1. **Implement a program to demonstrate simple reflex agents.**

import random

# Constants

GRID\_SIZE = 3 # Size of the grid (3x3)

DIRTY = 'D'

CLEAN = 'C'

VACUUM = 'V'

# Create a grid with random dirt placement

def create\_grid(size):

grid = [[random.choice([DIRTY, CLEAN]) for \_ in range(size)] for \_ in range(size)]

return grid

# Print the grid

def print\_grid(grid, vacuum\_pos):

for i in range(len(grid)):

row = ''

for j in range(len(grid[i])):

if (i, j) == vacuum\_pos:

row += f'{VACUUM} '

else:

row += f'{grid[i][j]} '

print(row)

print()

# Simple Reflex Agent

def simple\_reflex\_agent(grid, vacuum\_pos):

x, y = vacuum\_pos

if grid[x][y] == DIRTY:

print(f"Cell ({x}, {y}) is dirty. Cleaning...")

grid[x][y] = CLEAN

else:

print(f"Cell ({x}, {y}) is clean. Moving to the next cell.")

# Get next position for the vacuum

def get\_next\_position(pos, grid\_size):

x, y = pos

if y < grid\_size - 1: # Move right if not at the end of the row

return x, y + 1

elif x < grid\_size - 1: # Move down to the next row

return x + 1, 0

return None # No more positions to move to (finished)

# Main Function

def main():

grid = create\_grid(GRID\_SIZE)

vacuum\_pos = (0, 0) # Start at the top-left corner

print("Initial Grid:")

print\_grid(grid, vacuum\_pos)

while vacuum\_pos:

simple\_reflex\_agent(grid, vacuum\_pos)

print\_grid(grid, vacuum\_pos)

vacuum\_pos = get\_next\_position(vacuum\_pos, GRID\_SIZE)

print("All cells are clean!")

if \_\_name\_\_ == "\_\_main\_\_":

main()