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128 FenwickTree (BIT) sum query on 2D-Array:
129
130 //point update
131 struct FenwickTree2D {
132     vector<vector<int>> bit;
133     int n , m;
134
135     FenwickTree2D(int n , int m) {
136         this->n = n;
137         this->m = m;
138         bit.assign(n , vector<int>(m , 0));
139     }
140
141     FenwickTree2D(vector<vector<int>> a , int n , int m) : FenwickTree2D(n , m) {
142         for (int i = 0; i < n; i++)
143             for (int j = 0; j < m; j++)
144                 update(i , j , a[i][j]);
145     }
146
147     //answer query from (x , y) to (0 , 0)
148     int query(int x, int y) {
149         int ret = 0;
150         for (int i = x; i ≥ 0; i = (i & (i + 1)) - 1)
151             for (int j = y; j ≥ 0; j = (j & (j + 1)) - 1)
152                 ret += bit[i][j];
153         return ret;
154     }
155
156     //answer query from (x2 , y2) to (x1 , y2)
157     int query(int x1 , int y1 , int x2 , int y2){
158         return query(x2 , y2) - query(x1-1 , y2)
159             - query(x2 , y1-1) + query(x1-1 , y1-1);
160     }
161
162     void update(int x, int y, int delta) {
163         for (int i = x; i < n; i = i | (i + 1))
164             for (int j = y; j < m; j = j | (j + 1))
165                 bit[i][j] += delta;
166     }
167 };

```