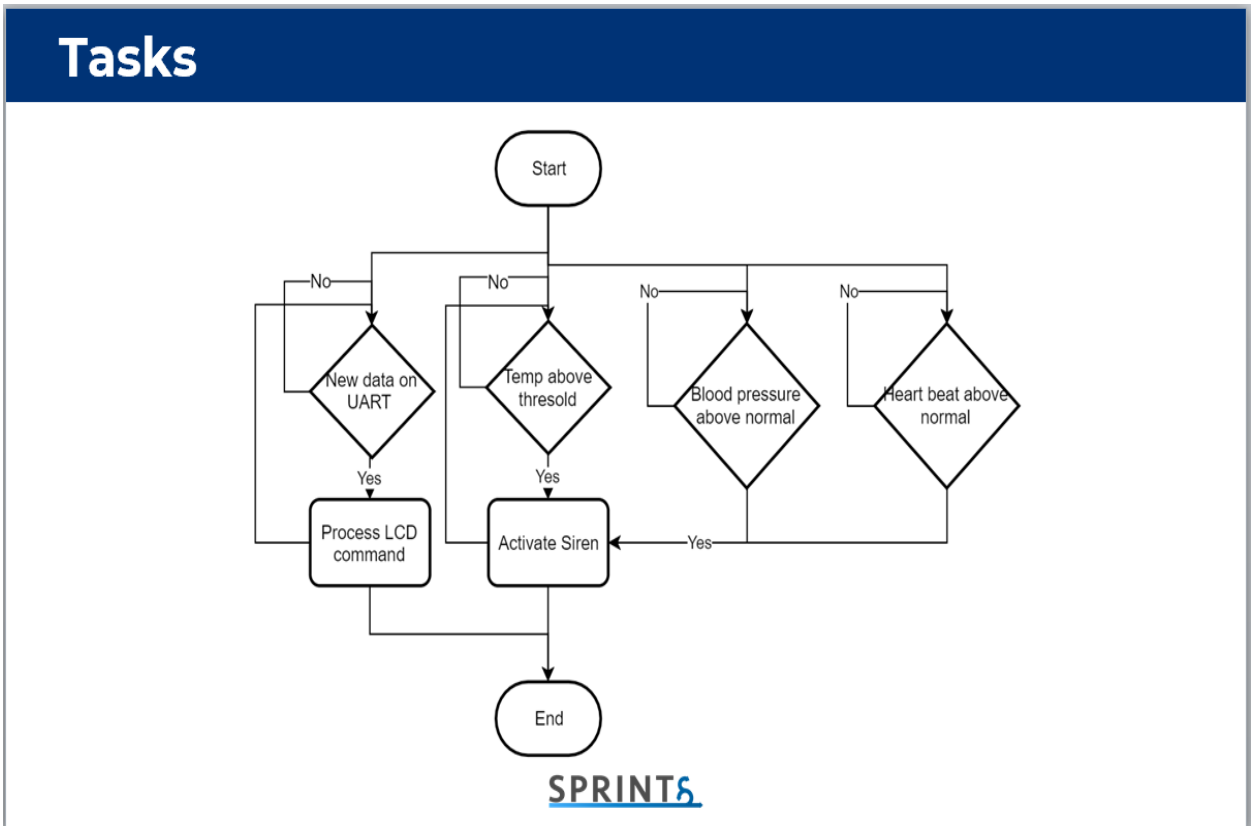
Sprints

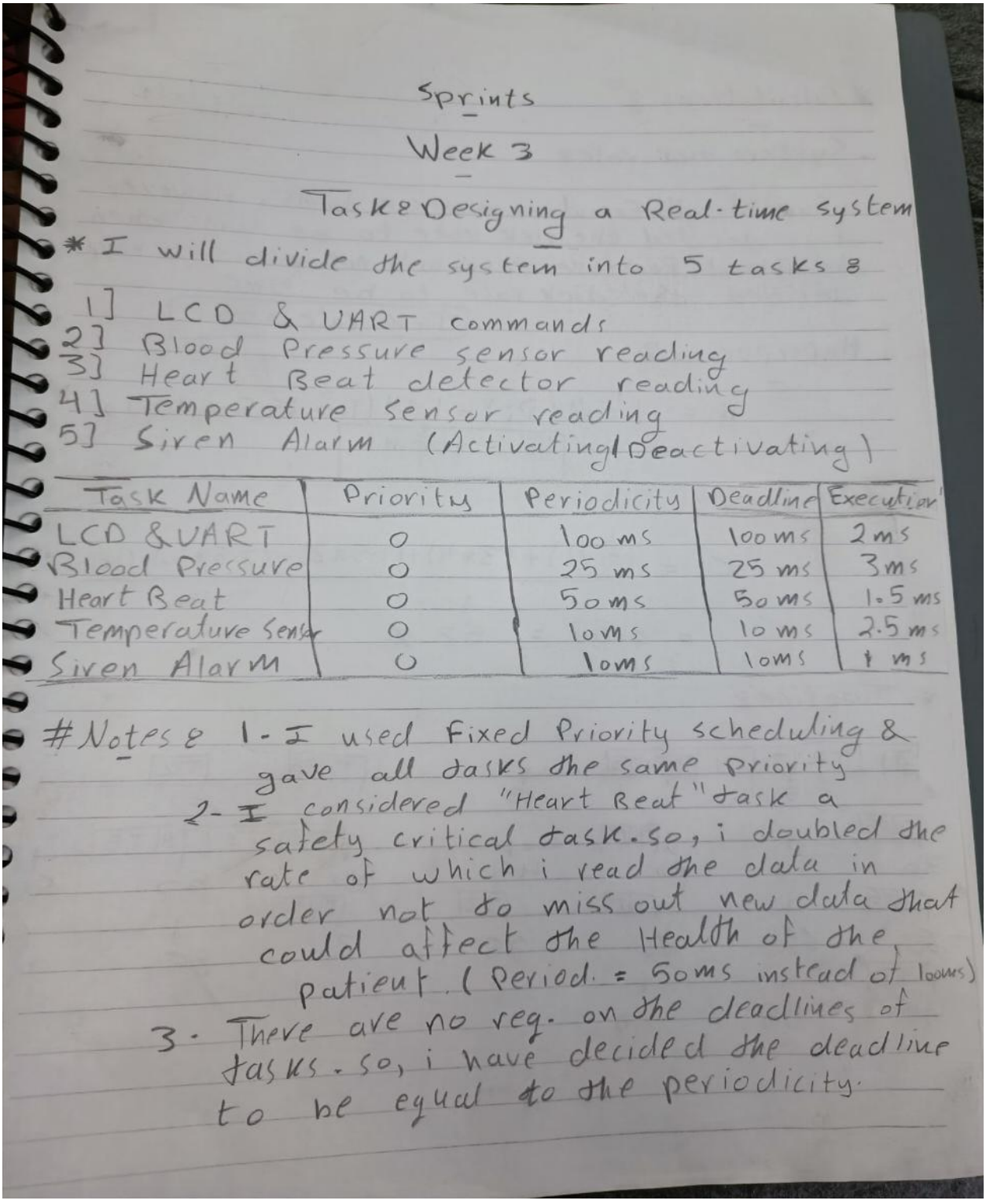
Week 3 Task

Designing a Real-Time System



Delivered By: Omar Adel Khedr

- **Hand Analysis**



Sprints

Week 3

Tasks Designing a Real-time system

* I will divide the system into 5 tasks :

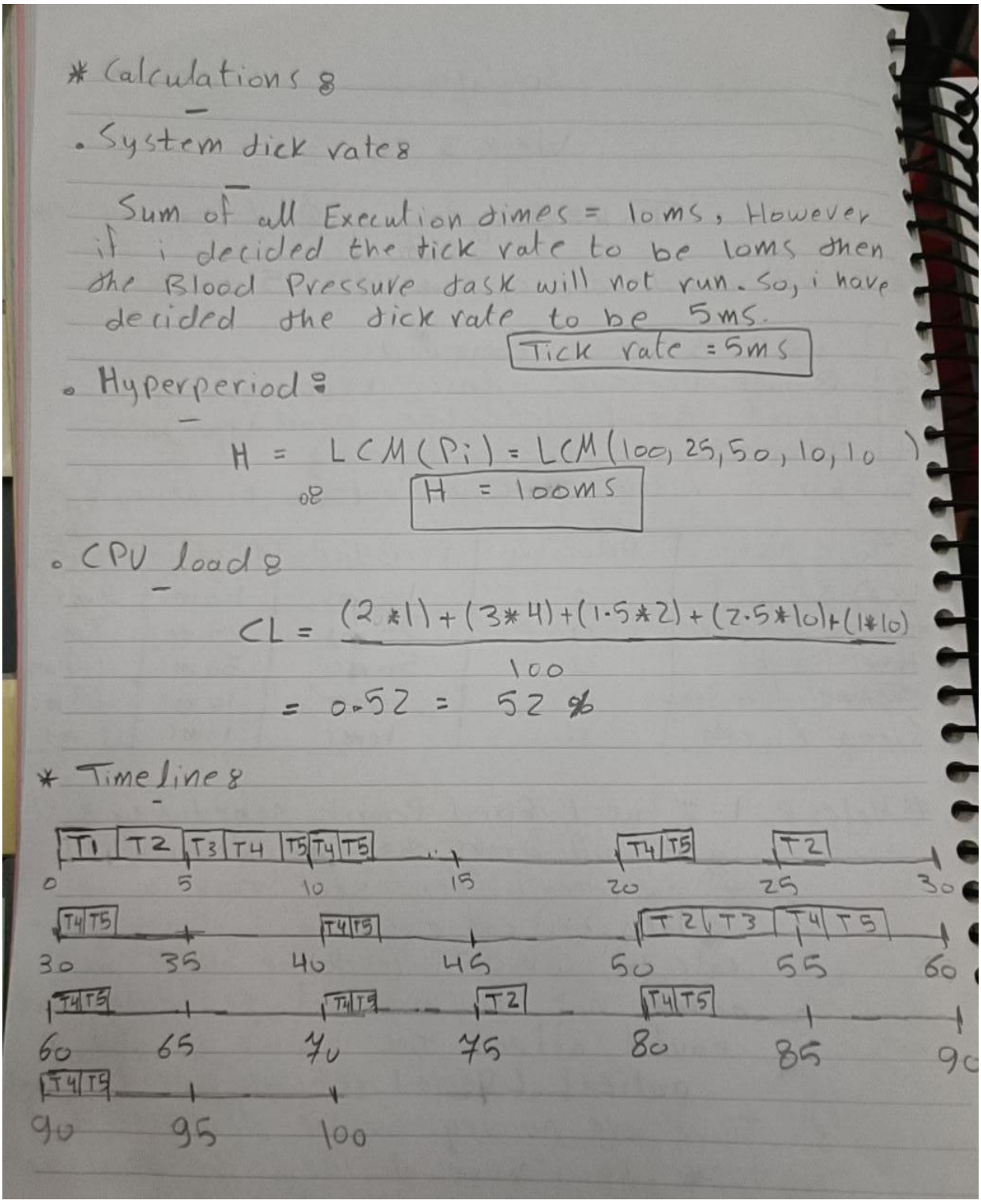
1] LCD & UART commands
2] Blood Pressure sensor reading
3] Heart Beat detector reading
4] Temperature sensor reading
5] Siren Alarm (Activating/Deactivating)

Task Name	Priority	Periodicity	Deadline	Execution
LCD & UART	0	100 ms	100 ms	2 ms
Blood Pressure	0	25 ms	25 ms	3 ms
Heart Beat	0	50 ms	50 ms	1.5 ms
Temperature Sens	0	10 ms	10 ms	2.5 ms
Siren Alarm	0	10 ms	10 ms	1 ms

#Notes : 1- I used Fixed Priority scheduling & gave all tasks the same priority

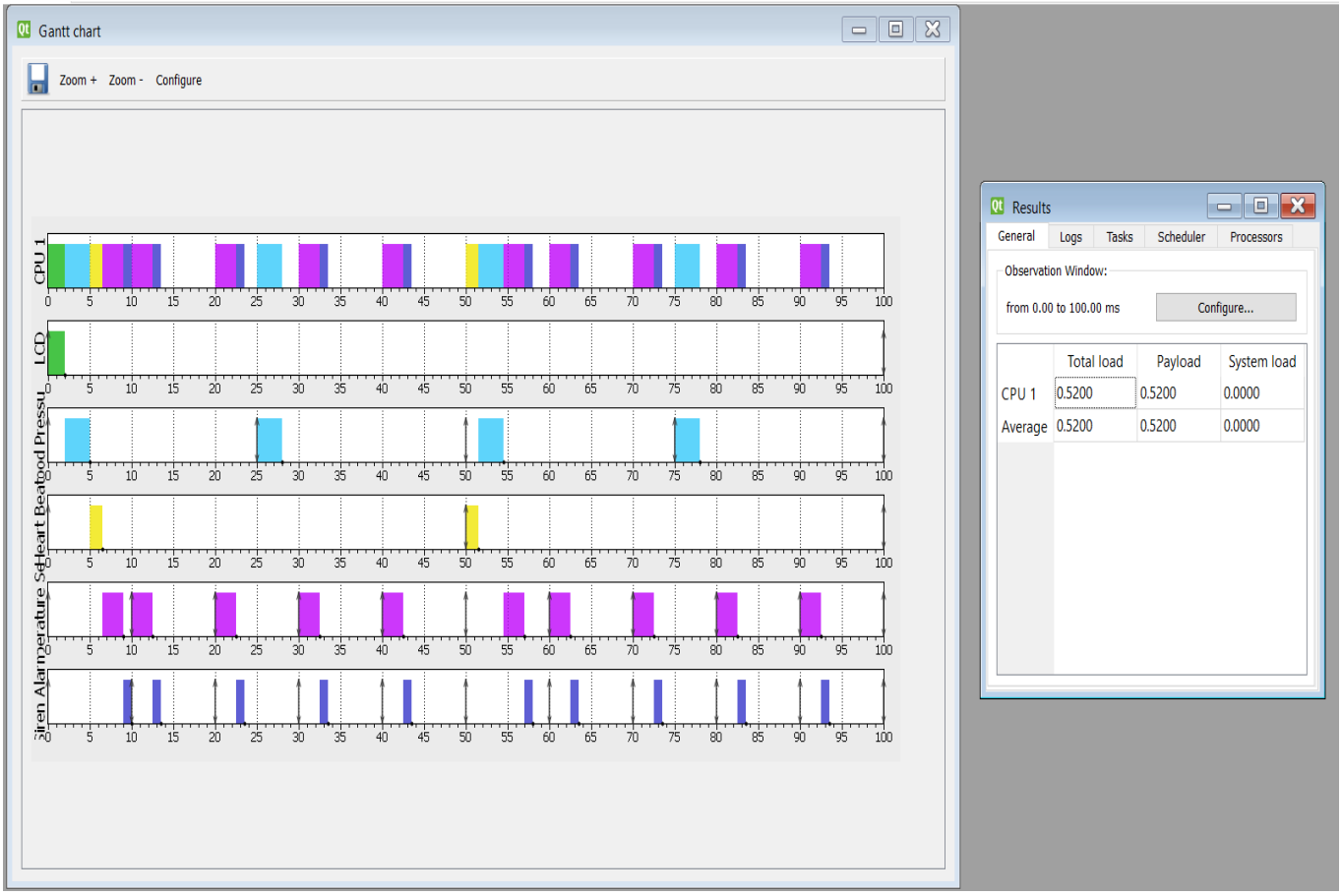
2- I considered "Heart Beat" task a safety critical task. so, i doubled the rate of which i read the data in order not to miss out new data that could affect the Health of the patient. (Period. = 50ms instead of 100ms)

3. There are no req. on the deadlines of tasks. so, i have decided the deadline to be equal to the periodicity.



From the analysis: The system is Schedulable as no task missed its deadline.

- **Simso Simulation Results**



- Comments

1. Simulation Results are the same as hand analysis but easier and quicker so it’s dependable and more effective in larger systems.
2. System is Schedulable.

3. We can decrease the CPU load by dividing the LCD & UART task into 2 tasks and make them on event tasks instead of periodic tasks, also we can make the Siren Alarm task on event task, but for the sake of demonstration I made it periodic and decided its periodicity depending on the least periodic task so that if any small change happens it’s detected and the alarm is activated so the health of the patient is not jeopardized.
4. CPU Load = 52%. So, System is healthy, however we can’t add more features if the schedule technique is Fixed Priority as in multiples of 100ms the execution time of all tasks is exactly 10ms, so if we added more tasks some tasks will miss their deadlines and this will make the system not schedulable.