PRACTICAL FILE

MODELING AND SIMULATION LAB

(CS 603)

BE CSE 6TH SEM

(GROUP-4)

University Institute of Engineering and Technology (UIET), Panjab University, Chandigarh, India- 160014

Under the guidance of

Priyanka Mam

Department of Computer Science and Engineering

Submitted By

Ojas Arora

Roll No: UE223073

Practical 5

Aim

Simulation of Zigzag Walking Person.

Introduction to Zigzag Walking Person

The **Zigzag Walking Person** is a simulation that demonstrates a structured movement pattern where a person moves in a predefined zigzag manner. Unlike random walking, where the direction is unpredictable, zigzag walking follows a fixed sequence of movements (Left, Forward, Right, Forward, and repeats).

This type of movement is commonly seen in:

- **Everyday life** – A person navigating through a crowded space in a zigzag pattern.
- **Sports & Athletics** – Athletes performing agility drills using zigzag running.
- **Robotics & AI** – Autonomous robots using systematic zigzag scanning to explore areas.
- **Nature** – Animals moving in zigzag paths to evade predators or track prey.

Concept of Zigzag Walking Person

The movement pattern consists of three primary directions:

1. **Left (L):** Move one step left.
2. **Forward (F):** Move one step forward (upward).
3. **Right (R):** Move one step right.

This pattern repeats, creating a zigzag motion on a 2D plane.

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Code for Implementation of Simulation of Zigzag Walking Person

```
clc;
clear;
close all;
num_steps = 20;
x = zeros(num_steps+1, 1);
y = zeros(num_steps+1, 1);
directions = repmat(['L'; 'F'; 'R'; 'F'], ceil(num_steps/4), 1);
directions = directions(1:num_steps);
for i = 1:num_steps
    switch directions(i)
        case 'L'
            x(i+1) = x(i) - 1;
            y(i+1) = y(i);
        case 'R'
            x(i+1) = x(i) + 1;
            y(i+1) = y(i);
        case 'F'
            x(i+1) = x(i);
            y(i+1) = y(i) + 1;
    end
end
T = table((1:num_steps)', directions, x(2:end), y(2:end), ...
    'VariableNames', {'Step', 'Direction', 'X', 'Y'});
disp(T);
figure;
plot(x, y, '-o', 'LineWidth', 2);
grid on;
xlabel('X Position');
ylabel('Y Position');
title('Zigzag Walking Person Simulation');
 axis equal;
 hold on;
 scatter(x(1), y(1), 100, 'r', 'filled');
 scatter(x(end), y(end), 100, 'g', 'filled');
 hold off;
```

Output

Step	Direction	X	Y
1	L	-1	0
2	F	-1	1
3	R	0	1
4	F	0	2
5	L	-1	2
6	F	-1	3
7	R	0	3
8	F	0	4
9	L	-1	4
10	F	-1	5
11	R	0	5
12	F	0	6
13	L	-1	6
14	F	-1	7
15	R	0	7
16	F	0	8
17	L	-1	8
18	F	-1	9
19	R	0	9
20	F	0	10