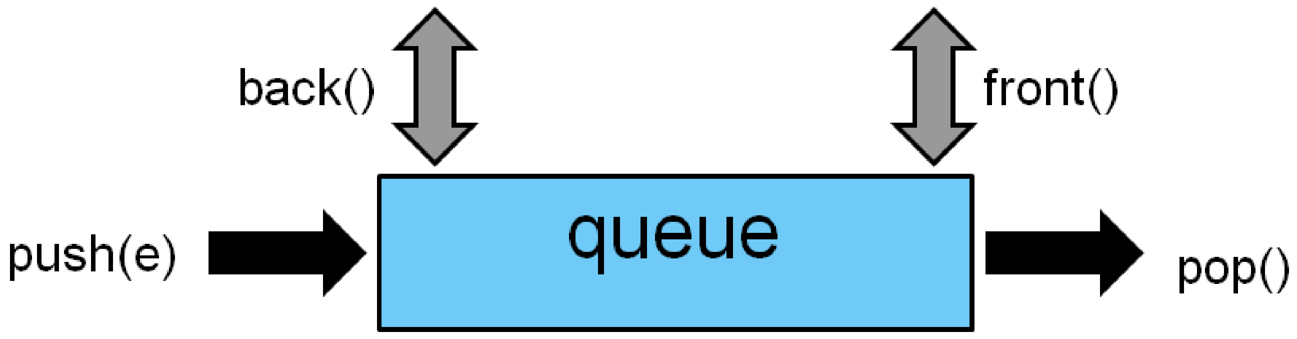
Queue

A queue follows the opposite principle of stack. It is a very powerful data structure in its own right.



The std::queue follows the FIFO principle (**F**irst **I**n **F**irst **O**ut). The queue `que`, which needs the header `<queue>`, has four special methods.

With `que.push(e)` you can insert an element `e` at the end of the queue and remove the first element from the queue with `que.pop()`. `que.back()` enables you to refer to the last element in the `que`, `que.front()` to the first element in the `que`. `std::queue` has similar characteristics as `std::stack`. So you can compare `std::queue` instances and get their sizes. The operations of the queue have constant complexity.

```
#include <iostream>
#include <queue>

int main(){
  std::queue<int> myQueue;

  std::cout << myQueue.empty() << std::endl;    // true
  std::cout << myQueue.size() << std::endl;     // 0

  myQueue.push(1);
  myQueue.push(2);
  myQueue.push(3);
  std::cout << myQueue.back() << std::endl;     // 3
  std::cout << myQueue.front() << std::endl;    // 1

  while (!myQueue.empty()){
    std::cout << myQueue.back() << " ";
    std::cout << myQueue.front() << " : ";
    myQueue.pop();
  }                                             // 3 1 : 3 2 : 3 3
  std::cout << std::endl << myQueue.empty() << std::endl;    //1 (denotes true)
  std::cout << myQueue.size() << std::endl;     // 0


  return 0;
}
```

std::queue