrow = 1;
}
else
borrow = 0;
    *diffptr-- = val;
}

/* If n1 has more digits than n2, we now do that subtract. */
if (diff_len != min_len)
{
    for (count = diff_len - min_len; count > 0; count--)
    {
        val = *n1ptr-- - borrow;
        if (val < 0)
        {
            val += BASE;
            borrow = 1;
        }
        else
            borrow = 0;
        *diffptr-- = val;
    }
}

/* Clean up and return. */
_bc_rm_leading_zeros (diff);
return diff;
}

/* Here is the full subtract routine that takes care of negative numbers.
N2 is subtracted from N1 and the result placed in RESULT. SCALE_MIN
is the minimum scale for the result. */

void
bc_sub (n1, n2, result, scale_min)

    bc_num n1, n2, *result;
    int scale_min;
{
    bc_num diff = NULL;
    int cmp_res;
    int res_scale;

    if (n1->n_sign != n2->n_sign)
    {

```

```

diff = _bc_do_add (n1, n2, scale_min);
diff->n_sign = n1->n_sign;
}
else
{
/* subtraction must be done. */
/* Compare magnitudes. */
cmp_res = _bc_do_compare (n1, n2, FALSE, FALSE);
switch (cmp_res)
{
case -1:
/* n1 is less than n2, subtract n1 from n2. */
diff = _bc_do_sub (n2, n1, scale_min);
diff->n_sign = (n2->n_sign == PLUS ? MINUS : PLUS);
break;
case 0:
/* They are equal! return zero! */
res_scale = MAX (scale_min, MAX(n1->n_scale, n2->n_scale));
diff = bc_new_num (1, res_scale);
memset (diff->n_value, 0, res_scale+1);
break;
case 1:
/* n2 is less than n1, subtract n2 from n1. */
diff = _bc_do_sub (n1, n2, scale_min);
diff->n_sign = n1->n_sign;
break;
}
}

/* Clean up and return. */
bc_free_num (result);
*result = diff;
}

/* Here is the
full add routine that takes care of negative numbers.
N1 is added to N2 and the result placed into RESULT. SCALE_MIN
is the minimum scale for the result. */

void
bc_add (n1, n2, result, scale_min)
    bc_num n1, n2, *result;
    int scale_min;
{
bc_num sum = NULL;
int cmp_res;
int res_scale;

```

```

if (n1->n_sign == n2->n_sign)
{
    sum = _bc_do_add (n1, n2, scale_min);
    sum->n_sign = n1->n_sign;
}
else
{
    /* subtraction must be done. */
    cmp_res = _bc_do_compare (n1, n2, FALSE, FALSE); /* Compare magnitudes. */
    switch (cmp_res)
    {
case -1:
        /* n1 is less than n2, subtract n1 from n2. */
        sum = _bc_do_sub (n2, n1, scale_min);
        sum->n_sign = n2->n_sign;
        break;
case 0:
        /* They are equal! return zero with the correct scale! */
        res_scale = MAX (scale_min, MAX(n1->n_scale, n2->n_scale));
        sum = bc_new_num (1, res_scale);
        memset (sum->n_value, 0, res_scale+1);
        break;
case 1:
        /* n2 is less than n1, subtract n2 from
n1. */
        sum = _bc_do_sub (n1, n2, scale_min);
        sum->n_sign = n1->n_sign;
    }
}

/* Clean up and return. */
bc_free_num (result);
*result = sum;
}

/* Recursive vs non-recursive multiply crossover ranges. */
#if defined(MULDIGITS)
#include "muldigits.h"
#else
#define MUL_BASE_DIGITS 80
#endif

int mul_base_digits = MUL_BASE_DIGITS;
#define MUL_SMALL_DIGITS mul_base_digits/4

/* Multiply utility routines */

```

```

static bc_num
new_sub_num (length, scale, value)
    int length, scale;
    char *value;
{
    bc_num temp;

    if (_bc_Free_list != NULL) {
        temp = _bc_Free_list;
        _bc_Free_list = temp->n_next;
    } else {
        temp = (bc_num) malloc (sizeof(bc_struct));
        if (temp == NULL) bc_out_of_memory ();
    }
    temp->n_sign = PLUS;
    temp->n_len = length;
    temp->n_scale = scale;
    temp->n_refs = 1;
    temp->n_ptr = NULL;
    temp->n_value = value;
    return temp;
}

static void
_bc_simp_mul (bc_num n1, int n1len, bc_num n2, int n2len, bc_num *prod,
             int full_scale)
{
    char *n1ptr, *n2ptr, *pvptr;
    char *n1end, *n2end; /* To the end of n1 and n2. */
    int indx, sum, prodlen;

    prodlen = n1len+n2len+1;

    *prod = bc_new_num (prodlen, 0);

    n1end = (char *) (n1->n_value + n1len - 1);
    n2end = (char *) (n2->n_value + n2len - 1);
    pvptr = (char *) ((*prod)->n_value + prodlen - 1);
    sum = 0;

    /* Here is the loop... */
    for (indx = 0; indx < prodlen-1; indx++)
    {
        n1ptr = (char *) (n1end - MAX(0, indx-n2len+1));
        n2ptr = (char *) (n2end - MIN(indx, n2len-1));
        while ((n1ptr >= n1->n_value) && (n2ptr <= n2end))
            sum += *n1ptr-- * *n2ptr++;
        *pvptr-- = sum % BASE;
    }
}

```

```

    sum = sum / BASE;
}
*pvptr = sum;
}

/* A special adder/subtractor for the recursive divide and conquer
multiply algorithm. Note: if sub is called, accum must
be larger than what is being subtracted. Also, accum and val
must have n_scale = 0. (e.g. they must look like integers. *) */
static void
_bc_shift_addsub (bc_num accum, bc_num val, int
shift, int sub)
{
signed char *accp, *valp;
int count, carry;

count = val->n_len;
if (val->n_value[0] == 0)
    count--;
assert (accum->n_len+accum->n_scale >= shift+count);

/* Set up pointers and others */
accp = (signed char *) (accum->n_value +
    accum->n_len + accum->n_scale - shift - 1);
valp = (signed char *) (val->n_value + val->n_len - 1);
carry = 0;

if (sub) {
    /* Subtraction, carry is really borrow. */
    while (count--) {
        *accp -= *valp-- + carry;
        if (*accp < 0) {
            carry = 1;
            *accp-- += BASE;
        } else {
            carry = 0;
        }
        accp--;
    }
    while (carry) {
        *accp -= carry;
        if (*accp < 0)
            *accp-- += BASE;
        else
            carry = 0;
    }
} else {

```

```

/* Addition */
while (count--) {
    *accp += *valp-- + carry;
    if (*accp > (BASE-1)) {
carry = 1;
        *accp-- -= BASE;
    } else {
carry = 0;
accp--;
    }
}
while (carry) {
    *accp += carry;
    if (*accp > (BASE-1))
*accp--
    -= BASE;
    else
carry = 0;
}
}
}

```

/\* Recursive divide and conquer multiply algorithm.

Based on

Let  $u = u_0 + u_1 \cdot (b^n)$

Let  $v = v_0 + v_1 \cdot (b^n)$

Then  $uv = (B^{2n} + B^n) \cdot u_1 \cdot v_1 + B^n \cdot (u_1 - u_0) \cdot (v_0 - v_1) + (B^{n+1}) \cdot u_0 \cdot v_0$

B is the base of storage, number of digits in  $u_1, u_0$  close to equal.

\*/

static void

\_bc\_rec\_mul (bc\_num u, int ulen, bc\_num v, int vlen, bc\_num \*prod,  
int full\_scale)

{

bc\_num u0, u1, v0, v1;

int u0len, v0len;

bc\_num m1, m2, m3, d1, d2;

int n, prodlen, m1zero;

int d1len, d2len;

/\* Base case? \*/

if ((ulen+vlen) < mul\_base\_digits

|| ulen < MUL\_SMALL\_DIGITS

|| vlen < MUL\_SMALL\_DIGITS ) {

\_bc\_simp\_mul (u, ulen, v, vlen, prod, full\_scale);

return;

}



```

/* Calculate n -- the u and v split point in digits. */
n = (MAX(ulen, vlen)+1) / 2;

/* Split u and v. */
if (ulen < n) {
    u1 = bc_copy_num (_zero_);
    u0 = new_sub_num (ulen,0, u->n_value);
} else {
    u1 = new_sub_num (ulen-n, 0, u->n_value);
    u0 =
new_sub_num (n, 0, u->n_value+ulen-n);
}
if (vlen < n) {
    v1 = bc_copy_num (_zero_);
    v0 = new_sub_num (vlen,0, v->n_value);
} else {
    v1 = new_sub_num (vlen-n, 0, v->n_value);
    v0 = new_sub_num (n, 0, v->n_value+vlen-n);
}
_bc_rm_leading_zeros (u1);
_bc_rm_leading_zeros (u0);
u0len = u0->n_len;
_bc_rm_leading_zeros (v1);
_bc_rm_leading_zeros (v0);
v0len = v0->n_len;

m1zero = bc_is_zero(u1) || bc_is_zero(v1);

/* Calculate sub results ... */

bc_init_num(&d1);
bc_init_num(&d2);
bc_sub (u1, u0, &d1, 0);
d1len = d1->n_len;
bc_sub (v0, v1, &d2, 0);
d2len = d2->n_len;

/* Do recursive multiplies and shifted adds. */
if (m1zero)
    m1 = bc_copy_num (_zero_);
else
    _bc_rec_mul (u1, u1->n_len, v1, v1->n_len, &m1, 0);

if (bc_is_zero(d1) || bc_is_zero(d2))
    m2 = bc_copy_num (_zero_);
else
    _bc_rec_mul (d1, d1len, d2, d2len, &m2, 0);

```

```

if (bc_is_zero(u0) || bc_is_zero(v0))
    m3 = bc_copy_num (_zero_);
else
    _bc_rec_mul
(u0, u0->n_len, v0, v0->n_len, &m3, 0);

/* Initialize product */
prodlen = ulen+vlen+1;
*prod = bc_new_num(prodlen, 0);

if (!m1zero) {
    _bc_shift_addsub (*prod, m1, 2*n, 0);
    _bc_shift_addsub (*prod, m1, n, 0);
}
_bc_shift_addsub (*prod, m3, n, 0);
_bc_shift_addsub (*prod, m3, 0, 0);
_bc_shift_addsub (*prod, m2, n, d1->n_sign != d2->n_sign);

/* Now clean up! */
bc_free_num (&u1);
bc_free_num (&u0);
bc_free_num (&v1);
bc_free_num (&m1);
bc_free_num (&v0);
bc_free_num (&m2);
bc_free_num (&m3);
bc_free_num (&d1);
bc_free_num (&d2);
}

/* The multiply routine. N2 times N1 is put int PROD with the scale of
the result being MIN(N2 scale+N1 scale, MAX (SCALE, N2 scale, N1 scale)).
*/

void
bc_multiply (n1, n2, prod, scale)
    bc_num n1, n2, *prod;
    int scale;
{
    bc_num pval;
    int len1, len2;
    int full_scale, prod_scale;

/* Initialize things. */
len1 = n1->n_len + n1->n_scale;
len2 = n2->n_len + n2->n_scale;
full_scale

```

```

= n1->n_scale + n2->n_scale;
prod_scale = MIN(full_scale,MAX(scale,MAX(n1->n_scale,n2->n_scale)));

/* Do the multiply */
_bc_rec_mul (n1, len1, n2, len2, &pval, full_scale);

/* Assign to prod and clean up the number. */
pval->n_sign = ( n1->n_sign == n2->n_sign ? PLUS : MINUS );
pval->n_value = pval->n_ptr;
pval->n_len = len2 + len1 + 1 - full_scale;
pval->n_scale = prod_scale;
_bc_rm_leading_zeros (pval);
if (bc_is_zero (pval))
    pval->n_sign = PLUS;
bc_free_num (prod);
*prod = pval;
}

/* Some utility routines for the divide: First a one digit multiply.
NUM (with SIZE digits) is multiplied by DIGIT and the result is
placed into RESULT. It is written so that NUM and RESULT can be
the same pointers. */

static void
_one_mult (num, size, digit, result)
    unsigned char *num;
    int size, digit;
    unsigned char *result;
{
    int carry, value;
    unsigned char *nptr, *rptr;

    if (digit == 0)
        memset (result, 0, size);
    else
        {
            if
            (digit == 1)
                memcpy (result, num, size);
            else
                {
                    /* Initialize */
                    nptr = (unsigned char *) (num+size-1);
                    rptr = (unsigned char *) (result+size-1);
                    carry = 0;

                    while (size-- > 0)
                        {

```

```

    value = *nptr-- * digit + carry;
    *rptr-- = value % BASE;
    carry = value / BASE;
}

if (carry != 0) *rptr = carry;
}
}
}

/* The full division routine. This computes N1 / N2. It returns
0 if the division is ok and the result is in QUOT. The number of
digits after the decimal point is SCALE. It returns -1 if division
by zero is tried. The algorithm is found in Knuth Vol 2. p237. */

int
bc_divide (n1, n2, quot, scale)
    bc_num n1, n2, *quot;
    int scale;
{
    bc_num qval;
    unsigned char *num1, *num2;
    unsigned char *ptr1, *ptr2, *n2ptr, *qptr;
    int scale1, val;
    unsigned int len1, len2, scale2, qdigits, extra, count;
    unsigned int qdig, qguess, borrow, carry;
    unsigned char *mval;
    char zero;
    unsigned int norm;

    /* Test
for divide by zero. */
    if (bc_is_zero (n2)) return -1;

    /* Test for divide by 1. If it is we must truncate. */
    if (n2->n_scale == 0)
    {
        if (n2->n_len == 1 && *n2->n_value == 1)
        {
            qval = bc_new_num (n1->n_len, scale);
            qval->n_sign = (n1->n_sign == n2->n_sign ? PLUS : MINUS);
            memset (&qval->n_value[n1->n_len], 0, scale);
            memcpy (qval->n_value, n1->n_value,
                n1->n_len + MIN(n1->n_scale, scale));
            bc_free_num (quot);
            *quot = qval;
        }
    }
}

```

```

}

/* Set up the divide. Move the decimal point on n1 by n2's scale.
   Remember, zeros on the end of num2 are wasted effort for dividing. */
scale2 = n2->n_scale;
n2ptr = (unsigned char *) n2->n_value+n2->n_len+scale2-1;
while ((scale2 > 0) && (*n2ptr-- == 0)) scale2--;

len1 = n1->n_len + scale2;
scale1 = n1->n_scale - scale2;
if (scale1 < scale)
    extra = scale - scale1;
else
    extra = 0;
num1 = (unsigned char *) malloc (n1->n_len+n1->n_scale+extra+2);
if (num1 == NULL) bc_out_of_memory();

memset (num1, 0, n1->n_len+n1->n_scale+extra+2);
memcpy (num1+1, n1->n_value, n1->n_len+n1->n_scale);

len2 = n2->n_len + scale2;
num2 = (unsigned char *) malloc (len2+1);
if (num2 == NULL) bc_out_of_memory();
memcpy (num2, n2->n_value, len2);
*(num2+len2) = 0;
n2ptr = num2;
while (*n2ptr == 0)
{
    n2ptr++;
    len2--;
}

/* Calculate the number of quotient digits. */
if (len2 > len1+scale)
{
    qdigits = scale+1;
    zero = TRUE;
}
else
{
    zero = FALSE;
    if (len2>len1)
qdigits = scale+1; /* One for the zero integer part. */
    else
qdigits = len1-len2+scale+1;
}

/* Allocate and zero the storage for the quotient. */

```

```

qval = bc_new_num (qdigits-scale,scale);
memset (qval->n_value, 0, qdigits);

/* Allocate storage for the temporary storage mval. */
mval = (unsigned char *) malloc (len2+1);
if (mval == NULL) bc_out_of_memory ();

/* Now for the full divide algorithm. */
if (!zero)
{
    /* Normalize
    */
    norm = 10 / ((int)*n2ptr + 1);
    if (norm != 1)
    {
        _one_mult (num1, len1+scale1+extra+1, norm, num1);
        _one_mult (n2ptr, len2, norm, n2ptr);
    }

    /* Initialize divide loop. */
    qdig = 0;
    if (len2 > len1)
qptr = (unsigned char *) qval->n_value+len2-len1;
    else
qptr = (unsigned char *) qval->n_value;

    /* Loop */
    while (qdig <= len1+scale-len2)
    {
        /* Calculate the quotient digit guess. */
        if (*n2ptr == num1[qdig])
            qguess = 9;
        else
            qguess = (num1[qdig]*10 + num1[qdig+1]) / *n2ptr;

        /* Test qguess. */
        if (n2ptr[1]*qguess >
            (num1[qdig]*10 + num1[qdig+1] - *n2ptr*qguess)*10
            + num1[qdig+2])
        {
            qguess--;
            /* And again. */
            if (n2ptr[1]*qguess >
                (num1[qdig]*10 + num1[qdig+1] - *n2ptr*qguess)*10
                + num1[qdig+2])
                qguess--;
        }
    }
}

```

```

/* Multiply and subtract. */
borrow = 0;
if (qguess != 0)
{
    *mval = 0;
    _one_mult (n2ptr, len2, qguess, mval+1);

    ptr1 = (unsigned char *) num1+qdig+len2;
    ptr2 = (unsigned char *) mval+len2;
    for (count = 0; count < len2+1; count++)
    {
        val = (int) *ptr1 - (int) *ptr2-- - borrow;
        if (val < 0)
        {
            val += 10;
            borrow = 1;
        }
        else
            borrow = 0;
        *ptr1-- = val;
    }
}

/* Test for negative result. */
if (borrow == 1)
{
    qguess--;
    ptr1 = (unsigned char *) num1+qdig+len2;
    ptr2 = (unsigned char *) n2ptr+len2-1;
    carry = 0;
    for (count = 0; count < len2; count++)
    {
        val = (int) *ptr1 + (int) *ptr2-- + carry;
        if (val > 9)
        {
            val -= 10;
            carry = 1;
        }
        else
            carry = 0;
        *ptr1-- = val;
    }
    if (carry == 1) *ptr1 = (*ptr1 + 1) % 10;
}

/* We now know the quotient digit. */
*qptr++ = qguess;
qdig++;

```

```

}
}

/* Clean up and return the number. */
qval->n_sign = ( n1->n_sign == n2->n_sign ? PLUS : MINUS );
if (bc_is_zero (qval)) qval->n_sign
= PLUS;
_bc_rm_leading_zeros (qval);
bc_free_num (quot);
*quot = qval;

/* Clean up temporary storage. */
free (mval);
free (num1);
free (num2);

return 0; /* Everything is OK. */
}

/* Division *and* modulo for numbers. This computes both NUM1 / NUM2 and
NUM1 % NUM2 and puts the results in QUOT and REM, except that if QUOT
is NULL then that store will be omitted.
*/

int
bc_divmod (num1, num2, quot, rem, scale)
    bc_num num1, num2, *quot, *rem;
    int scale;
{
    bc_num quotient = NULL;
    bc_num temp;
    int rscale;

    /* Check for correct numbers. */
    if (bc_is_zero (num2)) return -1;

    /* Calculate final scale. */
    rscale = MAX (num1->n_scale, num2->n_scale+scale);
    bc_init_num(&temp);

    /* Calculate it. */
    bc_divide (num1, num2, &temp, scale);
    if (quot)
        quotient = bc_copy_num (temp);
    bc_multiply (temp, num2, &temp, rscale);
    bc_sub (num1, temp, rem, rscale);
    bc_free_num (&temp);

```



```

if (quot)
{
    bc_free_num (quot);
    *quot = quotient;
}

return 0; /* Everything is OK. */
}

/* Modulo for numbers. This computes NUM1 % NUM2 and puts the
result in RESULT. */

int
bc_modulo (num1, num2, result, scale)
    bc_num num1, num2, *result;
    int scale;
{
    return bc_divmod (num1, num2, NULL, result, scale);
}

/* Raise BASE to the EXPO power, reduced modulo MOD. The result is
placed in RESULT. If a EXPO is not an integer,
only the integer part is used. */

int
bc_raismod (base, expo, mod, result, scale)
    bc_num base, expo, mod, *result;
    int scale;
{
    bc_num power, exponent, parity, temp;
    int rscale;

    /* Check for correct numbers. */
    if (bc_is_zero(mod)) return -1;
    if (bc_is_neg(expo)) return -1;

    /* Set initial values. */
    power = bc_copy_num (base);
    exponent = bc_copy_num (expo);
    temp = bc_copy_num (_one_);
    bc_init_num(&parity);

    /* Check the base for scale digits. */
    if (base->n_scale != 0)
        bc_rt_warn ("non-zero scale in base");

```

```

/* Check
the exponent for scale digits. */
if (exponent->n_scale != 0)
{
    bc_rt_warn ("non-zero scale in exponent");
    bc_divide (exponent, _one_, &exponent, 0); /*truncate */
}

/* Check the modulus for scale digits. */
if (mod->n_scale != 0)
    bc_rt_warn ("non-zero scale in modulus");

/* Do the calculation. */
rscale = MAX(scale, base->n_scale);
while ( !bc_is_zero(exponent) )
{
    (void) bc_divmod (exponent, _two_, &exponent, &parity, 0);
    if ( !bc_is_zero(parity) )
    {
        bc_multiply (temp, power, &temp, rscale);
        (void) bc_modulo (temp, mod, &temp, scale);
    }

    bc_multiply (power, power, &power, rscale);
    (void) bc_modulo (power, mod, &power, scale);
}

/* Assign the value. */
bc_free_num (&power);
bc_free_num (&exponent);
bc_free_num (result);
*result = temp;
return 0; /* Everything is OK. */
}

/* Raise NUM1 to the NUM2 power. The result is placed in RESULT.
Maximum exponent is LONG_MAX. If a NUM2 is not an
integer,
only the integer part is used. */

void
bc_raise (num1, num2, result, scale)
    bc_num num1, num2, *result;
    int scale;
{
    bc_num temp, power;
    long exponent;
    int rscale;

```

```

int pwrscale;
int calcscale;
char neg;

/* Check the exponent for scale digits and convert to a long. */
if (num2->n_scale != 0)
    bc_rt_warn ("non-zero scale in exponent");
exponent = bc_num2long (num2);
if (exponent == 0 && (num2->n_len > 1 || num2->n_value[0] != 0))
    bc_rt_error ("exponent too large in raise");

/* Special case if exponent is a zero. */
if (exponent == 0)
{
    bc_free_num (result);
    *result = bc_copy_num (_one_);
    return;
}

/* Other initializations. */
if (exponent < 0)
{
    neg = TRUE;
    exponent = -exponent;
    rscale = scale;
}
else
{
    neg = FALSE;
    rscale = MIN (num1->n_scale*exponent, MAX(scale, num1->n_scale));
}

/* Set initial value of temp. */
power = bc_copy_num (num1);
pwrscale = num1->n_scale;
while ((exponent & 1) == 0)
{
    pwrscale = 2*pwrscale;
    bc_multiply (power, power, &power, pwrscale);
    exponent = exponent >> 1;
}
temp = bc_copy_num (power);
calcscale = pwrscale;
exponent = exponent >> 1;

/* Do the calculation. */
while (exponent > 0)
{

```

```

    pwrscale = 2*pwrscale;
    bc_multiply (power, power, &power, pwrscale);
    if ((exponent & 1) == 1) {
    calcscale = pwrscale + calcscale;
    bc_multiply (temp, power, &temp, calcscale);
    }
    exponent = exponent >> 1;
    }

/* Assign the value. */
if (neg)
{
    bc_divide (_one_, temp, result, rscale);
    bc_free_num (&temp);
}
else
{
    bc_free_num (result);
    *result = temp;
    if ((*result)->n_scale > rscale)
(*result)->n_scale = rscale;
}
bc_free_num (&power);
}

/* Take the square root NUM and return it in NUM with SCALE digits
after the
decimal place. */

int
bc_sqrt (num, scale)
    bc_num *num;
    int scale;
{
    int rscale, cmp_res, done;
    int cscale;
    bc_num guess, guess1, point5, diff;

/* Initial checks. */
    cmp_res = bc_compare (*num, _zero_);
    if (cmp_res < 0)
        return 0; /* error */
    else
    {
        if (cmp_res == 0)
        {
            bc_free_num (num);
            *num = bc_copy_num (_zero_);

```

```

    return 1;
}
}
cmp_res = bc_compare (*num, _one_);
if (cmp_res == 0)
{
    bc_free_num (num);
    *num = bc_copy_num (_one_);
    return 1;
}

/* Initialize the variables. */
rscale = MAX (scale, (*num)->n_scale);
bc_init_num(&guess);
bc_init_num(&guess1);
bc_init_num(&diff);
point5 = bc_new_num (1,1);
point5->n_value[1] = 5;

/* Calculate the initial guess. */
if (cmp_res < 0)
{
    /* The number is between 0 and 1. Guess should start at 1. */
    guess = bc_copy_num (_one_);
    cscale = (*num)->n_scale;
}
else
{
    /* The number is greater than 1. Guess should
start at 10^(exp/2). */
    bc_int2num (&guess,10);

    bc_int2num (&guess1,(*num)->n_len);
    bc_multiply (guess1, point5, &guess1, 0);
    guess1->n_scale = 0;
    bc_raise (guess, guess1, &guess, 0);
    bc_free_num (&guess1);
    cscale = 3;
}

/* Find the square root using Newton's algorithm. */
done = FALSE;
while (!done)
{
    bc_free_num (&guess1);
    guess1 = bc_copy_num (guess);
    bc_divide (*num, guess, &guess, cscale);

```

```

    bc_add (guess, guess1, &guess, 0);
    bc_multiply (guess, point5, &guess, cscale);
    bc_sub (guess, guess1, &diff, cscale+1);
    if (bc_is_near_zero (diff, cscale))
    {
        if (cscale < rscale+1)
            cscale = MIN (cscale*3, rscale+1);
        else
            done = TRUE;
    }
}

/* Assign the number and clean up. */
bc_free_num (num);
bc_divide (guess, _one_, num, rscale);
bc_free_num (&guess);
bc_free_num (&guess1);
bc_free_num (&point5);
bc_free_num (&diff);
return 1;
}

/* The following routines
provide output for bcd numbers package
using the rules of POSIX bc for output. */

/* This structure is used for saving digits in the conversion process. */
typedef struct stk_rec {
    long digit;
    struct stk_rec *next;
} stk_rec;

/* The reference string for digits. */
static char ref_str[] = "0123456789ABCDEF";

/* A special output routine for "multi-character digits." Exactly
SIZE characters must be output for the value VAL. If SPACE is
non-zero, we must output one space before the number. OUT_CHAR
is the actual routine for writing the characters. */

void
bc_out_long (val, size, space, out_char)
    long val;
    int size, space;
#ifdef __STDC__
    void (*out_char)(int);

```

```

#else
    void (*out_char)();
#endif
{
char digits[40];
int len, ix;

if (space) (*out_char) (' ');
sprintf (digits, "%ld", val);
len = strlen (digits);
while (size > len)
    {
        (*out_char) ('0');
        size--;
    }
for (ix=0; ix < len; ix++)
    (*out_char) (digits[ix]);
}

/*
Output of a bcd number. NUM is written in base O_BASE using OUT_CHAR
as the routine to do the actual output of the characters. */

void
bc_out_num (num, o_base, out_char, leading_zero)
    bc_num num;
    int o_base;
#ifdef __STDC__
    void (*out_char)(int);
#else
    void (*out_char)();
#endif
    int leading_zero;
{
char *nptr;
int index, fdigit, pre_space;
stk_rec *digits, *temp;
bc_num int_part, frac_part, base, cur_dig, t_num, max_o_digit;

/* The negative sign if needed. */
if (num->n_sign == MINUS) (*out_char) ('-');

/* Output the number. */
if (bc_is_zero (num))
    (*out_char) ('0');
else
    if (o_base == 10)
        {

```

```

/* The number is in base 10, do it the fast way. */
nptr = num->n_value;
if (num->n_len > 1 || *nptr != 0)
    for (index=num->n_len; index>0; index--)
        (*out_char) (BCD_CHAR(*nptr++));
else
    nptr++;

if (leading_zero && bc_is_zero (num))
    (*out_char) ('0');

/* Now the fraction. */
if (num->n_scale > 0)
{
    (*out_char) ('.');
    for (index=0; index<num->n_scale; index++)
        (*out_char) (BCD_CHAR(*nptr++));
}
}
else
{
/* special case ... */
if (leading_zero && bc_is_zero (num))
    (*out_char) ('0');

/* The number is some other base. */
digits = NULL;
bc_init_num (&int_part);
bc_divide (num, _one_, &int_part, 0);
bc_init_num (&frac_part);
bc_init_num (&cur_dig);
bc_init_num (&base);
bc_sub (num, int_part, &frac_part, 0);
/* Make the INT_PART and FRAC_PART positive. */
int_part->n_sign = PLUS;
frac_part->n_sign = PLUS;
bc_int2num (&base, o_base);
bc_init_num (&max_o_digit);
bc_int2num (&max_o_digit, o_base-1);

/* Get the digits of the integer part and push them on a stack. */
while (!bc_is_zero (int_part))
{
    bc_modulo (int_part, base, &cur_dig, 0);
    temp = (stk_rec *) malloc (sizeof(stk_rec));
    if (temp == NULL) bc_out_of_memory();
}
}

```



```

    temp->digit = bc_num2long (cur_dig);
    temp->next = digits;
    digits = temp;
    bc_divide
(int_part, base, &int_part, 0);
}

/* Print the digits on the stack. */
if (digits != NULL)
{
    /* Output the digits. */
    while (digits != NULL)
    {
        temp = digits;
        digits = digits->next;
        if (o_base <= 16)
            (*out_char) (ref_str[ (int) temp->digit]);
        else
            bc_out_long (temp->digit, max_o_digit->n_len, 1, out_char);
        free (temp);
    }
}

/* Get and print the digits of the fraction part. */
if (num->n_scale > 0)
{
    (*out_char) ('. ');
    pre_space = 0;
    t_num = bc_copy_num (_one_);
    while (t_num->n_len <= num->n_scale) {
        bc_multiply (frac_part, base, &frac_part, num->n_scale);
        fdigit = bc_num2long (frac_part);
        bc_int2num (&int_part, fdigit);
        bc_sub (frac_part, int_part, &frac_part, 0);
        if (o_base <= 16)
            (*out_char) (ref_str[fdigit]);
        else {
            bc_out_long (fdigit, max_o_digit->n_len, pre_space, out_char);
            pre_space = 1;
        }
        bc_multiply (t_num, base, &t_num, 0);
    }

    bc_free_num (&t_num);
}

/* Clean up. */
bc_free_num (&int_part);

```

```

bc_free_num (&frac_part);
bc_free_num (&base);
bc_free_num (&cur_dig);
bc_free_num (&max_o_digit);
    }
}
/* Convert a number NUM to a long. The function returns only the integer
part of the number. For numbers that are too large to represent as
a long, this function returns a zero. This can be detected by checking
the NUM for zero after having a zero returned. */

long
bc_num2long (num)
    bc_num num;
{
    long val;
    char *nptr;
    int index;

    /* Extract the int value, ignore the fraction. */
    val = 0;
    nptr = num->n_value;
    for (index=num->n_len; (index>0) && (val<=(LONG_MAX/BASE)); index--)
        val = val*BASE + *nptr++;

    /* Check for overflow. If overflow, return zero. */
    if (index>0) val = 0;
    if (val < 0) val = 0;

    /* Return the value. */
    if (num->n_sign == PLUS)
        return (val);
    else
        return (-val);
}

/* Convert an integer VAL to a bc number NUM. */

void
bc_int2num
(num, val)
    bc_num *num;
    int val;
{
    char buffer[30];
    char *bptr, *vptr;
    int ix = 1;

```

```

char neg = 0;

/* Sign. */
if (val < 0)
{
    neg = 1;
    val = -val;
}

/* Get things going. */
bptr = buffer;
*bptr++ = val % BASE;
val = val / BASE;

/* Extract remaining digits. */
while (val != 0)
{
    *bptr++ = val % BASE;
    val = val / BASE;
    ix++; /* Count the digits. */
}

/* Make the number. */
bc_free_num (num);
*num = bc_new_num (ix, 0);
if (neg) (*num)->n_sign = MINUS;

/* Assign the digits. */
vptr = (*num)->n_value;
while (ix-- > 0)
    *vptr++ = *--bptr;
}

/* Convert a numbers to a string. Base 10 only.*/

char
*num2str (num)
    bc_num num;
{
    char *str, *sptr;
    char *nptr;
    int index, signch;

    /* Allocate the string memory. */
    signch = ( num->n_sign == PLUS ? 0 : 1 ); /* Number of sign chars. */
    if (num->n_scale > 0)
        str = (char *) malloc (num->n_len + num->n_scale + 2 + signch);

```

```

else
    str = (char *) malloc (num->n_len + 1 + signch);
if (str == NULL) bc_out_of_memory();

/* The negative sign if needed. */
sptr = str;
if (signch) *sptr++ = '-';

/* Load the whole number. */
nptr = num->n_value;
for (index=num->n_len; index>0; index--)
    *sptr++ = BCD_CHAR(*nptr++);

/* Now the fraction. */
if (num->n_scale > 0)
{
    *sptr++ = '.';
    for (index=0; index<num->n_scale; index++)
        *sptr++ = BCD_CHAR(*nptr++);
}

/* Terminate the string and return it! */
*sptr = '\0';
return (str);
}
/* Convert strings to bc numbers. Base 10 only.*/

void
bc_str2num (num, str, scale)
    bc_num *num;
    char *str;
    int scale;
{
    int digits, strscale;
    char *ptr, *nptr;
    char zero_int;

    /* Prepare num. */
    bc_free_num (num);

    /* Check for valid number and count digits. */
    ptr = str;
    digits = 0;
    strscale = 0;
    zero_int = FALSE;
    if ((*ptr == '+') || (*ptr == '-')) ptr++; /* Sign */
    while (*ptr == '0') ptr++; /* Skip

```

```

leading zeros. */
while (isdigit((int)*ptr)) ptr++, digits++; /* digits */
if (*ptr == '.') ptr++; /* decimal point */
while (isdigit((int)*ptr)) ptr++, strscale++; /* digits */
if ((*ptr != '\0') || (digits+strscale == 0))
{
    *num = bc_copy_num (_zero_);
    return;
}

/* Adjust numbers and allocate storage and initialize fields. */
strscale = MIN(strscale, scale);
if (digits == 0)
{
    zero_int = TRUE;
    digits = 1;
}
*num = bc_new_num (digits, strscale);

/* Build the whole number. */
ptr = str;
if (*ptr == '-')
{
    (*num)->n_sign = MINUS;
    ptr++;
}
else
{
    (*num)->n_sign = PLUS;
    if (*ptr == '+') ptr++;
}
while (*ptr == '0') ptr++; /* Skip leading zeros. */
nptr = (*num)->n_value;
if (zero_int)
{
    *nptr++ = 0;
    digits = 0;
}
for (;digits > 0; digits--)
    *nptr++ = CH_VAL(*ptr++);

/* Build the fractional part. */
if (strscale > 0)
{
    ptr++; /*
skip the decimal point! */
for (;strscale > 0; strscale--)

```

```

*nptr++ = CH_VAL(*ptr++);
}
}

/* pn prints the number NUM in base 10. */

static void
out_char (int c)
{
    putchar(c);
}

void
pn (num)
    bc_num num;
{
    bc_out_num (num, 10, out_char, 0);
    out_char ('\n');
}

/* pv prints a character array as if it was a string of bcd digits. */
void
pv (name, num, len)
    char *name;
    unsigned char *num;
    int len;
{
    int i;
    printf ("%s=", name);
    for (i=0; i<len; i++) printf ("%c",BCD_CHAR(num[i]));
    printf ("\n");
}

```

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# 1.6 mtd-utils 1.5.2

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<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
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it under the terms of the GNU  
General Public License as published by  
the Free Software Foundation; either version 2 of the License, or  
(at your option) any later version.
```

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If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute
it
under certain conditions; type `show c' for details.
```

The hypothetical commands ``show w'` and ``show c'` should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ``show w'` and ``show c'`; they could even be mouse-clicks or menu items--whatever suits your program.

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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Version 3, 29 June 2007

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## 1.16 dc 1.3

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```
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* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/Example-Swift/AppDelegate.swift
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/Example-Swift/Tests/Example_SwiftTests.swift
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/Example-Swift-Bridging-Header.h
```

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```
<label opaque="NO" clipsSubviews="YES" userInteractionEnabled="NO" contentMode="left" horizontalHuggingPriority="251" verticalHuggingPriority="251" text=" Copyright (c) 2015 DC. All rights reserved." textAlignment="center" lineBreakMode="tailTruncation" baselineAdjustment="alignBaselines" minimumFontSize="9" translatesAutoresizingMaskIntoConstraints="NO" id="8ie-xW-0ye">
```

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```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/Example-Swift/Base.lproj/LaunchScreen.xib
```

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```
<string>The DCPathButton use the MIT license</string>
```



Found in path(s):

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Pods/Target Support Files/Pods/Pods-acknowledgements.plist  
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* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Example/BarButtonItemViewController.h  
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```

Pod::Spec.new do |s|

```
s.name      = "DCPathButton"  
s.version   = "2.1.1"  
s.summary   = " A beautiful button copy from Path® "
```

```
s.description = <<-DESC  
DCPathButton is a menu button, design by an famous App Path®.  
Since Path® 4.0, it return to use a tab bar instead of a side bar,  
and also change the menu button. So I try to implement it and then  
the DCPathButton born :)
```

```
DESC
```

```
s.homepage = "https://github.com/Tangdixi/DCPathButton"
```

```
s.license = {  
:type => 'MIT',  
:text => 'The DCPathButton use the MIT license'  
}
```

```
s.author = { "Tangdixi" => "Tangdixi@gmail.com" }
```

```
s.platform = :ios, '7.0'
```

```
s.source = {  
:git => "https://github.com/Tangdixi/DCPathButton.git",  
:tag => "2.1.1"  
}
```

```
s.source_files = 'DCPathButton/Classes/*.{h,m}'
```

```
s.resources = ["DCPathButton/Sounds/*"]
```

```
s.frameworks = 'QuartzCore','AudioToolbox'
```

```
s.requires_arc = true
```

```
end
```

```
Found in path(s):
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/DCPathButton.podspec
```

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```

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```

```
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```

```
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```

```
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```
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```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/ExampleTests/ExampleTests.m
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Pods/DCPathButton/DCPathButton/Classes/DCPathItemButton.h
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Example/ViewController.m
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Example/ViewController.h
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/DCPathButton/Classes/DCPathButton.h
```

```
*
```

```
/opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/DCPathButton/Classes/DCPathButton.h
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example/Example/main.m
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/Example-Swift/DCPathButton/Classes/DCPathButton.m
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-DCPathButton-39be410/DCPathButton/Classes/DCPathButton.m
```

```
* /opt/cola/permits/1000748847_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-
```

DCPathButton-39be410/Example/Example/AppDelegate.m

\* /opt/cola/permits/1000748847\_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-

DCPathButton-39be410/Example-Swift/DCPathButton/Classes/DCPathItemButton.h

\*

/opt/cola/permits/1000748847\_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-

DCPathButton-39be410/DCPathButton/Classes/DCPathItemButton.h

\* /opt/cola/permits/1000748847\_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-

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\* /opt/cola/permits/1000748847\_1607109746.66/0/tangdixi-dcpathbutton-2-1-3-0-ge4b13fb-tar-gz/Tangdixi-

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# 1.17 gmp 6.1.2

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<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
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## 1.18 gmp 6.0.0

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```
Gnomovision version 69, Copyright (C) year name of author  
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
This is free software, and you are welcome to redistribute  
it  
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program  
'Gnomovision' (which makes passes at compilers) written by James Hacker.
```

<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice

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## 1.20 ncurses 6.1

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## 1.24 linux-kernel 4.4.0

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\* `configure.ac`, `Makefile.am`: The original versions were derived from the ones in the XML Catalog Manager project, version 2.2.

Author: Julio Merino <jmmv@users.sourceforge.net>

\* `atf-c/ui.c`: The `format_paragraph` and `format_text` functions were derived from the ones in the Monotone project, revision 3a0982da308228d796df35f98d787c5cff2bb5b6.

Author: Julio Merino <jmmv@NetBSD.org>

\* `atf-c++/detail/io.hpp`, `atf-c++/detail/io.cpp`, `atf-c++/detail/io_test.cpp`: These files were derived from the `file_handle`, `systembuf`, `pipe` and `pistream` classes and tests found in the Boost.Process library.

Author: Julio Merino <jmmv84@gmail.com>

\* admin/check-style.sh,  
admin/check-style-common.awk,  
admin/check-style-cpp.awk, admin/check-style-shell.awk: These files,  
except the first one, were first implemented in the Buildtool project.  
They were later adapted to be part of Boost.Process and, during that  
process, the shell script was created.

Author: Julio Merino <jmmv84@gmail.com>

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vim: filetype=text:textwidth=75:expandtab:shiftwidth=2:softtabstop=2  
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```
<!-- $Id$ -->
```

```
<!-- Generate ISC copyright comments from Docbook copyright metadata. -->
```

```
<xsl:stylesheet version="1.0"  
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform"  
  xmlns:xi="http://www.w3.org/2001/XInclude"  
  xmlns:db="http://docbook.org/ns/docbook">  
  
  <xsl:template name="isc.copyright.format">  
    <xsl:param name="text"/>  
    <xsl:value-of select="$isc.copyright.leader"/>  
    <xsl:value-of select="normalize-space(substring-before($text, '&#10;'))"/>  
    <xsl:text>&#10;</xsl:text>  
    <xsl:variable name="rest" select="substring-after($text, '&#10;')"/>  
    <xsl:if test="translate($rest, '&#9;&#32;', '')">  
      <xsl:call-template name="isc.copyright.format">  
        <xsl:with-param  
name="text" select="$rest"/>  
      </xsl:call-template>  
    </xsl:if>  
  </xsl:template>  
  
  <xsl:variable name="isc.copyright.text">  
    <xsl:text>  
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      file, You can obtain one at http://mozilla.org/MPL/2.0/.  
    </xsl:text>  
  </xsl:variable>  
  
  <xsl:variable name="isc.copyright">  
    <xsl:call-template name="isc.copyright.format">  
      <xsl:with-param name="text">  
        <xsl:for-each select="book/info/copyright | refentry/docinfo/copyright">
```

```

<xsl:text>Copyright (C) </xsl:text>
<xsl:call-template name="copyright.years">
  <xsl:with-param name="years" select="year"/>
</xsl:call-template>
<xsl:text> </xsl:text>
<xsl:value-of select="holder"/>
  <xsl:value-of select="$isc.copyright.breakline"/>
<xsl:text>&#10;</xsl:text>
</xsl:for-each>
<xsl:value-of select="$isc.copyright.text"/>
  </xsl:with-param>
</xsl:call-template>
</xsl:variable>
</xsl:stylesheet>

<!--
- Local variables:
- mode: sgml
- End:
-->
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## 1.26 dosfs-tools 4.1

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## 1.31 gpt-fdisk 0.8.8

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```

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{
"testfiles": [
  "test/*.uts",
  "test/scapy/layers/*.uts",
  "test/contrib/automotive/*.uts",
  "test/contrib/automotive/obd/*.uts",
  "test/contrib/automotive/gm/*.uts",
  "test/contrib/automotive/bmw/*.uts",
  "test/contrib/automotive/xcp/*.uts",
  "test/contrib/*.uts"
],
"remove_testfiles": [
  "test/linux.uts",
  "test/windows.uts",
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  "test/contrib/automotive/gm/gmlanutils.uts",
  "test/contrib/isotp.uts",
  "test/contrib/isotpscan.uts"
],
"onlyfailed": true,
"preexec": {
  "test/contrib/*.uts": "load_contrib(\"%name%\")",
  "test/cert.uts": "load_layer(\"tls\")",
  "test/sslv2.uts": "load_layer(\"tls\")",
  "test/tls*.uts": "load_layer(\"tls\")"
},
"kw_ko": [
  "linux",
  "windows",
  "crypto_advanced",
  "ipv6",
  "vcan_socket"
]
}
```

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loginrec.h

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=====

curve25519-donna:

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\*

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\*  
\* curve25519-donna: Curve25519 elliptic curve, public key function  
\*  
\* <http://code.google.com/p/curve25519-donna/>  
\*  
\* Adam Langley <agl@imperialviolet.org>  
\*  
\* Derived from public domain C code by Daniel J. Bernstein <djb@cr.yp.to>  
\*  
\* More information about curve25519 can be found here  
\* <http://cr.yp.to/ecdh.html>  
\*  
\* djb's sample implementation of curve25519 is written in a special assembly  
\* language called qhasm and uses the floating point registers.  
\*  
\* This is, almost, a clean room reimplementation from the curve25519 paper. It  
\* uses many of the tricks described therein. Only the crecip function is taken  
\* from the sample implementation.  
\*/

# 1.46 golang-mock 1.5.0

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```
// This is a mock copyright header.
//
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// sed do eiusmod tempor incididunt ut labore et dolore magna
// aliqua. Velit ut tortor pretium viverra suspendisse potenti.
//
// Code generated by MockGen. DO NOT EDIT.
// Source: input.go
//
// Package empty_interface is a generated GoMock package.
package empty_interface
//
import (
    gomock "github.com/golang/mock/gomock"
)
//
// MockEmpty is a mock of Empty interface.
type MockEmpty struct {
    ctrl    *gomock.Controller
    recorder *MockEmptyMockRecorder
}
//
// MockEmptyMockRecorder is the mock recorder for MockEmpty.
type MockEmptyMockRecorder struct {
    mock *MockEmpty
}
//
// NewMockEmpty creates a new mock instance.
func NewMockEmpty(ctrl *gomock.Controller) *MockEmpty {
    mock := &MockEmpty{ctrl: ctrl}
    mock.recorder = &MockEmptyMockRecorder{mock}
    return mock
}
//
// EXPECT returns an object that allows the caller to indicate expected use.
func (m *MockEmpty)
    EXPECT() *MockEmptyMockRecorder {
    return m.recorder
}
//
# This is the official list of people who can contribute (and typically
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```

```
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#
# An entry with two email addresses specifies that the
# first address should be used in the submit logs and
# that the second address should be recognized as the
# same person when interacting with Rietveld.

# Please keep the list sorted.

Aaron Jacobs <jacobsa@google.com> <aaronjjacobs@gmail.com>
Alex Reece <awreece@gmail.com>
David Symonds <dsymonds@golang.org>
Ryan Barrett <ryanb@google.com>
//go:generate mockgen -package empty_interface -destination mock.go -source input.go -
copyright_file=mock_copyright_header

package empty_interface

type Empty interface{ }
```

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## 1.47 tdb 1.42.13

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## 1.48 lumberjack 2.0.0-20170531160350-a96e63847dc3

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```

```
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```

```

<!-- Generate ISC copyright comments from Docbook copyright metadata. -->

```

```

<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
xmlns:xi="http://www.w3.org/2001/XInclude"
xmlns:db="http://docbook.org/ns/docbook">

<xsl:template name="isc.copyright.format">
  <xsl:param name="text"/>
  <xsl:value-of select="$isc.copyright.leader"/>
  <xsl:value-of select="normalize-space(substring-before($text, '&#10;'))"/>
  <xsl:text>&#10;</xsl:text>
  <xsl:variable name="rest" select="substring-after($text, '&#10;')"/>
  <xsl:if test="translate($rest, '&#9;&#32;', '')">
    <xsl:call-template name="isc.copyright.format">
      <xsl:with-param name="text" select="$rest"/>
    </xsl:call-template>
  </xsl:if>
</xsl:template>

<xsl:variable name="isc.copyright.text">
  <xsl:text>
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  </xsl:text>
</xsl:variable>

<xsl:variable name="isc.copyright">
  <xsl:call-template name="isc.copyright.format">
    <xsl:with-param name="text">
      <xsl:for-each select="db:book/db:info/db:copyright | db:refentry/db:docinfo/db:copyright">
        <xsl:text>Copyright (C) </xsl:text>
        <xsl:call-template name="copyright.years">
          <xsl:with-param name="years" select="db:year"/>
        </xsl:call-template>
        <xsl:text> </xsl:text>
      </xsl:for-each>
    </xsl:with-param>
  </xsl:call-template>
</xsl:variable>

```

```

<xsl:value-of select="db:holder"/>
  <xsl:value-of select="$isc.copyright.breakline"/>
<xsl:text>#10;</xsl:text>
</xsl:for-each>
<xsl:value-of
select="$isc.copyright.text"/>
  </xsl:with-param>
</xsl:call-template>
</xsl:variable>
</xsl:stylesheet>

<!--
- Local variables:
- mode: sgml
- End:
-->
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## 1.61 x-text 0.3.8

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## 1.62 edk2 edk2-stable202202

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### Key Dates

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\* August 3, 2017

Update the TianoCore Contribution Agreement from Version 1.0 to Version 1.1 to cover open source documentation associated with the TianoCore project.

Version 1.0 covers source code files. Version 1.1 is a backwards compatible extension that adds support for document files in both source form and compiled form.

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### Proposals (RFCs):

<https://lists.01.org/pipermail/edk2-devel/2017-March/008654.html>

### TianoCore Bugzilla:

[https://bugzilla.tianocore.org/show\\_bug.cgi?id=629](https://bugzilla.tianocore.org/show_bug.cgi?id=629)

\* April 9, 2019

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<https://lists.01.org/pipermail/edk2-devel/2019-February/036260.html>

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2. Your commit message must include your "Signed-off-by" signature, and "Contributed-under" message.
3. Your "Contributed-under" message explicitly states that the contribution is made under the terms of the specified contribution agreement. Your "Contributed-under" message must include the name of contribution agreement and version. For example: Contributed-under: TianoCore Contribution Agreement 1.1 The "TianoCore Contribution Agreement" is included below in this document.
4. Submit your code to the TianoCore project using the process that the project documents on its web page. If the process is not documented, then submit the code on development email list for the project.
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=====  
 = Change Description / Commit Message / Patch Email =  
 =====

Your change description should use the standard format for a commit message, and must include your "Signed-off-by" signature and the "Contributed-under" message.

== Sample Change Description / Commit Message =

=== Start of sample patch email message ===

From: Contributor Name <contributor@example.com>

Subject: [Repository/Branch PATCH] Module: Brief-single-line-summary

## Full-commit-message

Contributed-under: TianoCore Contribution Agreement 1.1

Signed-off-by: Contributor Name <contributor@example.com>

---

An extra message for the patch email which will not be considered part of the commit message can be added here.

Patch content inline or attached

==== End of sample patch email message ====

==== Notes for sample patch email ====

- \* The first line of commit message is taken from the email's subject line following [Repository/Branch PATCH]. The remaining portion of the commit message is the email's content until the '---' line.
- \* git format-patch is one way to create this format

==== Definitions

for sample patch email ====

- \* "Repository" is the identifier of the repository the patch applies. This identifier should only be provided for repositories other than 'edk2'. For example 'edk2-BuildSpecification' or 'staging'.
- \* "Branch" is the identifier of the branch the patch applies. This identifier should only be provided for branches other than 'edk2/master'. For example 'edk2/UDK2015', 'edk2-BuildSpecification/release/1.27', or 'staging/edk2-test'.
- \* "Module" is a short identifier for the affected code or documentation. For example 'MdePkg', 'MdeModulePkg/UsbBusDxe', 'Introduction', or 'EDK II INF File Format'.
- \* "Brief-single-line-summary" is a short summary of the change.
- \* The entire first line should be less than ~70 characters.
- \* "Full-commit-message" a verbose multiple line comment describing the change. Each line should be less than ~70 characters.
- \* "Contributed-under" explicitly states that the contribution is  
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= Code Contributions =  
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1. Create a change description in the format specified below to use in the source control commit log.
2. Your commit message must include your "Signed-off-by" signature, and "Contributed-under" message.

3. Your "Contributed-under" message explicitly states that the contribution is made under the terms of the specified contribution agreement. Your "Contributed-under" message must include the name of contribution agreement and version. For example: Contributed-under: TianoCore Contribution Agreement 1.0 The "TianoCore Contribution Agreement" is included below in this document.

4. Submit your code to the TianoCore project using the process that the project documents on its web page. If the process is not documented, then submit the code on development email list for the project.

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Contributions using other licenses might be accepted, but further review will be required.

=====  
= Change Description / Commit Message / Patch Email =  
=====

Your change description should use the standard format for a commit message, and must include your "Signed-off-by" signature and the "Contributed-under" message.

== Sample Change Description / Commit Message =



==== Start of sample patch email message ====

From: Contributor Name <contributor@example.com>  
Subject: [PATCH] CodeModule: Brief-single-line-summary

Full-commit-message

Contributed-under:  
TianoCore Contribution Agreement 1.0  
Signed-off-by: Contributor Name <contributor@example.com>  
---

An extra message for the patch email which will not be considered part of the commit message can be added here.

Patch content inline or attached

==== End of sample patch email message ====

==== Notes for sample patch email ====

- \* The first line of commit message is taken from the email's subject line following [PATCH]. The remaining portion of the commit message is the email's content until the '---' line.
- \* git format-patch is one way to create this format

==== Definitions for sample patch email ====

- \* "CodeModule" is a short identifier for the affected code. For example MdePkg, or MdeModulePkg UsbBusDxe.
- \* "Brief-single-line-summary" is a short summary of the change.
- \* The entire first line should be less than ~70 characters.
- \* "Full-commit-message" a verbose multiple line comment describing the change.

Each line should be less than ~70 characters.

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```
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```

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<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
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```

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```

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```

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## 1.72 e2fsprogs 1.42.13

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Index: `tdbsa/tdb.c`

-----  
--- `tdbsa.orig/tdb.c`

+++ `tdbsa/tdb.c`

@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)

\*/

/\*

- Unix SMB/CIFS implementation.
- + trivial database library - standalone version

- trivial database library - private includes

-

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Gadi Oxman, August 1995

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```

```
<signature of Ty Coon>, 1 April 1989  
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#

# This is a Makefile stub which handles the creation of BSD shared libraries.

#

# In order to use this stub, the following makefile variables must be defined.

#

# BSDLIB\_VERSION = 1.0

# BSDLIB\_IMAGE = libce

# BSDLIB\_MYDIR = et

# BSDLIB\_INSTALL\_DIR = \$(SHLIBDIR)

#

all:: image

real-subdirs:: Makefile

@echo " MKDIR pic"

@mkdir -p pic

BSD\_LIB = \$(BSDLIB\_IMAGE).so.\$(BSDLIB\_VERSION)

BSDLIB\_PIC\_FLAG = -fpic

image: \$(BSD\_LIB)

\$(BSD\_LIB): \$(OBJS)

(cd pic; ld -Bshareable -o \$(BSD\_LIB) \$(LDFLAGS) \$(OBJS))

```
$(MV) pic/$(BSD_LIB) .
$(RM) -f ../$(BSD_LIB)
(cd ..; $(LN) $(LINK_BUILD_FLAGS) \
`echo $(my_dir) | sed -e 's;lib/;;'/"$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install: $(BSD_LIB)
@echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
@$(INSTALL_PROGRAM) $(BSD_LIB) \
$(DESTDIR)$BSDLIB_INSTALL_DIR)/$(BSD_LIB)
@$(LDCONFIG)
```

install-strip: install

install-shlibs-strip: install-shlibs

```
uninstall-shlibs uninstall:
$(RM) -f $(DESTDIR)$BSDLIB_INSTALL_DIR)/$(BSD_LIB)
```

```
clean:
$(RM)
-rf pic
$(RM) -f $(BSD_LIB)
$(RM) -f ../$(BSD_LIB)
```

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Theodore Ts'o  
23-June-2007

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

This is the Debian GNU/Linux prepackaged version of the Common Error Description library. It is currently distributed together with the EXT2 file system utilities, which are otherwise packaged as "e2fsprogs".

This package was put together by Yann Dirson <dirson@debian.org>, from sources obtained from a mirror of:  
tsx-11.mit.edu:/pub/linux/packages/ext2fs/

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This package was put together by Yann Dirson <dirson@debian.org>, from sources obtained from a mirror of:  
tsx-11.mit.edu:/pub/linux/packages/ext2fs/

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```
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2 7680 16383  8704 4.3M   8f8378c0-02
5 7936 12799  4864 2.4M
6 12544 16127  3584 1.8M
```

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```
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it
under certain conditions; type `show c' for details.
```

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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```
#!/usr/bin/env bash
# MIT licenses will each have a unique MD5 sum since they contain a unique copyright.
# This script will read the license file into memory, strip out the copyright, and then
# generate an MD5 that is not unique and can be matched against a known MIT MD5 sum.
set -e
```

```
calculate_md5_sum() {
  local FILE="$1"

  # Read the contents of the file into a variable
  local raw_license_text=$(<"$FILE")

  # Convert to lowercase
  local lowercase_license_text="${raw_license_text,,}"

  # Remove anything before the beginning of the license
  local stripped_license_text=$(awk '/permission is hereby granted,/{p=1} p' <<< "$lowercase_license_text")
```

```

# Replace line breaks (Windows or Linux) with a single space
local replaced_linebreaks=$(tr '\r\n' ' ' <<< "$stripped_license_text")

# Replace multiple spaces with a single space
local normalized_license_text=$(tr -s ' ' <<< "$replaced_linebreaks")

# Strip away any non-printable, non-whitespace characters
local clean_unprintable_license_text=$(tr
-cd '[:print:][:space:]' <<< "$normalized_license_text")

# Remove punctuation and special characters
local clean_license_text=$(echo "$clean_unprintable_license_text" | sed 's/[^a-zA-Z ]//g')

# Calculate the MD5 sum of the cleaned license text
local MD5SUM=$(echo -n "$clean_license_text" | md5sum | awk '{print $1}')

# Output the MD5 sum
echo "$MD5SUM"
}

# Check if the FILE argument is provided
if [ -z "$1" ]; then
echo "Please provide a FILE as an argument."
exit 1
fi

# Invoke the function with the provided FILE argument
calculate_md5_sum "$1"
WEV @@ WEV[B "1
x ?"U@,5 @mISmIN<GimCN7g1uIE
43mI,5WEV @@ WEV @mImImIAmImImI0mImImI*mImI
A0mImImI...
lost+found...

;9GimCN7g

!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~WEV @@
WEV[B "1

```

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## 1.77 iputils 20161105

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# 1.78 util-linux 2.27.0

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```
NR START  END SECTORS SIZE NAME UUID
1  32 7679  7648 3.7M  8f8378c0-01
2 7680 16383  8704 4.3M  8f8378c0-02
5 7936 12799  4864 2.4M
6 12544 16127  3584 1.8M
```

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Version 3, 29 June 2007

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it
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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```

#!/usr/bin/env bash
# MIT licenses will each have a unique MD5 sum since they contain a unique copyright.
# This script will read the license file into memory, strip out the copyright, and then
# generate an MD5 that is not unique and can be matched against a known MIT MD5 sum.
set -e

calculate_md5_sum() {
    local FILE="$1"

    # Read the contents of the file into a variable
    local raw_license_text=$(<"$FILE")

    # Convert to lowercase
    local lowercase_license_text="{raw_license_text,,}"

    # Remove anything before the beginning of the license
    local stripped_license_text=$(awk '/permission is hereby granted/{p=1} p' <<< "$lowercase_license_text")

    # Replace line breaks (Windows or Linux) with a single space
    local replaced_linebreaks=$(tr '\r\n' ' ' <<< "$stripped_license_text")

    # Replace multiple spaces with a single space
    local normalized_license_text=$(tr -s ' ' <<< "$replaced_linebreaks")

    # Strip away any non-printable, non-whitespace characters
    local clean_unprintable_license_text=$(tr
    -cd '[:print:][:space:]' <<< "$normalized_license_text")

    # Remove punctuation and special characters
    local clean_license_text=$(echo "$clean_unprintable_license_text" | sed 's/[^a-zA-Z ]//g')

    # Calculate the MD5 sum of the cleaned license text
    local MD5SUM=$(echo -n "$clean_license_text" | md5sum | awk '{print $1}')

    # Output the MD5 sum
    echo "$MD5SUM"
}

# Check if the FILE argument is provided
if [ -z "$1" ]; then
    echo "Please provide a FILE as an argument."
    exit 1
fi

# Invoke the function with the provided FILE argument
calculate_md5_sum "$1"
WEV @@ WEV[B "1

```

x ?"U@,5 @mISmIN<GimCN7g1u|E  
43mI,5WEV @@ WEV @mImImIAmImImI0mImImI\*mImI  
A0mImImI...  
lost+found...

;9GimCN7g

!"#\$%&'()\*+,-  
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~

!"#\$%&'()\*+,-  
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~

!"#\$%&'()\*+,-  
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~

!"#\$%&'()\*+,-  
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~WEV @@  
WEV[B "1

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## 1.79 busybox 1.25.1

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### 01

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*
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*
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## 1.91 mpfr 4.2.1

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Jan 21, 2002

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```
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```
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```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
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@ignore

@c Set file name and title for man page.

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@c man begin SEEALSO

gfdl(7), fsf-funding(7).

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To

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@var{one line to give the program's name and a brief idea of what it does.}

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@smallexample

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@c man end

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Version 2.1, February 1999

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```

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Version 3.1, 31 March 2009

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This is an attempt to acknowledge early contributions to the garbage collector. Later contributions should instead be mentioned in README.changes.

#### HISTORY -

Early versions of this collector were developed as a part of research projects supported in part by the National Science Foundation and the Defense Advance Research Projects Agency.

The garbage collector originated as part of the run-time system for the Russell programming language implementation. The first version of the garbage collector was written primarily by Al Demers. It was then refined and mostly rewritten, primarily by Hans-J. Boehm, at Cornell U., the University of Washington, Rice University (where it was first used for

C and assembly code), Xerox PARC, SGI, and HP Labs. However, significant contributions have also been made by many others.

Some other contributors:

More recent contributors are mentioned in the modification history in README.changes. My apologies for any omissions.

The SPARC specific code was

originally contributed by Mark Weiser.

The Encore Multimax modifications were supplied by

Kevin Kenny (kenny@m.cs.uiuc.edu). The adaptation to the IBM PC/RT is largely due to Vernon Lee, on machines made available to Rice by IBM.

Much of the HP specific code and a number of good suggestions for improving the generic code are due to Walter Underwood.

Robert Brazile (brazile@diamond.bbn.com) originally supplied the ULTRIX code.

Al Dosser (dosser@src.dec.com) and Regis Cridlig (Regis.Cridlig@cl.cam.ac.uk) subsequently provided updates and information on variation between ULTRIX systems. Parag Patel (parag@netcom.com) supplied the A/UX code.

Jesper Peterson(jep@mtiame.mtia.oz.au), Michel Schinz, and

Martin Tauchmann (martintauchmann@bigfoot.com) supplied the Amiga port.

Thomas Funke (thf@zelator.in-berlin.de(?)) and

Brian D.Carlstrom (bdc@clark.lcs.mit.edu) supplied the NeXT ports.

Douglas Steel (doug@wg.icl.co.uk) provided ICL DRS6000 code.

Bill Janssen (janssen@parc.xerox.com) supplied

the SunOS dynamic loader

specific code. Manuel Serrano (serrano@cornas.inria.fr) supplied linux and

Sony News specific code. Al Dosser provided Alpha/OSF/1 code. He and

Dave Detlefs(detlefs@src.dec.com) also provided several generic bug fixes.

Alistair G. Crooks(agg@uts.amdahl.com) supplied the NetBSD and 386BSD ports.

Jeffrey Hsu (hsu@soda.berkeley.edu) provided the FreeBSD port.

Brent Benson (brent@jade.ssd.csd.harris.com) ported the collector to

a Motorola 88K processor running CX/UX (Harris NightHawk).

Ari Huttunen (Ari.Huttunen@hut.fi) generalized the OS/2 port to

nonIBM development environments (a nontrivial task).

Patrick Beard (beard@cs.ucdavis.edu) provided the initial MacOS port.

David Chase, then at Olivetti Research, suggested several improvements.

Scott Schwartz (schwartz@groucho.cse.psu.edu) supplied some of the code to save and print call stacks for leak detection on a SPARC.

Jesse Hull and John Ellis supplied the C++ interface code.

Zhong Shao performed much of the

experimentation that led to the

current typed allocation facility. (His dynamic type inference code hasn't made it into the released version of the collector, yet.)

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Version 2.1, February 1999

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rights. These restrictions translate to certain responsibilities for  
you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis  
or for a fee, you must give the recipients all the rights that we gave  
you. You must make sure that they, too, receive or can get the source  
code. If you link other code with the library, you must provide  
complete object files to the recipients, so that they can relink them  
with the library after making changes to the library and recompiling  
it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the

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To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

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Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library.

The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the @dfn{Lesser} General Public License because it does @emph{Less} to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free

libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library" and a ``work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

@iftex

@appendixsubsec TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

@end iftex

@ifinfo

@center GNU LESSER GENERAL PUBLIC LICENSE

@center TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

@end ifinfo

@enumerate 0

@item

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A ``library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

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either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a

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@enumerate a

@item

The modified work must itself be a software library.

@item

You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

@item

You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

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If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

@end enumerate

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

@item

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

@item

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

@item

A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However,

linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work.

(Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

@item

As an exception to the Sections above, you may also combine or link a ``work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

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Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable ``work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

@item

Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time



a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

@item

Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

@item

If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

@item

Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

@end enumerate

For an executable, the required form of the ``work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

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@item

Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

@item

Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

@end enumerate

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@end enumerate

@iftex

@heading END OF TERMS AND CONDITIONS

@end iftex

@ifinfo

@center END OF TERMS AND CONDITIONS

@end ifinfo

@page

@appendixsubsec How to Apply These Terms to Your New Libraries

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To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the ``copyright" line and a pointer to where the full notice is found.

@smallexample

@var{one line to give the library's name and an idea of what it does.}

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@end smallexample

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@smallexample

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@var{signature of Ty Coon}, 1 April 1990

Ty Coon, President of Vice  
@end smallexample

That's all there is to it!

# 1.101 cpp 6.5

## 1.101.1 Available under license :

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Version 2, June 1991

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In addition, mere aggregation of another work not based on the Program



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c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

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```
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The hypothetical commands

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```
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Jan 21, 2002

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```
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```
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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
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```
@ignore
@c Set file name and title for man page.
@setfilename gpl
@settitle GNU General Public License
@c man begin SEEALSO
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@c man end
@c man begin COPYRIGHT
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@c man end

@end ignore

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@smallexample

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```
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```

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@c man end

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Any

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```

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**GCC RUNTIME LIBRARY EXCEPTION**

Version 3.1, 31 March 2009

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This is an attempt to acknowledge early contributions to the garbage collector. Later contributions should instead be mentioned in README.changes.

## HISTORY -

Early versions of this collector were developed as a part of research projects supported in part by the National Science Foundation and the Defense Advance Research Projects Agency.

The garbage collector originated as part of the run-time system for the Russell programming language implementation. The first version of the garbage collector was written primarily by Al Demers. It was then refined and mostly rewritten, primarily by Hans-J. Boehm, at Cornell U., the University of Washington, Rice University (where it was first used for C and assembly code), Xerox PARC, SGI, and HP Labs. However, significant contributions have also been made by many others.

Some other contributors:

More recent contributors are mentioned in the modification history in README.changes. My apologies for any omissions.

The SPARC specific code was originally contributed by Mark Weiser.

The Encore Multimax modifications were supplied by Kevin Kenny (kenny@m.cs.uiuc.edu). The adaptation to the IBM PC/RT is largely due to Vernon Lee, on machines made available to Rice by IBM.

Much of the HP specific code and a number of good suggestions for improving the generic code are due to Walter Underwood.

Robert Brazile (brazile@diamond.bbn.com) originally supplied the ULTRIX code. Al Dosser (dosser@src.dec.com) and Regis Cridlig (Regis.Cridlig@cl.cam.ac.uk) subsequently provided updates and information on variation between ULTRIX systems. Parag Patel (parag@netcom.com) supplied the A/UX code.

Jesper Peterson(jep@mtiame.mtia.oz.au), Michel Schinz, and Martin Tauchmann (martintauchmann@bigfoot.com) supplied the Amiga port.

Thomas Funke (thf@zelator.in-berlin.de(?)) and  
Brian D. Carlstrom (bdc@clark.lcs.mit.edu) supplied the NeXT ports.  
Douglas Steel (doug@wg.icl.co.uk) provided ICL DRS6000 code.  
Bill Janssen (janssen@parc.xerox.com) supplied  
the SunOS dynamic loader  
specific code. Manuel Serrano (serrano@cornas.inria.fr) supplied linux and  
Sony News specific code. Al Dosser provided Alpha/OSF/1 code. He and  
Dave Detlefs (detlefs@src.dec.com) also provided several generic bug fixes.  
Alistair G. Crooks (agc@uts.amdahl.com) supplied the NetBSD and 386BSD ports.  
Jeffrey Hsu (hsu@soda.berkeley.edu) provided the FreeBSD port.  
Brent Benson (brent@jade.ssd.csd.harris.com) ported the collector to  
a Motorola 88K processor running CX/UX (Harris NightHawk).  
Ari Huttunen (Ari.Huttunen@hut.fi) generalized the OS/2 port to  
nonIBM development environments (a nontrivial task).  
Patrick Beard (beard@cs.ucdavis.edu) provided the initial MacOS port.  
David Chase, then at Olivetti Research, suggested several improvements.  
Scott Schwartz (schwartz@groucho.cse.psu.edu) supplied some of the  
code to save and print call stacks for leak detection on a SPARC.  
Jesse Hull and John Ellis supplied the C++ interface code.  
Zhong Shao performed much of the  
experimentation that led to the  
current typed allocation facility. (His dynamic type inference code hasn't  
made it into the released version of the collector, yet.)  
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Version 2.1, February 1999

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## 1.102 stack 1.7.0

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## 1.104 e2fsprogs 1.44.2

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This package was added to the e2fsprogs debian source package by Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

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This is the Debian GNU/Linux prepackaged version of the static EXT2 file system consistency checker (e2fsck.static). The EXT2 utilities were written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

Sources were obtained from <http://sourceforge.net/projects/e2fsprogs>

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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#
```

all:: image

```
real-subdirs:: Makefile
@echo " MKDIR pic"
@mkdir -p pic
```

```
BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic
```

image: \$(BSD\_LIB)

```
$(BSD_LIB): $(OBJS)
(cd pic; ld -Bshareable -o $(BSD_LIB) $(LD_FLAGS_SHLIB) $(OBJS))
$(MV) pic/$(BSD_LIB) .
$(RM) -f ../$(BSD_LIB)
(cd ..; $(LN) $(LINK_BUILD_FLAGS) \
`echo $(my_dir) | sed -e 's;lib/;;'"/$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install:: $(BSD_LIB)
@echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
@$(INSTALL_PROGRAM) $(BSD_LIB) \
$(DESTDIR)$$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
@-$(LD_CONFIG)
```

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::

\$(RM) -f \$(DESTDIR)\$BSDLIB\_INSTALL\_DIR)/\$(BSD\_LIB)

clean::

\$(RM)

-rf pic

\$(RM) -f \$(BSD\_LIB)

\$(RM) -f ../\$(BSD\_LIB)

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Index: tdbsa/tdb.c

-----  
--- tdbsa.orig/tdb.c

+++ tdbsa/tdb.c

@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)

\*/

/\*

- Unix SMB/CIFS implementation.
- + trivial database library - standalone version

- trivial database library - private includes

-

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Gadi Oxman, August 1995

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```

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```

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```
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```

```
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```

```
Ty Coon, President of Vice
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Theodore Ts'o  
23-June-2007

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This package was added to the e2fsprogs debian source package by Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

<http://sourceforge.net/projects/e2fsprogs>

Upstream Author: Theodore Ts'o <tytso@mit.edu>

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# 1.105 gopkg.in-yaml 2.4.0

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# 1.106 goprotobuf 1.5.2

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Go support for Protocol Buffers - Google's data interchange format

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<https://github.com/golang/protobuf>

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# 1.107 autogen 0.2.36

## 1.107.1 Available under license :

# Tests

Tests are automatically run via GitHub actions. There are two workflows:

1. [build.yml](https://github.com/microsoft/autogen/blob/main/.github/workflows/build.yml)
1. [openai.yml](https://github.com/microsoft/autogen/blob/main/.github/workflows/openai.yml)

The first workflow is required to pass for all PRs (and it doesn't do any OpenAI calls). The second workflow is required for changes that affect the OpenAI tests (and does actually call LLM). The second workflow requires approval to run. When writing tests that require OpenAI calls, please use [pytest.mark.skipif](https://github.com/microsoft/autogen/blob/b1adac515931bf236ac59224269eeec683a162ba/test/oa/test\_client.py#L19) to make them run in only when `openai` package is installed. If additional dependency for this test is required, install the dependency in the corresponding python version in [openai.yml](https://github.com/microsoft/autogen/blob/main/.github/workflows/openai.yml).

Make sure all tests pass, this is required for [build.yml](https://github.com/microsoft/autogen/blob/main/.github/workflows/build.yml) checks to pass

## Running tests locally

To run tests, install the [test] option:

```
```bash
pip install -e."[test]"
```
```

Then you can run the tests from the `test` folder using the following command:

```
```bash
pytest test
```
```

Tests for the `autogen.agentchat.contrib` module may be skipped automatically if the required dependencies are not installed. Please consult the documentation for each contrib module to see what dependencies are required.

See [here](https://github.com/microsoft/autogen/blob/main/notebook/contributing.md#testing) for how to run notebook tests.

## ## Skip flags for tests

- `--skip-openai` for skipping tests that require access to OpenAI services.
- `--skip-docker` for skipping tests that explicitly use docker
- `--skip-redis` for skipping tests that require a Redis server

For example, the following command will skip tests that require access to OpenAI and docker services:

```
```bash
pytest
test --skip-openai --skip-docker
```
```

## ## Coverage

Any code you commit should not decrease coverage. To ensure your code maintains or increases coverage, use the following commands after installing the required test dependencies:

```
```bash
pip install -e ."[test]"

pytest test --cov-report=html
```
```

Pytest generated a code coverage report and created a htmlcov directory containing an index.html file and other related files. Open index.html in any web browser to visualize and navigate through the coverage data interactively. This interactive visualization allows you to identify uncovered lines and review coverage statistics for individual files.

## # Pre-commit

Run `pre-commit install` to install pre-commit into your git hooks. Before you commit, run `pre-commit run` to check if you meet the pre-commit requirements. If you use Windows (without WSL) and can't commit after installing pre-commit, you can run `pre-commit uninstall` to uninstall the hook. In WSL or Linux this is supposed to work.

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# Docker for Development

For developers contributing to the AutoGen project, we offer a specialized Docker environment. This setup is designed to streamline the development process, ensuring that all contributors work within a consistent and well-equipped environment.

## Autogen Developer Image (autogen\_dev\_img)

- **Purpose**: The `autogen_dev_img`` is tailored for contributors to the AutoGen project. It includes a suite of tools and configurations that aid in the development and testing of new features or fixes.
- **Usage**: This image is recommended for developers who intend to contribute code or documentation to AutoGen.
- **Forking the Project**: It's advisable to fork the AutoGen GitHub project to your own repository. This allows you to make changes in a separate environment without affecting the main project.
- **Updating Dockerfile**: Modify your copy of `Dockerfile`` in the `dev`` folder as needed for your development work.
- **Submitting Pull Requests**: Once your changes are ready, submit a pull request from your branch to the upstream AutoGen GitHub project for review and integration. For more details on contributing, see the [AutoGen Contributing](<https://microsoft.github.io/autogen/docs/Contribute>) page.

## Building the Developer Docker Image

- To build the developer Docker image (`autogen_dev_img``), use the following commands:

```
```bash
docker build -f .devcontainer/dev/Dockerfile -t autogen_dev_img https://github.com/microsoft/autogen.git#main
```
```

- For building the developer image built from a specific Dockerfile in a branch other than main/master

```
```bash
# clone the branch you want to work out of
git clone --branch {branch-name} https://github.com/microsoft/autogen.git
```

```
# cd to your new directory
```

```
cd autogen
```

```
# build your Docker image
```

```
docker build -f .devcontainer/dev/Dockerfile -t autogen_dev-srv_img .
```

```
...
```

### ## Using the Developer Docker Image

Once you have built the `autogen\_dev\_img`, you can run it using the standard Docker commands. This will place you inside the containerized development environment where you can run tests, develop code, and ensure everything is functioning as expected before submitting your contributions.

```
```bash
```

```
docker run -it -p 8081:3000 -v `pwd`/autogen-newcode:newstuff/ autogen_dev_img bash
```

```
```
```

- Note that the `pwd` is shorthand for present working directory. Thus, any path after the pwd is relative to that. If you want a more verbose method you could remove the "`pwd`/autogen-newcode" and replace it with the full path to your directory

```
```bash
```

```
docker run -it -p 8081:3000 -v /home/AutoGenDeveloper/autogen-newcode:newstuff/ autogen_dev_img bash
```

```
```
```

### ## Develop in Remote Container

If you use vscode, you can open the autogen folder in a [Container](<https://code.visualstudio.com/docs/remote/containers>).

We have provided the configuration in

[devcontainer](<https://github.com/microsoft/autogen/blob/main/.devcontainer>). They can be used in GitHub codespace too. Developing AutoGen in

dev containers is recommended.

```
# Guidance for Maintainers
```

### ## General

- Be a member of the community and treat everyone as a member. Be inclusive.
- Help each other and encourage mutual help.
- Actively post and respond.
- Keep open communication.
- Identify good maintainer candidates from active contributors.

### ## Pull Requests

- For new PR, decide whether to close without review. If not, find the right reviewers. One source to refer to is the roles on Discord. Another consideration is to ask users who can benefit from the PR to review it.

- For old PR, check the blocker: reviewer or PR creator. Try to unblock. Get additional help when needed.

- When requesting changes, make sure you can check back in time because it blocks merging.
- Make sure all the checks are passed.
- For changes that require running OpenAI tests, make sure the OpenAI tests pass too. Running these tests requires approval.
- In general, suggest small PRs instead of a giant PR.
- For documentation change, request snapshot of the compiled website, or compile by yourself to verify the format.
- For new contributors who have not signed the contributing agreement, remind them to sign before reviewing.
- For multiple PRs which may have conflict, coordinate them to figure out the right order.
- Pay special attention to:
  - Breaking changes. Dont make breaking changes unless necessary. Dont merge to main until enough heads up is provided and a new release is ready.
  - Test coverage decrease.
  - Changes that may cause performance degradation. Do regression test when test suites are available.
  - Discourage **\*\*change to the core library\*\*** when there is an alternative.

## ## Issues and Discussions

- For new issues, write a reply, apply a label if relevant. Ask on discord when necessary. For roadmap issues, apply the roadmap label and encourage community discussion. Mention relevant experts when necessary.
- For old issues, provide an update or close. Ask on discord when necessary. Encourage PR creation when relevant.
- Use good first issue for easy fix suitable for first-time contributors.
- Use task list for issues that require multiple PRs.
- For discussions, create an issue when relevant. Discuss on discord when appropriate.

## # Contributors

## Special thanks to all the people who help this project:

> These individuals dedicate their time and expertise to improve this project. We are deeply grateful for their contributions.

| Name              | GitHub Handle                                 | Organization          | Features                           | Roadmap Lead | Additional Information                                                                                                                                                               |
|-------------------|-----------------------------------------------|-----------------------|------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Qingyun Wu        | [qingyun-wu](https://github.com/qingyun-wu)   | Penn State University | all, alt-models, autobuilder       | Yes          | Available most of the time (US Eastern Time)                                                                                                                                         |
| Chi Wang          | [sonichi](https://github.com/sonichi)         | -                     | all                                | Yes          |                                                                                                                                                                                      |
| Li Jiang          | [thinkall](https://github.com/thinkall)       | Microsoft             | rag, autobuilder, group chat       | Yes          | [Issue #1657](https://github.com/microsoft/autogen/issues/1657) - Beijing, GMT+8                                                                                                     |
| Mark Sze          | [marklysze](https://github.com/marklysze)     | -                     | alt-models, group chat             | No           | Generally available (Sydney, AU time) - Group Chat "auto" speaker selection                                                                                                          |
| Hrushikesh Dokala | [Hk669](https://github.com/Hk669)             | -                     | alt-models, swebench, logging, rag | No           | [Issue #2946](https://github.com/microsoft/autogen/issues/2946), [Pull Request #2933](https://github.com/microsoft/autogen/pull/2933) - Available most of the time (India, GMT+5:30) |
| Jiale Liu         | [LeoLjl](https://github.com/LeoLjl)           | Penn State University | autobuild, group chat              | No           |                                                                                                                                                                                      |
| Shaokun Zhang     | [skzhang1](https://github.com/skzhang1)       | Penn State University | AgentOptimizer, Teachability       | Yes          | [Issue #521](https://github.com/microsoft/autogen/issues/521)                                                                                                                        |
| Rajan Chari       | [rajan-chari](https://github.com/rajan-chari) | Microsoft Research    | CAP, Survey of other frameworks    |              |                                                                                                                                                                                      |

| No || | | | |
| Victor Dibia | [victordibia](https://github.com/victordibia) | Microsoft Research | autogenstudio | Yes | [Issue #737](https://github.com/microsoft/autogen/issues/737) |  
| Yixuan Zhai | [randombet](https://github.com/randombet) | Meta | group chat, sequential\_chats, rag | No ||  
| Xiaoyun Zhang | [LittleLittleCloud](https://github.com/LittleLittleCloud) | Microsoft | AutoGen.Net, group chat | Yes | [Backlog - AutoGen.Net](https://github.com/microsoft/autogen/issues) - Available most of the time (PST) |  
| Yiran Wu | [yiranwu0](https://github.com/yiranwu0) | Penn State University | alt-models, group chat, logging | Yes ||  
| Beibin Li | [BeibinLi](https://github.com/BeibinLi) | Microsoft Research | alt-models | Yes ||  
| Gagan Bansal | [gagb](https://github.com/gagb) | Microsoft Research | All |||  
| Adam Fourney | [afourney](https://github.com/afourney) | Microsoft Research | Complex Tasks |||  
| Ricky Loynd | [rickyloynd-microsoft](https://github.com/rickyloynd-microsoft) | Microsoft Research | Teachability |||  
| Eric Zhu | [ekzhu](https://github.com/ekzhu) | Microsoft Research | All, Infra |||  
| Jack Gerrits | [jackgerrits](https://github.com/jackgerrits) | Microsoft Research | All, Infra |||  
| David Luong | [DavidLuong98](https://github.com/DavidLuong98) | Microsoft | AutoGen.Net |||  
| Davor Runje | [davorrunje](https://github.com/davorrunje) | airt.ai | Tool calling, IO || Available most of the time (Central European Time) |  
| Friederike Niedtner | [Friderike](https://www.microsoft.com/en-us/research/people/fniedtner/) | Microsoft Research | PM |||  
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| Jingya Chen | [jingyachen](https://github.com/JingyaChen) | Microsoft | UX Design, AutoGen Studio |||  
| Suff Syed | [suffsyed](https://github.com/suffsyed) | Microsoft | UX Design, AutoGen Studio |||

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## Are you missing from this list?

>

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# Documentation

## How to get a notebook rendered on the website

See [here](<https://github.com/microsoft/autogen/blob/main/notebook/contributing.md#how-to-get-a-notebook-displayed-on-the-website>) for instructions on how to get a notebook in the `notebook` directory rendered on the website.

## Build documentation locally

1\ To build and test documentation locally, first install [Node.js](<https://nodejs.org/en/download/>). For example,

```
```bash
nvm install --lts
```
```

Then, install `yarn` and other required packages:

```
```bash
npm install --global yarn
pip install pydoc-markdown pyyaml termcolor
```
```

2\ You also need to install quarto. Please click on the `Pre-release` tab from [this website](<https://quarto.org/docs/download/>) to download the latest version of `quarto` and install it. Ensure that the `quarto` version is `1.5.23` or higher.

3\ Finally, run the following commands to build:

```
```console
cd website
yarn install --frozen-lockfile --ignore-engines
pydoc-markdown
python process_notebooks.py
  render
yarn start
```
```

The last command starts a local development server and opens up a browser window.  
Most changes are reflected live without having to restart the server.

## ## Build with Docker

To build and test documentation within a docker container. Use the Dockerfile in the `dev` folder as described above to build your image:

```
```bash
docker build -f .devcontainer/dev/Dockerfile -t autogen_dev_img https://github.com/microsoft/autogen.git#main
```
```

Then start the container like so, this will log you in and ensure that Docker port 3000 is mapped to port 8081 on your local machine

```
```bash
docker run -it -p 8081:3000 -v `pwd`/autogen-newcode:newstuff/ autogen_dev_img bash
```
```

Once at the CLI in Docker run the following commands:

```
```bash
cd website
yarn install --frozen-lockfile --ignore-engines
pydoc-markdown
python process_notebooks.py render
yarn start --host 0.0.0.0 --port 3000
```
```

Once done you should be able to access the documentation at `http://127.0.0.1:8081/autogen`  
# File A Bug Report

When you submit an issue to [GitHub](https://github.com/microsoft/autogen/issues), please do your best to follow these guidelines! This will make it a lot easier to provide you with good feedback:

- The ideal bug report contains a short reproducible code snippet. This way anyone can try to reproduce the bug easily (see [this](https://stackoverflow.com/help/mcve) for more details). If



your snippet is

longer than around 50 lines, please link to a [gist](https://gist.github.com) or a GitHub repo.

- If an exception is raised, please **provide the full traceback**.

- Please include your **operating system type and version number**, as well as your **Python, autogen, scikit-learn versions**. The version of autogen can be found by running the following code snippet:

```
```python
import autogen
print(autogen.__version__)
```
```

- Please ensure all **code snippets and error messages are formatted in appropriate code blocks**. See [Creating and highlighting code blocks](https://help.github.com/articles/creating-and-highlighting-code-blocks) for more details.

# Contributing to AutoGen

The project welcomes contributions from developers and organizations worldwide. Our goal is to foster a collaborative and inclusive community where diverse perspectives and expertise can drive innovation and enhance the project's capabilities. Whether you are an individual contributor or represent an organization, we invite you to join us in shaping the future of this project. Together, we can build something truly remarkable. Possible contributions include but not limited to:

- Pushing patches.
- Code review of pull requests.
- Documentation, examples and test cases.
- Readability improvement, e.g., improvement on docstr and comments.
- Community participation in [issues](https://github.com/microsoft/autogen/issues), [discussions](https://github.com/microsoft/autogen/discussions), [discord](https://aka.ms/autogen-dc), and [twitter](https://twitter.com/pyautogen).
- Tutorials, blog posts, talks that promote the project.
- Sharing application scenarios and/or related research.

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## ## Roadmaps

To see what we are working on and what we plan to work on, please check our [Roadmap Issues](https://aka.ms/autogen-roadmap).

## ## Becoming a Reviewer

There is currently no formal reviewer solicitation process. Current reviewers identify reviewers from active contributors. If you are willing to become a reviewer, you are welcome to let us know on discord.

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# 1.109 liblockfile 3.4.7

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Upstream-Name: liblockfile

Upstream-Contact: Miquel van Smoorenburg <mike@langeraar.net>

Source: <https://github.com/mikevs/liblockfile>

Files: \*

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Files: debian/\*

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Files: dotlockfile.1 dotlockfile.c

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# 1.110 fmt 11.0

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### A. HISTORY OF THE SOFTWARE

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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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| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 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                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 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        |                     |
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| 2.2.3          | 2.2.2        | 2003      | PSF        | yes                 |
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|-------|-------|------|-----|-----|
| 2.5.2 | 2.5.1 | 2008 | PSF | yes |
| 2.5.3 | 2.5.2 | 2008 | PSF | yes |
| 2.6   | 2.5   | 2008 | PSF | yes |
| 2.6.1 | 2.6   | 2008 | PSF | yes |
| 2.6.2 | 2.6.1 | 2009 | PSF | yes |
| 2.6.3 | 2.6.2 | 2009 | PSF | yes |
| 2.6.4 | 2.6.3 | 2009 | PSF | yes |
| 2.6.5 | 2.6.4 | 2010 | PSF | yes |
| 3.0   | 2.6   | 2008 | PSF | yes |
| 3.0.1 | 3.0   | 2009 | PSF | yes |
| 3.1   | 3.0.1 | 2009 | PSF | yes |
| 3.1.1 | 3.1   | 2009 | PSF | yes |
| 3.1.2 | 3.1.1 | 2010 | PSF | yes |
| 3.1.3 | 3.1.2 | 2010 | PSF | yes |
| 3.1.4 | 3.1.3 | 2011 | PSF | yes |
| 3.2   | 3.1   | 2011 | PSF | yes |
| 3.2.1 | 3.2   | 2011 |     |     |
|       | PSF   | yes  |     |     |
| 3.2.2 | 3.2.1 | 2011 | PSF | yes |
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# 1.115 mpir 1.3.1

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#### MMC tools (mmc-utils)

=====

mmc-utils is a tool for configuring MMC storage devices from userspace.

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One can document themselves by reading how to submit a patch in the official Linux kernel documentation:

<https://www.kernel.org/doc/html/latest/process/submitting-patches.html>

Not all sections apply but it should be a good way to get started.

A patch should be sent as a mail (not as an attachment, see documentation above) to the [linux-mmc@vger.kernel.org](mailto:linux-mmc@vger.kernel.org) mailing list with maintainers as

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## Documentation

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<https://mmc-utils.readthedocs.io/en/latest/>

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Appendix E: The SIL Open Font License Version 1.1

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SIL OPEN FONT LICENSE Version 1.1 - 26 February 2007

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Any

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```
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## 1.121 pcre 10.44

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PCRE2 is a library of functions to support regular expressions whose syntax and semantics are as close as possible to those of the Perl 5 language.

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### THE BASIC LIBRARY FUNCTIONS

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