CS 156 – Introduction to AI
Assignment 3

Instructions:

- Submission type: 1 file; a completed A3_LocalSearch.py
- Maximum points: 100
- Due: June 22nd, 11:59 PM
- Do not use AI tools to generate content for this assignment. You can use it for research, but all material submitted as answer should be your own. You should be ready to explain the logic and reasoning behind your answers.

Section 1– 100 points – completed A3_LocalSearch.py must be submitted.
Use the files in Assignment3.zip. The zip file consists of a Data.csv file and a A3_Local Search.py file.
About the Data.csv file: Assume that there are 100 possible sates in a state space.
States: Si where i $\in$ {1,2,.100} , Each state S1 and S100 have exactly 2 neighbors.
The neighborhood for any point Si i $\in$ {2,..99} is defined as {Si-1 and Si+1}
Data.csv file directly provides the reward/utility of every state (1 to 100). Column named "State" corresponds to state number and its respective row " Reward" corresponds to utility of the state.

A simple hill climbing method, without sideway moves, is implemented as an example in A3_Local Search.py. The file also has more instructions.

(40 points) Question 1
Complete the “HillClimWithSideways” function, that will allow sideways moves with 0.5 probability.
(60 points) Question 2
Complete the “SimulatedAnnealing” function to implement a Simulated annealing method which allows all upward moves and allows downward moves with probability p = e^(delta/T). Use a linearly decreasing T , that is, T=T-1 every iteration. The Algorithm must randomly select a neighbor with probability 0.5, and then allow downward moves with probability p. Note: delta stands for the difference in reward/utility of the states.