Scribe

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November 1,2018

1 Bipartite Graphs

A bipartite graph (or bigraph) is a graph whose vertices can be divided into two disjoint and independent sets U and V such that every edge connects a vertex in U to one in V.

G=(U,V,E) is used to denote a bipartite graph whose partition has the parts U and V, with E denoting the edges of the graph.
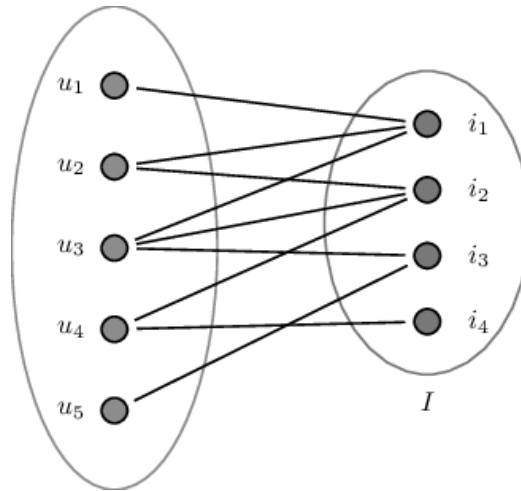

Figure 1.1 A Bipartite Graph

2 Bipartite Matching

A matching M is a subset of edges such that each node in V appears in at most one edge in M.

Definition 2.1 (Maximum Matching) A maximum matching is a matching with the largest possible number of edges; it is globally optimal.

Definition 2.2 An alternating path with respect to M is a path that alternates between edges in M and edges in E M.

Definition 2.3 An augmenting path with respect to M is an alternating path in which the first and last vertices are exposed.

3 Problem

Given a Bipartite graph G=(U,V,E), Find a matching in G which has the maximum cardinality.

BIPARTITE MATCHING(G)
M = ϕ
repeat $P = (Augmenting - Path(G, M))$
                M = M $\oplus P$
until $P = \phi$