Lot Streaming Problems

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The test problems are used in:

> Feldmann, M., Biskup, D.: On lot streaming with multiple products. Discussion Paper No. 542, Bielefeld University.
> http://bieson.ub.uni-bielefeld.de/frontdoor.php?source_opus=772

This pdf-file contains:

(1) a description of how to get the lot streaming problems

(2) an explanation of how to interpret a given instance

(3) the optimal objective function values of 1760 instances (8 Tables):

Number of products J	Number of stages M	Intermingling sublots permitted	Intermingling sublots **not** permitted
J = 2	M = {2, 3, 4, 5, 6}	A	C
J = 2	M = {7, 8, 9 10}	B	D
J = 3	M = {2, 3, 4, 5, 6}	E	G
J = 3	M = {7, 8, 9 10}	F	H

(1) HOW TO GET THE LOT STEAMING PROBLEMS

There are three possibilities to get the data files:

a) unzip in the File: ls_prob.ZIP

b) request the data by email: mfeldmann1@gmx.net
mfeldmann@wiwi.uni-bielefeld.de

c) generate the data files using the problem generator LSGen: LSGen.ZIP
or download lsgen.exe via the following link:

http://www.wiwi.uni-bielefeld.de/%7Ekistner/mitarbeiter/feldmann/lsgen.exe

(2) HOW TO INTERPRET A GIVEN INSTACE

Within LSGen it is just necessary to appoint the number of products *J*, the number of stages *M* and the number of the instance *N*, to receive the reproducible instance *J_M_N*. The data files share the extension MF and can be opened with any editor: 3_4_10.MF
LSGen calculates r_{jm} (processing time for one unit of product *j* on machine *m*) and L_j, (number of identical items of product j to be produced), as uniformly distributed integers within the following ranges: $r_{jm} = \{1, ..., 12\}$; $L_j = \{10, ..., 40\}$.

Additionally a $J \times J$ matrix of setup times with $c_{jk} = \{0, ..., 30\}$ is given. In the following the data of instance 3_4_10 (three jobs: $J = 3$, four stages: $M = 4$, tenth instance: $N = 10$) are given:

$$r_{jm} = \begin{bmatrix} 3 & 10 & 12 & 7 \\ 10 & 1 & 6 & 10 \\ 6 & 3 & 12 & 11 \end{bmatrix} \qquad L_j = \begin{bmatrix} 32 \\ 38 \\ 18 \end{bmatrix} \qquad c_{jk} = \begin{bmatrix} 24 & 17 & 5 \\ 10 & 0 & 17 \\ 3 & 15 & 9 \end{bmatrix}$$

If 3_4_10.MF is opened you will find:

```
 3  4 10
 3 10 12  7 32
10  1  6 10 38
 6  3 12 11 18

24 17  5
10  0 17
 3 15  9
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(3) OPTIMAL OBJECTIV FUNCTION VALUES

(A) INTERMINGLING SUBLOTS PERMITTED; J = 2 AND M = {3, 4, 5, 6}

Instance	Number of sublots						
	1	**2**	**3**	**4**	**5**	**6**	**7**
2_3_1	418	283	255.52	242.05	234.95	231.81	229.92
2_3_2	501	348.53	297.94	273.67	263.59	259.12	256.61
2_3_3	394	298.75	269.64	256.85	250.35	246.81	244.81
2_3_4	468	341.68	305.34	297.62	295.4	294.57	294.24
2_3_5	333	266.45	246.29	238.05	234.49	232.78	231.94
2_3_6	471	364.38	324.48	306.55	295.95	289.05	284.56
2_3_7	709	519.61	451.54	419.17	406.49	398.75	393.76
2_3_8	596	436	383.54	357.95	343.09	333.58	327.11
2_3_9	772	587.83	527.89	498.97	482.41	471.99	465.05
2_3_10	526	416.8	387.77	377.26	373.05	371.29	370.55
2_4_1	1142	828.5	724	670.45	635.55	615.08	604.57
2_4_2	792	541.53	460.01	420.68	398.16	384	374.55
2_4_3	1007	677.83	579.13	534.47	510.04	495.28	485.82
2_4_4	1146	811.31	697.07	640.91	608.43	585.96	570.52
2_4_5	540	402	351.88	331.36	319.64	312.7	308.74
2_4_6	638	446.17	391.66	361.11	344.01	332.67	325.69
2_4_7	1020	684.67	573.83	524.93	495.84	477.62	465.17
2_4_8	333	237	205	189	179.4	173	168.43
2_4_9	1221	897.25	798.07	754.33	732.15	719.96	712.99
2_4_10	974	691.3	603.7	560.06	535.37	519.07	508.06
2_5_1	1020	686.39	591.78	540	507	491.74	479.13
2_5_2	897	586.33	492.63	444.54	417.73	398.2	385.75
2_5_3	793	545.31	462.88	420.73	396.64	381.2	370.56
2_5_4	1476	948.48	756.95	687.25	658.5	639.67	626.39
2_5_5	889	611.33	537.12	512.74	503.76	500.09	498.47
2_5_6	1434	931.06	747.78	660.43	605.57	569.57	544.52
2_5_7	856	586.41	497.59	453.72	427.15	409.87	397.69
2_5_8	1077	705.03	612.65	566.62	539.27	521.11	508.21
2_5_9	1251	847	710.5	642.37	606.06	579.75	563.47
2_5_10	1026	687.95	572.11	512.95	482.14	466.34	456.54
2_6_1	1246	801.68	679.83	617.04	582.82	557.98	542.25
2_6_2	1967	1315.27	1099.47	992.2	929.23	886.52	857.51
2_6_3	1140	785.09	674.08	619.6	589.32	570.87	558.98
2_6_4	1008	682.68	568.23	510.16	475.22	452.69	435.74
2_6_5	1432	922.36	758.26	676.39	629.33	599.85	579.37
2_6_6	838	533.26	434.22	391.35	366.57	352.22	341.74
2_6_7	2257	1472.25	1218.37	1093.24	1019.43	970.43	935.69
2_6_8	1827	1114	876.25	756.02	684.34	636.15	600.47
2_6_9	1219	772.6	624.3	550.51	503.31	473.73	454.17
2_6_10	1406	951.22	804.02	732.54	689.54	662.92	643.32

(B) INTERMINGLING SUBLOTS PERMITTED ; J = 2 AND M = {7, 8, 9, 10}

Instance	Number of sublots						
	1	**2**	**3**	**4**	**5**	**6**	**7**
2_7_1	1458	927.44	790.38	729.27	697.28	680.01	668.9
2_7_2	1291	864.11	712.89	633.43	585.08	552.61	529.35
2_7_3	2508	1626.25	1334.89	1189.2	1100.89	1042.49	1000.96
2_7_4	1994	1244.96	994.43	867.18	791.17	741.24	705.97
2_7_5	1372	923.55	769.69	699.16	659.1	633.66	617.45
2_7_6	1436	923.24	753.01	661.02	609.28	576.68	558.01
2_7_7	1208	763.34	615.32	540.83	493.88	463.91	442.99
2_7_8	1653	1049.38	849.96	751.57	693.58	655.77	629.46
2_7_9	1680	1103.74	912.45	815.93	757.1	718.51	691.23
2_7_10	1023	620.59	486.49	419.46	377.11	351.15	333.49
2_8_1	1525	917.5	715	619.12	561.76	523.93	498.87
2_8_2	1879	1168.95	913.51	783	707.7	659.66	624.98
2_8_3	2030	1266.97	1014.18	886.49	810.03	759.5	723.12
2_8_4	783	529.35	441.04	398.94	375.83	361.11	351.51
2_8_5	1158	762.78	623.62	557.7	517.79	491.99	475.19
2_8_6	2900	1792.75	1423.93	1236.24	1127.85	1058.7	1011.56
2_8_7	1400	872	700.57	617.8	569.19	537.16	514.56
2_8_8	2668	1727.48	1389.47	1224.37	1132.64	1069.15	1024.52
2_8_9	2421	1493.82	1170.27	1020.68	930.72	868.53	826.88
2_8_10	1096	722.86	601.3	538.43	499.55	473.15	453.93
2_9_1	1494	878.1	672.85	579	524.52	488.96	463.87
2_9_2	2427	1473.68	1157.67	998.1	907.42	845.73	801.93
2_9_3	1606	982.48	782.99	681.96	618.93	579.41	552.12
2_9_4	1974	1230.42	983.28	850.68	770.87	719.58	683.62
2_9_5	1892	1160.85	918.54	799.6	729.11	683.14	649.69
2_9_6	1363	870.56	705.06	625.26	576.84	545.8	523.33
2_9_7	2488	1467.29	1130.7	974.06	890.17	835.21	796.68
2_9_8	1681	1058.01	830.42	724.01	661.36	620.9	592.93
2_9_9	2507	1580.96	1270.18	1115.74	1023.31	961.15	918.27
2_9_10	2616	1535.25	1227.97	1067.02	974.48	907.92	866.99
2_10_1	1842	1079.37	826.14	700.94	627.52	578.26	543.75
2_10_2	2030	1253.7	994.22	852.9	771.21	718.17	679.92
2_10_3	1672	1022.32	807.64	698.57	632.74	589.28	558.12
2_10_4	2682	1641.01	1260.95	1075.11	968.64	897.58	844.17
2_10_5	1460	906.09	721.8	639.58	592.93	563.23	541.74
2_10_6	2216	1412.04	1119.6	980.59	892.99	835.95	795.11
2_10_7	2396	1460.21	1143.42	985.12	885.88	820.42	772.61
2_10_8	2348	1415.16	1085.75	925.64	827.91	763.47	717.63
2_10_9	1248	740.27	592.1	519.59	476.12	447.16	426.54
2_10_10	1754	1063.24	847.1	737.75	673.17	630.79	600.01

(C) INTERMINGLING SUBLOTS **NOT** PERMITTED; J = 2 AND M = {3, 4, 5, 6}

Instance	**Number of sublots**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
2_3_1	418	283	260.77	250.13	243.91	239.84	236.99
2_3_2	501	348.53	297.94	273.67	264.09	261.06	258.97
2_3_3	394	304.59	276.01	262.58	255.16	250.69	247.85
2_3_4	468	341.68	305.34	297.62	295.4	294.57	294.24
2_3_5	333	268.09	246.29	238.05	234.49	232.82	231.98
2_3_6	471	364.38	329.13	311.23	300.42	293.62	288.99
2_3_7	709	519.61	451.55	419.17	407.43	400.03	395.08
2_3_8	596	436	383.54	357.95	343.09	333.58	327.11
2_3_9	772	587.83	527.89	498.97	482.41	472	465.05
2_3_10	526	416.8	387.77	377.26	373.05	371.3	370.55
2_4_1	1142	828.5	724	670.45	635.55	615.08	604.57
2_4_2	792	541.53	460.01	420.67	398.16	383.99	374.55
2_4_3	1007	677.82	584.55	545.82	528.18	520.38	516.09
2_4_4	1146	811.31	700.33	645.27	611.37	589.28	574.04
2_4_5	540	402	355.07	333.35	319.83	312.83	308.99
2_4_6	638	483.48	422.77	393.39	378.38	367.63	360.55
2_4_7	1020	684.66	573.83	543.72	516.85	495.86	482.24
2_4_8	333	259.15	228.41	215.22	206.9	201.8	198.41
2_4_9	1221	921.11	824.44	777.71	751.78	736.02	725.87
2_4_10	974	691.3	626.6	587.99	559.78	541.19	528.1
2_5_1	1020	756.54	647.8	600.26	574.19	557.01	546.14
2_5_2	897	586.33	512.54	475.59	452.37	436.74	426.45
2_5_3	793	545.31	462.88	420.73	396.64	381.2	370.56
2_5_4	1476	948.48	756.95	687.25	658.5	639.67	626.39
2_5_5	889	611.33	537.13	512.74	503.76	500.09	498.47
2_5_6	1434	937.76	762.16	677.42	624.81	590.04	565.06
2_5_7	856	596	508.64	462.94	436.37	419	407.25
2_5_8	1077	705.03	612.65	566.62	539.27	521.11	508.21
2_5_9	1251	892.58	769.85	710.01	675.05	651.42	633.44
2_5_10	1026	687.95	575.21	518.63	492.9	478.85	469.49
2_6_1	1246	801.68	684.58	626.63	593.01	572.87	558.62
2_6_2	1967	1315.27	1099.47	992.63	931.64	890.99	861.96
2_6_3	1140	789.93	676.8	622.76	592.25	573.37	561.03
2_6_4	1008	738.54	656.84	620.59	605.39	595.77	587.92
2_6_5	1432	994.24	842.61	768.94	726.4	696.25	673.33
2_6_6	838	533.26	454.29	417.06	395.33	381.29	372.19
2_6_7	2257	1537.23	1297.89	1181.53	1110.9	1062.08	1023.42
2_6_8	1827	1114	876.33	757.5	686.2	637.63	601.83
2_6_9	1219	772.6	624.3	550.51	503.31	473.73	454.17
2_6_10	1406	951.22	807.88	739.39	697.01	669.93	651.02

(D) INTERMINGLING SUBLOTS **NOT** PERMITTED; J = 2 AND M = {7, 8, 9, 10}

Instance	**Number of sublots**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
2_7_1	1458	953.74	818.67	755.69	720.35	698.49	684.16
2_7_2	1291	900	776.7	708.88	667.9	642.21	622.57
2_7_3	2508	1640.56	1352.02	1207.61	1120.42	1061.38	1019.63
2_7_4	1994	1260	1020.22	895.17	821.17	773.42	739.96
2_7_5	1372	931.9	789.61	727.58	690.3	666.78	651.05
2_7_6	1436	923.24	753.01	661.02	609.28	576.68	558.01
2_7_7	1208	776	628.58	555.38	517	492.96	476.59
2_7_8	1653	1070.74	877.14	780.24	720.33	681.51	654.39
2_7_9	1680	1120.13	929.64	832.93	776.96	737.74	711.04
2_7_10	1023	620.59	486.49	419.46	377.45	352.35	335.44
2_8_1	1525	917.5	715	620.64	570.56	545.24	526.55
2_8_2	1879	1168.95	932.98	813.16	742.45	696.1	663.5
2_8_3	2030	1270	1017	890.52	819.16	763.26	727.03
2_8_4	783	529.35	446.43	403.18	379.16	364.88	355.59
2_8_5	1158	764.13	630.27	565.45	525.19	499.95	482.71
2_8_6	2900	1792.75	1423.93	1236.24	1127.85	1058.7	1011.56
2_8_7	1400	872	715.12	644.18	604.11	577.55	554.02
2_8_8	2668	1742.93	1422.02	1266.34	1171.9	1109.03	1064.51
2_8_9	2421	1493.82	1234.67	1071.59	975.34	920.45	883.83
2_8_10	1096	722.86	611.38	557.67	526.48	507.45	493.7
2_9_1	1494	878.1	672.85	580.78	532.08	501.3	480.03
2_9_2	2427	1527.26	1210.31	1052.71	956.59	893.77	847.29
2_9_3	1606	982.48	789.78	693.12	637.95	605.66	581.1
2_9_4	1974	1263.73	1027.44	899.8	831	784.23	751.28
2_9_5	1892	1160.86	921.33	808.16	742	699.26	669.96
2_9_6	1363	870.56	705.07	625.26	576.84	545.8	523.33
2_9_7	2488	1467.29	1139.35	993.82	907.97	850.25	810.08
2_9_8	1681	1063.49	855.43	747.12	676.38	632.34	601.25
2_9_9	2507	1646.82	1357.53	1209.57	1121.91	1064.7	1024.1
2_9_10	2616	1605.75	1294.79	1124.99	1024.2	958.44	913.23
2_10_1	1842	1120.22	879.83	760	688.14	640.3	606.27
2_10_2	2030	1312.55	1065.64	942.22	871.05	823.15	792.15
2_10_3	1672	1022.32	807.64	702.3	639.31	597.33	568.02
2_10_4	2682	1642.43	1288.89	1113.32	1001.91	931.64	880.15
2_10_5	1460	913.2	734.24	650.2	598.59	565.97	542.76
2_10_6	2216	1412.04	1137.21	1001.61	919.66	864.71	825.62
2_10_7	2396	1468.44	1180.11	1029.81	937.14	875.39	831.31
2_10_8	2348	1417.09	1098.98	939.88	845.91	781.29	736.3
2_10_9	1248	740.27	592.1	519.59	476.12	447.16	426.54
2_10_10	1754	1063.24	847.33	744.08	681.56	641.68	613.52

(E) INTERMINGLING SUBLOTS PERMITTED; J = 3 AND M = {3, 4, 5, 6}

Instance	**Number of sublots**			
	1	**2**	**3**	**4**
3_3_1	636	540	512.57	501.6
3_3_2	537	454.06	433.29	425.9
3_3_3	1102	782.58	744.65	742.48
3_3_4	769	620.2	573.21	551.52
3_3_5	976	838.22	806.29	797.81
3_3_6	949	838.85	819.71	816.78
3_3_7	713	596	572.73	566.62
3_3_8	1039	875.67	840.78	832.27
3_3_9	640	571.31	561.53	560.25
3_3_10	1202	981.15	920.75	894.74
3_4_1	1213	896.38	808.94	772.79
3_4_2	1210	951.02	879.98	849.04
3_4_3	686	495	470.76	465.31
3_4_4	920	728.61	666.85	639.31
3_4_5	1086	831.49	739.76	693.89
3_4_6	833	622.97	555.54	526.18
3_4_7	1885	1412.63	1271.98	1209.12
3_4_8	1634	1114.38	941.23	854.7
3_4_9	792	611.57	554.81	531.88
3_4_10	1512	1082.37	955.59	901.55
3_5_1	2148	1489.69	1271.7	1158.93
3_5_2	1515	1035.11	886.65	818.14
3_5_3	1744	1190.64	1001.56	910.72
3_5_4	1325	892.27	748.21	675.62
3_5_5	1770	1251.66	1128.19	1073.24
3_5_6	1953	1342.54	1174.18	1114.82
3_5_7	1244	884.53	778.17	727.23
3_5_8	2256	1675.08	1491.59	1412.51
3_5_9	1277	921.67	808.39	753.78
3_5_10	640	449.6	387.63	357.73
3_6_1	1459	974.03	825.72	753.72
3_6_2	1756	1184.41	993.02	915.23
3_6_3	966	716.14	636.67	600.51
3_6_4	1590	1089.87	927.98	843.58
3_6_5	1516	1070.02	925.67	853.74
3_6_6	1346	901.4	763.4	694.81
3_6_7	2003	1308.52	1095.55	989.2
3_6_8	1169	803.38	685.52	625.91
3_6_9	1885	1285.34	1081.89	989.45
3_6_10	1415	983.52	833.81	764.21

(F) INTERMINGLING SUBLOTS PERMITTED; J = 3 AND M = {7, 8, 9, 10}

Instance		Number of sublots		
3_7_1	1730	1196.96	999.83	899.28
3_7_2	1989	1233.87	993.9	888.42
3_7_3	919	635.77	546.17	505.62
3_7_4	2145	1415.86	1187.77	1077.98
3_7_5	1524	1046.44	888.26	808.77
3_7_6	1029	693.08	582.07	526.29
3_7_7	2222	1419.97	1152.69	1019.09
3_7_8	1972	1364.78	1172.42	1079.66
3_7_9	1130	764.02	642.96	588.16
3_7_10	1518	970.44	810.68	751.17
3_8_1	1962	1190.82	945.43	822.84
3_8_2	2003	1274.17	1027.31	905.64
3_8_3	1670	1031	819.18	713.06
3_8_4	2610	1692.11	1386.23	1240.26
3_8_5	1154	700.6	562.08	497.47
3_8_6	2057	1297.82	1044.9	918.54
3_8_7	2360	1576.63	1311.92	1178.54
3_8_8	2170	1310.77	1106.95	1029.69
3_8_9	2110	1449.55	1243.06	1143.97
3_8_10	1571	1048.5	866.32	784
3_9_1	1363	887.72	725.36	699.06
3_9_2	1184	759.17	614.74	542.68
3_9_3	2239	1465.72	1202.65	1074.49
3_9_4	1602	1013.8	824.98	730.04
3_9_5	2772	1692	1335.23	1165.02
3_9_6	1276	829.98	687.86	620.6
3_9_7	2209	1548.39	1322.92	1201.34
3_9_8	2053	1242.35	991.18	871.11
3_9_9	2161	1317.55	1045.38	908.45
3_9_10	2320	1420.93	1112.43	962.84
3_10_1	3087	1916.54	1570.87	1408.19
3_10_2	1864	1125.92	909.03	796.77
3_10_3	2325	1412.87	1100.29	959.9
3_10_4	2865	1806.4	1457.62	1281.24
3_10_5	2540	1621.28	1306.11	1145.8
3_10_6	3288	1919.44	1460.06	1232.45
3_10_7	2218	1413.33	1141.84	1013.7
3_10_8	2500	1613.81	1314.8	1179.46
3_10_9	1419	830.54	651.45	566.29
3_10_10	2303	1433.23	1142.21	995.99

(G) INTERMINGLING SUBLOTS **NOT** PERMITTED; J = 3 AND M = {3, 4, 5, 6}

Instance	**Number of sublots**			
	1	**2**	**3**	**4**
3_3_1	636	549.6	522.32	509.72
3_3_2	537	459.67	437.57	428.73
3_3_3	1102	782.58	749.02	744.12
3_3_4	769	620.2	573.21	551.52
3_3_5	976	842	812.77	801.92
3_3_6	949	838.85	822.41	817.89
3_3_7	713	606.06	577.3	568.24
3_3_8	1039	899	859.88	844.18
3_3_9	640	576	564.3	561.21
3_3_10	1202	993.42	929.35	901.63
3_4_1	1213	939.17	837.86	790.34
3_4_2	1210	995.89	942.72	913.04
3_4_3	686	496.94	470.99	465.31
3_4_4	920	736.14	685.54	658.05
3_4_5	1086	914.36	854	820.28
3_4_6	833	641.49	580.34	550.96
3_4_7	1885	1479.26	1368.95	1306.46
3_4_8	1634	1114.38	941.23	856.16
3_4_9	792	648.31	598.23	566.19
3_4_10	1512	1183.27	1069.52	1006.86
3_5_1	2148	1558.09	1350	1250.04
3_5_2	1515	1093.72	953.38	883.27
3_5_3	1744	1236.19	1056.6	959.89
3_5_4	1325	892.27	750.18	709.79
3_5_5	1770	1297.05	1152.33	1096.12
3_5_6	1953	1375	1199.28	1136.47
3_5_7	1244	884.53	778.17	727.23
3_5_8	2256	1770.67	1609.18	1528.66
3_5_9	1277	1053.11	957.03	910.74
3_5_10	640	453.9	406.21	379.5
3_6_1	1459	974.03	825.72	753.89
3_6_2	1756	1202.69	1006.41	942.81
3_6_3	966	736.21	663.97	628.57
3_6_4	1590	1089.87	948.44	880.33
3_6_5	1516	1081.33	946.7	881.13
3_6_6	1346	937.79	809.18	740.93
3_6_7	2003	1342	1114.98	1020.53
3_6_8	1169	815	700.48	644
3_6_9	1885	1303.39	1109.83	1027.86
3_6_10	1415	991.76	851.91	781.93

(H) INTERMINGLING SUBLOTS **NOT** PERMITTED; J = 3 AND M = {7, 8, 9, 10}

Instance	**Number of sublots**			
	1	**2**	**3**	**4**
3_7_1	1730	1247.12	1123.63	1055.5
3_7_2	1989	1285.68	1067.73	965
3_7_3	919	657.79	564.56	522.06
3_7_4	2145	1578.45	1357.83	1240.49
3_7_5	1524	1058.5	903.33	825.75
3_7_6	1029	727.79	634.89	600.63
3_7_7	2222	1419.97	1152.69	1019.09
3_7_8	1972	1385.28	1229.77	1155.36
3_7_9	1130	769.55	648.21	597.61
3_7_10	1518	971.32	837.6	775.53
3_8_1	1962	1213.61	969.18	846.3
3_8_2	2003	1329.74	1107.61	983.32
3_8_3	1670	1053.75	843.72	740.66
3_8_4	2610	1692.11	1386.23	1249.93
3_8_5	1154	725.02	624	572.12
3_8_6	2057	1297.82	1044.9	918.54
3_8_7	2360	1733.11	1444.68	1330.37
3_8_8	2170	1357.54	1135.74	1049.18
3_8_9	2110	1524.46	1321.16	1213.83
3_8_10	1571	1065.23	897.82	817.77
3_9_1	1363	914.62	777.55	710.94
3_9_2	1184	764.8	623.6	551.49
3_9_3	2239	1505.59	1277.84	1165.75
3_9_4	1602	1066.55	889.21	807.66
3_9_5	2772	1692	1339.43	1192.02
3_9_6	1276	849.5	710.24	640.01
3_9_7	2209	1593.4	1376.6	1276.72
3_9_8	2053	1254.43	1030.4	922.79
3_9_9	2161	1330.03	1053.43	914.26
3_9_10	2320	1423.03	1126	991.45
3_10_1	3087	1925.29	1583.03	1428.63
3_10_2	1864	1178.84	974.04	870.71
3_10_3	2325	1417.5	1115.14	964.06
3_10_4	2865	1831.39	1485.03	1314.35
3_10_5	2540	1653.59	1386.75	1267.72
3_10_6	3288	1939.6	1460.7	1265.08
3_10_7	2218	1440.83	1204.61	1091.59
3_10_8	2500	1613.81	1330.72	1214.31
3_10_9	1419	840.4	679.8	599.42
3_10_10	2303	1445.98	1153.09	1008.12