Project 5: TSP - GA with Wisdom of Artificial Crowds

- Learning objectives. At the completion of this project, you should be able to:
    - Implement a hybrid algorithm for solving TSP which combines Genetic Algorithm with a Wisdom of Crowds approach.
    - Be able to evaluate a novel algorithm for solving an NP-Complete problem.

- Problem
    - Read: "*Wisdom of the Crowds in Traveling Salesman Problems*" by Sheng Kung Michael Yi, Mark Steyvers, Michael D. Lee and Matthew J. Dry.
    - Modify you GA from Programming Assignment 4 to utilize the Wisdom of Crowds
    - Test data will be supplied, but also generate your own test cases

- Hints
    - Take a certain percentage (experimentally determine what percentage) of the fittest individuals in the population of solutions (let's call them experts) to the TSP and combine their solutions to produce a better solution.
    - Regardless of which approach you take to combine opinions of the experts make sure your final solution visits all nodes and does not visit any node multiple times (except the starting node).
    - If you detect that the resulting solution does not satisfy requirements of a TSP solution use a greedy algorithm of your choice to get it into the proper form.

- **Deliverables**

    - Well-commented source code for your project. You can use any language you like, but I reserve the right to ask you to demo performance of your algorithm on a new dataset.
    - Include a GUI with visual representation of the solutions for this project and incorporate snapshots in your report.
    - Project report (5-6 pages).

- **The following should be included in your report:**

    - Describe in detail the algorithm you used to aggregate opinions. Did you have to alter the combined solution to make it a valid TSP solution?
    - On **average** how well did the Wisdom of Crowds approach perform compared to the standard unenhanced GA?
    - Comparison charts for GA vs. (GA & WOC) on same problems in terms of performance, speed, optimality of discovered solutions, etc.
    - Does the size of the problem make a difference? What is the largest you tested?
    - Report results of your experiments with multiple graphs, tables and figures. Look at: "*A Hybrid Heuristic for the Traveling Salesman Problem*" (included with the assignment) for some ideas on how to present results of your experiments.