```cpp
class BIT {
private:
  vll nodes;
  int n;
public:
  BIT(vll a) {
    n = a.size();
    nodes = vll(n, 0);
    Loop(i, a.size()) add(i, a[i]);
  }
  void add(int k, ll x) {
    ++k;
    for (int id = k; id <= n; id += id & -id) {
      nodes[id - 1] += x;
    }
  }
  // note: sum of [s, t)
  ll sum(int s, int t) {
    ll ret = 0;
    for (int id = t; id > 0; id -= id & -id) {
      ret += nodes[id - 1];
    }
    for (int id = s; id > 0; id -= id & -id) {
      ret -= nodes[id - 1];
    }
    return ret;
  }
};

// solve the number of pair(i, j) such that a[i] > a[j] (i < j)
ll solve_inversion_number(const vll &a) {
  int n = a.size();
  map<ll, int> mp;
  Loop(i, n) mp[a[i]] = 1;
  int cnt = 0;
  Loopitr(itr, mp) itr->second = cnt++;
  vi b(n);
  Loop(i, n) b[i] = mp[a[i]];
  BIT bit(vll(cnt, 0));
  ll ret = 0;
  Loop(i, n) {
    ret += bit.sum(b[i] + 1, cnt);
    bit.add(b[i], 1);
  }
  return ret;
}
```