Exersise 6	The tests were run for 20,000 iterations of 4 hours (whichever came first)										

Elitisim Selection, Order Crossover and Inversion Mutation — **Average/Standard Deviation (Population Size)** — **Final Results**

TSP	Generations	Average (10)	SD(10)	Average (20)	SD(20)	Average (50)	SD(50)	Average (100)	SD(100)	Minumum	SD Average
EIL51	5000	467.39	6.22	476.18	13.46	474.55	14.59	473.26	5.07	467.39	9.835
EIL51	10000	459.83	12.67	465.48	2.34	469.57	11.03	466.61	1.65	459.83	6.9225
EIL51	20000	451.07	6.21	469.45	19.69	468.06	7.15	465.37	4.73	451.07	9.445
EIL76	5000	650.73	21.57	662.61	14.7	645.62	7.27	670	4.93	645.62	12.1175
EIL76	10000	612.19	14.38	598.96	12.68	613.05	3.81	615.34	4.83	598.96	8.925
EIL76	20000	605.9	25.24	586.57	17.5	581.24	10.2	600.32	4.02	581.24	14.24
EIL101	5000	865.69	24.29	861.84	6.09	870.12	9.66	822.11	9.7	822.11	12.435
EIL101	10000	774.31	15.1	734.67	4.72	790.01	15.25	753.02	4.15	734.67	9.805
EIL101	20000	717.02	21.43	711.63	4.94	720.01	15.24	710.58	9.39	710.58	12.75
ST70	5000	802.85	39.83	776.28	4.45	813.13	10.02	785.85	10.85	776.28	16.2875
ST70	10000	722.6	18.3	753.36	14.02	757.07	22.18	754.36	4.73	722.6	14.8075
ST70	20000	709.43	34.27	740.28	25.171	754.22	19.36	744.52	12.01	709.43	22.70275
kroA100	5000	29317.92	387.97	33046.23	1196.43	33639.39	635.35	33565.01	514.95	29317.92	683.675
kroA100	10000	26116.92	820.42	28373.21	900.5	26697.22	755.06	28906.73	149.43	26116.92	656.3525
kroA100	20000	23972.26	855.98	23830.53	433.39	24523.91	342.68	24650.85	294.61	23830.53	481.665
kroC100	5000	30584.93	148.19	31721.81	1080.95	31953.97	593.53	28399.05	453.05	28399.05	568.93
kroC100	10000	26098.87	1717.26	27430.21	250.87	26695.32	178.02	25731.11	215.86	25731.11	590.5025
kroC100	20000	24149.35	2179.36	23303.08	851.53	23765.64	812.59	2396.9	359.56	2396.9	1050.76
lin105	5000	23946.53	799.92	23423.18	228.26	24235.93	196.87	21998.73	430.65	21998.73	413.925
lin105	10000	18886.84	1288.95	17618.82	178.44	19882.11	391.7	17266.38	106.56	17266.38	491.4125
lin105	20000	16683.03	825.61	16925.05	108.43	15534.16	216.04	17609.1	232.79	15534.16	345.7175
pcb442	5000	286655.6503	209.5923737	274881.4317	743.3735521	264816.7213	774.7940231	283162.2079	1435.697531	264816.7213	790.86437
pcb442	10000	207431.8435	214.2427967	206280.0706	698.9495706	203902.2723	757.7290698	206839.0054	789.9693733	203902.2723	615.2227026
pcb442	20000	143819.9635	319.5234435	148486.6093	338.490426	140676.3302	312.9790684	151154.5873	477.3141831	140676.3302	362.0767803
pr2392	5000	10068121.27	1703.891638	10248333.17	3960.442915	10434676.98	11925.73551	10248556.89	23030.53196	10068121.27	10155.15051
pr2392	10000	8056039.892	1625.784978	8170900.293	2889.741005	8543426.562	4203.161473	8209375.038	8553.62178	8056039.892	4318.077309
pr2392	20000	6009929.877	3322.290951	6171823.198	3547.850708	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	6009929.877	3435.07083
usa13509	5000	2105863643	155119.77	2088589920	161937.584	2110792969	528036.7607	2104314474	1130475.565	2088589920	493892.4199
usa13509	10000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
usa13509	20000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
								Average Distance and SD		70451055.94	17896.62397

Elitisim Selection, Edge Recombination and Inversion Mutation — **Average/Standard Deviation (Population Size)** — **Final Results**

TSP	Generations	Average (10)	SD(10)	Average (20)	SD(20)	Average (50)	SD(50)	Average (100)	SD(100)	Minimum	SD Average
EIL51	5000	494.67	12.27	454.45	14.57	460.29	8.05	483.38	3.84	454.45	9.6825
EIL51	10000	479.63	28.69	440.96	2.69	453.38	3.06	475.35	6.42	440.96	10.215
EIL51	20000	470.02	12.53	441.73	7.14	451.87	1.16	472.98	0.8	441.73	5.4075
EIL76	5000	651.29	19.95	661.27	7.55	670.2	9.98	664.99	6.93	651.29	11.1025
EIL76	10000	619.01	16	612.37	19.5	618.14	5	628.83	6.26	612.37	11.69

EIL76	20000	612.29	8.98	608.94	17.42	600.01	4.45	613.48	1.72	600.01	8.1425
EIL101	5000	888.65	24.87	864.38	21.14	893.46	8.58	876.42	5.44	864.38	15.0075
EIL101	10000	777.17	10.33	749.63	5.51	770.22	8.11	788.05	8.9	749.63	8.2125
EIL101	20000	712.51	2.77	709.63	20.67	713.61	4.33	740.76	8.29	709.63	9.015
ST70	5000	758.86	19.98	793.67	6.37	823.06	18.23	829.17	9.99	758.86	13.6425
ST70	10000	737.09	48.26	749.17	15.92	750.73	16.13	730.52	9.86	730.52	22.5425
ST70	20000	717.45	20.58	746.91	28.67	719.57	7.89	708.99	18.6	708.99	18.935
kroA100	5000	34552.46	554.94	33444.63	274.33	34625.47	472.21	35627.57	703.38	33444.63	501.215
kroA100	10000	29652.53	633.06	28004.01	531.78	27227.2	151.73	26927	429.43	26927	436.5
kroA100	20000	252312.31	457.8	24386.49	911.75	23785.55	395.04	23645.23	232.37	23645.23	499.24
kroC100	5000	31657.447	758.86	34982.96	274.26	31323.9	677.74	35595.21	380.65	31323.9	522.8775
kroC100	10000	25501.84	1747.13	28766.85	577.88	27533.08	167.37	27271.69	370.95	25501.84	715.8325
kroC100	20000	23185.38	1667.36	25139.53	535.81	22925.76	198.37	23805.79	387.22	22925.76	697.19
lin105	5000	24116.09	1097.48	23370.16	100.61	23312.55	166.98	24572.41	259.49	23312.55	406.14
lin105	10000	18203.27	262.3	18714.92	385.4	18589.49	210.56	19542.95	316.52	18203.27	293.695
lin105	20000	16178.77	505.06	16093.19	666.49	16593.97	35.95	16953.21	121.42	16093.19	332.23
pcb442	5000	276771.5456	293.5691178	280600.7726	473.6654135	280704.7059	1022.506479	281687.677	1192.514119	276771.5456	745.5637823
pcb442	10000	214154.7446	93.60131563	201878.6697	404.2315315	202889.7638	690.4150356	197867.5968	652.8199864	197867.5968	460.2669673
pcb442	20000	148935.1664	770.3352592	150468.1763	346.3702601	143898.0561	735.6177156	141316.8024	592.9960437	141316.8024	611.3298197
pr2392	5000	10891777.77	6797.08003	11216216.12	3150.247397	10861755.15	12469.83277	11989861.16	17842.09572	10861755.15	10064.81398
pr2392	10000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
pr2392	20000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
usa13509	5000	2132518660	278598.9186	2132975178	477840.0057	2135059741	552743.6174	2129164855	1305627.28	2129164855	653702.4553
usa13509	10000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
usa13509	20000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
								Average Distance and SD		71362388.89	22337.76483

Tournament Selection, Order Crossover and Inversion Mutation		Average/Standard Deviation (Population Size)								Final Results	
TSP	Generations	Average (10)	SD(10)	Average (20)	SD(20)	Average (50)	SD(50)	Average (100)	SD(100)	Minimum	Average SD
EIL51	5000	476.45	22.66	474.69	3.09	524.57	6.26	593.57	6.84	474.69	9.7125
EIL51	10000	454.86	19.04	461.58	12.42	468.53	3.55	503.63	4.9	454.86	9.9775
EIL51	20000	456	22.76	448.51	17.28	445.03	2.13	451.9	3.67	445.03	11.46
EIL76	5000	694.17	27.06	709.39	5.15	848.79	7.56	953.14	8.67	694.17	12.11
EIL76	10000	609.42	7.76	614.82	3.69	699.57	6.56	793.64	10.01	609.42	7.005
EIL76	20000	610.66	17.86	591.12	10.61	640.03	4.78	652.68	5.08	591.12	9.5825
EIL101	5000	890.81	8.55	975.36	3.93	1208.43	7.72	1373.97	10.96	890.81	7.79
EIL101	10000	751.97	20.76	805.09	2.12	948.33	4.5	1081.45	9.15	751.97	9.1325
EIL101	20000	707.5	3.34	720.61	5.13	812.44	4.87	852.52	8.76	707.5	5.525
ST70	5000	830.2	32.09	917.58	22.27	1061.36	8.28	1151.72	15.15	830.2	19.4475
ST70	10000	720.53	48.71	819.34	33.07	893.72	4.49	971.32	13.08	720.53	24.8375
ST70	20000	776.28	4.45	766.96	7.57	785.92	6.45	821.09	5.8	766.96	6.0675
kroA100	5000	35360.49	452.35	38614.65	457.06	45777.95	335.68	58608.58	620.98	35360.49	466.5175

kroA100	10000	26995.54	78.43	30581.86	783.86	35685.82	224.56	43255.97	342.78	26995.54	357.4075
kroA100	20000	24186.79	1380.16	25237.23	272.1	28390.85	675.46	33967.37	766.53	24186.79	773.5625
kroC100	5000	33640	1552.14	34347.76	357.49	47645.15	529.2	57917.14	652.78	33640	772.9025
kroC100	10000	28419.55	579.25	28913.25	480.16	33267.6	286.7	45288.22	621.22	28419.55	491.8325
kroC100	20000	25693.51	1421.63	25139.77	498.42	26889.54	612.1	33048.07	317.21	25139.77	712.34
lin105	5000	24880.13	662.12	28716.6	850.52	31731.62	206.65	43343.03	598.05	24880.13	579.335
lin105	10000	19327.47	343.78	21083.55	823.25	24026.9	273.24	31409.93	251.55	19327.47	422.955
lin105	20000	17554.41	172.88	16648.02	67.62	18895.17	380.08	23937.47	346.02	16648.02	241.65
pcb442	5000	274466.7975	703.2391265	344167.5012	893.937529	416604.8379	1124.148148	494434.9625	1360.779336	274466.7975	1020.526035
pcb442	10000	199161.1477	737.7669378	252378.1647	458.9918217	318894.616	977.8104071	392644.9898	1255.353947	199161.1477	857.4807783
pcb442	20000	147751.0698	1165.502137	185086.2977	800.5963514	235914.5485	597.6987648	289799.2323	616.786705	147751.0698	709.7448571
pr2392	5000	10534235.03	3460.407501	11390402.49	4359.576902	12695863.09	6209.530892	13450742.98	8552.677827	10534235.03	5645.54828
pr2392	10000	8551616.387	2600.261139	9404251.833	6110.317175	11167347.73	5117.148709	10205464.82	8481.012068	8551616.387	5577.184773
pr2392	20000	6502929.788	2600.261139	7298213.744	2040.016879	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	6502929.788	2320.139009
usa13509	5000	2096479046	184335.5532	2115656420	416074.1181	2120813581	169953.5273	2117050400	227998.7858	2096479046	249590.4961
usa13509	10000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
usa13509	20000	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	POST-4HRS	0	0
								Average Distance and SD		70764391.39	9022.408994

Experiment 2: The tests were run for 20,000 iterations of 4 hours (whichever came first)

TSP	Average	SD	Generations
EIL51	478.2556012	11.13744693	20000
EIL76	630.0892046	13.10507545	20000
EIL101	708.785266	13.67823732	20000
ST70	805.0564599	7.032643477	20000
kroA100	23547.39452	124.2758049	20000
kroC100	23193.64026	220.5500468	20000
lin105	16893.95736	614.8507193	20000
pcb442	143813.121	644.5763787	20000
pr2392	6187739.44	5082.601876	20000
usa13509	2073800403	456291.7365	1416

Excersise 7 The following code tests the inner over technique. The tests were run for 20,000 iterations of 4 hours (whichever came first)

InverOver	Generations	Average (50)	SD (50)	Iterations
EIL51	20000	446.03	5.25	- 30 iterations
EIL76	20000	581.99	8.7	- 30 iterations
EIL101	20000	697.57	13.6	- 30 iterations
ST70	20000	708.45	15.15	-18 iterations
kroA100	20000	24530.47	687.54	- 8 iterations
kroC100	20000	22866.75	635.47	-30 iterations
lin105	20000	15546.65	457.06	- 13 iterations
pcb442	20000	193183.41	4090.79	- 2 iterations

pr2392	20000	POST-4HRS	POST-4HRS	No iteration run							
usa13509	20000	POST-4HRS	POST-4HRS	No iteration run							