실전 알고리즘 0x06강

큐

BaaaaaaaaaaaaaaaarkingDog

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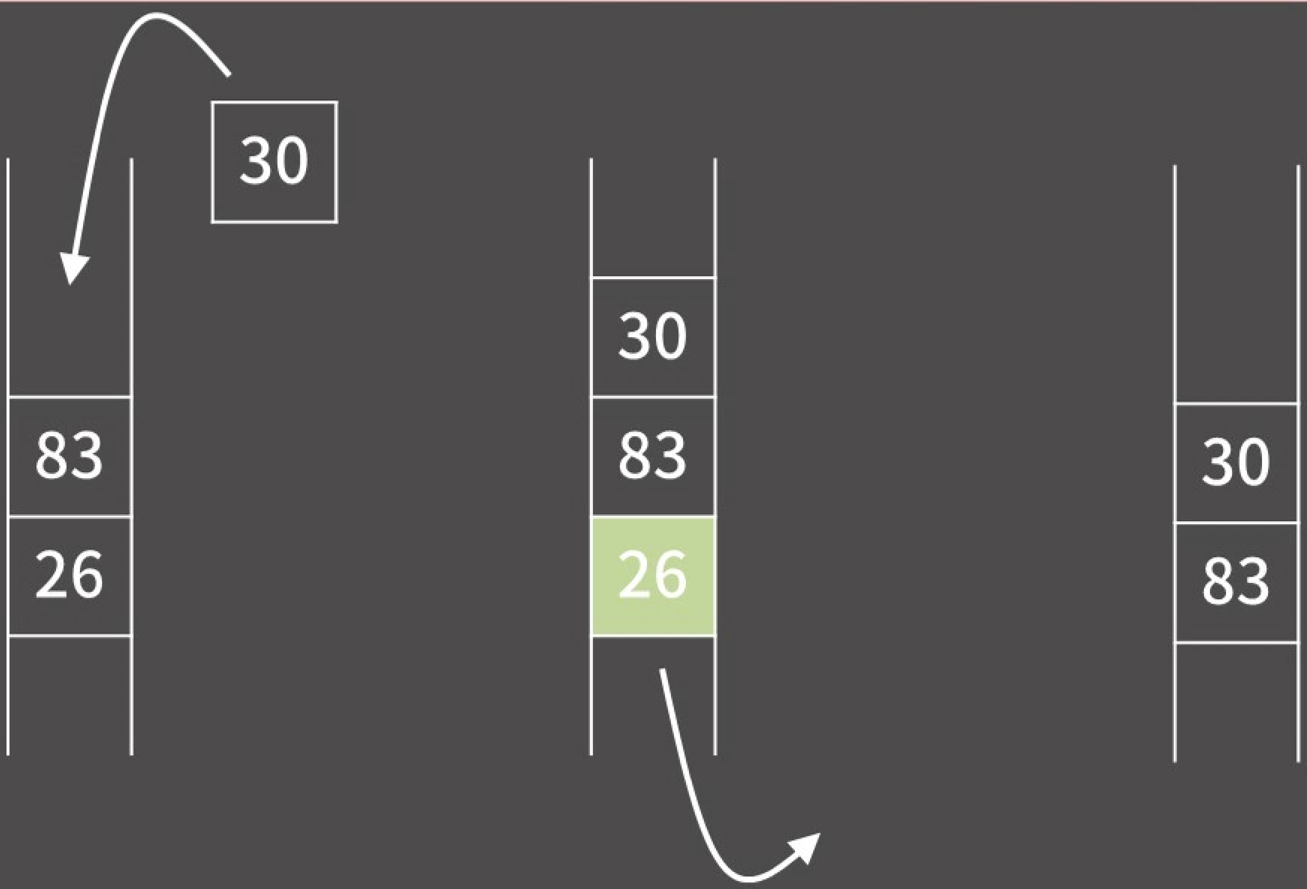
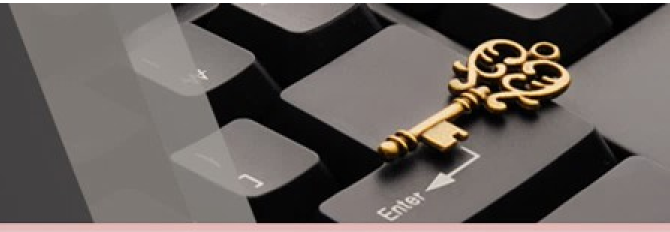
0x00 정의와 성질



0x00 정의와 성질

큐의 성질

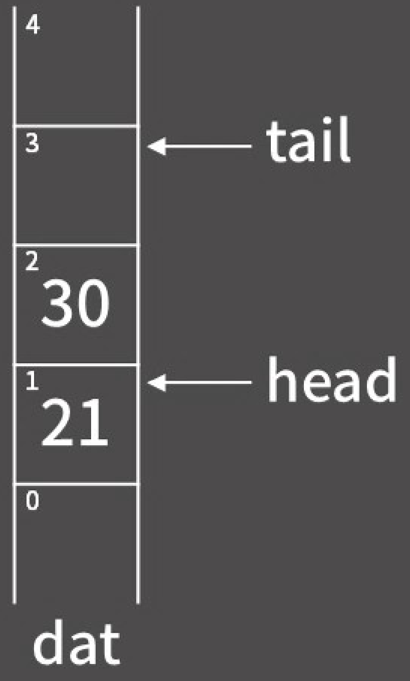
1. 원소의 추가가 O(1)
2. 원소의 제거가 O(1)
3. 제일 앞/뒤의 원소 확인이 O(1)
4. 제일 앞/뒤가 아닌 나머지 원소들의 확인/변경이 원칙적으로 불가능



0x01 기능과 구현

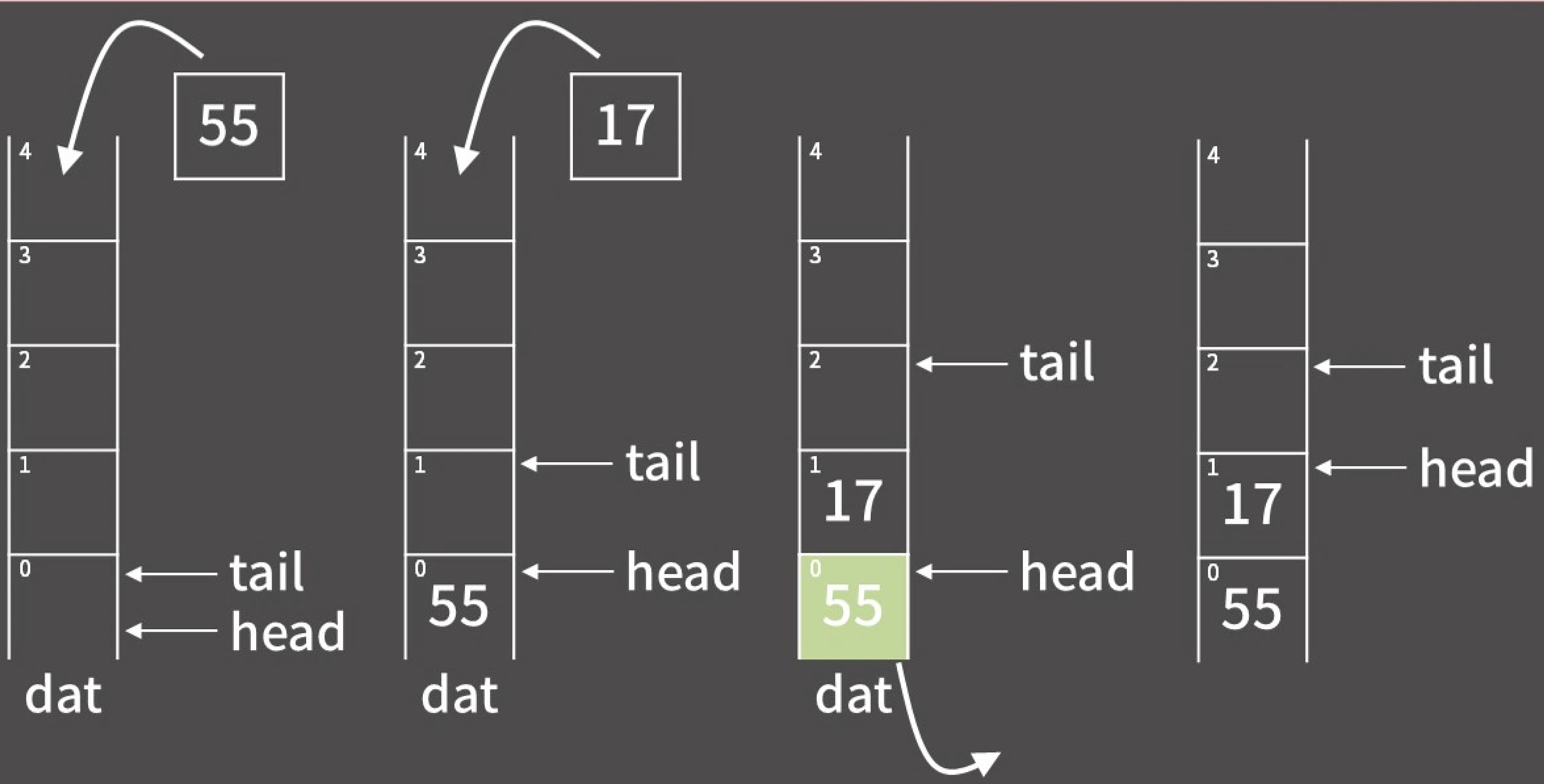
구현

```
const int MX = 1000005;
int dat[MX];
int head = 0, tail = 0;
```



0x01 기능과 구현

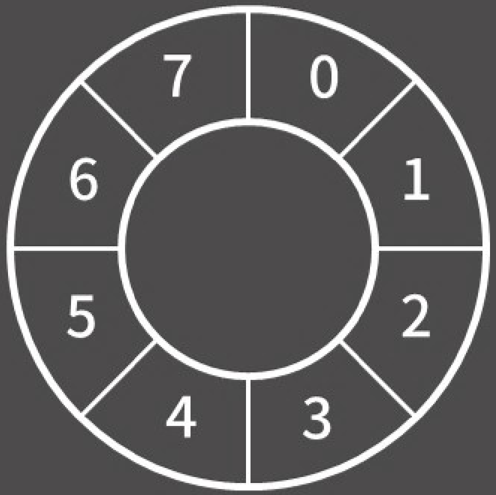
구현



0x01 기능과 구현

구현

0	1	2	3	4	5	6	7



0x01 기능과 구현

구현

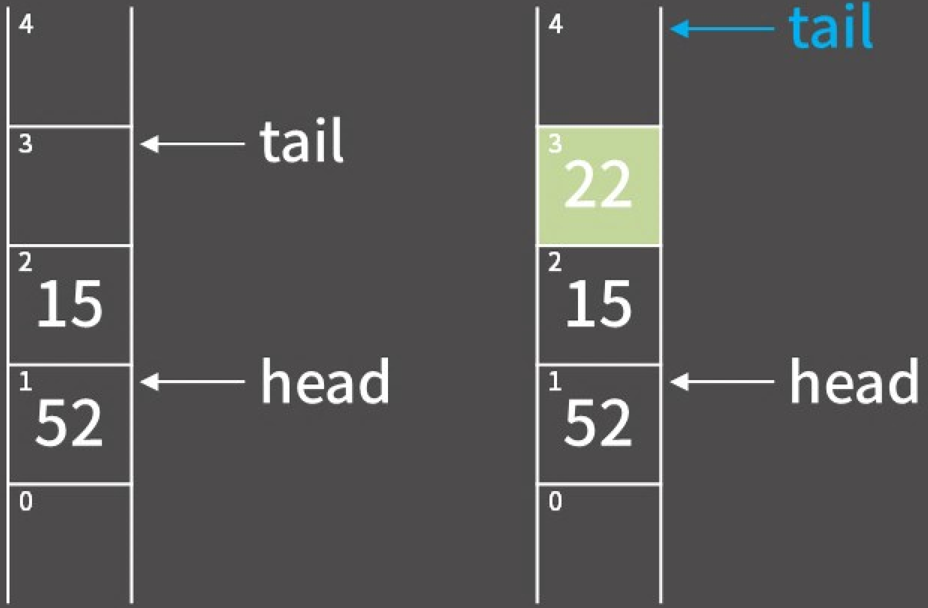
https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x06/queue_test.cpp

```cpp
#include <bits/stdc++.h>
using namespace std;

const int MX = 1000005;
int dat[MX];
int head = 0, tail = 0;

void push(int x){

}

void pop(){

}
```

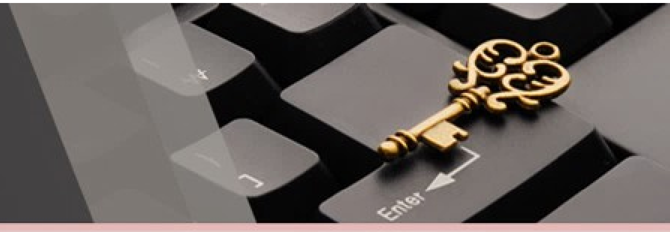
```cpp
int front(){

}

int back(){

}

void test(){
  ...
}

int main(void) {
  test();
}
```

0x01 기능과 구현

push 함수

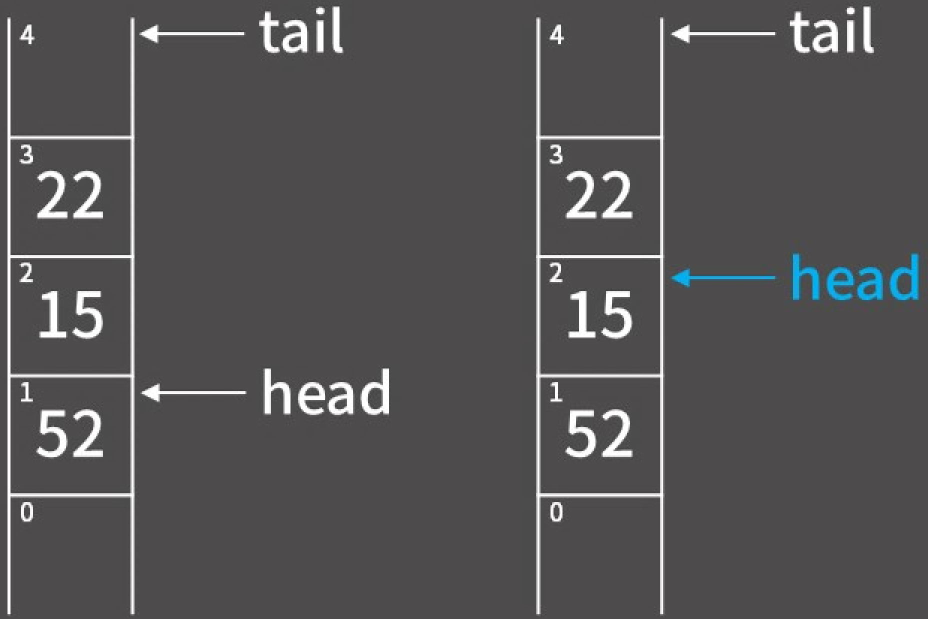


```
void push(int x){
  dat[tail++] = x;
}
```

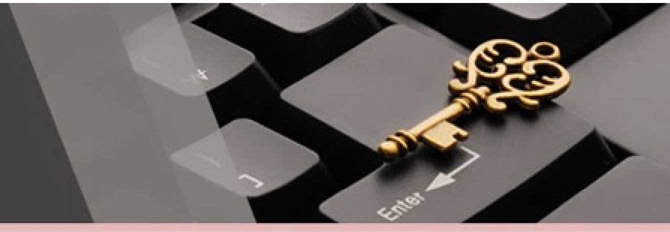


0x01 기능과 구현

pop 함수

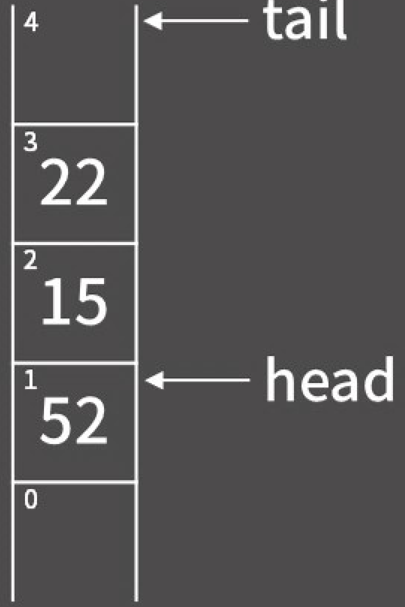


```
void pop(){
  head++;
}
```



0x01 기능과 구현

front/back 함수



```
int front(){
  return dat[head];
}

int back(){
  return dat[tail-1];
}
```

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x06/queue_test_ans.cpp

0x02 STL queue

reference : http://www.cplusplus.com/reference/queue/queue/

https://github.com/blisstoner/basic-algo-lecture-metarial
/blob/master/0x06/queuee_example.cpp

```cpp
#include <bits/stdc++.h>
using namespace std;

int main(void) {
  queue<int> Q;
  Q.push(10); // 10
  Q.push(20); // 10 20
  Q.push(30); // 10 20 30
  cout << Q.size() << '\n'; // 3
  if(Q.empty()) cout << "Q is empty\n";
  else cout << "Q is not empty\n"; // Q is not empty
  Q.pop(); // 20 30
  cout << Q.front() << '\n'; // 20
  cout << Q.back() << '\n'; // 30
  Q.push(40); // 20 30 40
  Q.pop(); // 30 40
  cout << Q.front() << '\n'; // 30
}
```

0x03 연습문제

BOJ 10845번: 큐

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x06/10845_1.cpp

```cpp
#include <bits/stdc++.h>
using namespace std;

int main(void) {
  ios::sync_with_stdio(0);
  cin.tie(0);

  queue<int> Q;
  int n;
  cin >> n;
  while(n--){
    string q;
    cin >> q;
    if(q=="push"){
      int val;
      cin >> val;
      Q.push(val);
    }
    else if(q=="pop"){
      if(Q.empty()) cout << -1 << '\n';
      else{
        cout << Q.front() << '\n';
        Q.pop();
      }
    }
    else if(q=="size"){
      cout << Q.size() << '\n';
    }
    else if(q=="empty"){
      cout << Q.empty() << '\n';
    }
    else if(q=="front"){
      if(Q.empty()) cout << -1 << '\n';
      else cout << Q.front() << '\n';
    }
    else{ // back
      if(Q.empty()) cout << -1 << '\n';
      else cout << Q.back() << '\n';
    }
  }
}
```

0x03 연습문제

BOJ 10845번: 큐

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x06/10845_2.cpp

```cpp
#include <bits/stdc++.h>
using namespace std;

const int MX = 1000005;
int dat[MX];
int head, tail;

void push(int x){
  dat[tail++] = x;
}

void pop(){
  head++;
}

int front(){
  return dat[head];
}

int back(){
  return dat[tail-1];
}

int main(void) {
  ios::sync_with_stdio(0);
  cin.tie(0);
  int n;
  cin >> n;
  while(n--){
    string q;
    cin >> q;
    if(q=="push"){
      int val;
      cin >> val;
      push(val);
    }
    else if(q=="pop"){
      if(tail==head)
        cout << -1 << '\n';
      else{
        cout << front() << '\n';
        pop();
      }
    }
    else if(q=="size"){
      cout << tail-head << '\n';
    }
    else if(q=="empty"){
      cout << (tail==head) << '\n';
    }
    else if(q=="front"){
      if(tail==head)
        cout << -1 << '\n';
      else cout << front() << '\n';
    }
    else{ // back
      if(tail==head)
        cout << -1 << '\n';
      else cout << back() << '\n';
    }
  }
}
```

강의 정리