Lin Yang

Project4 Result

Problem 1:

```
Top 20 betweenness centrality vertices
VertexID    visitedTime
760         362744
590         319444
859         284626
757         280944
858         279748
1021        265056
374         260048
92          253512
931         253050
857         239990
758         238750
393         236172
496         230272
775         229474
1093        227922
932         227762
1094        226808
835         226192
589         226172
751         225816
```

Problem 2:

Dynamic Programming (two-dimensional array)

```
NodeID      ConnectedNodeID     Distance
0           1                   223
1           21                  206
21          11                  223
11          14                  199
14          13                  225
13          2                   210
2           3                   222
3           4                   197
4           5                   537
5           12                  206
12          7                   543
7           6                   210
6           19                  277
19          17                  208
17          23                  390
23          18                  173
18          22                  180
22          15                  267
15          8                   177
8           20                  543
20          16                  180
16          10                  528
10          9                   428
9           0                   181
The minimum distance for the salesperson to travel is 6733
```

Dynamic Programming (one-dimensional array)

```
NodeID      ConnectedNodeID     Distance
0           1                   223
1           21                  206
21          11                  223
11          14                  199
14          13                  225
13          2                   210
2           3                   222
3           4                   197
4           5                   537
5           12                  206
12          7                   543
7           6                   210
6           19                  277
19          17                  208
17          23                  390
23          18                  173
18          22                  180
22          15                  267
15          8                   177
8           20                  543
20          16                  180
16          10                  528
10          9                   428
9           0                   181
The minimum distance for the salesperson to travel is 6733
```

Two-dimensional array branch-and-bound

```
NodeID      ConnectedNodeID     Distance
0           9                   181
9           10                  428
10          16                  528
16          20                  180
20          8                   543
8           15                  177
15          22                  267
22          18                  180
18          23                  173
23          17                  390
17          19                  208
19          6                   277
6           7                   210
7           12                  543
12          5                   206
5           4                   537
4           3                   197
3           2                   222
2           13                  210
13          14                  225
14          11                  199
11          21                  223
21          1                   206
1           0                   223
The minimum distance for the salesperson to travel is 6733
```

One-dimensional array branch-and-bound

```
NodeID      ConnectedNodeID     Distance
0           9                   181
9           10                  428
10          16                  528
16          20                  180
20          8                   543
8           15                  177
15          22                  267
22          18                  180
18          23                  173
23          17                  390
17          19                  208
19          6                   277
6           7                   210
7           12                  543
12          5                   206
5           4                   537
4           3                   197
3           2                   222
2           13                  210
13          14                  225
14          11                  199
11          21                  223
21          1                   206
1           0                   223
The minimum distance for the salesperson to travel is 6733
```

Program 3:

```
Legal queen configurations for n = 2 is 0
Legal queen configurations for n = 3 is 152
Legal queen configurations for n = 4 is 27880
Legal queen configurations for n = 5 is 8637762
```