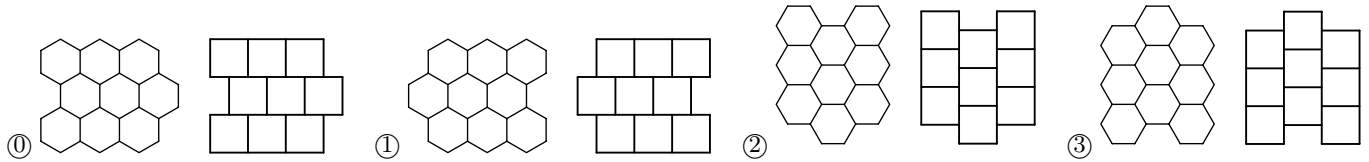


2. Hexagonal boards

First we shall deal with the organisation of our hexagonal board in memory. Here the basic idea is that an hexagonal board is only a bidimensionnal board with odd/even lines shifted, as the following pictures show:



As you can see the shift of the first line is an important characteristic of our board. Thus i will put it in a `FirstShift` variable, say it is 0 in situations ① and say it is 1 in situation ②.

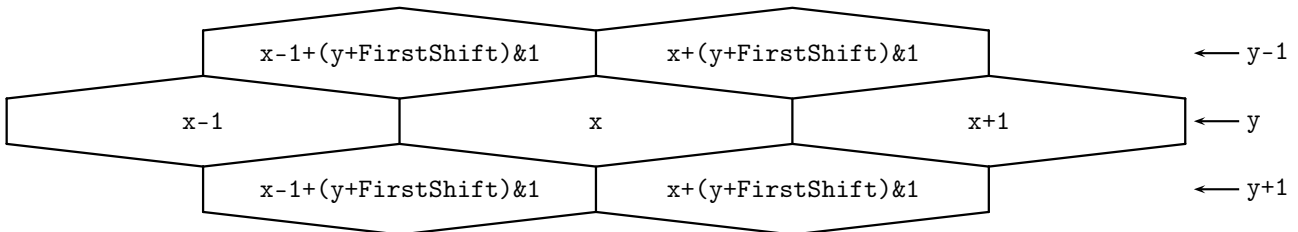
So you have to create a bidimensionnal array, determine what kind of `FirstShift` you want, and you'll also probably need to say that some hexagonal cells are forbidden (or invisible) to have the hexagonal board you want. For example the classical 7 hexagonals board can be obtained in (at least) two ways with a 3×3 array:



Then the neighbourhood of the $(x;y)$ cell depends on the parity of $y+\text{FirstShift}$:

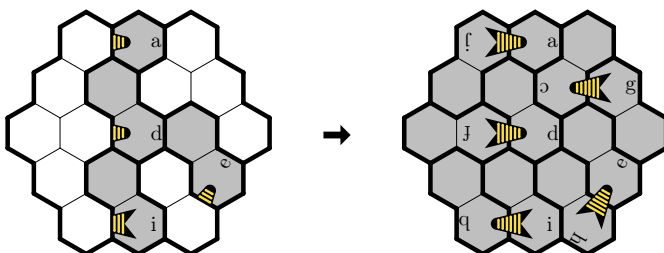
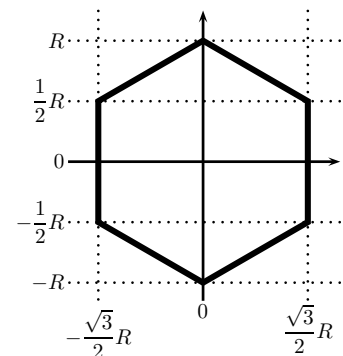


We can merge the two situations by accessing the cells of horizontal coordinates $x-1+(y+\text{FirstShift})\&1$ and $x+(y+\text{FirstShift})\&1$ on lines $y-1$ and $y+1$, where $\&1$ is the bitwise AND operator (using the modulus operation $\%2$ won't handle negative numbers the way we want). This is summarised in the stretched diagram below:



We also need to know how to draw the hexagons on screen. Considering we want an hexagon of radius R , with the origin on its center, some basic trigonometry gives us the coordinates seen on the right diagram.

Of course you'll have to modify the coordinates according to the $(x;y)$ position of the cell in your board, and also take $(y+\text{FirstShift})\&1$ in account to know if you must shift the hexagon or not (ie add $\frac{\sqrt{3}}{2}R$ to horizontal value).



If your aim is to have the hexagonal board drawn on a printer or a pdf file (i needed that to create my puzzle game Bee Logic, see picture on the left), you can alternatively use \TeX and my `ffn2tex` preprocessor which can be found at <http://abrobecker.free.fr/progs.htm>.

Last here are two addresses if you want another, more complete, view of hexagonal boards:

<https://redblobgames.com/grids/hexagons/> - <https://catlikecoding.com/unity/tutorials/hex-map/>