

Caderno de Programação Competitiva

Capangas do Ribas

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1 Algoritmos

1.1 DP

1.2 Estruturas de Dados

1.3 General

1.4 Geometry

1.5 Grafos

1.5.1 BFS

```

1 vector<int> bfs(int s, int N) {
2     vector<int> dist(N + 1, oo);
3     queue<int> q;
4
5     dist[s] = 0; q.push(s);
6
7     while (not q.empty())
8     {
9         auto u = q.front(); q.pop();
10
11         // visita/processa u
12
13         for (auto v : adj[u]) {
14             if (dist[v] == oo) {
15                 dist[v] = dist[u] + 1; q.push(v);
16             }
17         }
18     }
19
20     return dist;
21 }
```

1.5.2 DFS

```

1 const int MAX { 200010 };
2
3 bitset<MAX> visited;
4 vector<int> adj[MAX];
5
6 void dfs(int u)
7 {
8     if (visited[u])
9         return;
10
11     // processa/visita u
12
13     visited[u] = true;
14
15     for (auto v : adj[u])
16         dfs(v);
17 }
```

1.5.3 Dijkstra

```

1 using ii = pair<int, int>;
2 using edge = tuple<int, int, int>;
```

```

3
4 const int MAX { 100010 };
5 vector<ii> adj[MAX];
6
7 vector<int> dijkstra(int s, int N)
8 {
9     const int oo { 1000000010 };
10
11     vector<int> dist(N + 1, oo);
12     dist[s] = 0;
13
14     set<ii> U;
15     U.emplace(0, s);
16
17     while (not U.empty())
18     {
19         auto [d, u] = *U.begin();
20         U.erase(U.begin());
21
22         for (auto [v, w] : adj[u])
23         {
24             if (dist[v] > d + w)
25             {
26                 if (U.count(ii(dist[v], v)))
27                     U.erase(ii(dist[v], v));
28
29                 dist[v] = d + w;
30                 U.emplace(dist[v], v);
31             }
32         }
33     }
34
35     return dist;
36 }
```

1.6 Matemática

1.6.1 Combinations

```

1 using ll = long long;
2
3 ll binom(int n, int m)
4 {
5     if (m > n)
6         return 0;
7
8     vector<ll> dp(m + 1, 0);
9     dp[0] = 1;
10
11     for (int i = 1; i <= n; ++i)
12         for (int j = m; j > 0; --j)
13             dp[j] = dp[j] + dp[j - 1];
14
15     return dp[m];
16 }
```

1.7 Primitives

1.8 String