This exercise covers some aspects of Johnson’s paper on *yacc*\(^1\) along with some graph terminology, both of which are featured in the next homework.

1. List the members of your group below:

2. Earlier exercises have introduced several well-known graphs, such as \(K_n\) and \(C_n\). Another such graph is a \(m \times n\) grid graph (or lattice graph, or mesh graph) \(G_{m,n} = (V, E)\) where \(V = \{(x, y) \mid x \in 0, 1, 2, \ldots, m\text{ and } y \in 0, 1, 2, \ldots, n\}\) and \(E = \{(p, q) \mid p, q \in V \text{ and } d(p, q) = 1\}\), using \(d(p, q)\) to denote the Euclidean distance between points \(p\) and \(q\).

   Depict \(G_{m,n}\) for \(0 \leq n \leq m \leq 5\).

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3. Is it possible to generate $G_{m,n}$ (Question 2) using the graph calculator described in the homework assignment? If so, provide the calculator input that generates and prints the graph; else explain why not.

4. Determine the number of paths from the origin $(0,0)$ of a grid graph to the vertex $(m,n)$ assuming all edges are oriented away from the origin. Justify your answer. Present the numerical answers for $0 \leq n \leq m \leq 5$. 
5. Determine the number of paths from \((0,0)\) to \((m,n)\), as in Question 4, but subject to the constraint that the paths are not permitted to visit any vertex \((x,y)\) with \(x < y\). Present the numerical answers for \(0 \leq n \leq m \leq 5\). Comment on any observed similarities to previously studied sequences.
6. Recall the question from the midterm exam that asked for a trace of bit-splitting radix sort. Provide a bash script that generates the answer to that question given the data (in decimal) as input. The goal is to generate as concise a script as possible. You may use any of the standard Unix tools, such as grep, sed, awk, sort, etc. (Ask for clarifications about tool use.)