CAD & Physical Design

CAD = Computer Aided Design

Complexity of today's circuits requires computer support for most design tasks

CAD split into Synthesis, Physical Design

Synthesis = translating designer requirements into a circuit graph

PD = translating circuit graph into layout ("blueprint") for fabrication

Partitioning
Floorplanning
Placement
Global Routing
Detailed Routing
Compaction
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

Hungarian method