



## Why

We want to model the progressive fill-in during Gauss elimination with graphs.

## Definition

Let  $G = ((V, E), \sigma)$  be an ordered undirected graph with  $|V| = n$ . Define  $E_0 = E$ . The *elimination edge sequence* of  $G$  is a sequence  $(E_1, \dots, E_{n-1})$  defined by

$$E_i = E_{i-1} \cup \{\{v, w\} \mid v \succ \sigma(i), w \succ \sigma(i), \text{ and } \{\sigma(i), w\} \in E_{i-1}\}$$

for  $i = 1, \dots, n-1$ . The difference between  $E_{i-1}$  and  $E$  can be described by saying that the higher neighborhood of the intermediate graph  $((V, E_{i-1}), \sigma)$  is made complete by the addition of edges between all non-adjacent vertices.

The *elimination graph* of  $G$  is the graph  $((V, E_{n-1}), \sigma)$ .



