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Outline

Stack

Queue

* Priority Queue

Stack

- Stack
  - A stack is an ordered list in which insertions and deletions are made at one end called the top.
  - If we add the elements *A*, *B*, *C*, *D*, *E* to the stack, in that order, t hen *E* is the first element we delete from the stack
  - A stack is also known as a ***Last-In-First-Out*** (***LIFO***) list.

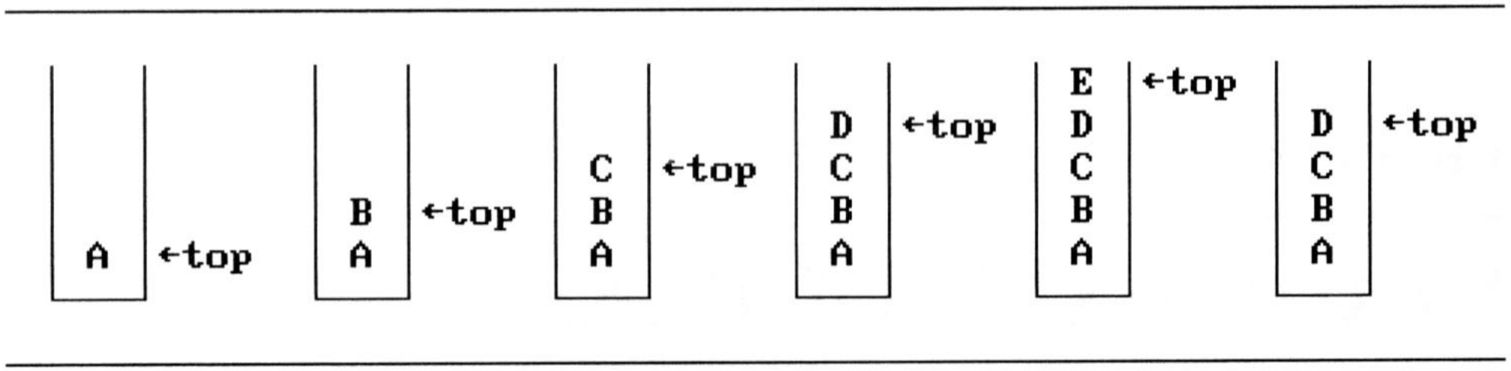
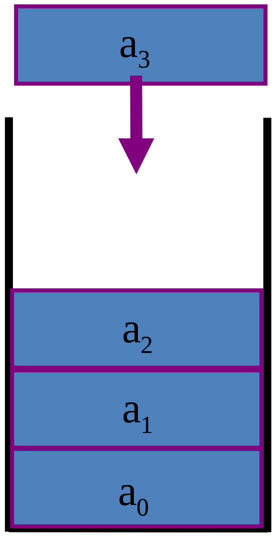


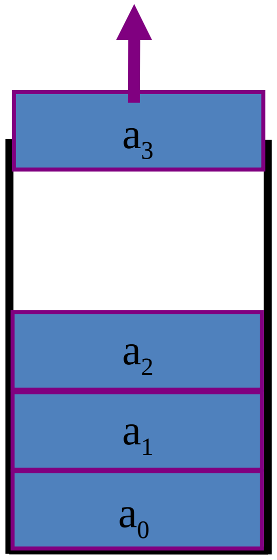
Figure 3.1: Inserting and deleting elements in a stack

Stack

- Member Function
  - push
  - pop
  - top
  - empty
  - size



Push (Add)

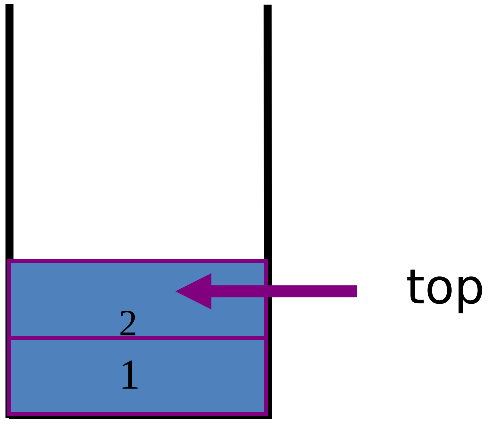


Pop (Delete)

Stack

- Stack Usage in STL – Standard Template Library

```
/* stack example */
#include <iostream>
#include <stack>
using namespace std;

int main()
{
    stack<int> stk;
    stk.push(1);
    stk.push(2);
    cout<< stk.top();  // 2
    cout<< stk.empty(); // false

    /* clear the stack */
    while(!stk.empty()) stk.pop();
}
```



Question

Practice 1

Uva-673

Parantheses

Outline

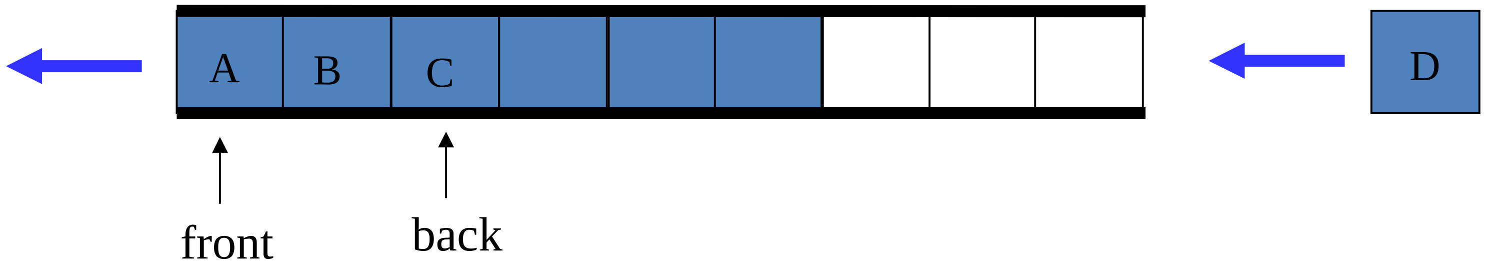
Stack

Queue

* Priority Queue

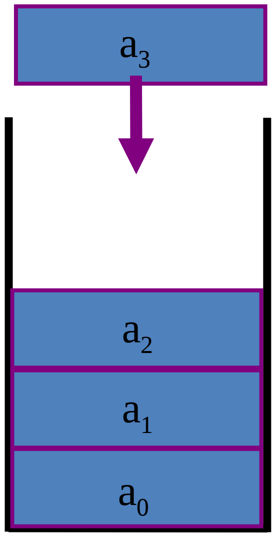
Queue

- Queue
  - A queue is an ordered list in which insertions and deletions ar e made at one end called the front
  - If we add the elements *A*, *B*, *C*, *D*, *E* to the stack, in that order, t hen *A* is the first element we delete from the queue
  - A stack is also known as a ***First-In-First-Out*** (***FIFO***) list.

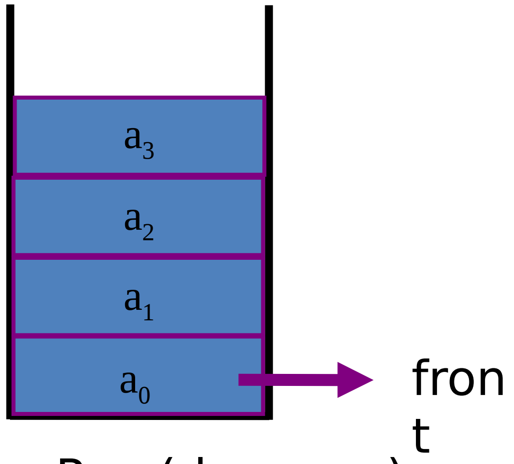


Queue

- Member Function
  - push
  - pop
  - front
  - back
  - empty
  - size



Push (enqueue)

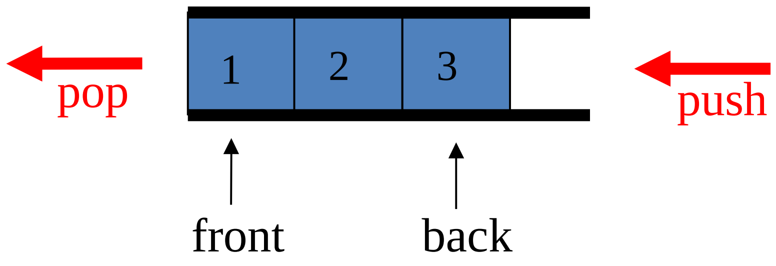


Pop (dequeue)

Queue

- Queue Usage in STL

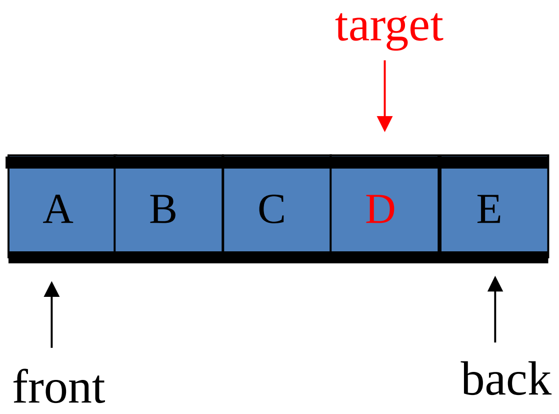
```
/* stack example */
#include <iostream>
#include <queue>
using namespace std;

int main()
{
    queue<int> que;
    que.push(1);
    que.push(2);
    que.push(3);
    cout<<que.front(); // 1

    /* clear the stack */
    while(!que.empty()) que.pop();
}
```



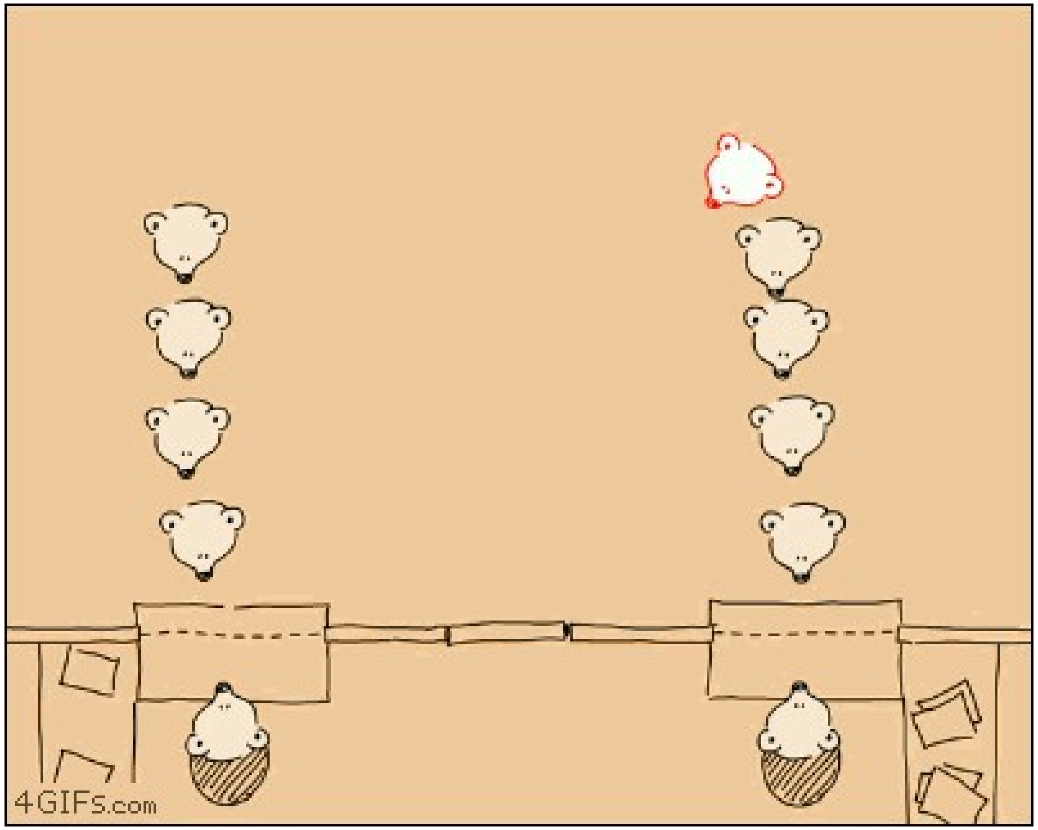
Queue

- Scan elements in queue

```
while(que.front() != ‘D’) {
    que.pop();
}
```



Question



Practice 2

POJ – 3125

Printer Queue

Outline

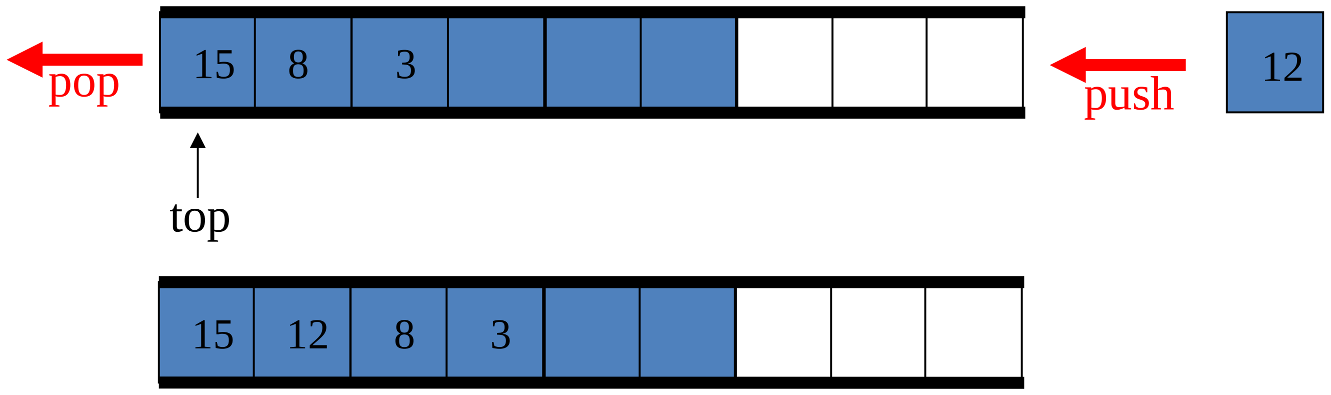
Stack

Queue

* Priority Queue

(補充) Priority Queue

- Priority Queue
  - Priority queues are a type of container adaptors, specifically d esigned such that its **first element is always the greatest** of t he elements it contains, according to some strict weak orderi ng criterion.
- Member Function
  - push
  - pop
  - **top**
  - empty
  - size



(補充) Priority Queue

- **User-Defined Structure**

```
typedef structure _PRICE{
    int value;

    bool operator<(const structure _PRICE a) const {
        return value > a.value;
    }
} price;

int main()
{
    priority_queue<price> pq;
    price p1, p2;
    p1.value = 10;    p2.value = 5;
    pq.push(p1);      pq.push(p2);

    printf("top element's value = %d\n", pq.top().value);
    /* top element's value = 5 */
}
```

Practice 3

Uva - 11995

I Can Guess the Data Structure