Queue

Generated by Doxygen 1.8.11

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Class queue_t

base should'nt be accessible, see https://stackoverflow.com/questions/5368028/how-to-make-struct-

2 Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

3 File Index

3.1 File List

Here is a list of all files with brief descriptions:

4 Data Structure Documentation

4.1 queue_t Struct Reference

`#include <queue.h>`

Data Fields

- size_t width
- int front
- int count
- void ** base
- int max_size

4.1.1 Detailed Description

Abstract queue using array.

Todo *base* should'nt be accessible, see https://stackoverflow.com/questions/5368028/how-to-make-struc

Definition at line 22 of file queue.h.

4.1.2 Field Documentation

4.1.2.1 void** base

pointer to the array

Definition at line 26 of file queue.h.

4.1.2.2 int count

count element amount

Definition at line 25 of file queue.h.

4.1.2.3 int front

front element index

Definition at line 24 of file queue.h.

4.1.2.4 int max_size

width * max_size bytes is reserved for the queue

Definition at line 27 of file queue.h.

4.1.2.5 size_t width

element size (in bytes)

Definition at line 23 of file queue.h.

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

- queue.h

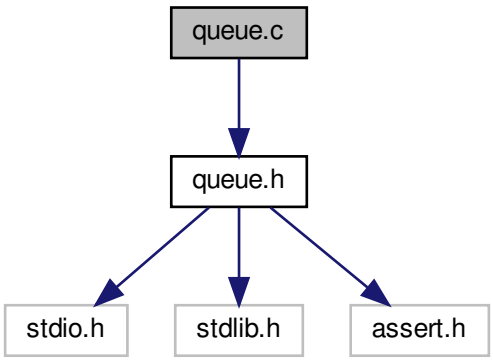
5 File Documentation

5.1 queue.c File Reference

queue's basic operations implementation (using array)

```
#include "queue.h"
```

Include dependency graph for queue.c:



Functions

- int queue_isempty (queue_t *q)
- int queue_isfull (queue_t *q)
- void queue_enqueue (queue_t *q, void *e)
- void * queue_dequeue (queue_t *q)
- queue_t * queue_create (size_t width, int max_size)
- void queue_destruct (queue_t *q)
- void queue_int_print (queue_t *q)

5.1.1 Detailed Description

queue's basic operations implementation (using array)

Author

Firmin MARTIN

Version

0.1

Date

28/12/2017

Definition in file queue.c.

5.1.2 Function Documentation

5.1.2.1 queue_t* queue_create (size_t *width*, int *max_size*)

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

Parameters

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

Returns

a queue initialized

Definition at line 70 of file queue.c.

```
00070                                           {
00071     queue_t* q = malloc(sizeof(queue_t));
00072     assert(q);
00073     q->width = width;
```

```
00074     q->max_size = max_size ;
00075     q->base = (void**) calloc(q->max_size, sizeof(void*));
00076     assert(q->base);
00077     q->front = 0;
00078     q->count = 0;
00079     return q;
00080 }
```

5.1.2.2 void* queue_dequeue (queue_t * q)

Dequeue an element from the queue s.

Parameters

q	queue

Returns

an element or NULL if the queue is empty

Definition at line 53 of file queue.c.

```
00053                                {
00054     if(queue_isempty(q)) {
00055         fprintf(stderr, "The queue is empty : failed to dequeue.\n");
00056         return NULL;
00057     }
00058     void* e = q->base[(q->front - q->count + q->max_size)%q->
      max_size];
00059     q->count--;
00060     return e;
00061 }
```

Here is the call graph for this function:

5.1.2.3 void queue_destruct (queue_t * q)

Free a queue.

Parameters

q	a queue

Definition at line 87 of file queue.c.

```
00087                                   {
00088     for(int i=0; i<q->max_size;i++){
00089         free(q->base[i]);
00090     }
00091     free(q->base);
00092     free(q);
00093 }
```

5.1.2.4 void queue_enqueue (queue_t * q, void * e)

Enqueue an element e into the queue q.

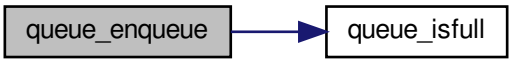
Parameters

q	queue
e	element which be enqueued

Definition at line 37 of file queue.c.

```
00037                                           {
00038     if(queue_isfull(q)) {
00039         fprintf(stderr, "The queue is full : failed to enqueue.\n");
00040         return;
00041     }
00042     q->base[q->front] = e;
00043     q->count++;
00044     q->front = (q->front+ 1)%q->max_size;
00045 }
```

Here is the call graph for this function:



5.1.2.5 void queue_int_print (queue_t * q)

Print an int queue

Definition at line 100 of file queue.c.

```
00100                                   {
00101     for(int i = 0; i < q->max_size; i++) {
00102         if ((q->front - i + q->max_size) % q->max_size <= q->
      count && i != q->front)
00103             printf("[%d]", *((int*)q->base[i]));
00104         else
00105             printf("[]");
00106     }
00107     puts("");
00108 }
```

5.1.2.6 int queue_isempty (queue_t * q)

Determinate the emptiness of a queue.

Parameters

s	queue

Returns

1 if the queue s is empty, 0 otherwise.

Definition at line 17 of file queue.c.

```
00017                                {
00018     return q->count == 0;
00019 }
```

5.1.2.7 int queue_isfull (queue_t * *q*)

Determinate the fullness of a queue.

Parameters

s	queue

Returns

1 if the queue s is full, 0 otherwise.

Definition at line 27 of file queue.c.

```
00027                                {
00028     return q->count == q->max_size;
00029 }
```

5.2 queue.c

```
00001
00009 #include "queue.h"
00010
00017 int queue_isempty(queue_t* q) {
00018     return q->count == 0;
00019 }
00020
00027 int queue_isfull(queue_t* q) {
00028     return q->count == q->max_size;
00029 }
00030
00037 void queue_enqueue(queue_t* q, void* e) {
00038     if(queue_isfull(q)) {
00039         fprintf(stderr, "The queue is full : failed to enqueue.\n");
00040         return;
00041     }
00042     q->base[q->front] = e;
00043     q->count++;
00044     q->front = (q->front+ 1)%q->max_size;
00045 }
00046
00053 void* queue_dequeue(queue_t* q) {
00054     if(queue_isempty(q)) {
00055         fprintf(stderr, "The queue is empty : failed to dequeue.\n");
00056         return NULL;
00057     }
```

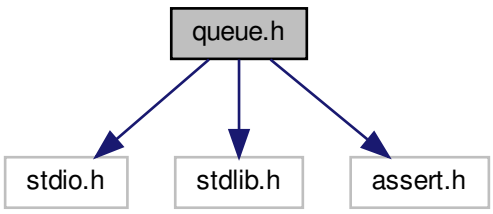
```
00058     void* e = q->base[(q->front - q->count + q->max_size)%q->
      max_size];
00059     q->count--;
00060     return e;
00061 }
00062
00070 queue_t* queue_create(size_t width, int max_size) {
00071     queue_t* q = malloc(sizeof(queue_t));
00072     assert(q);
00073     q->width = width;
00074     q->max_size = max_size ;
00075     q->base = (void**) calloc(q->max_size, sizeof(void*));
00076     assert(q->base);
00077     q->front = 0;
00078     q->count = 0;
00079     return q;
00080 }
00081
00087 void queue_destruct(queue_t* q) {
00088     for(int i=0; i<q->max_size;i++){
00089         free(q->base[i]);
00090     }
00091     free(q->base);
00092     free(q);
00093 }
00094
00095
00100 void queue_int_print(queue_t* q) {
00101     for(int i = 0; i < q->max_size; i++) {
00102         if ((q->front - i + q->max_size) % q->max_size <= q->
      count && i != q->front)
00103             printf("[%d]", *((int*)q->base[i]));
00104         else
00105             printf("[]");
00106     }
00107     puts("");
00108 }
00109
```

5.3 queue.h File Reference

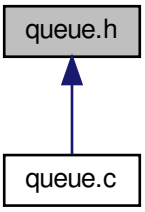
queue (using array) definition and basic operations

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

Include dependency graph for queue.h:



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



Data Structures

- struct queue_t

Functions

- queue_t * queue_create (size_t width, int max_size)
- void queue_destruct (queue_t *q)
- int queue_isempty (queue_t *q)
- int queue_isfull (queue_t *q)
- void * queue_dequeue (queue_t *q)
- void queue_enqueue (queue_t *q, void *e)
- void queue_int_print (queue_t *q)

5.3.1 Detailed Description

queue (using array) definition and basic operations

Author

Firmin MARTIN

Version

0.1

Date

28/12/2017

Definition in file queue.h.

5.3.2 Function Documentation

5.3.2.1 queue_t* queue_create (size_t *width*, int *max_size*)

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

Parameters

width	size of each element
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Returns

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Definition at line 70 of file queue.c.

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00075     q->base = (void**) calloc(q->max_size, sizeof(void*));
00076     assert(q->base);
00077     q->front = 0;
00078     q->count = 0;
00079     return q;
00080 }
```

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Dequeue an element from the queue s.

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Definition at line 53 of file queue.c.

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00054     if(queue_isempty(q)) {
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00057     }
00058     void* e = q->base[(q->front - q->count + q->max_size)%q->
      max_size];
00059     q->count--;
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00061 }
```

Here is the call graph for this function:

5.3.2.3 void queue_destruct (queue_t * q)

Free a queue.

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Definition at line 87 of file queue.c.

```
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```

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00041     }
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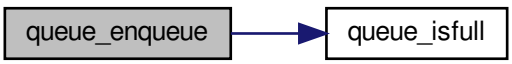

5.3.2.5 void queue_int_print (queue_t * q)

Print an int queue

Definition at line 100 of file queue.c.

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```

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Determinate the emptiness of a queue.

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s	queue

Returns

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```

5.3.2.7 int queue_isfull (queue_t * q)

Determinate the fullness of a queue.

Parameters

s	queue

Returns

1 if the queue s is full, 0 otherwise.

Definition at line 27 of file queue.c.

```
00027                                   {
00028     return q->count == q->max_size;
00029 }
```

5.4 queue.h

```
00001 #ifndef QUEUE_H
00002 #define QUEUE_H
00003
00004 #include <stdio.h>
00005 #include <stdlib.h>
```

```
00006 #include <assert.h>
00007
00022 typedef struct {
00023     size_t width;
00024     int front;
00025     int count;
00026     void** base;
00027     int max_size;
00028 } queue_t;
00029
00030 queue_t* queue_create(size_t width, int max_size);
00031 void queue_destruct(queue_t* q);
00032 int queue_isempty(queue_t* q);
00033 int queue_isfull(queue_t* q);
00034 void* queue_dequeue(queue_t* q);
00035 void queue_enqueue(queue_t* q, void* e);
00036 void queue_int_print(queue_t* q);
00037
00038 #endif /* ifndef QUEUE_H */
```

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