Chapter 1

Version

This document is a common guide but it applies mainly to version 12 or $v12$.

Chapter 2

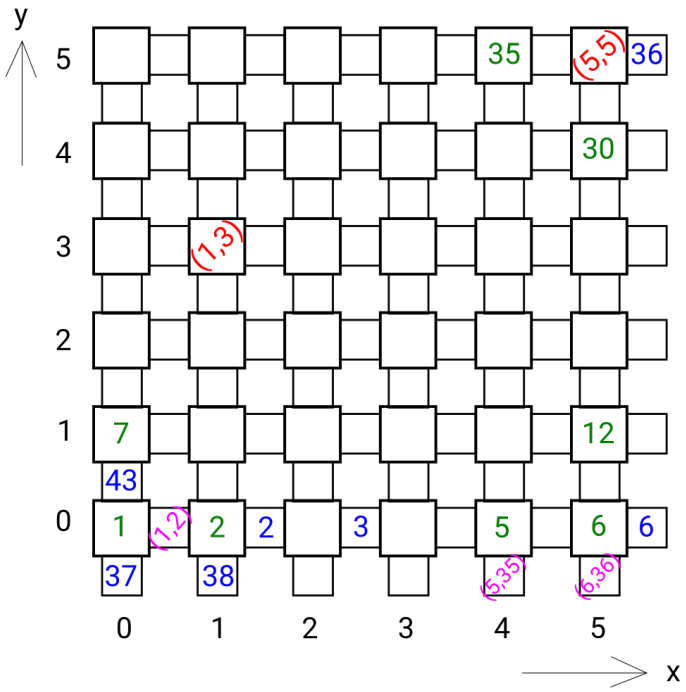
Components

2.1 Site

1. *id* or *label*
2. *group_id*
3. Index
4. Relative Index with respect to

2.2 Bond

1. *id* or *label*
2. *group_id* which can coincide with site group id
3. Index. (a, b) where a is the *id* of one site and b is the id of another site.



(a)

Figure 2.1: Red color is for site index, Green color is for site id(or label), Magenta color is for bond index, Blue color is for bond id (or label).

2.3 Lattice

We will study $2D$ system specifically with a $2d$ vector in C++.

1. Site
2. Bond

A $1d$ vector looks like

$$V_i = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$$

A $2d$ vector looks like

$$V_{i,j} = \begin{bmatrix} 0,0 & 0,1 & 0,2 \\ 1,0 & 1,1 & 1,2 \\ 2,0 & 2,1 & 2,2 \end{bmatrix}$$

But we want grid like structure

$$V'_{i,j} = \begin{bmatrix} 0,2 & 1,2 & 2,2 \\ 0,1 & 1,1 & 2,1 \\ 0,0 & 1,0 & 2,0 \end{bmatrix}$$

where each column of V' is row of V but backwards. So when viewing the lattice we just need to generate row index backward and switch row and column index. Note that horizontal bonds become vertical and vice versa in this process.

2.4 Cluster