Graph Theory Fall 2022

Assignment 1

1. Sketch the following graphs described as sets of vertices and adjacency rules ("iff" means "if and only if"). Also, give the values of n and m for each graph.

   A. $V = \{(i,j)\colon\ 1 \le i,j \le 3\}$

   And (i,j) is adjacent to (p,q) iff $|p-i| + |q-j| = 1$

   B. $V = \{0,1,2,3,4,5,6,7\}$

   And i is adjacent to j iff $i - j$ is odd.

   C. $V = \{(0,0,1), (0,0,-1), (0,1,0), (0,-1,0), (1,0,0), (-1,0,0)\}$

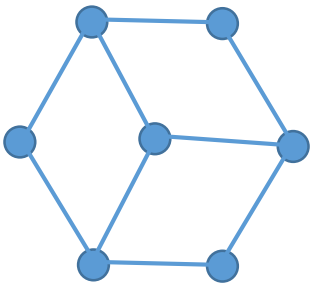
   And (i,j,k) is adjacent to (p,q,r) iff they disagree in two positions.

   D. $V = \{(0,\pm1,\pm2), (\pm1,\pm2,0), (\pm2,0,\pm1)\}$. Here, the $\pm$ symbols are completely independent, so $(0,\pm1,\pm2)$ represents $(0,1,2), (0,1,-2), (0,-1,2)$, and $(0,-1,-2)$.

   And (i,j,k) is adjacent to (p,q,r) iff the Euclidean distance d between them satisfies $0 < d < 3$.

2. Give a "set of vertices and rule(s) for edges" recipe for the following two graphs:

   A.



   B.