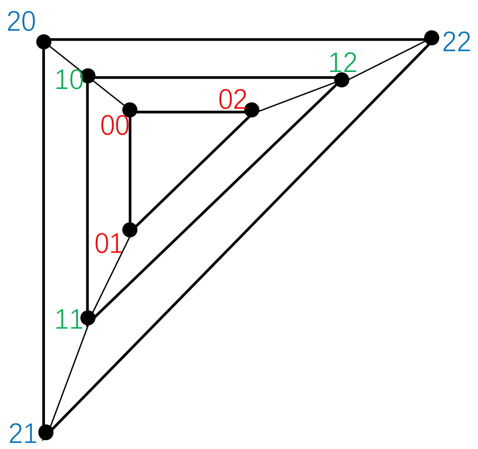
1.

The maximum number of edges such a simple graph could have is to connect every pair of distinct vertices with an edge. Obviously, this is the definition of a Complete graph. So the total number of edges of a complete graph Kn is nn−12=100100−12=4950.

The minimum possible values for m are 0.

2.

A.



B. G_n $is\ a\ simple\ graph\ with\ n\ vertices. The\ number\ of\ edges\ of\ G_n\ is$

$m = 2n - 3$. When n=9, m=15. So the number of edges of G is 15.

3.

A. Let the number of vertices of the grid graph $P_{r,s}$ be n.

Formula: $n = rs$.

B. Let the number of edges of the grid graph $P_{r,s}$ be m.

Formula: $m = (r-1)s + (s-1)r$.

4.

A. Let cubic graph G has n vertices and m edges. Then according to the first Theorem of Graph Theory, the total degree is twice the number of edges. So, $\sum_{i=1}^{n} deg(v_i) = 2m$. Also, the cubic graph is a 3-regular graph, so the degree of every vertex is 3. Then we have $3n = 2m$. Since $2m$ must be a positive integer, n must not be an odd number. This is means that there exists no cubic graph with an odd number of vertices.

B. For every integer $n \geq 3$, C_{2n} will be a simple cubic graph with $2n$ vertices; $V = \{-n,\ -(n-1), \dots ,\ -2,\ -1,\ 1,\ 2,\ 3, \dots ,\ n\}$.

An edge joins vertices $k\ and\ q$ if and only if $|k-q| = 1\ or\ |k-q| = n-1\ or\ k = -q$.