

1. Given an undirected, complete graph  $G(V, E)$  with  $n(\geq 2)$  nodes and  $\frac{n(n-1)}{2}$  arcs. Let the weight of the arc  $(i, j)$  that connects node  $i$  and node  $j$  be  $\frac{i^2+j^2}{i+j}$ , for  $i \leq j \leq n$ .  
Now consider the “maximum cut problem” as we discussed in class, you are required to solve this problem by using the Simulated Annealing method.
  - (a) How large is the solution space  $S$ ?
  - (b) How are you going to represent a solution? Why?
  - (c) How to generate an initial solution  $s_0$ ?
  - (d) How to generate a neighborhood of a given solution?
  - (e) How many solutions in your neighborhood?
  - (f) How to select an initial temperature  $T$ ? Why?
  - (g) How to select the iteration count  $Max$ ? Why?
  - (h) How to select the temperature reduction function  $\alpha(T)$ ? Why?
  - (i) What is your stopping condition? Why?
2. If you have time, write a program to show that your design works efficiently for  $n = 100, 200$  and  $500$ .
3. Now you are required to solve this problem by using the Tabu Search method.
  - (a) How are you going to represent a solution? Why?
  - (b) How to generate an initial solution?
  - (c) How to generate a neighborhood of a given solution?
  - (d) How to tabu a movement?
  - (e) How to select a tabu tenure? Why?
  - (f) How to select aspiration criteria? Why?
  - (g) What is your stopping condition? Why?
4. If you have time, write a program to show that your design works efficiently for  $n = 100, 200$  and  $500$ .
5. Compared the results obtained by using the above two methods, which one works better for this particular problem? Why?