DATASETS AND BENCHMARKS FOR SOLVING RICH VRP, CASE STUDY: PT. PELNI INDONESIA

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Abstract The effectiveness of such transportation system depends on the suitability of routes for various types of vehicle available and it studies in vehicle routing problem. This research focuses to solve problem in the ship routing problem and owned by government. There are two important things in the public transportation owned by government i.e. accessibility and profitability. The goal of increasing profit will contradict with the aim of the accessibility. To overcome these problems an operation strategy required in order to minimize conflicts of interest between accessibility and profitability. Problem solving in this research is divided into two steps, first steps is how to generate feasible route combination that meets all requirement, and the second step is how to determine the route combination in the first step has an optimal value. In the first step partitioning heuristic is used while hybrid genetic algorithm (hGA) was used in the second step. Result shows that the route produced by hGA can be effectively used for solving ship routing problem and especially VRP with a large number of customers, depots and vehicle.

Keywords: VRP; hybrid GA; multi-depot; heterogeneous; site dependent; asymmetric

This paper contains data sets and benchmark used in the research about Rich Vehicle Routing Problem. This research was supported in part by the University of Malaya under Grant RG078-ICT 2011.

Let,

benchmark 40c-9d-8k (B.1), then B.1 consists of 8 ships (8k) and serves 49 ports (40 + 9) with 9 fuel port (9k). List of the ships used and its specification shown in Appendix B.

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Appendix A - Ports and Routes

- A.1 Ports Code
- A.2 Ships
- A.3 Sea Depth
- A.4 Distance between Ports
- A.5 Number of Passenger on Board between Ports

Appendix B - Benchmarks

- B.1 40c-9d-8k
- B.2 28c-9d-9k
- B.3 45c-11d-11k
- B.4 32c-4d-8k
- B.5 34c-11d-11k
- B.6 63c-14d-11k
- B.7 18c-6d-8k
- B.8 28c-6d-11k
- B.9 12c-4d-8k
- B.10 53c-12d-11k
- B.11 24c-5d-10k

Appendix C - Routes

- C.1 Existing Routes (PT. PELNI in 2010)
- C.2 Routes Generated by PELNI Method

Appendix A - Ports and Routes

A.1 Ports Code

Costumer Ports	
Ports	Code
Agats	c1
Banda	c2
Banggai	c3
Batam	c4
Batulicin	c5
Bau-Bau	c6
Biak	c7
Bima	c8
Bliny	c9
Bula	c10
Dobo	c11
Ende	c12
Fak-Fak	c13
Geser	c14
Gorontalo	c15
GunungSitol	c16
Ilwaki	c17
Jayapura	c18
Kaimana	c19
Kalabahi	c20
Karatung	c21
Kendari	c22
Kijang	c23
Kisar	c24
Kolonedale	c25
Kumai	c26
Labuanbajo	c27
Larantuka	c28
Lembar	c29
Leti	c30
Letung	c31
Lirung	c32
Loweleba	c33
Luwuk	c34
Manokwari	c35
Marapokot	c36

Costumer Ports	
Ports	Code
Maumere	c37
Merauke	c38
Miangas	c39
Midai	c40
Nabire	c41
Namlea	c42
Namrole	c43
Natuna	c44
Nunukan	c45
Padang	c46
Pantoloan	c47
Pare-Pare	c48
Poso	c49
Raha	c50
Samarinda	c51
Sampit	c52
Sanana	c53
Saumlaki	c54
Serasan	c55
Serui	c56
Sibolga	c57
Sorong	c58
Tahuna	c59
Tanjung Balai	c60
Tanjung Pandan	c61
Tarakan	c62
Tarempa	c63
Tepa	c64
Timika	c65
Toli-Toli	c66
Tongkahu	c67
Tual	c68
Ulusiau	c69
Waingapu	c70
Wanci	c71
Wasior	c72

Fuel Ports	
Ports	Code
Ambon	d1
Balikpapan	d2
Belawan	d3
Benoa	d4
Bitung	d5
Kupang	d6
Makassar	d7
Pontianak	d8
Semarang	d9
Surabaya	d10
Tanjung Priok	d11
Ternate	d12

A.2 Ships

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k1	1,312	2,176	11	4.2	45.68	336	360300	2
k2	1,325	2,176	12	4.2	51.67	336	360200	2
k3	1518	2176	13	4.2	49.85	336	360200	2
k4	2513	8700	16	5.9	94.78	336	1100360	2
k5	2612	8700	17	5.9	118.96	336	853230	2
k6	2602	8700	17	5.9	111.71	336	1047900	2
k7	3,204	11,587	17	5.9	136.58	336	853230	2
k8	1,583	8,160	18	5.9	108.69	336	1048100	2
k9	1198	2176	10	4.2	56.82	336	327940	2
k10	2404	11587	18	5.9	127.51	336	853230	2
k11	2126	8500	16	5.9	117.02	336	1048100	2
k12	3018	11421	19	5.9	140.24	336	853230	2
k13	2513	8700	16.5	5.9	121.07	336	1100360	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k15	1325	2176	11	4.2	45.65	336	360300	2
k16	3410	11587	18	5.9	143.40	336	853230	2
k17	594	1632	9	4.2	42.12	336	130600	2
k18	593	1632	10	4.2	32.18	336	130600	2
k19	2402	11587	19	5.9	129.60	336	853230	2
k20	1312	2176	11	4.2	51.76	336	360300	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k22	2554	8700	17	5.7	102.72	336	1047900	2
k23	1518	2176	11	4.2	47.94	336	360200	2
k24	1518	8500	16	5.9	116.38	336	1048100	2
k25	595	1632	10	4.2	38.08	336	130600	2

A.3 Sea Depth

Customer Ports	
Ports	Code
c1	10
c2	10
c3	10
c4	10
c5	10
c6	7
c7	12
c8	12
c9	12
c10	10
c11	10
c12	10
c13	10
c14	10
c15	10
c16	10
c17	10
c18	10
c19	11
c20	10
c21	50
c22	8
c23	10
c24	10
c25	9
c26	6
c27	10
c28	10
c29	6
c30	10
c31	10
c32	6.2
c33	10
c34	10
c35	10
c36	10

Customer Ports	
Ports	Code
c37	45
c38	25
c39	10
c40	10
c41	9
c42	6
c43	10
c44	10
c45	7
c46	6
c47	10
c48	10
c49	10
c50	10
c51	35
c52	7.5
c53	10
c54	10
c55	6
c56	6
c57	10
c58	10
c59	10
c60	4
c61	6
c62	11
c63	10
c64	10
c65	10
c66	20
c67	6
c68	10
c69	27
c70	10
c71	10
c72	10

Fuel Ports	
Ports	Code
d1	10
d2	10
d3	10
d4	20
d5	10
d6	10
d7	7
d8	13
d9	8
d10	10
d11	10
d12	10

A.4 Distance between Ports

PORT	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
c1	0	796	1380	2599	1576	1137	1027	1494	2419	625	292	1162	507	560
c2	796	0	782	1953	978	539	1469	1053	1788	135	278	642	173	70
c3	1380	782	0	1801	721	243	2469	694	1713	318	1088	525	471	517
c4	2599	1953	1801	0	1250	1668	1616	1380	242	2114	2350	1630	2267	2110
c5	1576	978	721	1250	0	478	1917	445	966	1034	1227	563	2215	1030
c6	1137	539	243	1668	478	0	1112	453	1366	595	845	282	788	591
c7	1027	1469	2469	1616	1917	1112	0	1264	2496	893	734	1160	696	796
c8	1494	1053	694	1380	445	453	1264	0	1127	1009	939	213	919	1005
c9	2419	1788	1713	242	966	1366	2496	1127	0	1934	2186	1347	2280	1930
c10	625	135	318	2114	1034	595	893	1009	1934	0	301	717	153	65
c11	292	278	1088	2350	1227	845	734	939	2186	301	0	820	212	236
c12	1162	642	525	1630	563	282	1160	213	1347	717	820	0	2244	713
c13	507	173	471	2267	2215	788	696	919	2280	153	212	2244	0	119
c14	560	70	517	2110	1030	591	796	1005	1930	65	236	713	119	0
c15	1390	790	210	2243	1163	410	975	863	2063	657	1098	692	949	727
c16	2932	2297	2097	1318	1846	1171	4414	1705	1163	2390	2603	1906	2505	2386
c17	920	400	514	1737	657	271	1330	374	1309	556	628	382	653	534
c18	1337	1432	2330	3107	1893	2349	310	1572	2630	1003	1212	774	850	969
c19	325	262	751	2397	1317	878	746	1292	2039	299	145	2062	182	234
c20	1893	1079	1085	1960	834	842	1763	366	1474	587	1341	410	660	541
c21	1527	329	623	2322	1250	1050	1112	1217	2142	779	1513	1332	1086	834
c22	1366	556	203	1787	707	113	870	682	1607	447	714	404	607	443
c23	2626	1971	1771	45	1520	1528	2601	1399	174	2084	2277	1600	2185	2080
c24	856	336	455	1815	735	212	1266	452	1557	535	564	306	589	470
c25	1532	934	142	1975	895	301	1507	870	1795	588	1240	683	1217	525
c26	2088	1267	1233	1022	351	796	2271	763	721	1546	1619	926	1432	1542
c27	1551	925	696	1512	445	294	1996	83	1229	776	404	118	1100	776
c28	1683	753	828	1657	577	177	1389	294	1399	599	924	302	2312	595
c29	1753	1155	898	1233	647	688	1383	202	1053	1081	116	303	1086	1207
c30	766	286	512	1872	792	269	1219	509	1654	488	499	363	542	423
c31	2786	2131	1931	165	1680	1688	3070	1559	334	2244	2437	1860	2359	2240
c32	1462	864	558	2257	1185	985	1047	1152	2077	714	870	1367	1021	832
c33	1730	720	875	1704	624	250	1705	314	1429	611	894	272	709	590
c34	1468	870	153	1985	905	325	1336	757	1616	540	1176	883	1027	670
c35	927	697	1215	2403	1323	1889	140	1173	2398	604	643	1069	451	570
c36	1121	601	513	1609	542	270	1623	180	1326	700	829	240	815	696
c37	1633	519	431	1607	527	188	1793	162	1342	618	747	322	730	611
c38	380	1942	1760	2859	1899	1517	3678	1874	2679	1005	672	1246	1717	940
c39	1587	989	683	2382	1310	1110	1172	1277	2202	839	1573	1492	1146	957
c40	2636	1981	1781	392	1170	1538	3678	1349	540	2094	2287	1697	2209	2090
c41	1654	1247	2145	2922	1842	1117	146	2106	2466	1654	1619	1813	670	823
c42	811	213	296	1847	927	351	613	902	1882	329	519	869	370	265

PORT	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
c43	835	237	305	2031	951	512	810	916	1851	293	543	634	394	289
c44	2683	2026	1828	345	1217	1585	3218	1396	583	2141	2339	1744	2256	2137
c45	2152	1339	1173	1950	870	876	1819	845	1760	1128	1862	1265	1435	1246
c46	2531	1933	1853	1094	1302	1610	2439	1349	929	2247	2212	1538	2138	2162
c47	1972	1032	866	1643	563	571	1235	508	1277	946	1252	666	1031	1064
c48	1412	832	2378	1443	261	371	1312	338	1377	905	1120	583	1025	920
c49	1574	976	394	2427	1347	637	1159	1090	2247	1032	1282	876	1133	911
c50	1178	580	386	1599	519	41	1153	494	1434	636	886	323	829	632
c51	1619	1021	853	1650	233	578	1444	545	1470	1111	1327	793	1418	1130
c52	1769	1189	1091	1001	294	1769	2029	696	836	728	1451	1611	1364	943
c53	921	416	220	2117	1037	598	896	1021	1937	196	629	720	480	375
c54	608	300	1034	2212	1230	791	832	792	2047	435	240	617	340	370
c55	2484	1886	1686	487	870	1443	3707	1254	120	2060	2192	515	2100	1955
c56	1147	729	2045	2822	1742	1222	120	2006	2366	668	979	1713	515	916
c57	2863	2145	2195	2065	1514	1822	4314	1693	1133	2439	2451	1941	2479	2374
c58	707	316	1675	2452	1372	886	320	954	2003	353	912	850	200	418
c59	1363	765	459	2158	1078	600	948	1053	1978	615	1393	1049	922	733
c60	2524	1926	1846	45	1295	1789	3043	1612	1106	2220	2232	1722	2260	2155
c61	2155	1557	1477	741	926	1234	2511	1105	153	1851	1863	1353	1891	1786
c62	1449	1290	1124	1901	821	829	1259	770	1898	1790	1273	928	1078	1955
c63	2556	2065	1985	215	1434	1742	3218	1613	999	2332	2371	1861	2399	2294
c64	612	306	519	1955	919	396	1313	636	1781	420	446	490	573	355
c65	110	752	1270	2617	1409	1685	848	1559	2873	574	182	1002	421	449
c66	1813	1215	529	1745	786	794	1120	761	1686	989	1521	1009	1094	905
c67	752	884	310	2335	1255	719	1067	1172	2155	940	1190	784	1041	819
c68	401	197	979	2240	1118	640	1330	1009	2078	282	109	98	170	217
c69	1303	705	399	2098	1018	826	6188	993	1918	555	1289	989	862	673
c70	1784	1186	1192	1579	949	552	1240	150	1399	998	900	98	854	890
c71	1223	357	329	1644	564	86	1198	539	1464	366	931	374	530	427
c72	1047	656	2015	2792	1712	1226	150	1294	2343	693	1252	1190	540	690
d1	730	132	200	1926	846	407	705	821	1746	188	438	529	289	184
d2	1659	1061	861	1402	610	618	1694	710	1222	1238	1367	958	1278	1173
d3	2988	2390	2190	389	1639	1947	3020	1818	593	2564	2696	2066	2604	2499
d4	1744	1146	946	1179	595	703	1776	250	999	1320	1452	498	1360	1255
d5	1496	898	212	2013	941	455	803	908	1833	470	1204	904	777	672
d6	1340	742	748	1823	705	405	1731	479	1643	1075	948	146	1115	1010
d7	1284	686	486	1315	235	243	1223	210	1135	860	992	458	900	795
d8	2303	1705	1505	327	682	1262	2247	1073	260	1879	2011	1321	1919	1814
d9	1875	1277	1077	757	446	834	1319	645	577	1451	1583	893	1491	1386
d10	1792	1144	944	917	333	701	1636	512	737	1318	1450	760	1358	1253
d11	1958	1360	1280	521	729	1037	2022	908	341	1654	1666	1156	1694	1589
d12	1065	467	365	2166	1094	608	666	1561	1833	411	773	868	624	519

PORT	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28
c1	1390	2932	920	1337	325	1893	1527	1366	2626	856	1532	2088	1551	1683
c2	790	2297	400	1432	262	1079	329	556	1971	336	934	1267	925	753
c3	210	2097	514	2330	751	1085	623	203	1771	455	142	1233	696	828
c4	2243	1318	1737	3107	2397	1960	2322	1787	45	1815	1975	1022	1512	1657
c5	1163	1846	657	1893	1317	834	1250	707	1520	735	895	351	445	577
c6	410	1171	271	2349	878	842	1050	113	1528	212	301	796	294	177
c7	975	4414	1330	310	746	1763	1112	870	2601	1266	1507	2271	1996	1389
c8	863	1705	374	1572	1292	366	1217	682	1399	452	870	763	63	294
c9	2063	1163	1309	2630	2039	1474	2142	1607	174	1557	1795	721	1229	1399
c10	657	2390	556	1003	299	587	779	447	2084	535	588	1546	776	599
c11	1098	2603	628	1212	145	1341	1513	714	2277	564	1240	1619	404	924
c12	692	1906	382	774	2062	410	1332	404	1600	306	683	926	118	302
c13	949	2505	653	850	182	660	1086	607	2185	589	1217	1432	1100	2312
c14	727	2386	534	969	234	541	834	443	2080	470	525	1542	776	595
c15	0	1725	681	1405	961	1527	381	413	1915	622	352	1206	900	1270
c16	1725	0	2013	4709	1959	2236	2598	2083	1288	2091	2271	1172	1788	1933
c17	681	2013	0	1503	662	60	1321	384	1707	64	572	1137	349	80
c18	1405	4709	1503	0	1032	2298	1542	1771	3031	1439	1673	2246	1868	2088
c19	961	1959	662	1032	0	775	1268	677	2367	654	1859	168	394	352
c20	1527	2236	60	2298	775	0	1586	1071	1930	85	2201	1129	533	108
c21	381	2598	1321	1542	1268	1586	0	835	2272	1262	749	1747	1217	1329
c22	413	2083	384	1771	677	1071	835	0	1757	325	188	1060	682	814
c23	1915	1288	1707	3031	2367	1930	2272	1757	0	1785	2090	992	1482	1627
c24	622	2091	64	1439	654	85	1262	325	1785	0	513	902	362	158
c25	352	2271	572	1673	1859	2201	749	188	2090	513	0	834	733	744
c26	1206	1172	1137	2246	168	1129	1747	1060	992	902	834	0	798	930
c27	900	1788	349	1868	394	533	1217	682	1482	362	733	798	0	269
c28	1270	1933	80	2088	352	108	1329	814	1627	158	744	930	269	0
c29	1008	1509	576	1691	1438	549	1419	627	1203	654	1072	605	285	581
c30	679	2148	165	1392	577	142	1319	382	1842	57	570	959	419	215
c31	2075	1448	1867	7191	2233	2090	2452	1917	160	2011	254	856	1642	1847
c32	416	2533	1256	1477	1203	1541	65	770	2227	1197	684	1682	1152	1284
c33	1028	1967	150	2118	824	138	1396	262	1674	94	551	977	276	47
c34	142	2261	596	1658	420	1269	559	212	1955	537	126	1100	768	295
c35	835	2679	1099	436	562	1728	972	779	2373	1040	1131	2441	1867	1430
c36	680	1885	324	1704	930	351	1314	383	1579	265	571	895	97	108
c37	598	1943	242	1950	845	159	1299	301	1777	183	489	849	155	81
c38	1770	3135	999	2567	3973	2057	2185	1746	2829	940	2316	2252	1874	2006
c39	541	2658	1381	1146	1328	1646	60	895	2352	1322	809	1807	1257	1389
c40	2223	2007	1860	3973	2324	1880	2302	1767	387	1801	1955	1008	1432	1637
c41	789	4524	1062	395	1329	1330	1199	1232	2600	1259	1330	763	1531	1121
c42	326	2283	627	2401	499	1244	716	717	1977	563	253	1691	902	1034

PORT	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28
c43	574	2367	493	1240	576	504	755	364	2001	399	907	1304	693	516
c44	2270	2110	1907	1246	865	1974	2349	1814	340	1848	2002	688	1068	1196
c45	830	2991	1872	2117	1615	1056	967	1279	3087	1950	1158	975	856	977
c46	2162	224	2886	2743	2449	2012	2374	1679	1064	1807	5047	936	1564	1709
c47	648	3245	884	1543	1308	748	1135	719	2780	962	851	1110	549	670
c48	998	1826	617	222	1108	727	665	600	1299	695	651	1021	349	470
c49	184	2703	865	1589	1145	1711	565	597	2397	806	536	1390	1322	1709
c50	369	1212	312	1583	919	883	805	72	1569	253	386	837	494	1454
c51	813	1946	814	1874	1752	694	950	807	1620	905	995	575	545	626
c52	1280	1287	1413	2901	1533	973	1472	957	643	1055	1076	192	774	895
c53	525	2393	579	944	662	1354	662	827	2087	485	993	1390	1012	1144
c54	1044	2606	440	1140	391	461	1181	585	2180	376	1092	1622	900	725
c55	2128	1405	1659	698	2282	1785	2207	1672	306	1635	1860	546	1377	1542
c56	1095	4424	1450	310	698	1927	1232	1461	3959	1386	1281	2591	2017	1026
c57	2507	103	2098	4609	2661	2224	2586	2051	1278	2019	2239	1142	1776	1921
c58	615	4054	909	637	338	1557	752	981	3588	888	911	2231	1078	1256
c59	317	2434	871	1375	1104	1442	164	671	2128	812	585	1133	1053	1185
c60	2288	1363	1879	2338	2442	2005	2367	1832	55	1800	2090	1117	2253	1702
c61	1919	1047	1510	2806	2073	1636	1998	1463	318	1931	1651	565	1201	1333
c62	739	3503	1255	1800	1526	1362	876	892	3038	1333	1109	931	807	928
c63	2427	1502	2018	3513	2581	2144	2506	1971	210	1939	159	1008	1696	1667
c64	806	2275	292	1423	518	269	1446	509	1569	184	697	1086	546	342
c65	1558	2645	810	1342	215	1567	1695	1256	2339	746	1996	1763	1384	2142
c66	489	2162	1043	1550	1276	1150	626	1023	1836	1121	757	1139	761	893
c67	92	2611	773	1497	1053	1619	473	505	2305	714	704	1298	1230	1362
c68	1267	2354	647	1464	150	682	1404	753	2168	376	1431	1440	959	794
c69	257	2374	811	1318	1044	1382	224	611	2068	722	525	1371	993	1125
c70	1328	835	452	1548	861	274	1596	484	2118	394	1969	1567	1014	474
c71	496	1920	337	1628	619	928	850	127	1614	188	315	882	380	671
c72	955	4394	1219	977	678	1897	1092	1321	3928	1160	1251	2571	1417	1596
d1	469	2202	762	1135	471	399	650	259	1896	294	802	1199	588	411
d2	836	1678	1101	2124	1460	974	973	847	1372	845	1035	774	585	717
d3	2632	1707	2430	3450	2786	2303	2712	2176	419	2144	2364	1420	1901	2046
d4	1388	1455	908	2206	1542	781	1467	932	1149	791	1120	551	333	764
d5	172	2289	1259	1233	959	887	309	526	1983	667	440	1286	908	943
d6	1190	2099	264	2161	1497	137	1469	934	1793	259	1122	1195	396	120
d7	928	1611	1290	1658	1082	359	987	472	1285	470	660	588	210	342
d8	1947	1224	1731	2677	2101	1604	2026	1491	663	1328	1679	384	1156	1361
d9	1519	1033	1303	2249	1673	1176	1598	1063	282	1026	1251	265	728	933
d10	1386	1193	1170	2116	1540	1043	1465	930	887	893	1118	289	595	800
d11	1722	797	1566	2452	1876	1439	1801	1266	491	1234	1454	501	991	1136
d12	325	2442	1097	1096	806	734	315	679	2136	629	467	1439	1061	746

PORT	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42
c1	1753	766	2786	1462	1730	1468	927	1121	1633	380	1587	2636	1654	811
c2	1155	286	2131	864	720	870	697	601	519	1942	989	1981	1247	213
c3	898	512	1931	558	875	153	1215	513	431	1760	683	1781	2145	296
c4	1233	1872	165	2257	1704	1985	2403	1609	1607	2859	2382	392	2922	1847
c5	647	792	1680	1185	624	905	1323	542	527	1899	1310	1170	1842	927
c6	688	269	1688	985	250	325	1889	270	188	1517	1110	1538	1117	351
c7	1383	1219	3070	1047	1705	1336	140	1623	1793	3678	1172	3678	146	613
c8	202	509	1559	1152	314	757	1173	1800	162	1874	1277	1349	2106	902
c9	1053	1654	334	2077	1429	1616	2398	1326	1342	2679	2202	540	2466	1882
c10	1081	488	2244	714	611	540	604	700	618	1005	839	2094	1654	329
c11	116	499	2437	870	894	1176	643	829	747	672	1573	2287	1619	519
c12	303	363	1860	1367	272	883	1069	240	322	1246	1492	1697	1813	869
c13	1086	542	2359	1021	709	1027	451	815	730	1717	1146	2209	670	370
c14	1207	423	2240	832	590	670	570	696	611	940	957	2090	823	265
c15	1008	679	2075	416	1028	142	835	680	598	1770	541	2223	789	326
c16	1506	2148	1448	2533	1967	2261	2679	1885	1943	3135	2658	2007	4524	2283
c17	576	165	1867	1256	150	596	1099	324	242	999	1381	1860	1062	627
c18	1691	1392	7191	1477	2118	1658	436	1704	1950	2567	1146	3973	395	2401
c19	1438	577	2233	1203	824	420	562	930	845	3973	1328	2324	1329	499
c20	549	142	2090	1541	138	1269	1728	351	159	2057	1646	1880	1330	1244
c21	1419	1319	2452	65	1396	559	972	1314	1299	2185	60	2302	1199	716
c22	627	382	1917	770	262	212	779	383	301	1746	895	1767	1232	717
c23	1203	1842	160	2227	1674	1955	2373	1579	1777	2829	2352	387	2600	1977
c24	654	57	2011	1197	94	537	1040	265	183	940	1322	1801	1259	563
c25	1072	570	254	684	551	126	1131	571	489	2316	809	1955	1330	253
c26	605	959	856	1682	977	1100	2441	895	849	2252	1807	1008	763	1691
c27	285	419	1642	1152	276	768	1867	97	155	1874	1257	1432	1531	902
c28	581	215	1847	1284	47	295	1430	108	81	2006	1389	1637	1121	1034
c29	0	711	1363	1354	531	842	1292	376	417	2076	1459	1153	202	1104
c30	711	0	2338	1108	151	494	941	599	201	907	1233	2128	1086	620
c31	1363	2338	0	2387	1894	2115	2621	1739	1998	3295	2512	227	2766	2039
c32	1354	1108	2387	0	1155	494	907	1244	1134	2120	125	2237	1134	651
c33	531	151	1894	1155	0	575	986	155	97	1058	1280	1684	1133	601
c34	842	494	2115	494	575	0	1196	595	513	2126	619	1965	1446	657
c35	1292	941	2621	907	986	1196	0	1077	1653	2181	1374	3538	145	1966
c36	376	599	1739	1244	155	595	1077	0	82	1306	1369	1529	1222	620
c37	417	201	1998	1134	97	513	1653	82	0	3536	1199	1587	1903	539
c38	2076	907	3295	2120	1058	2126	2181	1306	3536	0	2245	2959	1294	1191
c39	1459	1233	2512	125	1280	619	1374	1369	1199	2245	0	2302	1259	776
c40	1153	2128	227	2237	1684	1965	3538	1529	1587	2959	2302	0	3788	1987
c41	202	1086	2766	1134	1133	1446	145	1222	1903	1294	1259	3788	0	2216
c42	1104	620	2039	651	601	657	1966	621	539	1191	776	1987	2216	0

PORT	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42
c43	998	481	2161	690	528	457	670	617	535	1215	815	2011	815	186
c44	1142	1835	180	2284	1731	2012	2430	1576	1674	3006	2409	47	2657	2034
c45	930	1434	1908	902	1196	1182	1713	1114	931	1981	1027	2616	1951	1244
c46	1207	2260	1224	2309	1756	2057	2344	1661	1659	2609	2434	1276	3662	2079
c47	568	1019	1493	720	781	876	1144	699	624	1649	845	2508	1644	937
c48	423	755	1229	1070	517	676	1206	435	360	1474	1195	1942	1444	737
c49	1524	906	2325	600	887	326	1019	907	825	1954	725	2175	1246	763
c50	696	310	1729	740	291	386	1930	311	229	1558	865	1579	2180	529
c51	747	962	1436	1277	724	1005	1423	642	627	1999	1402	1630	1656	1027
c52	848	1112	752	1427	874	1032	1573	792	777	2149	1811	746	1806	1177
c53	1214	567	2247	697	614	1023	726	703	621	1301	722	2097	1053	110
c54	970	257	2595	1116	408	1466	741	856	458	683	1241	2385	1499	298
c55	1058	1712	212	2142	1589	1870	3567	1434	1140	2864	2267	95	3817	1892
c56	2091	1025	2149	1167	1248	1346	150	1885	1803	1140	1292	3688	100	2116
c57	1497	2472	1436	2521	1968	2249	4174	1873	1871	3123	2646	1688	4424	2271
c58	1075	585	2169	687	768	976	220	1515	1433	820	812	3318	390	298
c59	1255	869	2288	99	1056	395	808	1145	975	2021	224	2138	1035	591
c60	1410	1913	210	2302	1749	2218	2903	1654	1652	2904	2427	437	3153	2052
c61	909	1544	517	1933	1440	1661	2371	1298	1380	2535	2058	506	2621	1683
c62	1393	1098	1716	811	1152	1133	1168	904	986	1694	936	2767	1902	1196
c63	1183	1965	50	2414	1714	1995	3078	1559	1617	2989	2539	177	3328	2017
c64	838	127	1579	1002	278	721	885	449	367	712	1371	1573	1030	401
c65	1586	628	2122	1630	1043	1210	703	1387	1205	380	1755	2469	842	701
c66	692	1063	1671	561	940	567	980	858	940	2193	686	1665	1223	724
c67	1432	909	2321	508	969	234	927	1133	1051	1862	633	2315	1170	671
c68	1211	3337	515	1339	470	1557	1190	862	780	562	1464	2178	1440	410
c69	1195	949	2228	159	996	335	748	1085	915	1957	284	2078	975	488
c70	320	301	1420	1302	268	1762	1149	1090	266	1266	1427	302	174	1224
c71	741	355	1630	785	336	513	1058	283	254	1603	910	1624	892	574
c72	1415	985	2509	1027	1108	1316	120	1855	1773	1160	1152	3658	127	638
d1	1023	376	2056	585	423	352	565	512	430	1110	710	1906	710	81
d2	801	1222	1532	908	764	914	1554	682	667	2039	1442	1319	1699	1070
d3	1622	2551	579	2647	2093	2374	2880	1998	1996	3368	2772	806	3025	2396
d4	54	1029	1309	1402	609	1130	1636	430	512	2124	1527	1099	1781	1152
d5	1110	864	2143	244	911	250	663	1005	830	1876	369	1993	890	407
d6	681	385	1553	1404	120	1132	1591	299	217	1920	1529	1743	1315	1107
d7	412	627	1101	942	389	670	1088	307	292	1664	1047	1295	1321	692
d8	877	2271	282	1961	1408	1689	2107	1253	1131	2683	2086	276	2334	1711
d9	449	1424	887	1533	980	1261	1679	825	883	2255	1658	743	1906	1283
d10	316	951	1047	1400	847	1128	1546	692	750	2122	1525	837	1773	1150
d11	712	1687	651	1736	1183	1464	1882	1088	1086	2338	1861	703	2109	1486
d12	1358	716	2143	250	758	403	526	847	765	1445	375	2146	753	254

PORT	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56
c1	835	2683	2152	2531	1972	1412	1574	1178	1619	1769	921	608	2484	1147
c2	237	2026	1339	1933	1032	832	976	580	1021	1189	416	300	1886	729
c3	305	1828	1173	1853	866	2378	394	386	853	1091	220	1034	1686	2045
c4	2031	345	1950	1094	1643	1443	2427	1599	1650	1001	2117	2212	487	2822
c5	951	1217	870	1302	563	261	1347	519	233	294	1037	1130	870	1742
c6	512	1585	876	1610	571	371	637	41	578	1769	598	791	1443	1222
c7	810	3218	1819	2439	1235	1312	1159	1153	1444	2029	896	832	3707	120
c8	916	1396	845	1349	508	338	1090	494	545	696	1021	792	1254	2006
c9	1851	583	1760	929	1277	1377	2247	1434	1470	836	1937	2047	120	2366
c10	293	2141	1128	2247	946	905	1032	636	1111	728	196	435	2060	668
c11	543	2339	1862	2212	1252	1120	1282	886	1327	1451	629	240	2192	979
c12	634	1744	1265	1538	666	583	876	323	793	1611	720	617	515	1713
c13	394	2256	1435	2138	1031	1025	1133	829	1418	1364	480	340	2100	515
c14	289	2137	1246	2162	1064	920	911	623	1130	943	375	370	1955	916
c15	574	2270	830	2162	648	998	184	369	813	1280	525	1044	2128	1095
c16	2367	210	2991	224	3245	1826	2703	1212	1946	1287	2393	2606	1405	4424
c17	493	1907	1872	2886	884	617	865	312	814	1413	579	440	1659	1450
c18	1240	1246	2117	2743	1543	222	1589	1583	1874	2901	944	1140	698	310
c19	576	865	1615	2449	1308	1108	1945	919	1752	1533	662	391	2282	698
c20	504	1974	1056	2012	748	727	1711	883	694	973	1354	461	1785	1927
c21	755	2349	967	2374	1135	665	565	805	950	1472	662	1181	2207	1232
c22	364	1814	1279	1679	719	600	597	72	807	957	827	585	1672	1461
c23	2001	340	3087	1064	2780	1299	2397	1569	1620	643	2087	2180	306	3959
c24	399	1848	1950	1807	962	695	806	253	905	1055	485	376	1635	1386
c25	907	2002	1158	5047	851	651	536	386	995	1076	993	1092	1860	1281
c26	1304	688	975	936	1110	1021	1390	837	575	192	1390	1622	546	2591
c27	693	1068	856	1564	549	349	1322	494	545	774	1012	900	1377	2017
c28	516	1196	977	1709	670	470	1709	1454	626	895	1144	725	1542	1026
c29	998	1142	930	1207	568	423	1524	696	747	848	1214	970	1058	2091
c30	481	1835	1434	2260	1019	755	906	310	962	1112	567	257	1712	1025
c31	2161	180	1908	1224	1493	1229	2325	1729	1436	752	2247	2595	212	2149
c32	690	2284	902	2309	720	1070	600	740	1277	1427	697	1116	2142	1167
c33	528	1731	1196	1756	781	517	887	291	724	874	614	408	1589	1248
c34	457	2012	1182	2057	876	676	326	386	1005	1032	1023	1466	1870	1346
c35	670	2430	1713	2344	1144	1206	1019	1930	1423	1573	726	741	3567	150
c36	617	1576	1114	1661	699	435	907	311	642	792	703	856	1434	1885
c37	535	1674	931	1659	624	360	825	229	627	777	621	458	1140	1803
c38	1215	3006	1981	2609	1649	1474	1954	1558	1999	2149	1301	683	2864	1140
c39	815	2409	1027	2434	845	1195	725	865	1402	1811	722	1241	2267	1292
c40	2011	47	2616	1276	2508	1942	2175	1579	1630	746	2097	2385	95	3688
c41	815	2657	1951	3662	1644	1444	1246	2180	1656	1806	1053	1499	3817	100
c42	186	2034	1244	2079	937	737	763	529	1027	1127	110	298	1892	2116

PORT	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56
c43	0	2394	1523	2083	1108	844	949	553	1051	1201	296	489	1916	930
c44	2394	0	1626	1323	1534	1270	2254	1426	1277	793	1944	2137	142	2490
c45	1523	1626	0	2690	323	532	1014	919	400	907	1011	1431	2845	1851
c46	2083	1323	2690	0	1443	1594	2499	1651	1702	1063	2189	2044	1181	3562
c47	1108	1534	323	1443	0	264	832	612	170	677	829	1684	2536	1544
c48	844	1270	532	1594	264	0	1182	412	293	666	930	924	1851	1344
c49	949	2254	1014	2499	832	1182	0	553	1815	1365	709	1228	2000	1279
c50	553	1426	919	1651	612	412	553	0	619	769	639	1080	1484	2080
c51	1051	1277	400	1702	170	293	1815	619	0	507	1137	1330	1535	1683
c52	1201	793	907	1063	677	666	1365	769	507	0	1287	1281	1310	2281
c53	296	1944	1011	2189	829	930	709	639	1137	1287	0	1225	2002	1073
c54	489	2137	1431	2044	1684	924	1228	1080	1330	1281	1225	0	2195	1309
c55	1916	142	2845	1181	2536	1851	2000	1484	1535	1310	2002	2195	0	3717
c56	930	2490	1851	3562	1544	1344	1279	2080	1683	2281	1073	1309	3717	0
c57	2295	1535	3452	212	3145	1798	2691	1863	1914	1267	2381	2574	1393	4324
c58	450	2010	1101	2127	927	996	799	1710	1203	1911	506	624	3347	360
c59	738	1985	803	2210	621	971	501	680	786	1587	537	1056	2043	1068
c60	2076	390	2181	1139	1874	1674	2426	1830	1695	1232	2162	2355	336	3053
c61	1707	553	1649	770	1342	1241	2103	1275	1326	700	1793	1986	411	2521
c62	1160	1905	91	1699	292	556	923	870	290	883	920	1202	2796	1802
c63	2188	130	2356	1274	2049	1664	2379	1783	1607	1123	2274	2320	194	3228
c64	425	1620	1561	2847	1146	882	1033	437	1084	1239	511	130	1820	1109
c65	725	2316	1815	2421	1528	1228	1742	1736	1509	1696	811	671	2374	918
c66	910	1693	274	1938	159	398	673	813	290	1036	670	1189	1570	1240
c67	857	2162	922	2407	740	1148	92	461	1355	1505	617	1136	2220	1187
c68	434	2025	1522	2270	1215	1016	1451	1171	1218	1372	520	207	2083	1340
c69	678	1925	743	2150	561	911	437	581	726	1527	434	953	1983	1008
c70	915	1366	1224	1447	604	797	1189	865	695	1759	1001	709	1769	1869
c71	287	1471	1136	1716	721	457	680	127	664	814	684	877	1529	1318
c72	796	2350	1441	2467	1267	1336	1139	2056	1543	2201	846	964	3687	700
d1	105	1953	1146	1978	964	739	844	448	946	1362	191	384	1811	825
d2	1094	1366	432	1454	188	250	1020	659	43	778	1180	1373	1224	1814
d3	2420	759	2511	1483	1154	1832	2816	1988	2039	1236	2506	2699	901	3140
d4	1176	1146	1181	1231	931	588	1572	744	795	555	1262	1455	1009	1896
d5	593	2040	658	2065	476	826	356	496	641	1442	353	872	1898	923
d6	1131	1790	1269	1875	1575	590	574	746	797	1199	1217	642	1648	1851
d7	716	1342	807	1387	392	128	1112	284	335	485	802	795	1200	1348
d8	1735	323	1478	1000	1234	1147	2131	1303	1354	470	1821	2014	181	2367
d9	1307	790	1050	809	806	719	1703	875	926	326	1393	1586	648	1939
d10	1174	884	917	969	669	514	1570	742	793	293	1260	1453	742	1806
d11	1510	750	1313	573	1065	922	1906	1078	1129	562	1596	1789	608	2142
d12	440	2193	952	2218	629	979	509	649	794	1602	200	719	2051	786

PORT	c57	c58	c59	c60	c61	c62	c63	c64	c65	c66	c67	c68	c69	c70
c1	2863	707	1363	2524	2155	1449	2556	612	110	1813	752	401	1303	1784
c2	2145	316	765	1926	1557	1290	2065	306	752	1215	884	197	705	1186
c3	2195	1675	459	2846	1477	1124	1945	519	1270	529	310	979	399	1192
c4	2065	2452	2158	45	741	1901	215	1955	2617	1745	2335	2240	2098	1579
c5	1514	1372	1078	1295	926	821	1434	919	1409	786	1255	1118	1018	949
c6	1822	886	600	1789	1234	829	1742	396	1685	794	719	640	826	552
c7	4314	320	948	3043	2511	1259	3218	1313	848	1120	1067	1330	6188	1240
c8	1693	954	1053	1612	1105	770	1613	636	1559	761	1172	1009	993	150
c9	1133	2003	1978	1106	153	1898	999	1781	2873	1686	2155	2078	1918	1399
c10	2439	353	615	2220	1851	1790	2332	420	574	989	940	282	555	998
c11	2451	912	1393	2232	1863	1273	2371	446	182	1521	1190	109	1289	900
c12	1941	850	1049	1722	1353	928	1861	490	1002	1009	784	98	989	98
c13	2479	200	922	2260	1891	1078	2399	573	421	1094	1041	170	862	854
c14	2374	418	733	2155	1786	1955	2294	355	449	905	819	217	673	890
c15	2507	615	317	2288	1919	739	2427	806	1558	489	92	1267	257	1328
c16	80	4054	2434	1363	1047	3503	1502	2275	2645	2162	2611	2354	2374	835
c17	2098	909	871	1879	1510	1255	2018	292	810	1043	773	647	811	452
c18	4609	637	1375	2338	2806	1800	3513	1423	1342	1550	1497	1464	1318	1548
c19	2661	338	1104	2442	2073	1526	2581	518	215	1276	1053	150	1044	861
c20	2224	1557	1442	2005	1636	1362	2144	269	1567	1150	1619	682	1382	274
c21	2586	752	164	2367	1998	876	2506	1446	1695	626	473	1404	224	1596
c22	2051	981	671	1832	1463	892	1971	509	1256	1023	505	753	611	484
c23	1278	3588	2128	55	318	3038	210	1569	2339	1836	2305	2168	2068	2118
c24	2019	888	812	1800	1931	1333	1939	184	746	1121	714	376	722	394
c25	2239	911	585	2090	1651	1109	159	697	1996	757	704	1431	525	1969
c26	1142	2231	1133	1117	565	931	1008	1086	1763	1139	1298	1440	1371	1567
c27	1776	1078	1053	2253	1201	807	1696	546	1384	761	1230	959	993	1014
c28	1921	1256	1185	1702	1333	928	1667	342	2142	893	1362	794	1125	474
c29	1497	1075	1255	1410	909	1393	1183	838	1586	692	1432	1211	1195	320
c30	2472	585	869	1913	1544	1098	1965	127	628	1063	909	3337	949	301
c31	1436	2169	2288	210	517	1716	50	1579	2122	1671	2321	515	2228	1420
c32	2521	687	99	2302	1933	811	2414	1002	1630	561	508	1339	159	1302
c33	1968	768	1056	1749	1440	1152	1714	278	1043	940	969	470	996	2683
c34	2249	976	395	2218	1661	1133	1995	721	1210	567	234	1557	335	1762
c35	4174	220	808	2903	2371	1168	3078	885	703	980	927	1190	748	1149
c36	1873	1515	1145	1654	1298	904	1559	449	1387	858	1113	862	1085	1090
c37	1871	1433	975	1652	1380	986	1617	367	1205	945	1051	780	915	266
c38	3123	820	2021	2904	2535	1694	2989	712	380	2193	1862	562	1957	1266
c39	2646	812	224	2427	2058	936	2539	1371	1755	686	633	1464	284	1427
c40	1688	3318	2138	437	506	2767	177	1573	2469	1665	2315	2178	2078	302
c41	4424	390	1035	3153	2621	1902	3328	1030	842	1223	1170	1440	975	174
c42	2271	298	591	2052	1683	1196	2017	401	701	724	671	410	488	1224

PORT	c57	c58	c59	c60	c61	c62	c63	c64	c65	c66	c67	c68	c69	c70
c43	2295	450	738	2076	1707	1160	2188	425	725	910	857	434	678	911
c44	1535	2010	1985	390	553	1905	130	1620	2316	1693	2162	2025	1925	1366
c45	3452	1101	803	2181	1649	90	2356	1561	1815	274	922	1522	743	1224
c46	212	2127	2210	1179	770	1699	1274	2847	2421	1938	2407	2270	2150	1447
c47	3145	927	621	1874	1342	292	2049	1146	1528	159	740	1215	561	604
c48	1798	996	971	1674	1241	556	1664	882	1228	398	1148	1016	911	797
c49	2691	799	501	2426	2103	923	2379	1033	1742	673	92	1451	437	1189
c50	1863	1710	680	1830	1275	870	1783	437	1736	813	461	1171	581	865
c51	1914	1203	786	1695	1326	290	1607	1084	1509	290	1355	1218	726	695
c52	1267	1911	1587	1232	700	883	1123	1239	1696	1036	1505	1372	1527	1759
c53	2381	506	537	2162	1793	920	2274	511	811	670	617	520	434	1001
c54	2574	624	1056	2355	1986	1202	2320	130	671	1189	1136	207	953	709
c55	1393	3347	2043	336	411	2796	194	1820	2374	1570	2220	2083	1983	1769
c56	4324	360	1068	3053	2521	1802	3228	1109	918	1240	1187	1340	1008	1869
c57	0	3954	2090	1355	986	3403	1490	2263	2637	2013	2603	2346	2366	1619
c58	3954	0	588	2683	2151	951	2603	686	594	760	707	334	528	930
c59	2090	588	0	2203	1834	712	2315	996	1253	462	409	1240	60	1203
c60	1355	2683	2203	0	972	2132	420	2185	2848	1790	2380	2471	2143	696
c61	986	2151	1834	972	0	1600	688	1630	2045	1421	2011	1754	1774	690
c62	3403	951	712	2132	1600	0	2307	1225	1675	250	831	1473	652	866
c63	1490	2603	2315	420	688	2307	0	2138	2703	1823	2292	540	2055	640
c64	2263	686	996	2185	1630	1225	2138	0	628	1190	1115	337	1222	578
c65	2637	594	1253	2848	2045	1675	2703	628	0	1703	1372	1719	1193	512
c66	2013	760	462	1790	1421	250	1823	1190	1703	0	581	1412	402	614
c67	2603	707	409	2380	2011	831	2292	1115	1372	581	0	1359	349	1380
c68	2346	334	1240	2471	1754	1473	540	337	1719	1412	1359	0	1180	1255
c69	2366	528	60	2143	1774	652	2055	1222	1193	402	349	1180	0	1143
c70	1619	930	1203	696	690	866	640	578	512	614	1380	1255	1143	0
c71	1912	838	686	1875	1320	915	1828	482	1113	858	588	529	626	638
c72	4294	340	928	3023	2491	1291	2943	1026	934	1100	1047	674	868	1270
d1	2190	345	633	1971	1602	1055	1636	320	620	805	752	329	573	810
d2	1666	1243	809	1447	1078	388	1352	1349	1549	347	928	1258	749	860
d3	1695	2572	2548	344	1130	2467	604	2678	2878	2134	2729	2587	2488	1968
d4	1443	1328	1303	1224	855	1459	1129	1156	1634	1011	1480	1343	1243	400
d5	2277	443	145	2058	1689	567	2023	1002	1386	317	264	1095	85	1058
d6	2087	1330	1305	1868	1499	1225	1773	512	1430	1013	1482	1139	1245	244
d7	1579	868	843	1360	991	763	1125	754	1174	551	1020	883	783	360
d8	1212	1887	1862	738	230	1434	306	1297	2192	1389	2039	1902	1002	1223
d9	1021	1459	1434	802	433	1006	773	1551	1765	961	1611	1474	1374	795
d10	1181	1326	1301	962	593	873	867	1078	1632	828	1478	1341	1241	662
d11	785	1662	1637	566	197	1269	701	1474	1848	1224	1814	1557	1577	1058
d12	2430	306	298	2211	1842	1205	2176	849	955	470	417	664	238	1145

PORT	c71	c72	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12
c1	1223	1047	730	1659	2988	1744	1496	1340	1284	2303	1875	1792	1958	1065
c2	357	656	132	1061	2390	1146	898	742	686	1705	1277	1144	1360	467
c3	329	2015	200	861	2190	946	212	748	486	1505	1077	944	1280	365
c4	1644	2792	1926	1402	389	1179	2013	1823	1315	327	757	917	521	2166
c5	564	1712	846	610	1639	595	941	705	235	682	446	333	729	1094
c6	86	1226	407	618	1947	703	455	405	243	1262	834	701	1037	608
c7	1198	150	705	1694	3020	1776	803	1731	1223	2247	1319	1636	2022	666
c8	539	1294	821	710	1818	250	908	479	210	1073	645	512	908	1561
c9	1464	2343	1746	1222	593	999	1833	1643	1135	560	577	737	341	1833
c10	366	693	188	1238	2564	1320	470	1075	860	1879	1451	1318	1654	411
c11	931	1252	438	1367	2696	1452	1204	948	992	2011	1583	1450	1666	773
c12	374	1190	529	958	2066	498	904	146	458	1321	893	760	1156	868
c13	530	540	289	1278	2604	1360	777	1115	900	1919	1491	1358	1694	624
c14	427	690	184	1173	2499	1255	672	1010	795	1814	1386	1253	1589	519
c15	496	955	469	836	2632	1388	172	1190	928	1947	1519	1386	1722	325
c16	1920	4394	2202	1678	1707	1455	2289	2099	1611	1224	1033	1193	797	2442
c17	337	1219	762	1101	2430	908	1259	264	1290	1731	1303	1170	1566	1097
c18	1628	977	1135	2124	3450	2206	1233	2161	1658	2677	2249	2116	2452	1096
c19	619	678	471	1460	2786	1542	959	1497	1082	2101	1673	1540	1876	806
c20	928	1897	399	974	2303	781	887	137	359	1604	1176	1043	1439	734
c21	850	1092	650	973	2712	1467	309	1469	987	2026	1598	1465	1801	315
c22	127	1321	259	847	2176	932	526	934	472	1491	1063	930	1266	679
c23	1614	3928	1896	1372	419	1149	1983	1793	1285	663	282	887	491	2136
c24	188	1160	294	845	2144	791	667	259	470	1328	1026	893	1234	629
c25	315	1251	802	1035	2364	1120	440	1122	660	1679	1251	1118	1454	467
c26	882	2571	1199	774	1420	551	1286	1195	588	384	265	289	501	1439
c27	380	1417	588	585	1901	333	908	396	210	1156	728	595	991	1061
c28	671	1596	411	717	2046	764	943	120	342	1361	933	800	1136	746
c29	741	1415	1023	801	1622	54	1110	681	412	877	449	316	712	1358
c30	355	985	376	1222	2551	1029	864	385	627	2271	1424	951	1687	716
c31	1630	2509	2056	1532	579	1309	2143	1953	1101	282	887	1047	651	2143
c32	785	1027	585	908	2647	1402	244	1404	942	1961	1533	1400	1736	250
c33	336	1108	423	764	2093	609	911	120	389	1408	980	847	1183	758
c34	513	1316	352	914	2374	1130	250	1132	670	1689	1261	1128	1464	403
c35	1058	120	565	1554	2880	1636	663	1591	1088	2107	1679	1546	1882	526
c36	283	1855	512	682	1998	430	1005	299	307	1253	825	692	1008	847
c37	254	1773	430	667	1996	512	380	217	292	1131	883	750	1086	765
c38	1603	1160	1110	2039	3368	2124	1876	1920	1664	2683	2255	2122	2338	1445
c39	910	1152	710	1442	2772	1527	369	1529	1047	2086	1658	1525	1861	375
c40	1624	3658	1906	1319	806	1099	1993	1743	1295	276	743	837	703	2146
c41	892	127	710	1699	3025	1781	890	1315	1321	2334	1906	1773	2109	753
c42	574	638	81	1070	2396	1152	407	1107	692	1711	1283	1150	1486	254

PORT	c71	c72	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12
c43	287	796	105	1094	2420	1176	593	1131	716	1735	1307	1174	1510	440
c44	1471	2350	1953	1366	759	1146	2040	1790	1342	323	790	884	750	2193
c45	1136	1441	1146	432	2511	1181	658	1269	807	1478	1050	917	1313	952
c46	1716	2467	1978	1454	1483	1231	2065	1875	1387	1000	809	969	573	2218
c47	721	1267	964	188	1154	931	476	1575	392	1234	806	669	1065	629
c48	457	1336	739	250	1832	588	826	590	103	1147	719	514	922	979
c49	680	1139	844	1020	2816	1572	356	574	1112	2131	1703	1570	1906	509
c50	127	2056	448	659	1988	744	496	746	284	1303	875	742	1078	649
c51	664	1543	946	43	2039	795	641	797	335	1354	926	793	1129	794
c52	814	2201	1362	778	1236	555	1442	1199	485	430	326	293	562	1602
c53	684	846	191	1180	2506	1262	353	1217	802	1821	1393	1260	1596	200
c54	877	964	384	1373	2699	1455	872	642	795	2014	1586	1453	1789	719
c55	1529	3687	1811	1224	901	1009	1898	1648	1200	181	648	742	608	2051
c56	1318	700	825	1814	3140	1896	923	1851	1348	2367	1939	1806	2142	786
c57	1912	4294	2190	1666	1695	1443	2277	2087	1579	1212	1021	1181	785	2430
c58	838	340	345	1243	2572	1328	443	1330	868	1887	1459	1326	1662	306
c59	686	928	633	809	2548	1301	145	1305	843	1862	1434	1301	1637	298
c60	1875	3023	1971	1447	344	1224	2058	1868	1360	738	802	962	566	2211
c61	1320	2491	1602	1078	1130	855	1689	1499	991	230	433	593	197	1842
c62	915	1291	1055	388	2467	1459	567	1225	763	1434	1006	873	1269	1205
c63	1828	2943	1636	1352	604	1129	2023	1773	1125	306	773	867	701	2176
c64	482	1026	320	1349	2678	1156	1002	512	754	1297	1551	1078	1474	849
c65	1113	934	620	1549	2878	1634	1386	1430	1174	2192	1765	1632	1848	955
c66	858	1100	805	347	2134	1011	317	1013	551	1389	961	828	1224	470
c67	588	1047	752	928	2729	1480	264	1482	1020	2039	1611	1478	1814	417
c68	529	674	329	1258	2587	1343	1095	1139	883	1902	1474	1341	1557	664
c69	626	868	573	749	2488	1243	85	1245	783	1002	1374	1241	1577	238
c70	638	1270	810	860	1968	400	1058	244	360	1223	795	662	1058	1711
c71	0	1178	182	704	2033	789	541	791	329	1348	920	787	1123	517
c72	1178	0	685	1583	2912	1668	783	1670	1208	2227	1799	1666	2002	646
d1	182	685	0	989	2315	1071	488	622	611	1630	1202	1069	1405	335
d2	704	1583	989	0	2079	747	664	837	375	1046	618	485	881	817
d3	2033	2912	2315	2079	0	1568	2403	2166	1704	669	1155	1306	910	2555
d4	789	1668	1071	747	1568	0	1158	644	460	823	395	262	658	1311
d5	541	783	488	664	2403	1158	0	1160	698	1717	1289	1149	1492	153
d6	791	1670	622	837	2166	644	1160	0	462	1467	1039	906	1302	1313
d7	329	1208	611	375	1704	460	698	462	0	819	591	458	794	851
d8	1348	2227	1630	1046	669	823	1717	1467	819	0	467	561	427	1870
d9	920	1799	1202	618	1155	395	1289	1039	591	467	0	133	236	1442
d10	787	1666	1069	485	1306	262	1149	906	458	561	133	0	396	1309
d11	1123	2002	1405	881	910	658	1492	1302	794	427	245	396	0	1645
d12	517	646	335	817	2555	1311	153	1313	851	1870	1442	1309	1645	0

A.5 Number of Passenger on Board between Port

PORT	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
c1	0	0	0	0	0	0	0	0	0	0	0	0	0
c2	0	0	0	0	0	0	0	0	0	0	0	0	0
c3	0	0	0	0	0	7304	0	0	0	0	0	0	0
c4	0	0	0	0	0	0	0	0	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	0	0	0	0	0
c6	0	0	7304	0	0	0	0	0	0	0	0	0	0
c7	0	0	0	0	0	0	0	0	0	0	0	0	0
c8	0	0	0	0	0	0	0	0	0	0	0	0	0
c9	0	0	0	0	0	0	0	0	0	0	0	0	0
c10	0	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	0	0	0	0	0	0	0	0	0	0	0
c12	0	0	0	0	0	0	0	0	0	0	0	0	0
c13	0	0	0	0	0	0	0	0	0	0	2930	0	0
c14	0	0	0	0	0	0	0	0	0	12945	0	0	0
c15	0	0	0	0	0	0	0	0	0	0	0	0	0
c16	0	0	0	0	0	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	0	0	0
c18	0	0	0	0	0	0	86493	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	12792
c20	0	0	0	0	0	0	0	0	0	0	0	0	0
c21	0	0	0	0	0	0	0	0	0	0	0	0	0
c22	0	0	0	0	0	0	0	0	0	0	0	0	0
c23	0	0	0	0	0	0	0	0	24405	0	0	0	0
c24	0	0	0	0	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	0	0	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	21704	0	0	0	0	0
c28	0	0	0	0	0	0	0	0	0	0	0	0	0
c29	0	0	0	0	0	0	0	10088	0	0	0	0	0
c30	0	0	0	0	0	0	0	0	0	0	0	0	0
c31	0	0	0	0	0	0	0	0	0	0	0	0	0
c32	0	0	0	0	0	0	0	0	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	0	0	0
c34	0	0	0	0	0	0	0	0	0	0	0	0	0
c35	0	0	0	0	0	0	10125	0	0	0	0	0	0
c36	0	0	0	0	0	0	0	0	0	0	0	0	0
c37	0	0	0	0	0	0	0	0	0	0	0	0	0
c38	13334	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	0	0	0	0	0	0
c40	0	0	0	0	0	0	0	0	0	0	0	0	0
c41	0	0	0	0	0	0	0	0	0	0	0	0	0
c42	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
c43	0	0	0	0	0	0	0	0	0	0	0	0	0
c44	0	0	0	0	0	0	0	0	0	0	0	0	0
c45	0	0	0	0	0	0	0	0	0	0	0	0	0
c46	0	0	0	0	0	0	0	0	0	0	0	0	0
c47	0	0	0	0	0	0	0	0	0	0	0	0	0
c48	0	0	0	0	7127	0	0	0	0	0	0	0	0
c49	0	0	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	5418	0	0	0	0	0	0	0
c51	0	0	0	0	0	0	0	0	0	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	0	0	0	0	0	0	0	0	0	0	0
c54	0	69	0	0	0	0	0	0	0	0	0	0	0
c55	0	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	0	0	0	0	0	17944	0	0	0	0	0	0
c57	0	0	0	0	0	0	0	0	0	0	0	0	0
c58	0	0	0	0	0	0	8188	0	0	0	0	0	29060
c59	0	0	0	0	0	0	0	0	0	0	0	0	0
c60	0	0	0	708	0	0	0	0	0	0	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	0	0	0	0	0	0	0	0
c63	0	0	0	0	0	0	0	0	0	0	0	0	0
c64	0	0	0	0	0	0	0	0	0	0	0	0	0
c65	1087	0	0	0	0	0	0	0	0	0	565	0	0
c66	0	0	0	0	0	0	0	0	0	0	0	0	0
c67	0	0	0	0	0	0	0	0	0	0	0	0	0
c68	0	754	0	0	0	0	0	0	0	0	8987	0	0
c69	0	0	0	0	0	0	0	0	0	0	0	0	0
c70	0	0	0	0	0	0	0	4893	0	0	0	2198	0
c71	0	32	0	0	0	231	0	0	0	0	0	0	0
c72	0	0	0	0	0	0	0	0	0	0	0	0	0
d1	0	44049	0	0	0	42429	0	0	0	0	0	0	19761
d2	0	0	0	0	0	0	0	0	0	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	0	0	0	0	0	3829	0	0	0	0	0
d5	0	0	2137	0	0	0	0	0	0	0	0	0	0
d6	0	0	0	0	0	0	0	0	0	0	0	10601	0
d7	0	0	0	0	6504	79313	0	1553	0	0	0	0	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	10296	0	0	0	0	0	0	0	0
d10	0	0	0	0	15267	0	0	0	0	0	0	0	0
d11	0	0	0	68659	0	0	0	0	12077	0	0	0	0
d12	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26
c1	0	0	0	0	0	0	0	0	0	0	0	0	0
c2	0	0	0	0	0	0	0	0	0	0	0	0	0
c3	0	0	0	0	0	0	0	0	0	0	0	0	0
c4	0	0	0	0	0	0	0	0	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	0	0	0	0	0
c6	0	0	0	0	0	0	0	0	0	0	0	0	0
c7	0	0	0	0	57327	0	0	0	0	0	0	0	0
c8	0	0	0	0	0	0	0	0	0	0	0	0	0
c9	0	0	0	0	0	0	0	0	0	7219	0	0	0
c10	8745	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	0	0	0	434	0	0	0	0	0	0	0
c12	0	0	0	0	0	0	0	0	0	0	0	0	0
c13	0	0	0	0	0	3831	0	0	0	0	0	0	0
c14	0	0	0	0	0	0	0	0	0	0	0	0	0
c15	0	0	0	0	0	0	0	0	0	0	0	0	0
c16	0	0	0	0	0	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	8699	0	0
c18	0	0	0	0	0	0	0	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	0
c20	0	0	0	0	0	0	0	0	0	0	0	0	0
c21	0	0	0	0	0	0	0	0	0	0	0	0	0
c22	0	0	0	0	0	0	0	0	0	0	0	11325	0
c23	0	0	0	0	0	0	0	0	0	0	0	0	0
c24	0	0	0	12196	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	0	8325	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	0	0	0	0	0	0
c28	0	0	0	0	0	0	27018	0	0	0	0	0	0
c29	0	0	0	0	0	0	0	0	0	0	0	0	0
c30	0	0	0	0	0	0	0	0	0	0	8974	0	0
c31	0	0	0	0	0	0	0	0	0	28619	0	0	0
c32	0	0	0	0	0	0	0	8445	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	0	0	0
c34	0	6086	0	0	0	0	0	0	0	0	0	2161	0
c35	0	0	0	0	0	0	0	0	0	0	0	0	0
c36	0	0	0	0	0	0	0	0	0	0	0	0	0
c37	0	0	0	0	0	0	0	0	0	0	0	0	0
c38	0	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	8989	0	0	0	0	0
c40	0	0	0	0	0	0	0	0	0	0	0	0	0
c41	0	0	0	0	9750	0	0	0	0	0	0	0	0
c42	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26
c43	0	0	0	0	0	0	0	0	0	0	0	0	0
c44	0	0	0	0	0	0	0	0	0	0	0	0	0
c45	0	0	0	0	0	0	0	0	0	0	0	0	0
c46	0	0	5	0	0	0	0	0	0	0	0	0	0
c47	0	0	0	0	0	0	0	0	0	0	0	0	0
c48	0	0	0	0	0	0	0	0	0	0	0	0	0
c49	0	0	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	0	0	0	2027	0	0	0	0
c51	0	0	0	0	0	0	0	0	0	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	0	0	0	0	0	0	0	0	0	0	0
c54	0	0	0	0	0	0	0	0	0	0	0	0	0
c55	0	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	0	0	0	18346	0	0	0	0	0	0	0	0
c57	0	0	0	0	0	0	0	0	0	0	0	0	0
c58	0	0	0	0	0	0	0	0	0	0	0	0	0
c59	0	0	0	0	0	0	0	0	0	0	0	0	0
c60	0	0	0	0	0	0	0	0	0	0	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	0	0	0	0	0	0	0	0
c63	0	0	0	0	0	0	0	0	0	0	0	0	0
c64	0	0	0	0	0	0	0	0	0	0	0	0	0
c65	0	0	0	0	0	4116	0	0	0	0	0	0	0
c66	0	0	0	0	0	0	0	0	0	0	0	0	0
c67	0	8478	0	0	0	0	0	0	0	0	0	0	0
c68	0	0	0	0	0	0	0	0	0	0	0	0	0
c69	0	0	0	0	0	0	0	0	0	0	0	0	0
c70	0	0	0	0	0	0	0	0	0	0	0	0	0
c71	0	0	0	0	0	0	0	0	0	0	0	0	0
c72	0	0	0	0	0	0	0	0	0	0	0	0	0
d1	8729	0	0	0	0	0	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	0	0	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	0	0	0	0	0	0	0	0	0	0	0
d5	0	11469	0	0	0	0	0	0	0	0	0	0	0
d6	0	0	0	11595	0	0	4208	0	0	0	0	0	0
d7	0	0	0	0	0	0	0	0	0	0	0	0	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	44054
d10	0	0	0	0	0	0	0	0	0	0	0	0	29897
d11	0	0	0	0	0	0	0	0	0	23185	0	0	0
d12	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39
c1	0	0	0	0	0	0	0	0	0	0	0	7333	0
c2	0	0	0	0	0	0	0	0	0	0	0	0	0
c3	0	0	0	0	0	0	0	0	0	0	0	0	0
c4	0	0	0	0	0	0	0	0	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	0	0	0	0	0
c6	0	0	0	0	0	0	0	0	0	0	0	0	0
c7	0	0	0	0	0	0	0	0	10028	0	0	0	0
c8	21704	0	8318	0	0	0	0	0	0	0	0	0	0
c9	0	0	0	0	0	0	0	0	0	0	0	0	0
c10	0	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	0	0	0	0	0	0	0	0	0	0	0
c12	0	0	0	0	0	0	0	0	0	0	0	0	0
c13	0	0	0	0	0	0	0	0	0	0	0	0	0
c14	0	0	0	0	0	0	0	0	0	0	0	0	0
c15	0	0	0	0	0	0	0	6086	0	0	0	0	0
c16	0	0	0	0	0	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	0	0	0
c18	0	0	0	0	0	0	0	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	0
c20	0	2505	0	0	0	0	0	0	0	0	0	0	0
c21	0	0	0	0	0	2459	0	0	0	0	0	0	6763
c22	0	0	0	0	0	0	0	0	0	0	0	0	0
c23	0	0	0	0	28619	0	0	0	0	0	0	0	0
c24	0	0	0	8961	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	2517	0	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	0	0	3122	0	0	0
c28	0	0	0	0	0	0	0	0	0	0	0	0	0
c29	0	0	0	0	0	0	0	0	0	0	0	0	0
c30	0	0	0	0	0	0	0	0	0	0	0	0	0
c31	0	0	0	0	0	0	0	0	0	0	0	0	0
c32	0	0	0	0	0	0	0	0	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	108290	0	0
c34	0	0	0	0	0	0	0	0	0	0	0	0	0
c35	0	0	0	0	0	0	0	0	0	0	0	0	0
c36	3122	0	0	0	0	0	0	0	0	0	5028	0	0
c37	0	0	0	0	0	0	109613	0	0	5028	0	0	0
c38	0	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	0	0	0	0	0	0
c40	0	0	0	0	0	0	0	0	0	0	0	0	0
c41	0	0	0	0	0	0	0	0	33830	0	0	0	0
c42	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39
c43	0	0	0	0	0	0	0	0	0	0	0	0	0
c44	0	0	0	0	0	0	0	0	0	0	0	0	0
c45	0	0	0	0	0	0	0	0	0	0	0	0	0
c46	0	0	0	0	0	0	0	0	0	0	0	0	0
c47	0	0	0	0	0	0	0	0	0	0	0	0	0
c48	0	0	0	0	0	0	0	0	0	0	0	0	0
c49	0	0	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	0	0	0	0	0	0	0	0
c51	0	0	0	0	0	0	0	0	0	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	0	0	0	0	0	0	0	0	0	0	0
c54	0	0	0	0	0	0	0	0	0	0	0	0	0
c55	0	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	0	0	0	0	0	0	0	0	0	0	0	0
c57	0	0	0	0	0	0	0	0	0	0	0	0	0
c58	0	0	0	0	0	0	0	0	43140	0	0	0	0
c59	0	0	0	0	0	2159	0	0	0	0	0	0	0
c60	0	0	0	0	0	0	0	0	0	0	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	0	0	0	0	0	0	0	0
c63	0	0	0	0	2373	0	0	0	0	0	0	0	0
c64	0	0	0	9532	0	0	0	0	0	0	0	0	0
c65	0	0	0	0	0	0	0	0	0	0	0	0	0
c66	0	0	0	0	0	0	0	0	0	0	0	0	0
c67	0	0	0	0	0	0	0	0	0	0	0	0	0
c68	0	0	0	0	0	0	0	0	0	0	0	0	0
c69	0	0	0	0	0	0	0	0	0	0	0	0	0
c70	0	0	0	0	0	0	0	0	0	0	0	0	0
c71	0	0	0	0	0	0	0	0	0	0	0	0	0
c72	0	0	0	0	0	0	0	0	3872	0	0	0	0
d1	0	0	0	0	0	0	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	0	0	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	12494	0	0	0	0	0	0	0	0	0	0
d5	0	0	0	0	0	0	0	0	0	0	0	0	0
d6	0	9493	0	0	0	0	77927	0	0	0	0	0	0
d7	1275	13730	0	0	0	0	0	0	0	0	20408	0	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	0
d10	0	0	0	0	0	0	0	0	0	0	0	0	0
d11	0	0	0	0	0	0	0	0	0	0	0	0	0
d12	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52
c1	0	0	0	0	0	0	0	0	0	0	0	0	0
c2	0	0	0	0	0	0	0	0	0	0	0	0	0
c3	0	0	0	0	0	0	0	0	0	0	0	0	0
c4	0	0	0	0	0	0	0	0	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	4828	0	0	0	0
c6	0	0	0	0	0	0	0	0	0	0	5418	0	0
c7	0	0	0	0	0	0	0	0	0	0	0	0	0
c8	0	0	0	0	0	0	0	0	0	0	0	0	0
c9	0	0	0	0	0	0	0	0	0	0	0	0	0
c10	0	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	0	0	0	0	0	0	0	0	0	0	0
c12	0	0	0	0	0	0	0	0	0	0	0	0	0
c13	0	0	0	0	0	0	0	0	0	0	0	0	0
c14	0	0	0	0	0	0	0	0	0	0	0	0	0
c15	0	0	0	0	0	0	0	0	0	0	0	0	0
c16	0	0	0	0	0	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	0	0	0
c18	0	33775	0	0	0	0	0	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	0
c20	0	0	0	0	0	0	0	0	0	0	0	0	0
c21	0	0	0	0	0	0	0	0	0	0	0	0	0
c22	0	0	0	0	0	0	0	0	0	0	2027	0	0
c23	0	0	0	0	0	0	0	0	0	0	0	0	0
c24	0	0	0	0	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	0	0	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	0	0	0	0	0	0
c28	0	0	0	0	0	0	0	0	0	0	0	0	0
c29	0	0	0	0	0	0	0	0	0	0	0	0	0
c30	0	0	0	0	0	0	0	0	0	0	0	0	0
c31	0	0	0	0	0	0	0	0	0	0	0	0	0
c32	0	0	0	0	0	0	0	0	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	0	0	0
c34	0	0	0	0	0	0	0	0	0	0	0	0	0
c35	0	27530	0	0	0	0	0	0	0	0	0	0	0
c36	0	0	0	0	0	0	0	0	0	0	0	0	0
c37	0	0	0	0	0	0	0	0	0	0	0	0	0
c38	0	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	0	0	0	0	0	0
c40	0	0	0	0	4391	0	0	0	0	0	0	0	0
c41	0	0	0	0	0	0	0	0	0	0	0	0	0
c42	0	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52
c43	0	0	0	0	0	0	0	0	0	0	0	0	0
c44	4391	0	0	0	0	0	0	0	0	0	0	0	0
c45	0	0	0	0	0	0	0	3590	12347	0	0	0	0
c46	0	0	0	0	0	0	0	0	0	0	0	0	0
c47	0	0	0	0	0	3590	0	0	5094	0	0	0	0
c48	0	0	0	0	0	0	0	5094	0	0	0	9857	0
c49	0	0	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	0	0	0	0	0	0	0	0
c51	0	0	0	0	0	0	0	0	5458	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	9725	0	0	0	0	0	0	0	0	0	0
c54	0	0	0	0	0	0	0	0	0	0	0	0	0
c55	687	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	35983	0	0	0	0	0	0	0	0	0	0	0
c57	0	0	0	0	0	0	9	0	0	0	0	0	0
c58	0	0	0	0	0	0	0	0	0	0	0	0	0
c59	0	0	0	0	0	0	0	0	0	0	0	0	0
c60	0	0	0	0	0	0	0	0	0	0	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	77062	0	0	0	0	0	0	0
c63	0	0	0	0	12287	0	0	0	0	0	0	0	0
c64	0	0	0	0	0	0	0	0	0	0	0	0	0
c65	0	0	0	0	0	0	0	0	0	0	0	0	0
c66	0	0	0	0	0	0	0	15631	0	0	0	0	0
c67	0	0	0	0	0	0	0	0	0	7937	0	0	0
c68	0	0	0	0	0	0	0	0	0	0	0	0	0
c69	0	0	0	0	0	0	0	0	0	0	0	0	0
c70	0	0	0	0	0	0	0	0	0	0	0	0	0
c71	0	0	0	0	0	0	0	0	0	0	0	0	0
c72	0	5221	0	0	0	0	0	0	0	0	0	0	0
d1	0	0	49483	8132	0	0	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	80995	59302	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	0	0	0	0	0	0	0	0	0	0	0
d5	0	0	0	0	0	0	0	3050	0	0	0	0	0
d6	0	0	0	0	0	0	0	0	0	0	0	0	0
d7	0	0	0	0	0	0	0	0	19265	0	0	2502	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	32107
d10	0	0	0	0	0	0	0	0	38944	0	0	0	59258
d11	0	0	0	0	0	0	1705	0	0	0	0	0	0
d12	0	0	1267	0	0	0	0	0	0	0	0	0	0

PORT	c53	c54	c55	c56	c57	c58	c59	c60	c61	c62	c63	c64	c65
c1	0	0	0	0	0	0	0	0	0	0	0	0	3268
c2	0	56	0	0	0	0	0	0	0	0	0	0	0
c3	0	0	0	0	0	0	0	0	0	0	0	0	0
c4	0	0	0	0	0	0	0	723	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	0	0	0	0	0
c6	0	0	0	0	0	0	0	0	0	0	0	0	0
c7	0	0	0	16944	0	8188	0	0	0	0	0	0	0
c8	0	0	0	0	0	0	0	0	0	0	0	0	0
c9	0	0	0	0	0	0	0	0	0	0	0	0	0
c10	0	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	0	0	0	0	0	0	0	0	0	0	2647
c12	0	0	0	0	0	0	0	0	0	0	0	0	0
c13	0	0	0	0	0	25610	0	0	0	0	0	0	0
c14	0	0	0	0	0	0	0	0	0	0	0	0	0
c15	0	0	0	0	0	0	0	0	0	0	0	0	0
c16	0	0	0	0	26	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	0	0	0
c18	0	0	0	14753	0	0	0	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	204
c20	0	0	0	0	0	0	0	0	0	0	0	0	0
c21	0	0	0	0	0	0	0	0	0	0	0	0	0
c22	0	0	0	0	0	0	0	0	0	0	0	0	0
c23	0	0	0	0	0	0	0	0	0	0	0	0	0
c24	0	0	0	0	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	0	0	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	0	0	0	0	0	0
c28	0	0	0	0	0	0	0	0	0	0	0	0	0
c29	0	0	0	0	0	0	0	0	0	0	0	0	0
c30	0	0	0	0	0	0	0	0	0	0	0	9320	0
c31	0	0	0	0	0	0	0	0	0	0	2373	0	0
c32	0	0	0	0	0	0	8414	0	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	0	0	0
c34	0	0	0	0	0	0	0	0	0	0	0	0	0
c35	0	0	0	0	0	53501	0	0	0	0	0	0	0
c36	0	0	0	0	0	0	0	0	0	0	0	0	0
c37	0	0	0	0	0	0	0	0	0	0	0	0	0
c38	0	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	0	0	0	0	0	0
c40	0	0	687	0	0	0	0	0	0	0	0	0	0
c41	0	0	0	35983	0	0	0	0	0	0	0	0	0
c42	7254	0	0	0	0	0	0	0	0	0	0	0	0

PORT	c53	c54	c55	c56	c57	c58	c59	c60	c61	c62	c63	c64	c65
c43	0	0	0	0	0	0	0	0	0	0	0	0	0
c44	0	0	0	0	0	0	0	0	0	0	12287	0	0
c45	0	0	0	0	0	0	0	0	0	6512	0	0	0
c46	0	0	0	0	0	0	0	0	0	0	0	0	0
c47	0	0	0	0	0	0	0	0	0	0	0	0	0
c48	0	0	0	0	0	0	0	0	0	0	0	0	0
c49	0	0	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	0	0	0	0	0	0	0	0
c51	0	0	0	0	0	0	0	0	0	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	0	0	0	0	0	0	0	0	0	0	0
c54	0	0	0	0	0	0	0	0	0	0	0	8922	0
c55	0	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	0	0	0	0	0	0	0	0	0	0	0	0
c57	0	0	0	0	0	0	0	0	0	0	0	0	0
c58	0	0	0	0	0	0	0	0	0	0	0	0	0
c59	0	0	0	0	0	0	0	0	0	0	0	0	0
c60	0	0	0	0	0	0	0	0	0	0	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	0	0	0	0	0	0	0	0
c63	0	0	0	0	0	0	0	0	0	0	0	0	0
c64	0	9729	0	0	0	0	0	0	0	0	0	0	0
c65	0	0	0	0	0	0	0	0	0	0	0	0	0
c66	0	0	0	0	0	0	0	0	0	13828	0	0	0
c67	0	0	0	0	0	0	0	0	0	0	0	0	0
c68	0	54	0	0	0	0	0	0	0	0	0	0	0
c69	0	0	0	0	0	0	9165	0	0	0	0	0	0
c70	0	0	0	0	0	0	0	0	0	0	0	0	0
c71	0	0	0	0	0	0	0	0	0	0	0	0	0
c72	0	0	0	0	0	0	0	0	0	0	0	0	0
d1	0	13547	0	0	0	26867	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	0	0	8287	0	0	0
d3	0	0	0	0	0	0	0	21856	0	0	0	0	0
d4	0	0	0	0	0	0	0	0	0	0	0	0	0
d5	0	0	0	0	0	4478	0	0	0	0	0	0	0
d6	0	0	0	0	0	0	0	0	0	0	0	0	0
d7	0	0	0	0	0	22764	0	0	0	0	0	0	0
d8	0	0	21765	0	0	0	0	0	5665	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	0
d10	0	0	0	0	0	0	0	0	0	0	0	0	0
d11	0	0	0	0	0	0	0	0	1439	0	0	0	0
d12	5943	0	0	0	0	14646	0	0	0	0	0	0	0

PORT	c66	c67	c68	c69	c70	c71	c72	d1	d2	d3	d4	d5	d6
c1	0	0	0	0	0	0	0	0	0	0	0	0	0
c2	0	0	7406	0	0	365	0	384	0	0	0	0	0
c3	0	0	0	0	0	0	0	0	0	0	0	1983	0
c4	0	0	0	0	0	0	0	0	0	0	0	0	0
c5	0	0	0	0	0	0	0	0	0	0	0	0	0
c6	0	0	0	0	0	4121	0	55845	0	0	0	0	0
c7	0	0	0	0	0	0	0	0	0	0	0	0	0
c8	0	0	0	0	4893	0	0	0	0	0	4511	0	0
c9	0	0	0	0	0	0	0	0	0	0	0	0	0
c10	0	0	0	0	0	0	0	0	0	0	0	0	0
c11	0	0	8463	0	0	0	0	0	0	0	0	0	0
c12	0	0	0	0	2198	0	0	0	0	0	0	0	10601
c13	0	0	0	0	0	0	0	19761	0	0	0	0	0
c14	0	0	0	0	0	0	0	9718	0	0	0	0	0
c15	0	7552	0	0	0	0	0	0	0	0	0	16136	0
c16	0	0	0	0	0	0	0	0	0	0	0	0	0
c17	0	0	0	0	0	0	0	0	0	0	0	0	13165
c18	0	0	0	0	0	0	0	0	0	0	0	0	0
c19	0	0	0	0	0	0	0	0	0	0	0	0	0
c20	0	0	0	0	0	0	0	0	0	0	0	0	15479
c21	0	0	0	0	0	0	0	0	0	0	0	0	0
c22	0	0	0	0	0	0	0	0	0	0	0	0	0
c23	0	0	0	0	0	0	0	0	0	0	0	0	0
c24	0	0	0	0	0	0	0	0	0	0	0	0	0
c25	0	0	0	0	0	0	0	0	0	0	0	0	0
c26	0	0	0	0	0	0	0	0	0	0	0	0	0
c27	0	0	0	0	0	0	0	0	0	0	0	0	0
c28	0	0	0	0	0	0	0	0	0	0	0	0	9974
c29	0	0	0	0	0	0	0	0	0	0	13559	0	0
c30	0	0	0	0	0	0	0	0	0	0	0	0	0
c31	0	0	0	0	0	0	0	0	0	0	0	0	0
c32	0	0	0	0	0	0	0	0	0	0	0	0	0
c33	0	0	0	0	0	0	0	0	0	0	0	0	77857
c34	0	0	0	0	0	0	0	0	0	0	0	0	0
c35	0	0	0	0	0	0	14694	0	0	0	0	0	0
c36	0	0	0	0	0	0	0	0	0	0	0	0	0
c37	0	0	0	0	0	0	0	0	0	0	0	0	0
c38	0	0	0	0	0	0	0	0	0	0	0	0	0
c39	0	0	0	0	0	0	0	0	0	0	0	0	0
c40	0	0	0	0	0	0	0	0	0	0	0	0	0
c41	0	0	0	0	0	0	20824	0	0	0	0	0	0
c42	0	0	0	0	0	0	0	49483	0	0	0	0	0

PORT	c66	c67	c68	c69	c70	c71	c72	d1	d2	d3	d4	d5	d6
c43	0	0	0	0	0	0	0	9776	0	0	0	0	0
c44	0	0	0	0	0	0	0	0	0	0	0	0	0
c45	13966	0	0	0	0	0	0	0	12619	0	0	0	0
c46	0	0	0	0	0	0	0	0	0	0	0	0	0
c47	17894	0	0	0	0	0	0	0	81170	0	0	3050	0
c48	0	0	0	0	0	0	0	0	155179	0	0	0	0
c49	0	9763	0	0	0	0	0	0	0	0	0	0	0
c50	0	0	0	0	0	0	0	0	0	0	0	0	0
c51	0	0	0	0	0	0	0	0	0	0	0	0	0
c52	0	0	0	0	0	0	0	0	0	0	0	0	0
c53	0	0	0	0	0	0	0	0	0	0	0	0	0
c54	0	0	84	0	0	0	0	12552	0	0	0	0	0
c55	0	0	0	0	0	0	0	0	0	0	0	0	0
c56	0	0	0	0	0	0	0	0	0	0	0	0	0
c57	0	0	0	0	0	0	0	0	0	0	0	0	0
c58	0	0	0	0	0	0	0	32912	0	0	0	935	0
c59	0	0	0	5879	0	0	0	0	0	0	0	0	0
c60	0	0	0	0	0	0	0	0	0	19856	0	0	0
c61	0	0	0	0	0	0	0	0	0	0	0	0	0
c62	0	0	0	0	0	0	0	0	3979	0	0	0	0
c63	0	0	0	0	0	0	0	0	0	0	0	0	0
c64	0	0	0	0	0	0	0	0	0	0	0	0	0
c65	0	0	0	0	0	0	0	0	0	0	0	0	0
c66	0	0	0	0	0	0	0	0	0	0	0	0	0
c67	0	0	0	0	0	0	0	0	0	0	0	0	0
c68	0	0	0	0	0	0	0	0	0	0	0	0	0
c69	0	0	0	0	0	0	0	0	0	0	0	4643	0
c70	0	0	0	0	0	0	0	0	0	0	0	0	0
c71	0	0	0	0	0	0	0	0	0	0	0	0	0
c72	0	0	0	0	0	0	0	0	0	0	0	0	0
d1	0	0	0	0	0	0	0	0	0	0	0	0	0
d2	0	0	0	0	0	0	0	0	0	0	0	0	0
d3	0	0	0	0	0	0	0	0	0	0	0	0	0
d4	0	0	0	0	0	0	0	0	0	0	0	0	0
d5	0	0	0	2121	0	0	0	0	0	0	0	0	0
d6	0	0	0	0	0	0	0	0	0	0	0	0	0
d7	0	0	0	0	0	0	0	13785	0	0	0	0	0
d8	0	0	0	0	0	0	0	0	0	0	0	0	0
d9	0	0	0	0	0	0	0	0	0	0	0	0	0
d10	0	0	0	0	0	0	0	0	35094	0	11217	0	0
d11	0	0	0	0	0	0	0	0	0	0	0	0	0
d12	0	0	0	0	0	0	0	0	0	0	0	57064	0

PORT	d7	d8	d9	d10	d11	d12
c43	0	0	0	0	0	0
c44	0	0	0	0	0	0
c45	0	0	0	0	0	0
c46	0	0	0	0	1705	0
c47	0	0	0	0	0	0
c48	26674	0	0	1605	0	0
c49	0	0	0	0	0	0
c50	0	0	0	0	0	0
c51	6112	0	0	0	0	0
c52	0	0	16296	59116	0	0
c53	0	0	0	0	0	1878
c54	0	0	0	0	0	0
c55	0	339	0	0	0	0
c56	0	0	0	0	0	0
c57	0	0	0	0	0	0
c58	12973	0	0	0	0	14646
c59	0	0	0	0	0	0
c60	0	0	0	0	0	0
c61	0	3	0	0	5705	0
c62	0	0	0	0	0	0
c63	0	0	0	0	0	0
c64	0	0	0	0	0	0
c65	0	0	0	0	0	0
c66	0	0	0	0	0	0
c67	0	0	0	0	0	0
c68	0	0	0	0	0	0
c69	0	0	0	0	0	0
c70	0	0	0	0	0	0
c71	0	0	0	0	0	0
c72	0	0	0	0	0	0
d1	4790	0	0	0	0	0
d2	0	0	0	8475	0	0
d3	0	0	0	0	0	0
d4	0	0	0	4613	0	0
d5	0	0	0	0	0	74195
d6	0	0	0	0	0	0
d7	0	0	0	75258	5075	0
d8	0	0	15392	8032	0	0
d9	9209	20842	0	0	1149	0
d10	130994	47825	0	0	8327	0
d11	0	0	18725	41075	0	0
d12	0	0	0	0	0	0

PORT	d7	d8	d9	d10	d11	d12
c43	0	0	0	0	0	0
c44	0	0	0	0	0	0
c45	0	0	0	0	0	0
c46	0	0	0	0	1705	0
c47	0	0	0	0	0	0
c48	26674	0	0	1605	0	0
c49	0	0	0	0	0	0
c50	0	0	0	0	0	0
c51	6112	0	0	0	0	0
c52	0	0	16296	59116	0	0
c53	0	0	0	0	0	1878
c54	0	0	0	0	0	0
c55	0	339	0	0	0	0
c56	0	0	0	0	0	0
c57	0	0	0	0	0	0
c58	12973	0	0	0	0	14646
c59	0	0	0	0	0	0
c60	0	0	0	0	0	0
c61	0	3	0	0	5705	0
c62	0	0	0	0	0	0
c63	0	0	0	0	0	0
c64	0	0	0	0	0	0
c65	0	0	0	0	0	0
c66	0	0	0	0	0	0
c67	0	0	0	0	0	0
c68	0	0	0	0	0	0
c69	0	0	0	0	0	0
c70	0	0	0	0	0	0
c71	0	0	0	0	0	0
c72	0	0	0	0	0	0
d1	4790	0	0	0	0	0
d2	0	0	0	8475	0	0
d3	0	0	0	0	0	0
d4	0	0	0	4613	0	0
d5	0	0	0	0	0	74195
d6	0	0	0	0	0	0
d7	0	0	0	75258	5075	0
d8	0	0	15392	8032	0	0
d9	9209	20842	0	0	1149	0
d10	130994	47825	0	0	8327	0
d11	0	0	18725	41075	0	0
d12	0	0	0	0	0	0

Appendix B - Benchmarks

B.1 40c-9d-8k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k1	1312	2176	11	4.2	45.68	336	360300	2
k2	1325	2176	12	4.2	51.67	336	360200	2
k3	1518	2176	13	4.2	49.85	336	360200	2
k9	1198	2176	10	4.2	56.82	336	327940	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k15	1325	2176	11	4.2	45.65	336	360300	2
k20	1312	2176	11	4.2	51.76	336	360300	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k23	1518	2176	11	4.2	47.94	336	360200	2

B.2 28c-9d-9k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k2	1325	2176	12	4.2	51.67	336	360200	2
k8	1583	8160	18	5.9	108.69	336	1048100	2
k11	2126	8500	16	5.9	117.02	336	1048100	2
k12	3018	11421	19	5.9	140.24	336	853230	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k15	1325	2176	11	4.2	45.65	336	360300	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k24	1518	8500	16	5.9	116.38	336	1048100	2
k25	595	1632	10	4.2	38.08	336	130600	2

B.3 45c-11d-11k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k1	1312	2176	11	4.2	45.68	336	360300	2
k3	1518	2176	13	4.2	49.85	336	360200	2
k4	2513	8700	16	5.9	94.78	336	1100360	2
k5	2612	8700	17	5.9	118.96	336	853230	2
k6	2602	8700	17	5.9	111.71	336	1047900	2
k7	3204	11587	17	5.9	136.58	336	853230	2
k13	2513	8700	16.5	5.9	121.07	336	1100360	2
k16	3410	11587	18	5.9	143.4	336	853230	2
k17	594	1632	9	4.2	42.12	336	130600	2
k20	1312	2176	11	4.2	51.76	336	360300	2
k22	2554	8700	17	5.7	102.72	336	1047900	2

B.4 32c-4d-8k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k9	1198	2176	10	4.2	56.82	336	327940	2
k18	593	1632	10	4.2	32.18	336	130600	2
k19	2402	11587	19	5.9	129.6	336	853230	2
k23	1518	2176	11	4.2	47.94	336	360200	2

B.5 34c-11d-11k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k2	1325	2176	12	4.2	51.67	336	360200	2
k8	1583	8160	18	5.9	108.69	336	1048100	2
k10	2404	11587	18	5.9	127.51	336	853230	2
k11	2126	8500	16	5.9	117.02	336	1048100	2
k12	3018	11421	19	5.9	140.24	336	853230	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k15	1325	2176	11	4.2	45.65	336	360300	2
k20	1312	2176	11	4.2	51.76	336	360300	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k24	1518	8500	16	5.9	116.38	336	1048100	2
k25	595	1632	10	4.2	38.08	336	130600	2

B.6 63c-14d-11k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k1	1312	2176	11	4.2	45.68	336	360300	2
k3	1518	2176	13	4.2	49.85	336	360200	2
k4	2513	8700	16	5.9	94.78	336	1100360	2
k5	2612	8700	17	5.9	118.96	336	853230	2
k6	2602	8700	17	5.9	111.71	336	1047900	2
k7	3204	11587	17	5.9	136.58	336	853230	2
k9	1198	2176	10	4.2	56.82	336	327940	2
k13	2513	8700	16.5	5.9	121.07	336	1100360	2
k16	3410	11587	18	5.9	143.4	336	853230	2
k17	594	1632	9	4.2	42.12	336	130600	2
k18	593	1632	10	4.2	32.18	336	130600	2
k19	2402	11587	19	5.9	129.6	336	853230	2
k22	2554	8700	17	5.7	102.72	336	1047900	2
k23	1518	2176	11	4.2	47.94	336	360200	2

B.7 18c-6d-8k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k2	1325	2176	12	4.2	51.67	336	360200	2
k8	1583	8160	18	5.9	108.69	336	1048100	2
k11	2126	8500	16	5.9	117.02	336	1048100	2
k15	1325	2176	11	4.2	45.65	336	360300	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k24	1518	8500	16	5.9	116.38	336	1048100	2

B.8 28c-6d-11k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k1	1312	2176	11	4.2	45.68	336	360300	2
k4	2513	8700	16	5.9	94.78	336	1100360	2
k5	2612	8700	17	5.9	118.96	336	853230	2
k7	3204	11587	17	5.9	136.58	336	853230	2
k8	1583	8160	18	5.9	108.69	336	1048100	2
k15	1325	2176	11	4.2	45.65	336	360300	2

B.9 12c-4d-8k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k8	1583	8160	18	5.9	108.69	336	1048100	2
k13	2513	8700	16.5	5.9	121.07	336	1100360	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k15	1325	2176	11	4.2	45.65	336	360300	2

B.10 53c-12d-11k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k2	1325	2176	12	4.2	51.67	336	360200	2
k3	1518	2176	13	4.2	49.85	336	360200	2
k9	1198	2176	10	4.2	56.82	336	327940	2
k10	2404	11587	18	5.9	127.51	336	853230	2
k11	2126	8500	16	5.9	117.02	336	1048100	2
k12	3018	11421	19	5.9	140.24	336	853230	2
k16	3410	11587	18	5.9	143.4	336	853230	2
k17	594	1632	9	4.2	42.12	336	130600	2
k21	1312	2176	11	4.2	51.85	336	360300	2
k23	1518	2176	11	4.2	47.94	336	360200	2
k24	1518	8500	16	5.9	116.38	336	1048100	2
k25	595	1632	10	4.2	38.08	336	130600	2

B.11 24c-5d-10k

Ships	Capacity (seats)	Engine Power (HP)	Speed (Knot)	Ship Draft (meter)	Fuel Consumption (Liter(s)/Mile)	Comission Days	Tank Capacity	Number of Machine
k6	2602	8700	17	5.9	111.71	336	1047900	2
k14	1198	2176	11	4.2	51.47	336	327940	2
k18	593	1632	10	4.2	32.18	336	130600	2
k20	1312	2176	11	4.2	51.76	336	360300	2
k22	2554	8700	17	5.7	102.72	336	1047900	2

Appendix C – Routes

C.1 Existing Routes (PT. PELNI in 2010)

Ships	Ports
AWU	Surabaya - Sampit - Surabaya - Benoa - Lembar - Bima - Waingapu - Ende - Kupang - Kalabahi - Larantuka - Kupang - Ende - Waingapu - Bima - Benoa - Surabaya - Kumai - Surabaya.
BINAIYA	Semarang - Kumai - Semarang - Sampit - Surabaya - Batulicin - Pare-Pare - Samarinda - Pare-Pare - Batulicin - Surabaya - Sampit - Semarang.
BUKIT RAYA	Tg. Priok - Blinyu - Kijang - Letung - Tarempa - Natuna - Midai - Serasan - Pontianak - Surabaya - Pontianak - Serasan - Midai - Natuna - Tarempa - Letung - Kijang - Blinyu - Tg. Priok.
BUKIT SIGUNTANG	Kupang - Lewoleba - Maumere - Makassar - Pare-pare - Balikpapan - Tarakan - Nunukan - Pare-pare - Makassar - Pare-pare - Balikpapan - Tarakan - Nunukan - Balikpapan - Pare-pare - Makassar - Maumere - Lewoleba - Kupang.
CIREMAI	Kijang - Tg Priok - Surabaya - Makassar - Bau-Bau - Ambon - Banda - Tual - Dobo - kaimana - Fak-Fak - Dobo - Tual - Banda - Ambon - Bau-Bau - Makassar - Surabaya - Tg Priok - Kijang.
DOBONSOLO	Kijang - Tg Priok - Surabaya - Pare-Pare - Balikpapan - Pantoloan - Toli-Toli - Tarakan - Nunukan - Toli-Toli - Pantoloan - Balikpapan - Pare-Pare - Makassar - Surabaya - Tg Priok - Kijang.
DORO LONDA	Surabaya - Balikpapan - Pantoloan - Bitung - Ternate - Sorong - Manokwari - Nabire - Serui - Jayapura - Serui - Nabire - Manokwari - Sorong - Ternate - Bitung - Pantoloan - Balikpapan - Surabaya.
GUNUNG DEMPO	Tg.Priok - Surabaya - Makassar - Ambon - Sorong - Biak - Jayapura - Biak - Sorong - Ambon - Makassar - Surabaya - Tg.Priok.
KELIMUTU	Surabaya - Benoa - Bima - Makassar - Bau-Bau - Wanci - Banda - Saumlaki - Tual - Dobo - Timika - Agats - Merauke - Agats - Timika - Dobo - Tual - Saumlaki - Banda - Wanci - Bau-Bau - Makassar - Bima - Benoa - Surabaya.
KELUD	Tg. Priok - Batam - Tg. Balai - Belawan - Tg. Balai - Batam - Tg. Priok.
KERINCI	Surabaya - Pare Pare - Balikpapan - Pantoloan - Toli-Toli - Tarakan - Nunukan - Toli-Toli - Pantoloan - Balikpapan - Pare Pare - Makassar - Surabaya.
LABOBAR	Tg.Priok - Surabaya - Makassar - Sorong - Manokwari - Nabire - Jayapura - Nabire - Wasior - Manokwari - Sorong - Makassar - Surabaya - Tg.Priok.

Ships	Ports
LAMBELU	Kijang - Tg Priok - Surabaya - Makassar - Bau-bau - Ambon - Namlea - Ternate - Bitung - Ternate - Namlea - Ambon - Bau-bau - Makassar - Surabaya - Tg Priok - Kijang.
LAWIT	Semarang - Pontianak - Surabaya - Pontianak - Tg.Pandan - Tg.Priok - Padang - GunungSitoli - Sibolga - Padang - Tg.Priok - Semarang.
LEUSER	Tg.Priok - Tg.Pandan - Pontianak - Semarang - Kumai - Surabaya - Sampit - Surabaya - Kumai - Semarang - Pontianak - Tg.Pandan - Tg.Priok.
NGGAPULU	Makassar - Bau-Bau - Ambon - Fak-Fak - Sorong - Manokwari - Wasior - Nabire - Serui - Biak - Jayapura - Biak - Serui - Nabire - Manokwari - Sorong - Fak-Fak - Ambon - Bau-Bau - Makassar.
PANGRANGO	Ambon - Geser - Bula - Geser - Ambon - Namrore - Ambon - Saumlaki - Tepa - Leti - Kisar - Ilwaki - Kupang - Ilwaki - Kisar - Leti - Tepa - Saumlaki - Ambon.
SANGIANG	Bitung - Ulusiau - Tahuna - Lirung - Karantung - Miangas - Karatung - Lirung - Tahuna - Ulusiau - Bitung - Gorontalo - Tongkabu - Poso - Tongkabu - Gorontalo - Bitung - Ternate - Sanana - Namlea - Ambon - Namlea - Sanana - Ternate - Bitung.
SINABUNG	Tg. Priok - Semarang - Makassar - Bau-Bau - Banggai - Bitung - Ternate - Sorong - Manokwari - Biak - Serui - Jayapura - Serui - Biak - Manokwari - Sorong - Ternate - Bitung - Banggai - Bau-Bau - Makassar - Tg. Priok.
SIRIMAU	Kijang - Blinyu - Tg. Priok - Semarang - Batu Licin - Makassar - Larantuka - Kalabahi - Kupang - Larantuka - Makassar - Batu Licin - Semarang - Tg. Priok - Blinyu - Kijang.
TATAMAILAU	Bitung - Sorong - Fak-Fak - Kaimana - Timika - Agats - Merauke - Agats - Timika - Kaimana - Fak-Fak - Sorong - Bitung.
TIDAR	Surabaya - Pare-Pare - Pantoloan - Nunukan - Tarakan - Balikpapan - Pare-Pare - Surabaya - Makassar - Pare-Pare - Balikpapan - Tarakan - Nunukan - Pantoloan - Pare-Pare - Makassar - Surabaya.
TILONG KABILA	Denpasar - Lembar - Bima - Labuanbajo - Makassar - Bau-Bau - Raha - Kendari - Kolonedale - Luwuk - Gorontalo - Bitung - Gorontalo - Luwuk - Kolonedale - Kendari - Raha - Bau-Bau - Makassar - Labuanbajo - Bima - Lembar - Denpasar.
UMSINI	Surabaya - Pare Pare - Balikpapan - Pantoloan - Toli-Toli - Tarakan - Nunukan - Toli-Toli - Pantoloan - Balikpapan - Pare Pare - Makassar - Surabaya.
WILIS	Surabaya - Benoa - Bima - Labuanbajo - Marapokot - Maumere - Makassar - Samarinda - Makassar - Maumere - Marapokot - Labuanbajo - Bima - Benoa - Surabaya.

C.2 Routes Generated by PELNI Method

Ships	Ports	Travel Distance (miles)	Travel Time (minutes)
AWU	d10 - c52 - d10 - d4 - c29 - c8 - c70 - c12 - d6 - c20 - c28 - d6 - c12 - c70 - c8 - d4 - d10 - c26 - d10.	3,347	295
BINAIYA	d9 - c26 - d9 - c52 - d10 - c5 - c48 - c51 - c48 - c5 - d10 - c52 - d9.	3,542	271
BUKIT RAYA	d11 - c9 - c23 - c31 - c63 - c44 - c40 - c55 - d8 - d10 - d8 - c55 - c40 - c44 - c63 - c31 - c23 - c9 - d11.	3,478	264
BUKIT SIGUNTANG	d6 - c33 - c37 - d7 - c48 - d2 - c62 - c45 - c48 - d7 - c48 - d2 - c62 - c45 - d2 - c48 - d7 - c37 - c33 - d6.	4,152	248
CIREMAI	c23 - d11 - d10 - d7 - c6 - d1 - c2 - c68 - c11 - c19 - c13 - c11 - c68 - c2 - d1 - c6 - d7 - d10 - d11 - c23.	5,405	318
DOBONSOLO	c23 - d11 - d10 - c48 - d2 - c47 - c66 - c62 - c45 - c66 - c47 - d2 - c48 - d7 - d10 - d11 - c23.	4,658	260
DORO LONDA	d10 - d2 - c47 - d5 - d12 - c58 - c35 - c41 - c56 - c18 - c56 - c41 - c35 - c58 - d12 - d5 - c47 - d2 - d10.	4,766	276
GUNUNG DEMPO	d11 - d10 - d7 - d1 - c58 - c7 - c18 - c7 - c58 - d1 - d7 - d10 - d11.	4,880	266
KELIMUTU	d10 - d4 - c8 - d7 - c6 - c71 - c2 - c54 - c68 - c11 - c65 - c1 - c38 - c1 - c65 - c11 - c68 - c54 - c2 - c71 - c6 - d7 - c8 - d4 - d10.	5,392	491
KELUD	d11 - c4 - c60 - d3 - c60 - c4 - d11.	1,820	102
KERINCI	d10 - c48 - d2 - c47 - c66 - c62 - c45 - c66 - c47 - d2 - c48 - d7 - d10.	2,884	182
LABOBAR	d11 - d10 - d7 - c58 - c35 - c41 - c18 - c41 - c72 - c35 - c58 - d7 - d10 - d11.	5,066	261
LAMBELU	c23 - d11 - d10 - d7 - c6 - d1 - c42 - d12 - d5 - d12 - c42 - d1 - c6 - d7 - d10 - d11 - c23.	4,966	263
LAWIT	d9 - d8 - d10 - d8 - c61 - d11 - c46 - c16 - c57 - c46 - d11 - d9.	3,923	344
LEUSER	d11 - c61 - d8 - d9 - c26 - d10 - c52 - d10 - c26 - d9 - d8 - c61 - d11.	3,482	295
NGGAPULU	d7 - c6 - d1 - c13 - c58 - c35 - c72 - c41 - c56 - c7 - c18 - c7 - c56 - c41 - c35 - c58 - c13 - d1 - c6 - d7.	4,170	230
PANGRANGO	d1 - c14 - c10 - c14 - d1 - c43 - d1 - c54 - c64 - c30 - c24 - c17 - d6 - c17 - c24 - c30 - c64 - c54 - d1.	2,760	246

Ships	Ports	Travel Distance (miles)	Travel Time (minutes)
SANGIANG	d5 - c69 - c59 - c32 - c21 - c39 - c21 - c32 - c59 - c69 - d5 - c15 - c67 - c49 - c67 - c15 - d5 - d12 - c53 - c42 - d1 - c42 - c53 - d12 - d5.	2,538	211
SINABUNG	d11 - d9 - d7 - c6 - c3 - d5 - d12 - c58 - c35 - c7 - c56 - c18 - c56 - c7 - c35 - c58 - d12 - d5 - c3 - c6 - d7 - d11.	5,524	284
SIRIMAU	c23 - c9 - d11 - d9 - c5 - d7 - c28 - c20 - d6 - c28 - d7 - c5 - d9 - d11 - c9 - c23.	3,922	297
TATAMAILAU	d5 - c58 - c13 - c19 - c65 - c1 - c38 - c1 - c65 - c19 - c13 - c58 - d5.	3,060	249
TIDAR	d10 - c48 - c47 - c45 - c62 - d2 - c48 - d10 - d7 - c48 - d2 - c62 - c45 - c47 - c48 - d7 - d10.	4,806	268
TILONGKABILA	d4 - c29 - c8 - c27 - d7 - c6 - c50 - c22 - c25 - c34 - c15 - d5 - c15 - c34 - c25 - c22 - c50 - c6 - d7 - c27 - c8 - c29 - d4.	3,046	259
UMSINI	d10 - c48 - d2 - c47 - c66 - c62 - c45 - c66 - c47 - d2 - c48 - d7 - d10.	2,884	181
WILIS	d10 - d4 - c8 - c27 - c36 - c37 - d7 - c51 - d7 - c37 - c36 - c27 - c8 - d4 - d10 .	2,782	234

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