Caderno de Programação Competitiva

Capangas do Ribas

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1 Algoritmos

1.1 DP

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1.5 Grafos

1.5.1 BFS

```
vector<int> bfs(int s, int N) {
    vector<int> dist(N + 1, oo);
    queue<int> q;

    dist[s] = 0; q.push(s);

    while (not q.empty())
    {
        auto u = q.front(); q.pop();

        // visita/processa u

        for (auto v : adj[u]) {
            if (dist[v] == oo) {
                dist[v] = dist[u] + 1; q.push(v);
            }
        }
    }

    return dist;
}
```

1.5.2 DFS

```
const int MAX { 200010 };

bitset<MAX> visited;
vector<int> adj[MAX];

void dfs(int u)
{
    if (visited[u])
        return;

    // processa/visita u

    visited[u] = true;

    for (auto v : adj[u])
        dfs(v);
}
```

1.5.3 Dijkstra

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

const int MAX { 100010 };
vector<ii> adj[MAX];

vector<int> dijkstra(int s, int N)
{
    const int oo { 1000000010 };

    vector<int> dist(N + 1, oo);
    dist[s] = 0;

    set<ii> U;
    U.emplace(0, s);

    while (not U.empty())
    {
        auto [d, u] = *U.begin();
        U.erase(U.begin());

        for (auto [v, w] : adj[u])
        {
            if (dist[v] > d + w)
            {
                if (U.count(ii(dist[v], v)))
                    U.erase(ii(dist[v], v));

                dist[v] = d + w;
                U.emplace(dist[v], v);
            }
        }
    }

    return dist;
}
```

1.6 Matemática

1.6.1 Combinations

```
using ll = long long;

ll binom(int n, int m)
{
    if (m > n)
        return 0;

    vector<ll> dp(m + 1, 0);
    dp[0] = 1;

    for (int i = 1; i <= n; ++i)
        for (int j = m; j > 0; --j)
            dp[j] = dp[j] + dp[j - 1];

    return dp[m];
}
```

1.7 Primitives

1.8 String