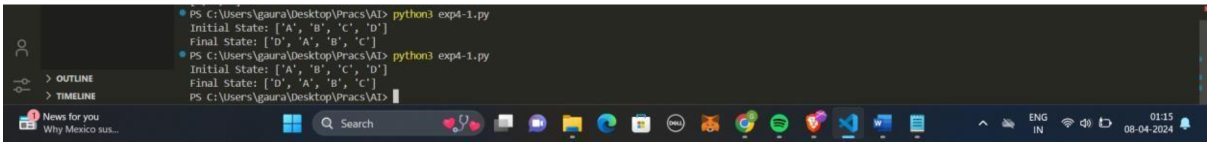
AI LAB 8 – 9762-Aditi Gupta– Batch D

Block world problem solving by Hill Climbing method:

CODE:

```
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', 'C', 'B', 'A']


# 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)
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:



```
PS C:\Users\gaura\Desktop\Pracs\AI> python3 exp4-1.py
Initial State: ['A', 'B', 'C', 'D']
Final State: ['D', 'A', 'B', 'C']
PS C:\Users\gaura\Desktop\Pracs\AI> python3 exp4-1.py
Initial State: ['A', 'B', 'C', 'D']
Final State: ['D', 'A', 'B', 'C']
PS C:\Users\gaura\Desktop\Pracs\AI> 
```