ARTIFICIAL INTELLIGENCE

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FA21-BCS-066

BCS-7A

HILL CLIMBING CODE IN JAVA AND ITS PYTHON CONVERSION

Java:

```java
import java.util.ArrayList;

public class Optimization {

    public static void main(String[] args) {

        System.out.println("=============== Iterative Cost Optimization ===============");

        int bestCost = h.computeCost(initial);

        int currentCost;

        ArrayList<Integer> currentSolution = new ArrayList<>(initial);

        ArrayList<Integer> bestSolution = new ArrayList<>(initial);

        ArrayList<ArrayList<Integer>> allSolutions = new ArrayList<>();

    for (int i = 0; i < initial.size(); i++) {

        int removedElement = currentSolution.remove(i);

        currentSolution.add(removedElement);

        currentCost = h.computeCost(currentSolution);

        if (currentCost < bestCost) {

            bestCost = currentCost;

            bestSolution = new ArrayList<>(currentSolution);

            System.out.println("Updated Best Solution: " + bestSolution);

            System.out.println("Updated Cost: " + bestCost);

}
```

```java
        allSolutions.add(new ArrayList<>(currentSolution));

    }

   System.out.println("=============== Optimization Complete ===============");

    System.out.println("Final Best Solution: " + bestSolution);

    System.out.println("Final Best Cost: " + bestCost);

 }

}
```

Python:

```python
print("=============== Iterative Cost Optimization ===============")

best_cost = h.compute_cost(initial)

current_solution = initial.copy()

best_solution = initial.copy()

all_solutions = []

for i in range(len(initial)):

    removed_element = current_solution.pop(i)

    current_solution.append(removed_element)

    current_cost = h.compute_cost(current_solution)

     if current_cost < best_cost:

       best_cost = current_cost

       best_solution = current_solution.copy()

          print(f"Updated Best Solution: {best_solution}")

       print(f"Updated Cost: {best_cost}")

    all_solutions.append(current_solution.copy())

Print("=============== Optimization Complete ===============")

print(f"Final Best Solution: {best_solution}")

print(f"Final Best Cost: {best_cost}")
```

OUTPUT:

=============== Iterative Cost Optimization ==============

Updated Best Solution: [2, 4, 7, 1]

Updated Cost: 14

Updated Best Solution: [4, 7, 1, 2]

Updated Cost: 13

Updated Best Solution: [7, 1, 2, 4]

Updated Cost: 12

Updated Best Solution: [1, 2, 4, 7]

Updated Cost: 10

=============== Optimization Complete ==============

Final Best Solution: [1, 2, 4, 7]

Final Best Cost: 10