**Scenario: Operating System Scheduling at TechWave Solutions**

TechWave Solutions is a mid-sized software company that runs a cloud-based ticketing system for customer support. The system handles multiple service requests (processes) that need to be scheduled efficiently to optimize response time and system performance.

The IT team, led by **Alex**, has been tasked with implementing an efficient CPU scheduling algorithm to manage customer requests. The company has different types of service requests, and the processing time for each request varies. Your team will analyze different scheduling approaches and decide which is best for different situations.

**Activity Instructions:**

Your team will act as **TechWave's IT Operations team**. You need to implement and compare various CPU scheduling algorithms based on given service requests.

**Step 1: Understanding the Processes**

TechWave receives five customer service requests at different times, as shown below:

| **Process** | **Arrival Time** | **Burst Time** | **Priority (1 = Highest)** |
| --- | --- | --- | --- |
| P1 | 0 ms | 8 ms | 3 |
| P2 | 1 ms | 4 ms | 1 |
| P3 | 2 ms | 9 ms | 4 |
| P4 | 3 ms | 5 ms | 2 |
| P5 | 4 ms | 2 ms | 5 |

**Step 2: Apply Different CPU Scheduling Algorithms**

Your task is to **simulate** and compare different scheduling algorithms to determine which one provides the best performance based on **waiting time, turnaround time, and response time**.

1. **First Come First Serve (FCFS)**
   * Schedule the processes based on arrival time.
   * Compute waiting time and turnaround time.
2. **Shortest Process First (SPF) – Non-preemptive**
   * Schedule processes based on the shortest burst time.
3. **Shortest Remaining Time First (SRTF) – Preemptive**
   * Select the process with the shortest remaining time.
4. **Round Robin (RR) – Preemptive** (Time Quantum = 3ms)
   * Each process gets 3ms before moving to the next in a cyclic manner.
5. **Priority Scheduling**
   * Execute processes based on priority (lower value = higher priority).

**Step 3: Analyze Performance**

After simulating each algorithm, calculate the following for each:

* **Waiting Time (WT)**: Time spent waiting in the ready queue.
* **Turnaround Time (TAT)**: Total time taken from arrival to completion.
* **Response Time (RT)**: Time from arrival to first CPU execution.

Compare the results and answer the following:

* Which scheduling algorithm is best for **minimizing waiting time**?
* Which scheduling algorithm is best for **fair resource allocation**?
* How does **preemptive scheduling** improve performance compared to non-preemptive?

**Submission Guidelines: Submit in PDF format.**

* **Part 1:** Write a short explanation of how each algorithm worked on the given data.
* **Part 2:** Present a table comparing **Waiting Time, Turnaround Time, and Response Time** for each algorithm.
* **Part 3:** Provide a short reflection on which scheduling algorithm would be best for a **real-time system** like customer support.