1. In problem #3 of assignment #17, multivariate polynomials

\[ D(x_1, x_3, \ldots, x_{2n+1}; y_2, y_4, \ldots, y_{2n}) \]

were defined. Find an infinite acyclic directed graph with special vertices \( \ldots, v_{-1}, v_0, v_1, \ldots \) where all edges are assigned weight 1 and vertices are assigned weights according to some scheme that you must devise, so that for all integers \( i \leq j \) the sum of the weights of the paths from \( v_i \) to \( v_j \) is \( D(x_{2i+1}, x_{2i+3}, \ldots, x_{2j+1}; y_{2i+2}, y_{2i+4}, \ldots, y_{2j}) \). Include a proof that your answer is correct.

2. Consider an infinite array with tilted upper boundary like the one shown below:

Here the entries \( w_i, x_i, y_i \) are formal indeterminates, and the entries marked with asterisks are determined by the diamond rule as in assignment #17; that is, whenever the array contains four entries arranged like

\[
\begin{array}{ccc}
a & b & c \\
b & & d \\
c & & \\
d & & \\
\end{array}
\]

we must have \( ad - bc = 1 \). Some experimentation will probably convince you that each entry in the table is a Laurent polynomial in the variables \( w_i, x_i, y_i \), and that moreover each coefficient in this polynomial equals +1. Show how for each such Laurent polynomial, the Laurent monomials that participate correspond to the perfect matchings of some graph.
(just as was the case in assignment #17). Give a concrete description of the graphs and the correspondence between matchings and monomials (including either a proof or convincingly large examples).