Artificial Intelligence for Robotics

- Homework 7 -

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1. Answer the following questions regarding local search:
   - What are local search algorithms?
   - What are the advantages of local search?
   - When do we try to find the global minimum?
   - When do we try to find the global maximum?
   - What is the characteristic of a complete local search algorithm?
   - What is the characteristic of an optimal algorithm?
   - What is a landscape?
   - What is Hill Climbing ?
   - What is the problem of Hill Climbing ?
   - What drives the success of Hill Climbing ?
   - What is Simulated Annealing?
   - What is the condition that enables Simulated Annealing to find the optimal solution?
2. Travelling Salesman Problem (1)
   - On LEA you will find a text file that contains the latitude and longitude coordinates of some world cities. Your tasks are:
     (a) Using random-restart hill climbing, solve/implement the Traveling Salesman Problem (agent.cpp) for these cities (Find the cycle that covers all cities with the minimum cycle cost). You must restart the search at least 5 times. You can assume linear distance between cities, and that all cities are connected.
     (b) Discuss and comment on the performance of this algorithm.
3. 1 `https://en.wikipedia.org/wiki/Travelling_salesman_problem`

Notes

- Your are allowed to work in a team of two. **Team members must submit the same files. Each team member should be able to present the submitted solution.** Peer programming can be a useful resource.
- You can use any editor to complete this assignment. The following steps will show you how to use eclipse to compile and run your code:
  - Extract the files.
  - Open a terminal and go into the "air_assignment_07/build" directory.
  - Generate the MakeFile by running the command: cmake ..
  - Compile your code by running the command: make
  - Open eclipse.
  - Select File $->$ New $->$ MakeFile Project from Existing Code.
    - Project Name: Set this field to "air_assignment_07".
    - Exiting Code Location: Browse and select the "air_assignment_07" folder.
    - Toolchain for Indexer Settings: Select the option "Linux GCC".
    - Press finish.
  - Select your project in the Project Explorer and carry out the following actions:
    - Right click
    - Select properties
    - Select C/C++ Build
      - Change the build directory from ${workspace_loc:/air_assignment_07}/ to ${workspace_loc:/air_assignment_07}/build/
    - Select Run/Debug settings:
      - Select New
      - Select C/C++ Application
      - Press "OK"
      - Under the "Main" tab:
        1. Set "C/C++ Application:" to "bin/assignmet07".
      - Under the "Arguments" tab:
        1. Uncheck "Use default" under "Working Directory:".
        2. Change "Working Directory:" from ${workspace_loc:/air_assignment_07} to ${workspace_loc:/air_assignment_07}/bin/
  - Run your program.