Parth Ray

Lab 8-1

1. a. 1, 4, 3, 2, 5, 6

b. c. 

d.







Lab 8-2

1. Dining Problem
   1. The capacity of the edges going toward the families is the amount of family members per family and the capacity of the tables is described in the outgoing edges from the tables. The edges from family to table is 1, since no two members of the same family can sit at the same table.

Source

Sink

F1

b1

ak

ai

a1

Qk

Qj

Fk

Fi

Q1

bj

bq

1

1

1

1

1

1

* 1. No solution if flow conservation constraints are not met.
  2. We can see how many family members from each family are seated at a table and we can see which tables they sit at by looking at which q vertices are connected to a f vertex.

1. Committee Representation
   1. Our flow network will have each subset have an incoming edge of capacity 1 since they must be represented by one object. Then, we connect the subsets to the objects that could possible represent then with an edge of capacity 1. Then, we have an outgoing edge from each object of capacity 1 to the sink. This will tell us if we can have an object represent a subset.

Source

Sink

S1

ak

aj

Sk

Si

a1

1

1

1

1

1

1

1

1

1

1

1

* 1. We know that there is no solution if the max flow is less than the number of outgoing edges from the source (# of subsets, k).
  2. There is a solution if the max flow equals the number of subsets, k. We will know which object represents which subset by looking at which edges are at full capacity.