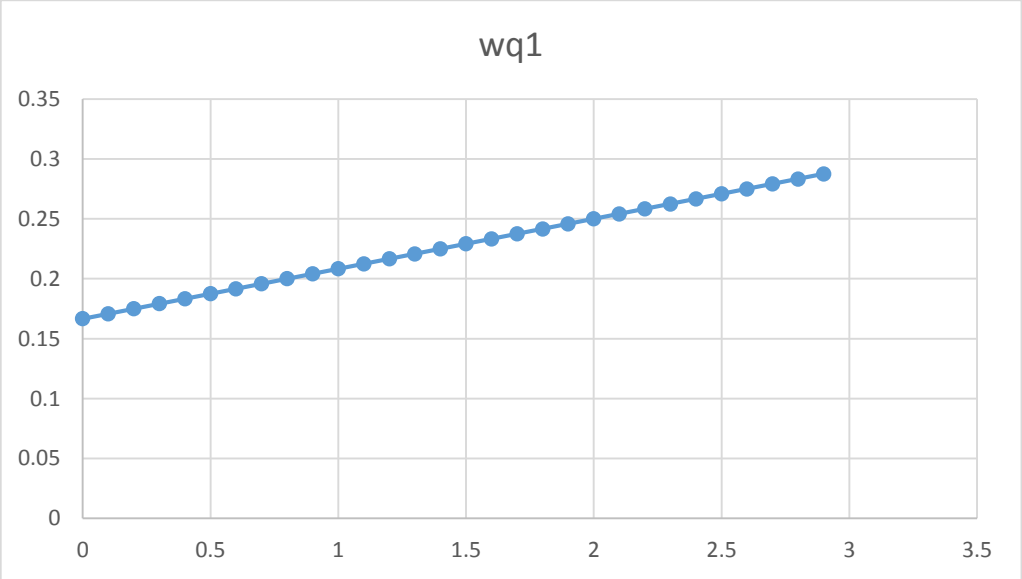
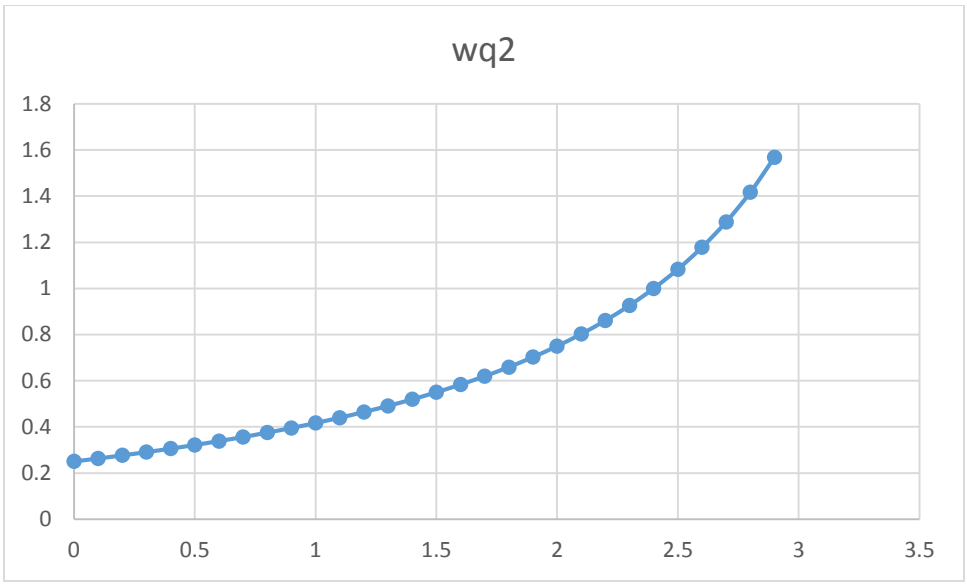
ISE420 hw#3 Name: Bolun Xu

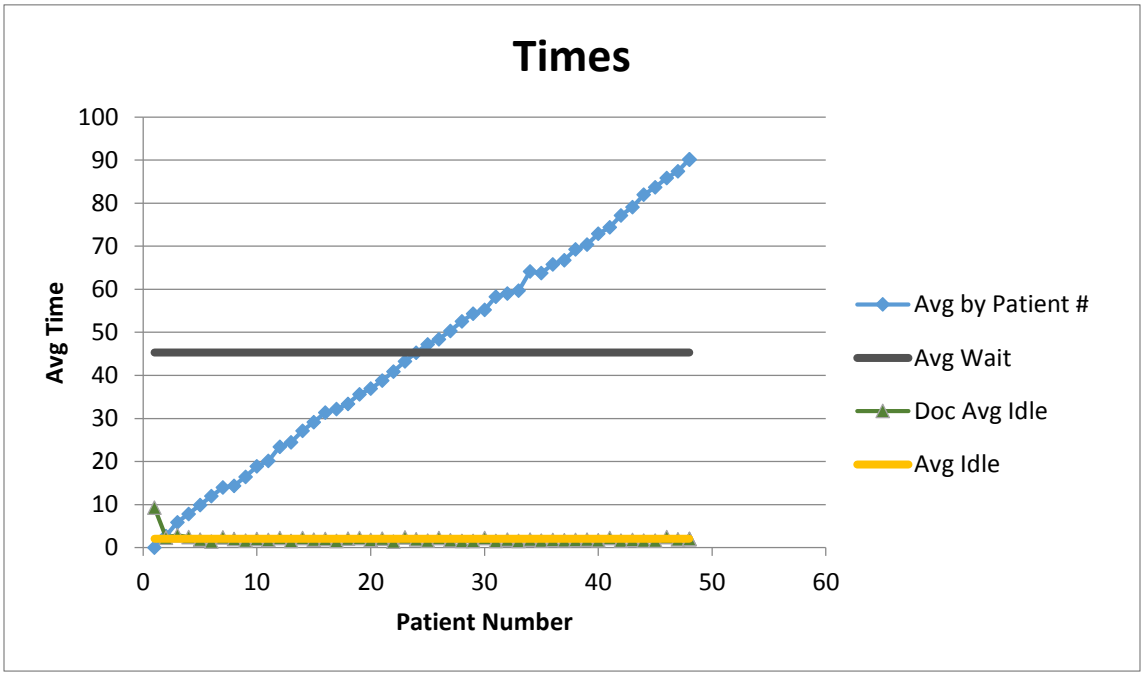
9.5(a)

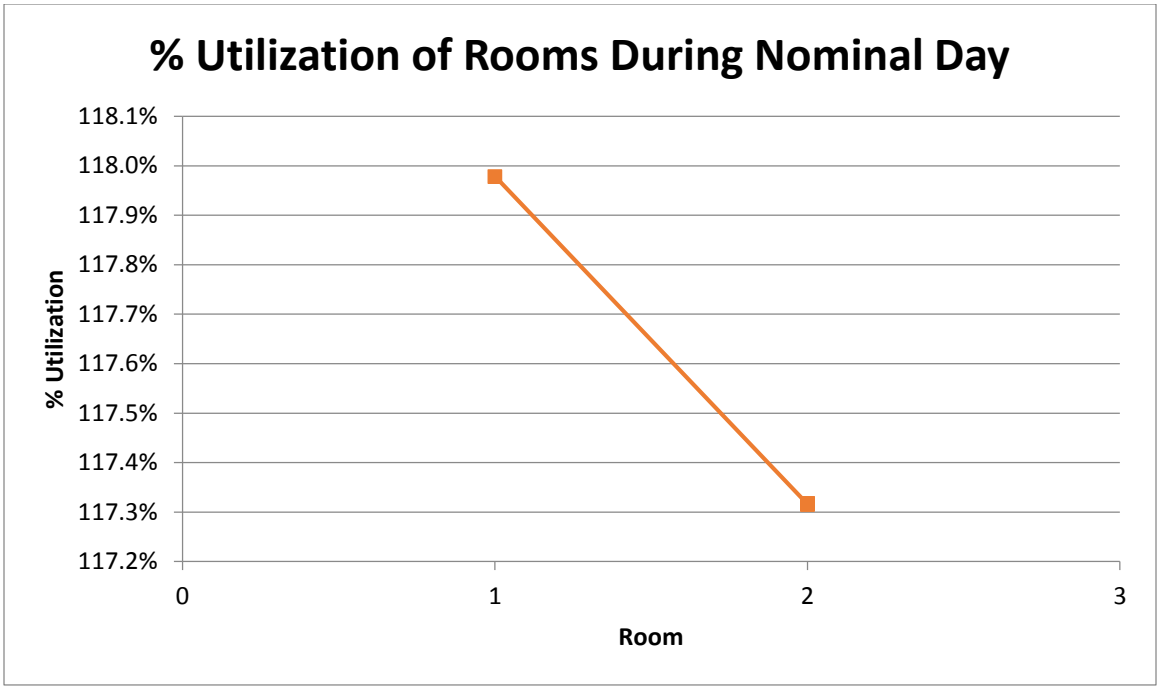
(b)



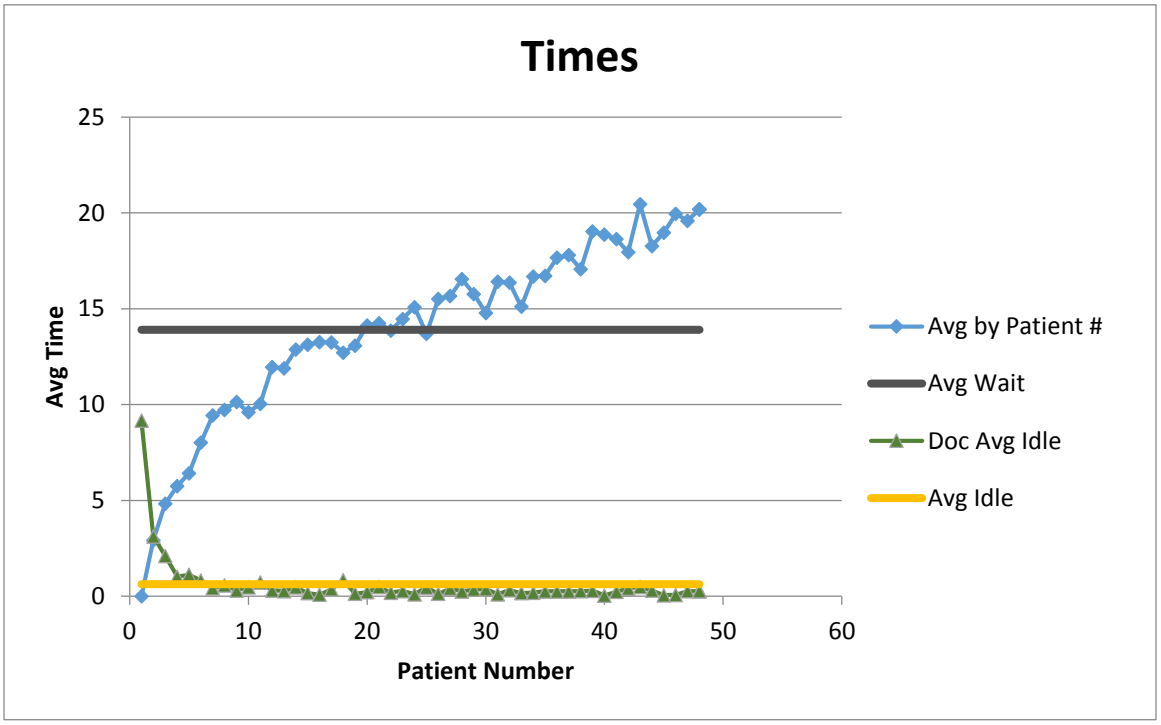

wq2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5

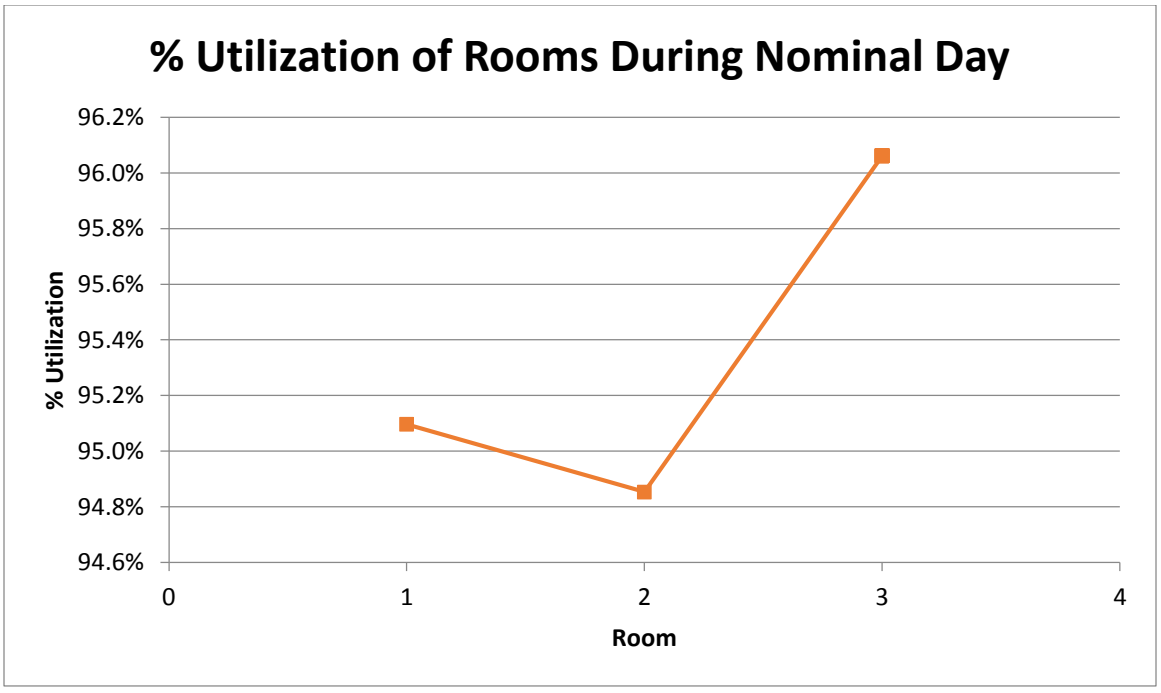
9.9(a)


Times
100
90
80
70
60
50
40
30
20
10
0
Avg Time
0
10
20
30
40
50
60
Patient Number
Avg by Patient #
Avg Wait
Doc Avg Idle
Avg Idle

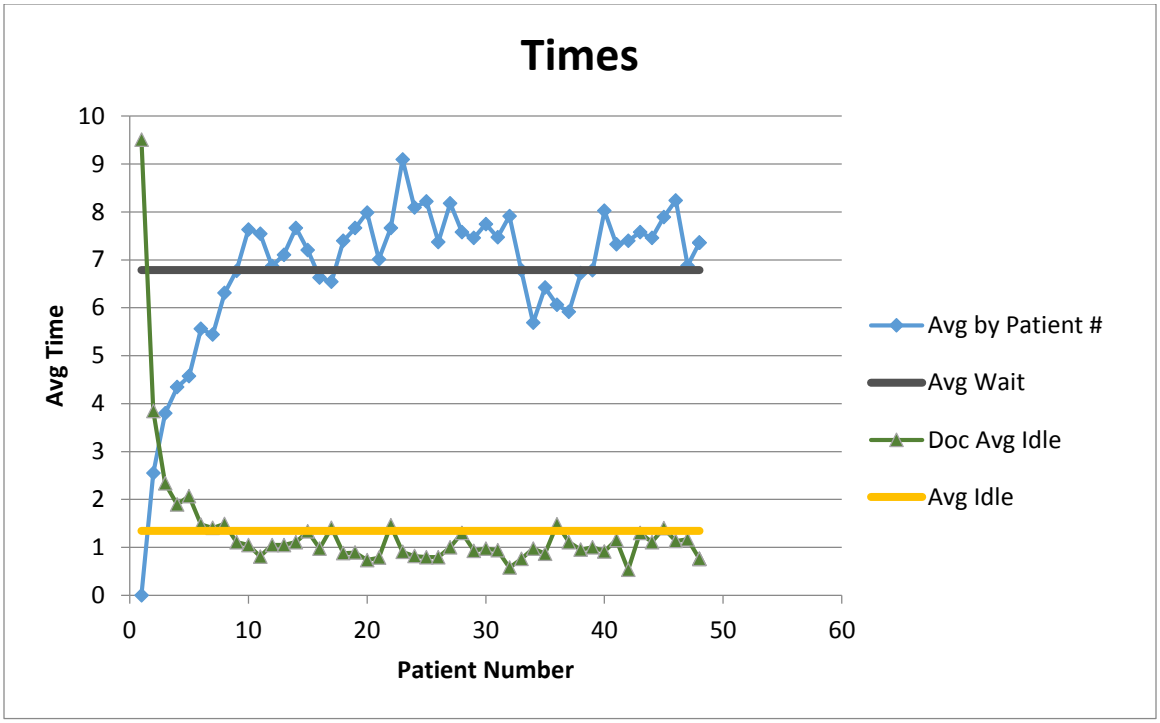

% Utilization of Rooms During Nominal Day
118.1%
118.0%
117.9%
117.8%
117.7%
117.6%
117.5%
117.4%
117.3%
117.2%
% Utilization
0
1
2
3
Room

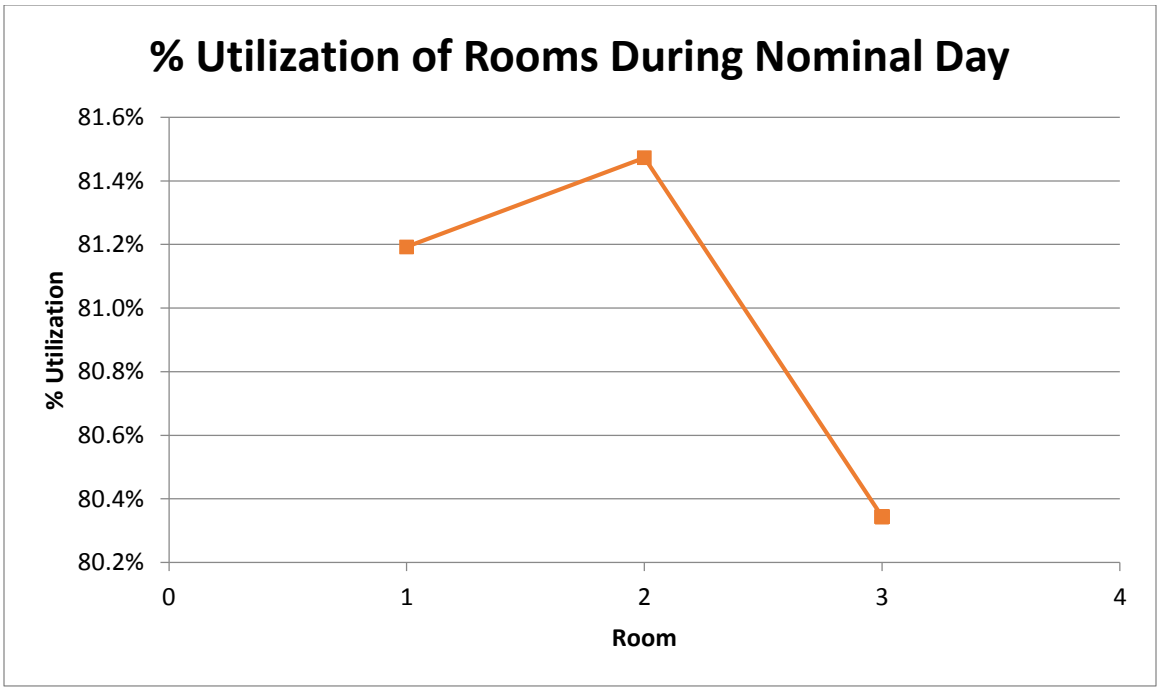
(b)


Times
Avg Time
25
20
15
10
5
0
0
10
20
30
40
50
60
Patient Number
Avg by Patient #
Avg Wait
Doc Avg Idle
Avg Idle

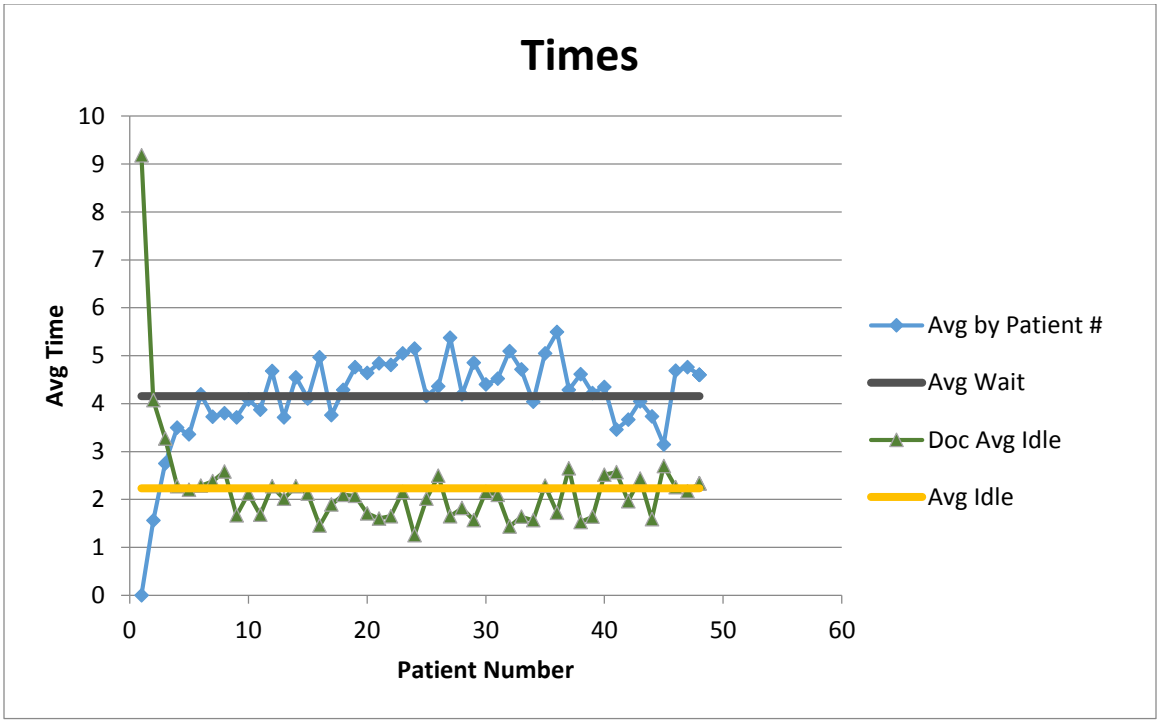

% Utilization of Rooms During Nominal Day
% Utilization
96.2%
96.0%
95.8%
95.6%
95.4%
95.2%
95.0%
94.8%
94.6%
0
1
2
3
4
Room

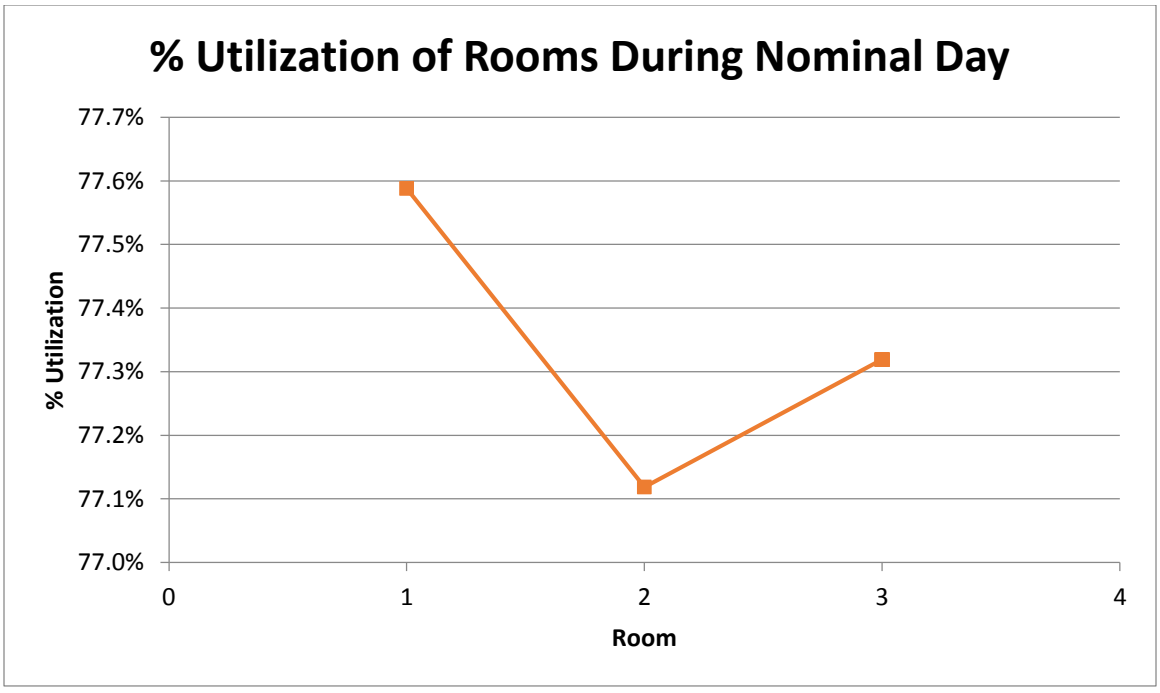
(c)


Times
Avg Time
Patient Number
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
Avg by Patient #
Avg Wait
Doc Avg Idle
Avg Idle


% Utilization of Rooms During Nominal Day
% Utilization
Room
81.6%
81.4%
81.2%
81.0%
80.8%
80.6%
80.4%
80.2%
0
1
2
3
4

(d)


Times
Avg Time
Patient Number
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
Avg by Patient #
Avg Wait
Doc Avg Idle
Avg Idle


% Utilization of Rooms During Nominal Day
% Utilization
Room
77.7%
77.6%
77.5%
77.4%
77.3%
77.2%
77.1%
77.0%
0
1
2
3
4

3. Simulate in Excel with A=68 B=140 for 15000 appointments:

Patient #	Appt Time	Actual start	Actuall Serv Time	Outsource(min)	Patient Delay (min)	Doc Delay (min)	Cost
1	0	0	63.49934	0	0	0	0
2	68	68	46.91365	0	0	4.5006578	67.50987
3	136	136	41.23088	0	0	21.086347	316.2952
4	204	204	50.73073	0	0	26.769124	401.5369
5	272	272	33.27238	0	0	17.26927	259.0391
6	340	340	34.14481	0	0	34.727624	520.9144
7	408	408	30.67971	0	0	33.855188	507.8278
8	476	476	36.3669	0	0	37.320289	559.8043
9	544	544	70.02064	0	0	31.633103	474.4965
10	612	614.0206	39.00166	0	2.0206402	0	2.02064
11	680	680	125.3876	0	0	26.977702	404.6655
12	748	805.3876	138.3445	0	57.387579	0	57.38758
13	816	943.7321	40.01332	0	127.73207	0	127.7321
14	884	983.7454	77.93252	0	99.745385	0	99.74538
15	952	1061.678	79.2781	0	109.67791	0	109.6779
16	1020	1140.956	30.69856	0	120.95601	0	120.956
17	1088	1171.655	20.00381	0	83.654569	0	83.65457
18	1156	1191.658	71.22817	0	35.658383	0	35.65838
19	1224	1262.887	48.65217	0	38.886555	0	38.88655
20	1292	1311.539	66.69248	0	19.53873	0	19.53873

With many trials with different As and Bs, I found the min avg Cost is about 164 when A = 68 ± 5, B = 140 ±10.

Here are some of results with A and B:

A=	B=	Avg Cost=
80	90	397
70	80	294
70	90	253
70	100	222
70	110	203
70	120	190
70	140	173
68	140	164