CircularSinglyLinkedList

Generated by Doxygen 1.8.11

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1.1 Data Structures

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2.1 File List

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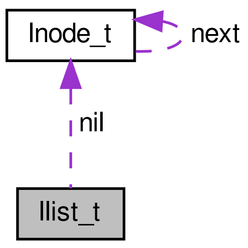
3 Data Structure Documentation

3.1 llist_t Struct Reference

```
#include <llist.h>
```

Collaboration diagram for llist_t:



Data Fields

- size_t width
- lnode_t ∗ nil
- int count

3.1.1 Detailed Description

Definition at line 21 of file llist.h.

3.1.2 Field Documentation

3.1.2.1 int count

count element amount

Definition at line 24 of file llist.h.

3.1.2.2 lnode_t∗ nil

sentinel (dummy node)

Definition at line 23 of file llist.h.

3.1.2.3 size_t width

element size (in bytes)

Definition at line 22 of file llist.h.

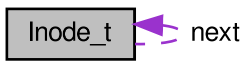
The documentation for this struct was generated from the following file:

- llist.h

3.2 lnode_t Struct Reference

```
#include <llist.h>
```

Collaboration diagram for lnode_t:



Data Fields

- void ∗ data
- struct lnode_t ∗ next

3.2.1 Detailed Description

Definition at line 16 of file llist.h.

3.2.2 Field Documentation

3.2.2.1 void∗ data

data pointer

Definition at line 17 of file llist.h.

3.2.2.2 struct lnode_t∗ next

next node

Definition at line 18 of file llist.h.

The documentation for this struct was generated from the following file:

- llist.h

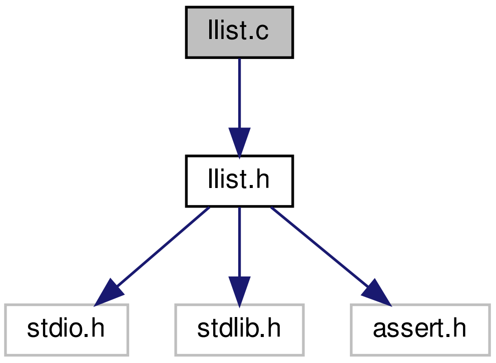
4 File Documentation

4.1 llist.c File Reference

Circular Singly linked list basic operations implementation.

```
#include "llist.h"
```

Include dependency graph for llist.c:



Functions

- llist_t ∗ llist_create (size_t width)
- void llist_destruct (llist_t ∗l)
- lnode_t ∗ llist_lsearch (llist_t ∗l, int n)
- void llist_delete (llist_t ∗l, int n)
- lnode_t ∗ llist_insert (llist_t ∗l, int n, void ∗e)
- void llist_int_print (llist_t ∗l)

4.1.1 Detailed Description

Circular Singly linked list basic operations implementation.

Author

Firmin MARTIN

Version

0.1

Date

03/01/2018

Definition in file llist.c.

4.1.2 Function Documentation

4.1.2.1 llist_t∗ llist_create (size_t *width*)

Given the size of each element and the list size, create a list.

Parameters

width	size of each element
max_size	size of the list, max_size∗width bytes will be reserved (definitively) for the list

Returns

a list initialized

Definition at line 18 of file llist.c.

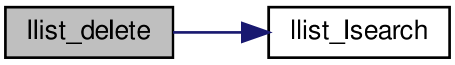
```
                                  {
    llist_t* l = malloc(sizeof(llist_t));
    assert(l);
    l->nil = malloc(sizeof(lnode_t));
    assert(l->nil);
    l->nil->next = l->nil;
    l->width = width;
    l->count = 0;
    return l;
}
```

4.1.2.2 void llist_delete (llist_t ∗ *l*, int *n*)

Definition at line 69 of file llist.c.

```
                                    {
    if (l->count == 0) return ;
    /* get the previous node */
    lnode_t* x =  llist_lsearch(l, n - 1);
    lnode_t* p = x->next;
    x->next = p->next;
    free(p->data);
    free(p);
    l->count--;
}
```

Here is the call graph for this function:



4.1.2.3 void llist_destruct (llist_t ∗ *l*)

Free a list.

Parameters

q	a list

Definition at line 34 of file llist.c.

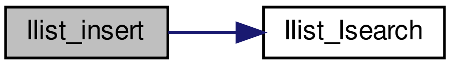
```
                               {
    lnode_t* x = l->nil->next, *p;
    while(x != l->nil) {
        p = x;
        x = x->next;
        free(p->data);
        free(p);
    }
    free(l->nil);
    free(l);
}
```

4.1.2.4 lnode_t∗ llist_insert (llist_t ∗ *l,* int *n,* void ∗ *e*)

Definition at line 99 of file llist.c.

```
                                                  {
    /* get the previous node */
    lnode_t* x =  llist_lsearch(l, n - 1);
    lnode_t* node = malloc(sizeof(lnode_t));
    assert(node);
    node->data = e;
    llist_insert_ptr(x, node);
    l->count++;
    return node;
}
```

Here is the call graph for this function:



4.1.2.5 void llist_int_print (**llist_t** ∗ *l*)

Print an int list

Definition at line 114 of file llist.c.

```
00114                                          {
00115     printf("%d nodes : nil->", l->count);
00116     lnode_t* x = l->nil->next;
00117     for(int i = 0; i < l->count; i++) {
00118         printf("[%d]->", *((int*)x->data));
00119         x = x->next;
00120     }
00121     puts("nil");
00122 }
```

4.1.2.6 **lnode_t**∗ llist_lsearch (**llist_t** ∗ *l*, int *n*)

Definition at line 54 of file llist.c.

```
00054                                                    {
00055     assert (n >= -1 || n < l->count) ;
00056     lnode_t* x = l->nil;
00057     for(int i = -1; i < n; i++) {
00058         x = x->next;
00059     }
00060     return x;
00061 }
```

4.2 llist.c

```
00001 #include "llist.h"
00002
00018 llist_t* llist_create(size_t width) {
00019     llist_t* l = malloc(sizeof(llist_t));
00020     assert(l);
00021     l->nil = malloc(sizeof(lnode_t));
00022     assert(l->nil);
00023     l->nil->next = l->nil;
00024     l->width = width;
00025     l->count = 0;
00026     return l;
00027 }
00028
00034 void llist_destruct(llist_t* l) {
00035     lnode_t* x = l->nil->next, *p;
00036     while(x != l->nil) {
00037         p = x;
00038         x = x->next;
00039         free(p->data);
00040         free(p);
00041     }
```

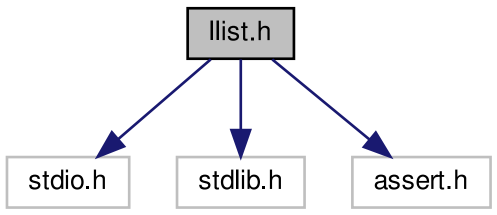
```
    free(l->nil);
    free(l);
}

/*
 * Given an index n, do a linear search on a list, return the node.
 * If n == -1, return sentinel node.
 * \param l a list
 * \param n index
 * \return the node of index n
 */

lnode_t* llist_lsearch(llist_t* l, int n) {
    assert (n >= -1 || n < l->count) ;
    lnode_t* x = l->nil;
    for(int i = -1; i < n; i++) {
        x = x->next;
    }
    return x;
}

/*
 * Delete the node of index n
 * \param l a list
 * \param n index
 */

void llist_delete(llist_t* l, int n) {
    if (l->count == 0) return ;
    /* get the previous node */
    lnode_t* x =  llist_lsearch(l, n - 1);
    lnode_t* p = x->next;
    x->next = p->next;
    free(p->data);
    free(p);
    l->count--;
}

/*
 * Insert a node \e x after a given node \e node
 * \param node the node to prepend
 * \param x the node to insert
 */

static void llist_insert_ptr(lnode_t* before, lnode_t* after) {
    after->next = before->next;
    before->next = after;
}

/*
 * Given an index n, insert in the front of the node n
 * \param l a list
 * \param n index
 * \param e element
 * \return the new node of index n which be inserted
 */

lnode_t* llist_insert(llist_t* l, int n, void* e) {
    /* get the previous node */
    lnode_t* x =  llist_lsearch(l, n - 1);
    lnode_t* node = malloc(sizeof(lnode_t));
    assert(node);
    node->data = e;
    llist_insert_ptr(x, node);
    l->count++;
    return node;
}

void llist_int_print(llist_t* l) {
    printf("%d nodes : nil->", l->count);
    lnode_t* x = l->nil->next;
    for(int i = 0; i < l->count; i++) {
        printf("[%d]->", *((int*)x->data));
        x = x->next;
    }
    puts("nil");
}
```

4.3 llist.h File Reference

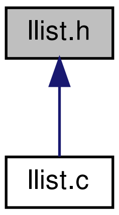
Circular singly linked list definition and basic operations.

```
#include <stdio.h>
#include <stdlib.h>
#include <assert.h>
```

Include dependency graph for llist.h:



This graph shows which files directly or indirectly include this file:



Data Structures

- struct lnode_t
- struct llist_t

Typedefs

- typedef struct lnode_t lnode_t
- typedef struct llist_t llist_t

Functions

- llist_t ∗ llist_create (size_t width)
- void llist_destruct (llist_t ∗l)
- lnode_t ∗ llist_insert (llist_t ∗l, int n, void ∗e)
- void llist_delete (llist_t ∗l, int n)
- void llist_int_print (llist_t ∗l)
- lnode_t ∗ llist_lsearch (llist_t ∗l, int n)

4.3.1 Detailed Description

Circular singly linked list definition and basic operations.

Author

Firmin MARTIN

Version

0.1

Date

03/01/2018

Definition in file llist.h.

4.3.2 Typedef Documentation

4.3.2.1 typedef struct llist_t llist_t

4.3.2.2 typedef struct lnode_t lnode_t

4.3.3 Function Documentation

4.3.3.1 llist_t* llist_create (size_t *width*)

Given the size of each element and the list size, create a list.

Parameters

width	size of each element
max_size	size of the list, max_size*width bytes will be reserved (definitively) for the list

Returns

a list initialized

Definition at line 18 of file llist.c.

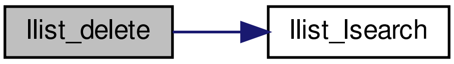
```
00018                                   {
00019     llist_t* l = malloc(sizeof(llist_t));
00020     assert(l);
00021     l->nil = malloc(sizeof(lnode_t));
00022     assert(l->nil);
00023     l->nil->next = l->nil;
00024     l->width = width;
00025     l->count = 0;
00026     return l;
00027 }
```

4.3.3.2 void llist_delete (**llist_t** ∗ *l*, int *n*)

Definition at line 69 of file llist.c.

```
00069                                    {
00070     if (l->count == 0) return ;
00071     /* get the previous node */
00072     lnode_t* x =  llist_lsearch(l, n - 1);
00073     lnode_t* p = x->next;
00074     x->next = p->next;
00075     free(p->data);
00076     free(p);
00077     l->count--;
00078 }
```

Here is the call graph for this function:



4.3.3.3 void llist_destruct (**llist_t** ∗ *l*)

Free a list.

Parameters

q	a list

Definition at line 34 of file llist.c.

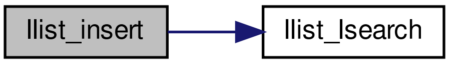
```
00034                               {
00035     lnode_t* x = l->nil->next, *p;
00036     while(x != l->nil) {
00037         p = x;
00038         x = x->next;
00039         free(p->data);
00040         free(p);
00041     }
00042     free(l->nil);
00043     free(l);
00044 }
```

4.3.3.4 **lnode_t**∗ llist_insert (**llist_t** ∗ *l*, int *n*, void ∗ *e*)

Definition at line 99 of file llist.c.

```
00099                                                   {
00100     /* get the previous node */
00101     lnode_t* x =  llist_lsearch(l, n - 1);
00102     lnode_t* node = malloc(sizeof(lnode_t));
00103     assert(node);
00104     node->data = e;
00105     llist_insert_ptr(x, node);
00106     l->count++;
00107     return node;
00108 }
```

Here is the call graph for this function:



4.3.3.5 void llist_int_print (**llist_t** ∗ *l*)

Print an int list

Definition at line 114 of file llist.c.

```
00114                                     {
00115     printf("%d nodes : nil->", l->count);
00116     lnode_t* x = l->nil->next;
00117     for(int i = 0; i < l->count; i++) {
00118         printf("[%d]->", *((int*)x->data));
00119         x = x->next;
00120     }
00121     puts("nil");
00122 }
```

4.3.3.6 **lnode_t**∗ llist_lsearch (**llist_t** ∗ *l,* int *n*)

Definition at line 54 of file llist.c.

```
00054                                              {
00055     assert (n >= -1 || n < l->count) ;
00056     lnode_t* x = l->nil;
00057     for(int i = -1; i < n; i++) {
00058         x = x->next;
00059     }
00060     return x;
00061 }
```

4.4 llist.h

```
00001 #ifndef LLIST_H
00002 #define LLIST_H
00003 
00004 #include <stdio.h>
00005 #include <stdlib.h>
00006 #include <assert.h>
00007 
00016 typedef struct lnode_t {
00017     void* data;
00018     struct lnode_t* next;
00019 } lnode_t;
00020 
00021 typedef struct llist_t {
00022     size_t width;
00023     lnode_t* nil;
00024     int count;
00025 } llist_t;
00026 
00027 llist_t*  llist_create(size_t width);
00028 void  llist_destruct(llist_t* l);
00029 lnode_t*  llist_insert(llist_t* l, int n, void* e);
00030 void llist_delete(llist_t* l, int n);
00031 void  llist_int_print(llist_t* l);
00032 lnode_t*  llist_lsearch(llist_t* l, int n);
00033 
00034 #endif /* ifndef LLIST_H */
```

Index