Ant Colony Optimization

Assignment #4

Due: Tuesday, March 7th

Implement an ant colony optimization algorithm to solve the Traveling Salesman Problem for the same distance matrix used before with the GA assignment.

Bakersfield																								
129	Barstow																							
206	153	Carlsbad																						
569	696	777	Eureka																					
107	236	315	462	Fresno																				
360	395	780	398	388	Lake Tahoe, So.																			
284	155	312	797	408	466	Las Vegas																		
144	139	82	713	251	479	314	Long Beach																	
115	130	93	694	222	456	302	29	Los Angeles																
162	291	370	407	55	194	446	306	277	Merced															
200	329	406	369	93	156	484	344	315	37	Modesto														
231	360	428	388	152	266	504	364	335	118	153	Monterey													
288	417	496	291	181	195	567	432	403	126	88	111	Oakland												
226	123	116	795	333	435	276	112	111	388	426	446	514	Palm Springs											
436	565	644	150	329	249	640	580	551	274	236	325	214	682	Redding										
272	401	480	314	185	107	587	416	387	110	72	185	87	498	164	Sacramento									
174	71	827	43	281	436	228	68	59	336	374	394	462	52	610	446	San Bernardino								
231	176	23	800	338	542	332	105	116	393	431	451	519	139	667	503	105	San Diego							
297	426	505	272	190	192	568	441	412	135	97	116	9	523	223	87	471	528	San Francisco						
252	381	460	317	145	197	524	396	367	114	82	71	40	478	254	114	426	483	45	San Jose					
118	247	293	504	137	197	414	229	200	192	230	135	227	311	411	301	259	316	232	187	San Luis Obispo				
146	225	188	609	242	492	354	124	95	297	335	240	332	206	546	406	254	211	337	292	105	Santa Barbara			
258	387	466	349	151	229	524	402	373	118	114	45	72	484	286	146	432	489	77	32	180	285	San Cruz		
347	476	565	222	240	199	610	491	462	185	147	166	59	573	251	103	521	578	50	95	282	387	127	Santa Rosa	
121	250	329	544	82	335	408	265	236	137	175	234	263	347	411	247	295	352	272	227	174	287	233	322	Sequoia Park
227	356	435	356	120	131	510	371	342	65	27	140	75	453	209	45	401	458	84	69	256	361	101	134	202
200	329	408	488	93	133	435	344	315	81	119	199	207	426	355	191	374	431	216	195	230	335	199	266	175

Stockton

146 Yosemite

You must author your own code using either the C++, Java or Python programming language and without the use of *external* software packages. Your project submission will be run through a source code verifier against previous submissions to check for plagiarism. Any evidence of cheating (CODE NOT WRITTEN SOLEY BY YOU) will result in a failing grade for this course. Treat this seriously. I do!

Your program should create an output file containing the best tour generating at each step. When submitting your assignment include:

- the output file
- your input data file containing the distance matrix
- a copy or your source code
- a README file containing any information required to run your program.

As before, this project is worth 25 points, and 4 points of the score will be based on how good of a solution your ACO is able to find. Strong solutions (lower/lowest cost tours) will

receive the full 4 points, weak solutions will receive 0 points, and solutions in between will receive 1-3 points. Take your time with this project and investigate different values for m (the number of ants), ρ (the evaporation rate), α (the initial pheromone intensity), β and Q in order to find the best answer you can!

Feel free to consult the ACO literature on the Traveling Salesman Problem.