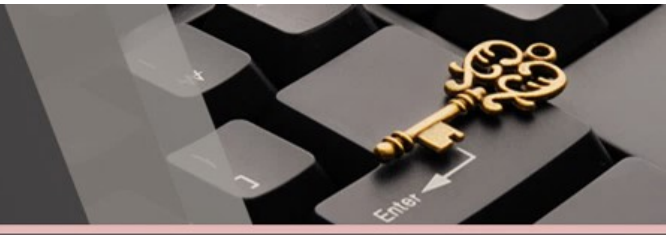
실전 알고리즘 0x05강

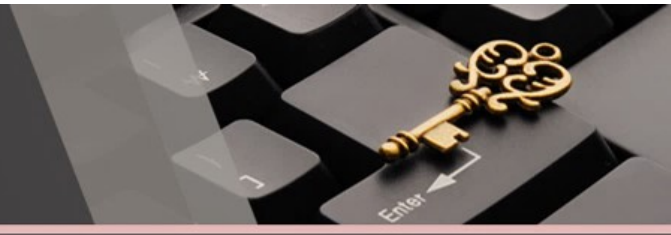
스택

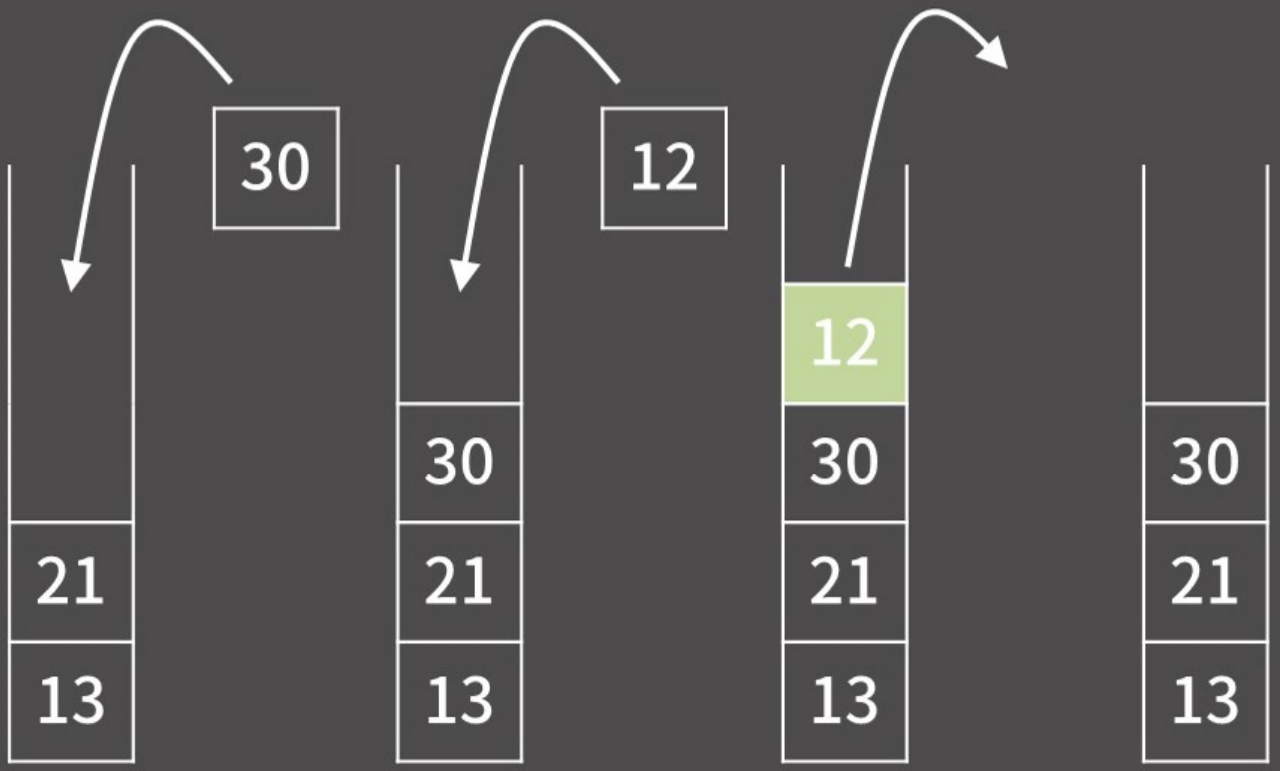
BaaaaaaaaaaaaaaaarkingDog

목차

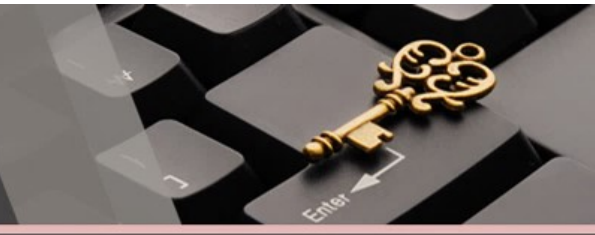


0x00 정의와 성질





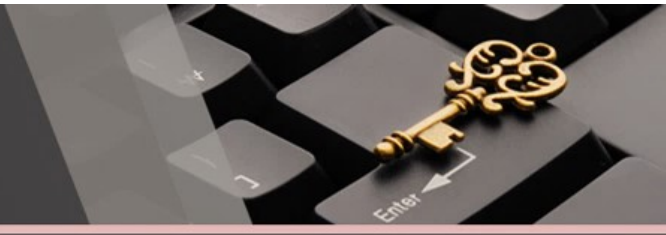
0x00 정의와 성질



스택의 성질

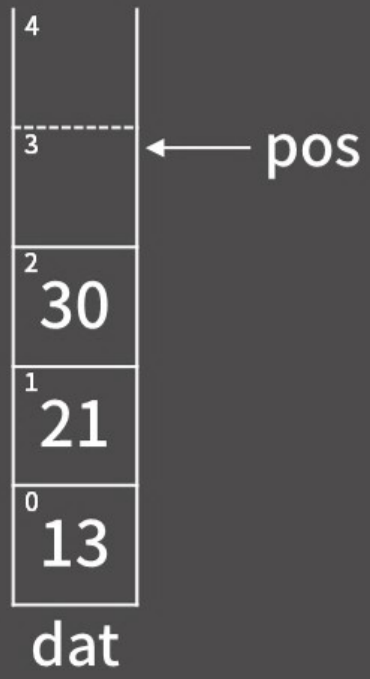
1. 원소의 추가가 O(1)
2. 원소의 제거가 O(1)
3. 제일 상단의 원소 확인이 O(1)
4. 제일 상단이 아닌 나머지 원소들의 확인/변경이 원칙적으로 불가능

0x01 기능과 구현

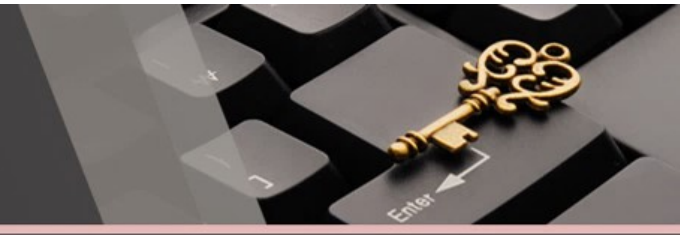


구현

```
01  const int MX = 1000005;
02  int dat[MX];
03  int pos = 0;
```



0x01 기능과 구현



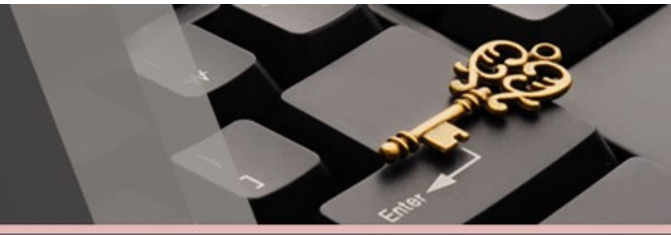
구현

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x05/stack_test.cpp

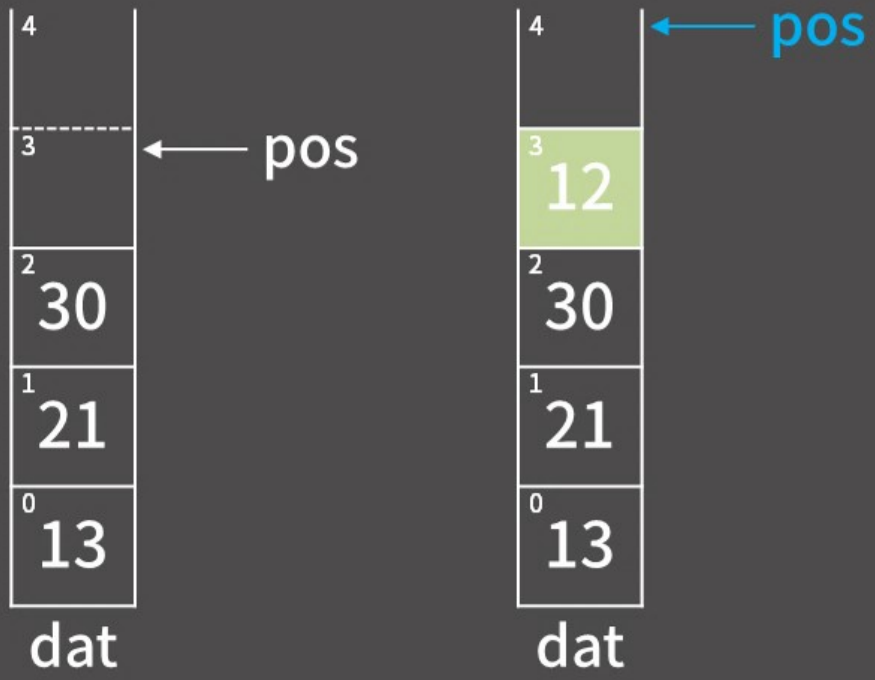
```cpp
#include <bits/stdc++.h>
using namespace std;

const int MX = 1000005;
int dat[MX];
int pos = 0;

void push(int x){

}

void pop(){

}
```

```cpp
int top(){

}

void test(){
  ...
}

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

0x01 기능과 구현

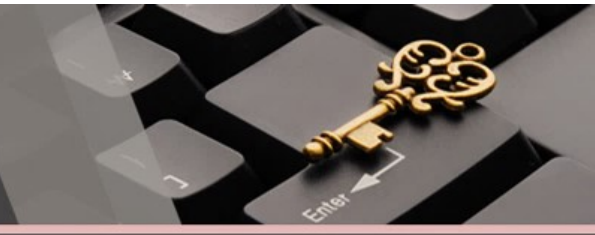


push 함수

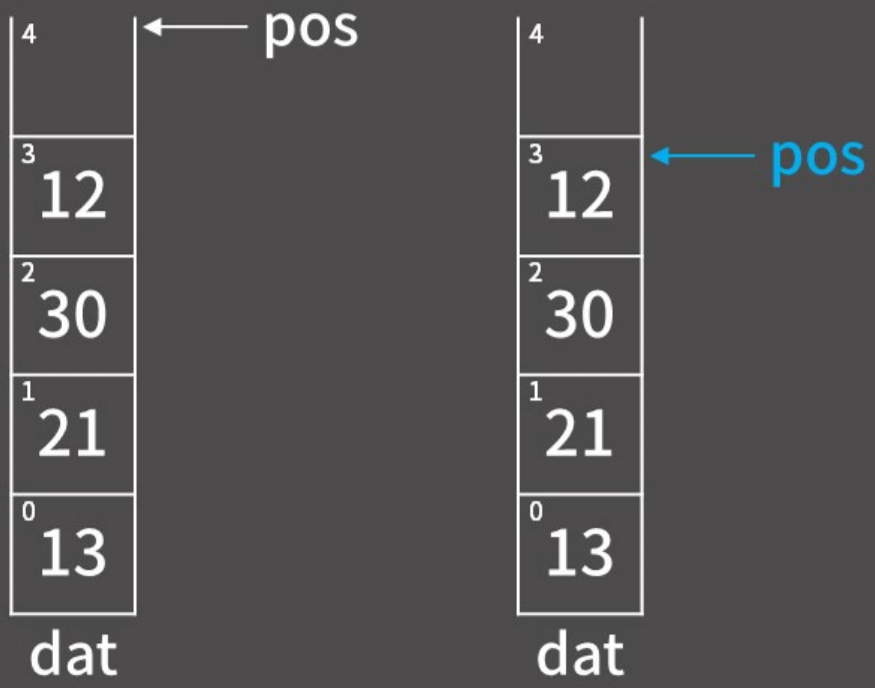



```
01  void push(int x){
02    dat[pos++] = x;
03  }
```

0x01 기능과 구현

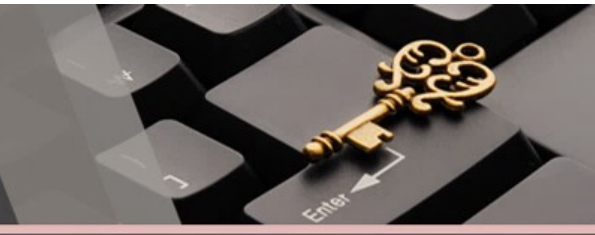


pop 함수

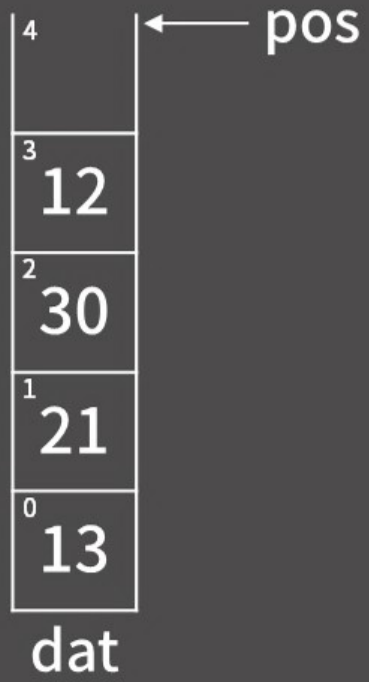



```
01  void pop(){
02    pos--;
03  }
```

0x01 기능과 구현



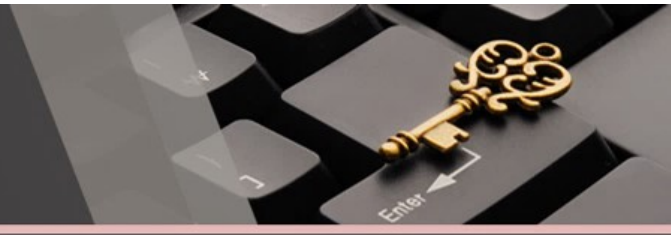
top 함수




```
01  int top(){
02    return dat[pos-1];
03  }
```

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x05/stack_test_ans.cpp

0x02 STL stack

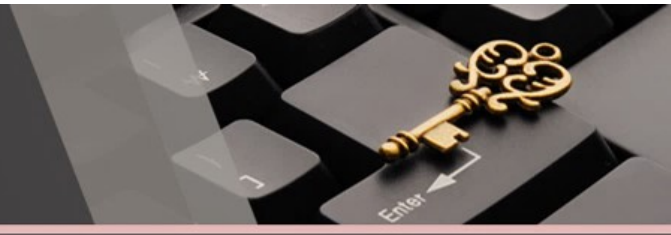


reference : http://www.cplusplus.com/reference/stack/stack/

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x05/stack_example.cpp

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

int main(void) {
  stack<int> S;
  S.push(10); // 10
  S.push(20); // 10 20
  S.push(30); // 10 20 30
  cout << S.size() << '\n'; // 3
  if(S.empty()) cout << "S is empty\n";
  else cout << "S is not empty\n"; // S is not empty
  S.pop(); // 10 20
  cout << S.top() << '\n'; // 20
  S.pop(); // 10
  cout << S.top() << '\n'; // 10
  S.pop(); // empty
  if(S.empty()) cout << "S is empty\n"; // S is empty
  cout << S.top() << '\n'; // runtime error 발생
}
```

0x03 연습문제

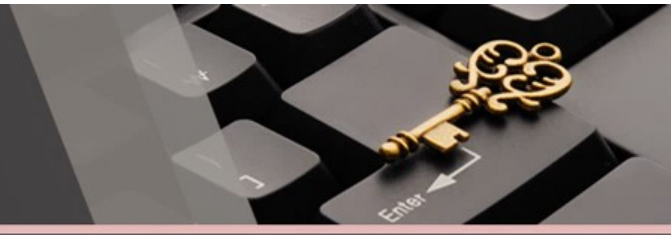


BOJ 10828번: 스택

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x05/10828_1.cpp

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

int main(void) {
  ios::sync_with_stdio(0);
  cin.tie(0);
  int n;
  cin >> n;
  stack<int> S;
  while(n--){ // n번 반복
    string c;
    cin >> c;
    if(c=="push"){
      int t;
      cin >> t;
      S.push(t);
    }
    else if(c=="pop"){
      if(S.empty())
        cout << -1 << '\n';
      else{
        cout << S.top() << '\n';
        S.pop();
      }
    }
    else if(c=="size")
      cout << S.size() << '\n';
    else if(c=="empty")
      cout << (int)S.empty() << '\n';
    else{ // top
      if(S.empty())
        cout << -1 << '\n';
      else cout << S.top() << '\n';
    }
  }
}
```

0x03 연습문제



BOJ 10828번: 스택

https://github.com/blisstoner/basic-algo-lecture-metarial/blob/master/0x05/10828_2.cpp

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

const int MX = 1000005;
int dat[MX];
int pos;

void push(int val){
  dat[pos++] = val;
}

void pop(){
  pos--;
}

int top(){
  return dat[pos-1];
}
```

```cpp
int main(void) {
  ios::sync_with_stdio(0);
  cin.tie(0);
  int n;
  cin >> n;
  while(n--){ // n번 반복
    string c;
    cin >> c;
    if(c=="push"){
      int t;
      cin >> t;
      push(t);
    }
    else if(c=="pop"){
      if(pos == 0)
        cout << -1 << '\n';
      else{
        cout << top() << '\n';
        pop();
      }
    }

    else if(c=="size")
      cout << pos << '\n';
    else if(c=="empty")
      cout << (int)(pos == 0) << '\n';
    else{ // top
      if(pos == 0)
        cout << -1 << '\n';
      else cout << top() << '\n';
    }
  }
}
```

강의 정리