



養天地正氣 法古今完人

队列的定义和实例



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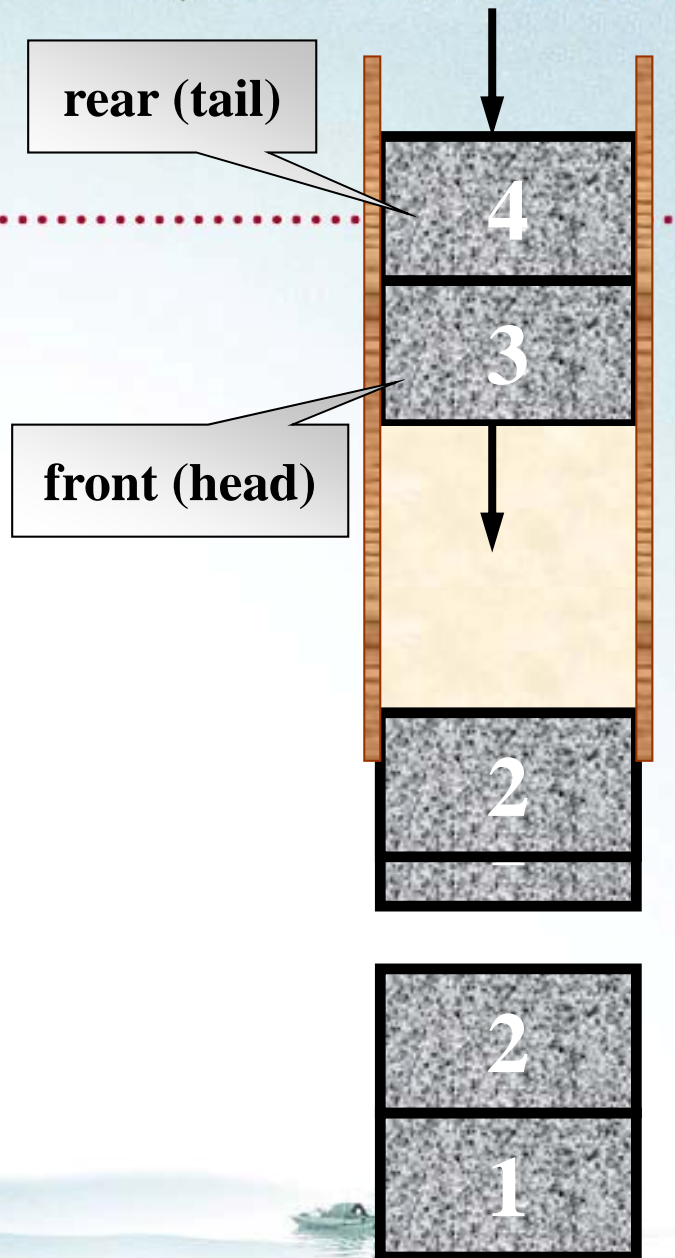
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队列的定义

- 定义:
 - 特殊的线性表
 - 插入在线性表一端进行（入队），删除在线性表另一端进行（出队）
- 特性: **first-in, first-out**
(**FIFO**, 先进先出)
- 术语:
 - **Front**: 队头——元素出队位置
 - **rear**: 队尾——元素入队位置
- 应用:
 - 打印机任务队列
 - 计算机系统的消息队列
 - 多任务CPU调度





队列的定义——基本操作

```
class Queue
public:
    Queue( );
    bool empty( ) const;
    Error_code append(const Queue_entry &x);
    Error_code serve( );
    Error_code retrieve(Queue_entry &x) const;
    // Additional members will represent queue data.
};
```

Add x to rear
or overflow

Repush at as x
front





队列的定义——基本操作

Queue :: Queue();

postcondition: The Queue has been created and is initialized to be empty.

Error_code Queue :: append(**const** Queue_entry &x);

postcondition: If there is space, x is added to the Queue as its rear. Otherwise an Error_code of overflow is returned.





队列的定义——基本操作

Error_code Queue :: serve();

postcondition: If the Queue is not empty, the front of the Queue has been removed. Otherwise an Error_code of underflow is returned.

Error_code Queue :: retrieve(Queue_entry &x) **const;**

postcondition: If the Queue is not empty, the front of the Queue has been recorded as x. Otherwise an Error_code of underflow is returned. (取队头元素)





队列的定义——基本操作

bool Queue :: empty() **const**;
postcondition: Return **true** if the Queue is empty,
otherwise return **false**.





队列的定义——扩展的操作

```
class Extended_queue: public Queue {  
public:  
    bool full( ) const;  
    int size( ) const;  
    void clear( );  
    Error_code serve_and_retrieve(Queue_entry &item);  
};
```





队列的定义——扩展的操作

bool Extended_queue :: full() **const**;

postcondition: Return **true** if the Extended_queue is full;
return **false** otherwise.

void Extended_queue :: clear();

postcondition: All entries in the Extended_queue have
been removed; it is now empty.





队列的定义——扩展的操作

```
int Extended_queue :: size( ) const;
```

postcondition: Return the number of entries in the Extended_queue.

```
Error_code Extended_queue :: serve_and_retrieve(Queue_entry  
&item);
```

postcondition: Return underflow if the Extended_queue is empty. Otherwise remove and copy the item at the front of the Extended_queue to item and return success.

