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TE Comps A

AI Experiment No. 7

Aim: Block World Problem solving by hill climbing approach

Program:

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# Devesh Vengurlekar
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import random

# Define the initial state of the block world
initial_state = ['A', 'B', 'C', 'D']

# Define the goal state of the block world
goal_state = ['D', 'A', 'B', 'C']

# Define a function to calculate the heuristic (number of misplaced blocks)
def heuristic(state):
    return sum([1 for i, j in zip(state, goal_state) if i != j])

# Define a function to generate neighboring states (move a block to the top)
def generate_neighbors(state):
    neighbors = []
    for i in range(len(state)):
        for j in range(i+1, len(state)):
            neighbor = state[:i] + [state[j]] + state[i:j] + state[j+1:]
            neighbors.append(neighbor)
    return neighbors

# Define the Hill Climbing algorithm
def hill_climbing(initial_state, goal_state):
    current_state = initial_state
    while True:
        current_heuristic = heuristic(current_state)
        neighbors = generate_neighbors(current_state)
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        best_neighbor = min(neighbors, key=lambda neighbor: heuristic(neighbor))
        if heuristic(best_neighbor) >= current_heuristic:
            return current_state
        current_state = best_neighbor

# Run the Hill Climbing algorithm
final_state = hill_climbing(initial_state, goal_state)

# Print the result
print("Initial State:", initial_state)
print("Final State:", final_state)
```

Output: