Advanced Topics: Bipartite Matching

Imagine you have two items that have to be assigned together:
  FPGA I/O signals and pins that can support specific protocols
  Men and women for arranged marriages

Graph form:
  Node sets A and B, and edges V from A to B representing compatibility

Possible goals:
1.) Find a perfect matching of elements from A to B, such that pairs are compatible.

2.) Find a maximum matching if a perfect matching not possible (more A’s than B’s? Not right compatibilities?).

Active Learning: Matchmaker

Find the most possible marriages that can be formed (no polygamy, etc).

```
Ann   Beth   Christina   Dorothy   Eve   Fiona
  ◆ ◆ ◆ ◆ ◆ ◆

Andy  Bob    Chuck       Dave     Edgar   Fred
  ◆ ◆ ◆ ◆ ◆ ◆
```
Bipartite Matching Algorithm – Max Flow

Add source to all women, sink from all men
Run max flow/min cut.

Bipartite Matching Example