CSI 604 – Spring 2016
Outlines for Two Greedy Heuristics

(a) Nearest-Neighbor Heuristic for the Traveling Salesperson Problem:

1. Let Current = 1, Length = 0 and \( U = \{2, 3, \ldots, n\} \).
   \((U \text{ represents the set of unvisited cities.})\)

2. while \(|U| > 0\) do

   (a) Choose a city \( i \in U \) so that the distance between Current and \( i \),
   denoted by \( d(\text{Current}, i) \), is the smallest among the cities in \( U \).

   (b) Length = Length + \( d(\text{Current}, i) \).

   (c) Delete \( i \) from \( U \) and set Current = \( i \).

3. Length = Length + \( d(\text{Current}, 1) \).

4. Output Length.

(b) Greedy Heuristic for Minimum Set Cover:

1. Let \( C' = \emptyset \) and \( U = Q \). \((C' \text{ is the set cover produced by the algorithm.})\)
   \((U \text{ represents the set of uncovered elements.})\)

2. while \(|U| > 0\) do

   (a) Choose a set \( s_j \) of maximum cardinality from \( C \).

   (b) Remove \( s_j \) from \( C \) and add it to \( C' \).

   (c) \( U = U - s_j \). \(/ \text{ Elements in } s_j \text{ have been covered.} \)

   (d) for each set \( s \in C \) do

      \[ s = s - s_j. \]

3. Output \( C' \).