HW5

演算法: Ford-Fulkerson + Edmonds-Karp

資料結構:使用BFS找尋從sink到tank的路徑，使用Queue完成BFS

使用DFS找尋vertices reachable from s

使用從初始流為 0 開始，從源到匯有一條增廣路徑，將此path flow添加到flow中的概念找尋max\_flow

因為給的圖是無向圖，所以每個邊都有兩個flow capacity皆為1

PsuedoCode:

rG // residual graph

Mincut(G,s,t)

for u ∈ G.V

for v ∈ G.V

rG[u][v] = G[u][v]

while(BFS(G))

path\_flow = **∞**

**for (v=t; v!=s; v=parent[v])**

**u = parent[v];**

**path\_flow = min(path\_flow, rGraph[u][v]);**

**for (v=t; v != s; v=parent[v])**

**u = π[v];**

**rG [u][v] -= path\_flow;**

**rG [v][u] += path\_flow;**

**max\_flow += path\_flow**

DFS(rG,s)

for i=0 to |V|

for j=0 to |V|

if (visited[i] && !visited[j] && graph[i][j])

return i,j

時間複雜度: Ford-Fulkerson = O(EF) F<=2V = O(mn)

BFS,DFS=O(n+m)

Ford-Fulkerson+BFS = O(nm2)

Time Complexity= O(n+m)(DFS) + O(nm2)

= O(nm2)

附上測試完畫面:

