

Stack

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## 1 Data Structure Index

### 1.1 Data Structures

Here are the data structures with brief descriptions:

<a href="#">stack_t</a>	<b>2</b>
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## 2 File Index

### 2.1 File List

Here is a list of all files with brief descriptions:

<a href="#">stack.c</a>	
Stack's basic operations implementation (using dynamic array)	<a href="#">3</a>
<a href="#">stack.h</a>	
Stack definition and basic operations	<a href="#">7</a>

## 3 Data Structure Documentation

### 3.1 `stack_t` Struct Reference

```
#include <stack.h>
```

#### Data Fields

- `size_t` [width](#)
- `int` [top](#)
- `void **` [base](#)
- `int` [mem\\_size](#)

#### 3.1.1 Detailed Description

Abstract stack using dynamic array.

Definition at line [20](#) of file [stack.h](#).

#### 3.1.2 Field Documentation

##### 3.1.2.1 `void** base`

pointer to the dynamic array

Definition at line [23](#) of file [stack.h](#).

##### 3.1.2.2 `int mem_size`

`width * mem_size` bytes is reserved for the dynamic array

Definition at line [24](#) of file [stack.h](#).

### 3.1.2.3 int top

top element index

Definition at line 22 of file [stack.h](#).

### 3.1.2.4 size\_t width

element size (in bytes)

Definition at line 21 of file [stack.h](#).

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

- [stack.h](#)

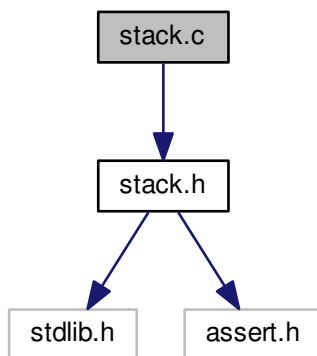
## 4 File Documentation

### 4.1 stack.c File Reference

stack's basic operations implementation (using dynamic array)

```
#include "stack.h"
```

Include dependency graph for stack.c:



#### Functions

- int [stack\\_isempty](#) ([stack\\_t](#) \*s)
- void [stack\\_push](#) ([stack\\_t](#) \*s, void \*e)
- void \* [stack\\_pop](#) ([stack\\_t](#) \*s)
- [stack\\_t](#) \* [stack\\_create](#) (size\_t width)
- void [stack\\_destruct](#) ([stack\\_t](#) \*s)

#### 4.1.1 Detailed Description

stack's basic operations implementation (using dynamic array)

##### Author

Firmin MARTIN

##### Version

0.1

##### Date

28/12/2017

Definition in file [stack.c](#).

#### 4.1.2 Function Documentation

##### 4.1.2.1 `stack_t* stack_create ( size_t width )`

Given the size of each element, create a stack 10 \* sizeof(void\*) bytes is reserved by default.

##### Parameters

<i>width</i>	size of each element
--------------	----------------------

##### Returns

a stack initialized

Definition at line 57 of file [stack.c](#).

```
00057     {
00058         stack_t* s = malloc(sizeof(stack_t));
00059         assert(s);
00060         s->width = width;
00061         s->mem_size = 10;
00062         s->base = (void**) malloc(sizeof(void*) * s->mem_size);
00063         assert(s->base);
00064         s->top = -1;
00065         return s;
00066     }
```

##### 4.1.2.2 `void stack_destruct ( stack_t * s )`

Free a stack.

##### Parameters

<i>s</i>	a stack
----------	---------

Definition at line 73 of file [stack.c](#).

```
00073                                     {
00074     free(s->base);
00075     free(s);
00076 }
```

#### 4.1.2.3 int stack\_isempty ( stack\_t \* s )

Determinate the emptiness of a stack.

##### Parameters

s	stack
---	-------

##### Returns

1 if the stack s is empty, 0 otherwise.

Definition at line 17 of file [stack.c](#).

```
00017                                     {
00018     return s->top == -1;
00019 }
```

#### 4.1.2.4 void\* stack\_pop ( stack\_t \* s )

Pop out an element from the stack s.

##### Parameters

s	stack
---	-------

##### Returns

an element

Definition at line 44 of file [stack.c](#).

```
00044                                     {
00045     if (stack_isempty(s)) return NULL;
00046     s->top--;
00047     return s->base[s->top + 1];
00048 }
```

Here is the call graph for this function:



#### 4.1.2.5 void stack\_push ( stack\_t \* s, void \* e )

Push an element *e* into the stack *s*.

##### Parameters

<i>s</i>	stack
<i>e</i>	element which be pushed

Definition at line 27 of file [stack.c](#).

```

00027                                     {
00028     s->top++;
00029     if (s->top == s->mem_size) {
00030         void** newptr = realloc(s->base, sizeof(void*) * (s->mem_size + 10));
00031         assert(newptr);
00032         s->base = newptr;
00033         s->mem_size += 10;
00034     }
00035     s->base[s->top] = e;
00036 }
  
```

## 4.2 stack.c

```

00001
00009 #include "stack.h"
00010
00017 int stack_isempty(stack_t* s) {
00018     return s->top == -1;
00019 }
00020
00027 void stack_push(stack_t* s, void* e) {
00028     s->top++;
00029     if (s->top == s->mem_size) {
00030         void** newptr = realloc(s->base, sizeof(void*) * (s->mem_size + 10));
00031         assert(newptr);
00032         s->base = newptr;
00033         s->mem_size += 10;
00034     }
00035     s->base[s->top] = e;
00036 }
00037
00044 void* stack_pop(stack_t* s) {
00045     if (stack_isempty(s)) return NULL;
00046     s->top--;
00047     return s->base[s->top + 1];
00048 }
00049
00057 stack_t* stack_create(size_t width) {
00058     stack_t* s = malloc(sizeof(stack_t));
00059     assert(s);
00060     s->width = width;
00061     s->mem_size = 10;
  
```

```
00062     s->base = (void**) malloc(sizeof(void*) * s->mem_size);
00063     assert(s->base);
00064     s->top = -1;
00065     return s;
00066 }
00067
00073 void stack_destruct(stack_t* s) {
00074     free(s->base);
00075     free(s);
00076 }
00077
00078
00079
```

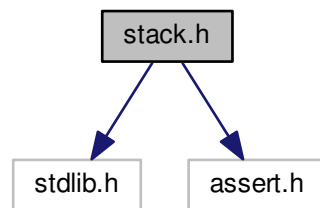
## 4.3 stack.h File Reference

stack definition and basic operations

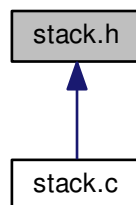
```
#include <stdlib.h>
```

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

Include dependency graph for stack.h:



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



### Data Structures

- struct `stack_t`



## Functions

- [stack\\_t](#) \* [stack\\_create](#) ([size\\_t](#) width)
- void [stack\\_destruct](#) ([stack\\_t](#) \*s)
- int [stack\\_isempty](#) ([stack\\_t](#) \*s)
- void \* [stack\\_pop](#) ([stack\\_t](#) \*s)
- void [stack\\_push](#) ([stack\\_t](#) \*s, void \*e)

### 4.3.1 Detailed Description

stack definition and basic operations

#### Author

Firmin MARTIN

#### Version

0.1

#### Date

28/12/2017

Definition in file [stack.h](#).

### 4.3.2 Function Documentation

#### 4.3.2.1 [stack\\_t](#)\* [stack\\_create](#) ( [size\\_t](#) width )

Given the size of each element, create a stack 10 \* sizeof(void\*) bytes is reserved by default.

#### Parameters

<i>width</i>	size of each element
--------------	----------------------

#### Returns

a stack initialized

Definition at line 57 of file [stack.c](#).

```
00057     {
00058         stack\_t* s = malloc(sizeof(stack\_t));
00059         assert(s);
00060         s->width = width;
00061         s->mem_size = 10;
00062         s->base = (void**) malloc(sizeof(void*) * s->mem_size);
00063         assert(s->base);
00064         s->top = -1;
00065         return s;
00066     }
```

#### 4.3.2.2 void stack\_destruct ( stack\_t \* s )

Free a stack.

##### Parameters

s	a stack
---	---------

Definition at line 73 of file [stack.c](#).

```
00073                                     {
00074     free(s->base);
00075     free(s);
00076 }
```

#### 4.3.2.3 int stack\_isempty ( stack\_t \* s )

Determinate the emptiness of a stack.

##### Parameters

s	stack
---	-------

##### Returns

1 if the stack s is empty, 0 otherwise.

Definition at line 17 of file [stack.c](#).

```
00017                                     {
00018     return s->top == -1;
00019 }
```

#### 4.3.2.4 void\* stack\_pop ( stack\_t \* s )

Pop out an element from the stack s.

##### Parameters

s	stack
---	-------

##### Returns

an element

Definition at line 44 of file [stack.c](#).

```
00044                                     {
00045     if (stack_isempty(s)) return NULL;
00046     s->top--;
00047     return s->base[s->top + 1];
00048 }
```

Here is the call graph for this function:



#### 4.3.2.5 void stack\_push ( stack\_t \* s, void \* e )

Push an element e into the stack s.

##### Parameters

<b>s</b>	stack
<b>e</b>	element which be pushed

Definition at line 27 of file [stack.c](#).

```

00027                                     {
00028     s->top++;
00029     if (s->top == s->mem_size) {
00030         void** newptr = realloc(s->base, sizeof(void*) * (s->mem_size + 10));
00031         assert(newptr);
00032         s->base = newptr;
00033         s->mem_size += 10;
00034     }
00035     s->base[s->top] = e;
00036 }
```

## 4.4 stack.h

```

00001 #ifndef STACK_H
00002 #define STACK_H
00003
00004 #include <stdlib.h>
00005 #include <assert.h>
00006
00020 typedef struct {
00021     size_t width;
00022     int top;
00023     void** base;
00024     int mem_size;
00025 } stack_t;
00026
00027 stack_t* stack_create(size_t width);
00028 void stack_destruct(stack_t* s);
00029 int stack_isempty(stack_t* s);
00030 void* stack_pop(stack_t* s);
00031 void stack_push(stack_t* s, void* e);
00032
00033 #endif /* ifndef STACK_H */
```

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