자료구조 실습

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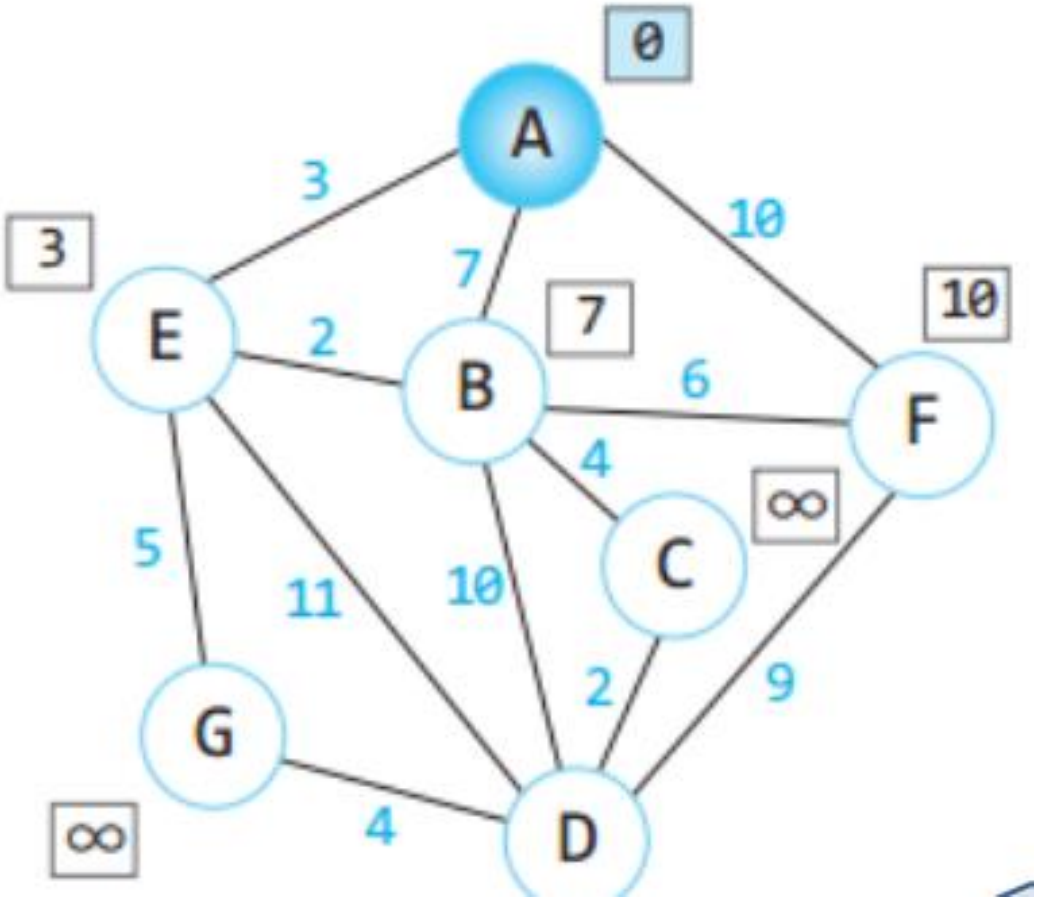
CODE 01



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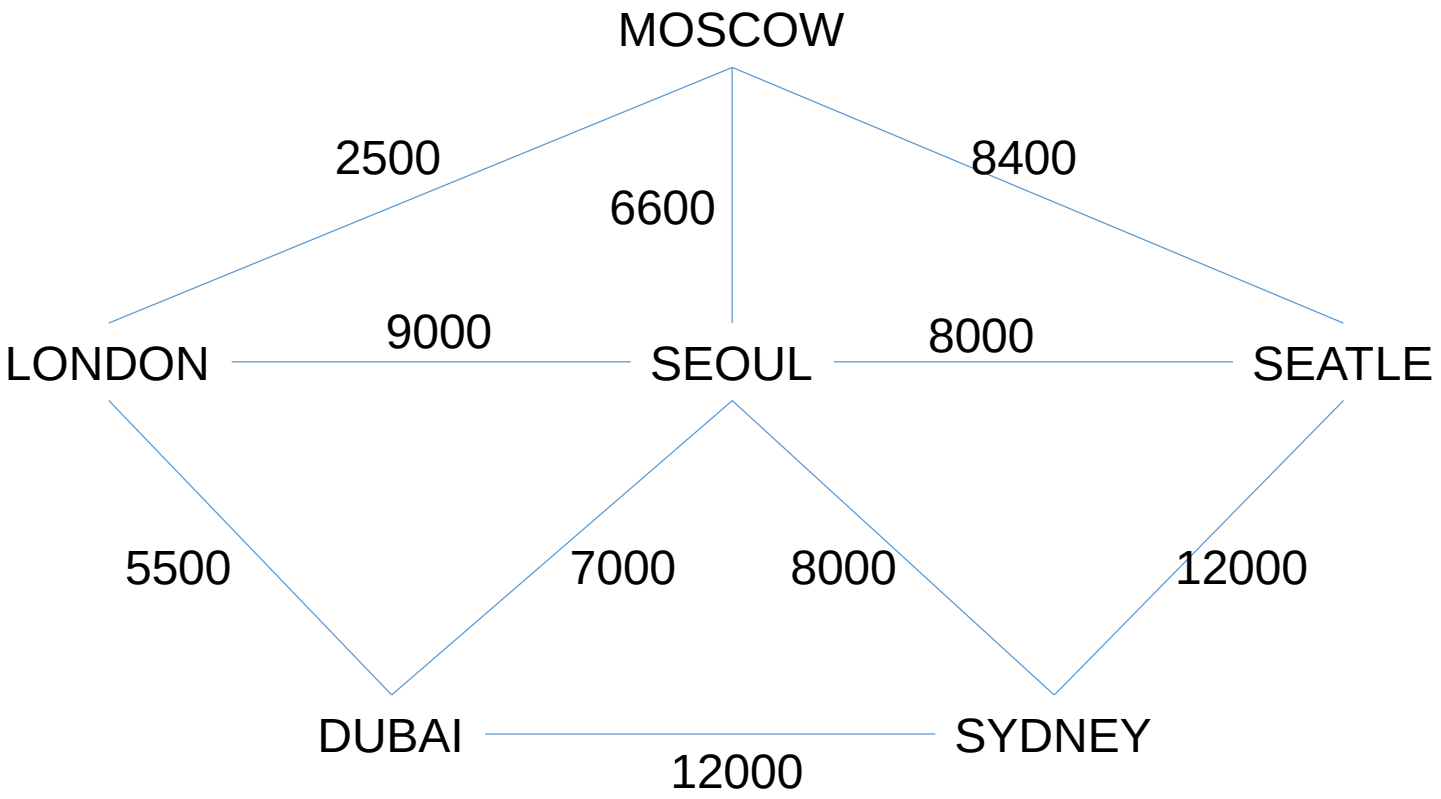
실습

- MOSCOW에서 각 공항까지 최단 거리 구하기



추가 실습

```
const auto data = { 1, 3, 3, 5, 2, 9, 7, 1 };
for (auto& i : data)
        cout << i << " ";
cout << endl;

priority_queue<int> Q;
for (auto& i : data)
        Q.push(i);
for (cout << "priority queue: "; !Q.empty(); Q.pop())
        cout << Q.top() << " ";
cout << endl;

priority_queue<int, vector<int>, greater<int>>
        MinQ(data.begin(), data.end());
for (cout << "priority queue: "; !MinQ.empty(); MinQ.pop())
        cout << MinQ.top() << " ";
cout << endl;
```

추가 실습

```
set<unsigned> dsp;
dsp.insert(1);
dsp.insert(2);
dsp.insert(2);
dsp.insert(3);
for (auto& i : dsp)
        cout << i << " ";
cout << endl;
cout << "count key value 2: " << dsp.count(2) << endl;
cout << "contains key value 2: " << dsp.contains(2) << endl;
dsp.insert(-3);
for (auto& i : dsp)
        cout << i << " ";
cout << endl;
```

추가 실습

```
map<string, int> m{ {"Brazil", 333}, {"Argentina", 550}, {"France", 750} };
m["England"] = 820;
for (auto& [key, value] : m)
        cout << "key: " << key << ", value: " << value << endl;
m["England"] = 800;
cout << m["Spain"] << endl;
for (auto& [key, value] : m)
        cout << "key: " << key << ", value: " << value << endl;
erase_if(m, [](const auto& pair) {
        return pair.second == 0;
        });
for (auto& [key, value] : m)
        cout << "key: " << key << ", value: " << value << endl;
```

보너스 1

```
numeric_limits<int>::lowest();  // -2147483648
numeric_limits<int>::min();     // -2147483648
numeric_limits<int>::max();     // 2147483647
numeric_limits<float>::lowest();        // -3.40282e+38
numeric_limits<float>::min();   // 1.17549e-38
numeric_limits<float>::max();   // 3.40282e+38
numeric_limits<double>::lowest();       // -1.79769e+308
numeric_limits<double>::min();  // 2.22507e-308
numeric_limits<double>::max();  // 1.79769e+308
```

보너스 2-1

```
int& func(int x){
        int value = x + 5;
        return value;
}
int main() {
        int a = 0;
        cout << func(a);
        return 0;
}
```

보너스 2-2

```
int func(array<int, 10>& array, int index) {
    return array[index];
}
int main() {
    array<int, 10> array;
    func(array, 3) = 2;
    cout << array[3] << endl;
    return 0;
}
```

func

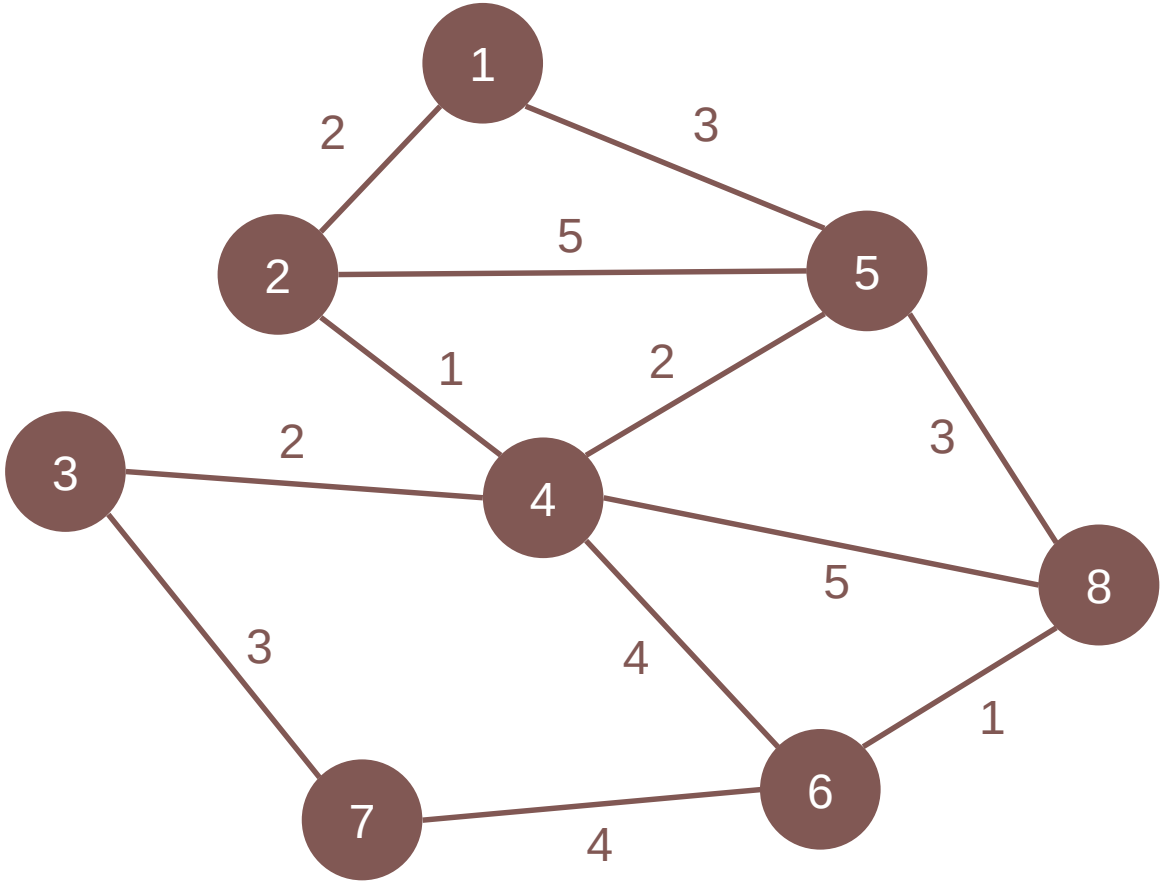
보너스 3

```
vector<int> myvector = { 10,20,30 };
auto it = myvector.emplace(myvector.begin() + 1, 100);
myvector.emplace(it, 200);
myvector.emplace(myvector.end(), 300);
cout << "myvector contains:";
for (auto& x : myvector)
    cout << ' ' << x;
```

보너스 4

```
istringstream iss("data structure, 21 Nov.");
string s1, s2, s3;
int date;
iss >> s1 >> s2 >> date >> s3;
cout << s1 << ' ' << s2 << ' ' << date << ' ' << s3 << endl;
```

CODE 02



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Homework

- **그래프 표현**
- **Dijkstra 코드 구현**
- **백준 알고리즘 문제 풀이(옵션)**
  - 1753 최단경로
  - 1238 파티
  - 1504 특정한 최단 경로
  - 11779 최소비용 구하기 2

CODE 03

- http://bit.ly/3dhlrrH
- Find the shortest path between 913 and 542 vertices.

실습 1, 2

- SunShine 예약(12월 2일까지)
- Dijkstra, Kruskal, Prim (약 5분 소요)

Final Project – Restrictions

- **3 pages only**
  - Page 1. Problems
  - Page 2. Data
  - Page 3. Effects
- **Standard slide size (4:3) or similar**
- **Languages: C, C++, Python, or Java**