CSE422 Practice problems.

Local Search:

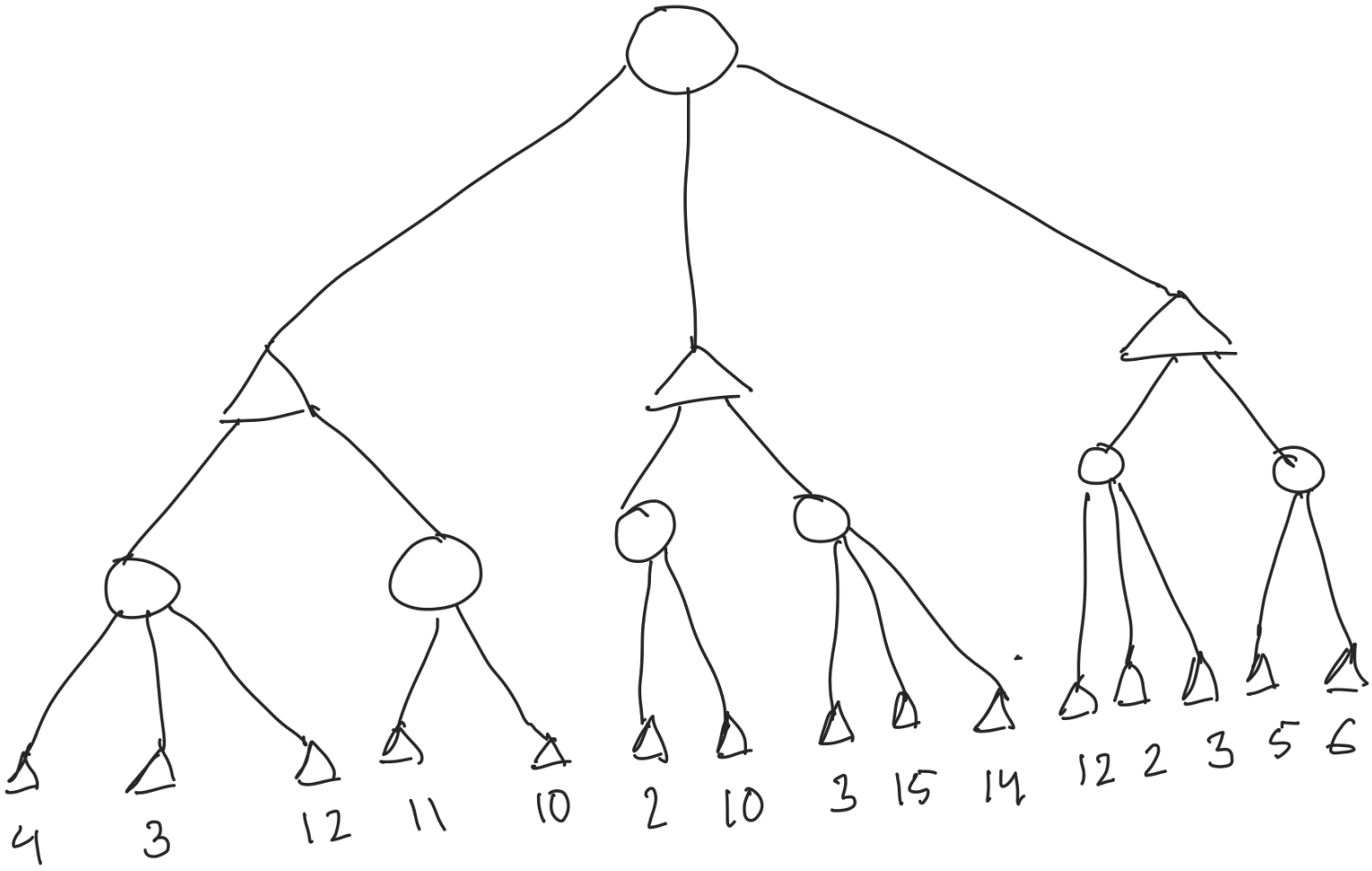
1. Using the 8-queen & 8-puzzle problem, illustrate the drawbacks of Hill-climbing.
    a. Hint: Use an 8-queen instance/8-puzzle, You may use the idea of heuristics to measure the objective function.
2. How are the concepts of global maxima and global minima used with respect to objective function in local search? Show an example.
    a. Hint: Again use 8-queen/8-puzzle problems. Use ideas like heuristics or fitness functions in explaining objective functions.
3. What are the key steps of simulated annealing?
4. How is the concept of probability implemented in Simulated annealing?
5. What is the relationship between Temperature and the probabilistic value e^{del E/T}?
6. With time how does the temperature change in the Simulated annealing algorithm? How does it affect the chances of selecting a bad neighbor?

Genetic Algorithm:

1. Using Genetic Algorithm, make a set of 4 numbers in between 51 to 100 such that both their sum and product are divisible by 6. Explain the significance of mutation function in GA with respect to this problem.

Games:

1. For the given game tree:



   a. Suppose the agent is currently at the Min state of the Mini-Max Algorithm. Which action will the Min state return? At each level show which value is returned. Show which branches will be pruned if alpha-beta instead of Minimax algorithm is used. Show the change of alpha, beta values at each step.
   b. Suppose the agent is currently at the max state of the Min-Max Algorithm. Which action will the Max state return? At each level show which value is returned.
   c. Between two players A and B. If A uses the Min-Max algorithm, which function does the program call/run first.
   d. Which algorithm is Mini-max algorithm similar to BFS, DFS, Greedy best? What are the cases when alpha-beta algorithm has the same space and time complexity as the Mini-max algorithm?