Healthcare System

Design document

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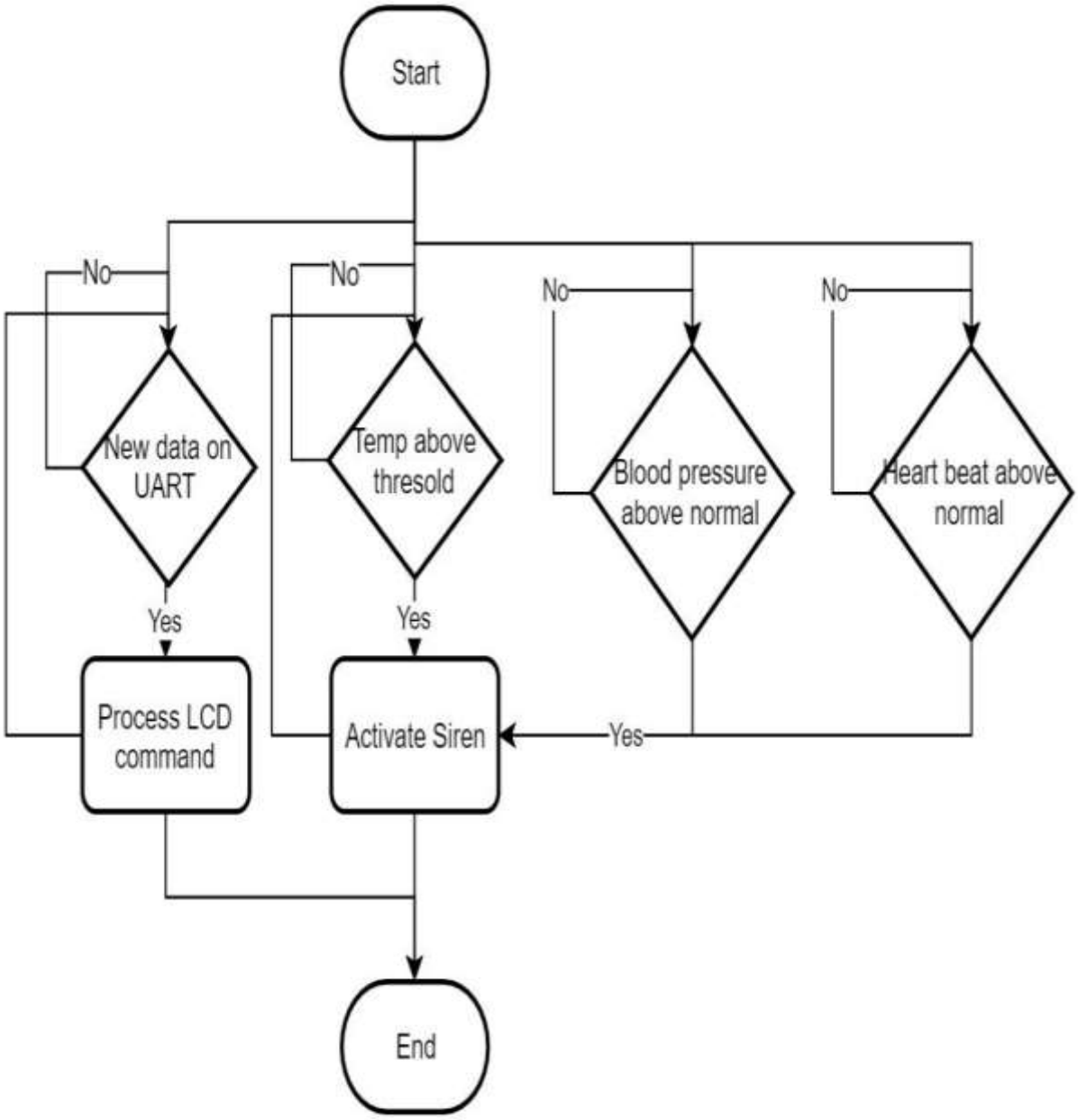
SPRINTS

System flowchart:



System tasks

Our system needs five tasks

Task parameters

T1 : Display

{P:100, E:5, D:100, PRIORITY:1 }

T2 : blood pressure sensor

{P:10, E:3, D:10, PRIORITY:3 }

T3 : heart beat detector

{P:50, E:1.5, D:50, PRIORITY:2 }

T4 : Temperature sensor

{P:5, E:2.5, D:5, PRIORITY:4 }

T5 : Alert siren

{P:50, E:1, D:50, PRIORITY:5 }

Comment:

- Tasks have Fixed priorities
- Scheduler is non preemptive
- For task 1 the execution time is equal to reading and processing the LCD command (2ms) + UART time (3ms)
- For task 5 the periodicity equal to 50 to ensure that there are a new data from the sensors in the system

System tick rate

Total execution time for all tasks = 5+3+1.5+2.5+1= 13ms

, so

The system tick time =20ms

Calculation

Hyperperiod (H) = 100ms

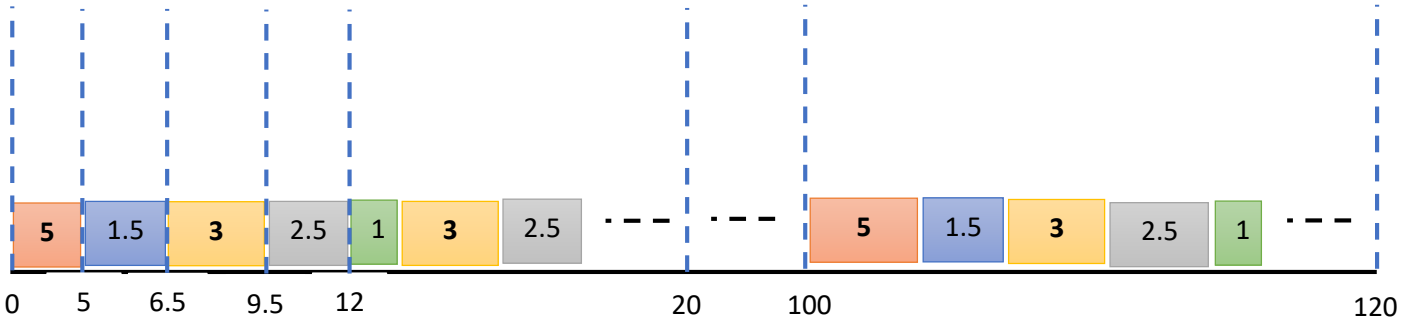
CPU loud = $\frac{E1+E2+E3+E4+E5}{H}$

$= \frac{(5)+(3*10)+(1.5*2)+(2.5*20)+(1*2)}{100} * 100 = 90\%$

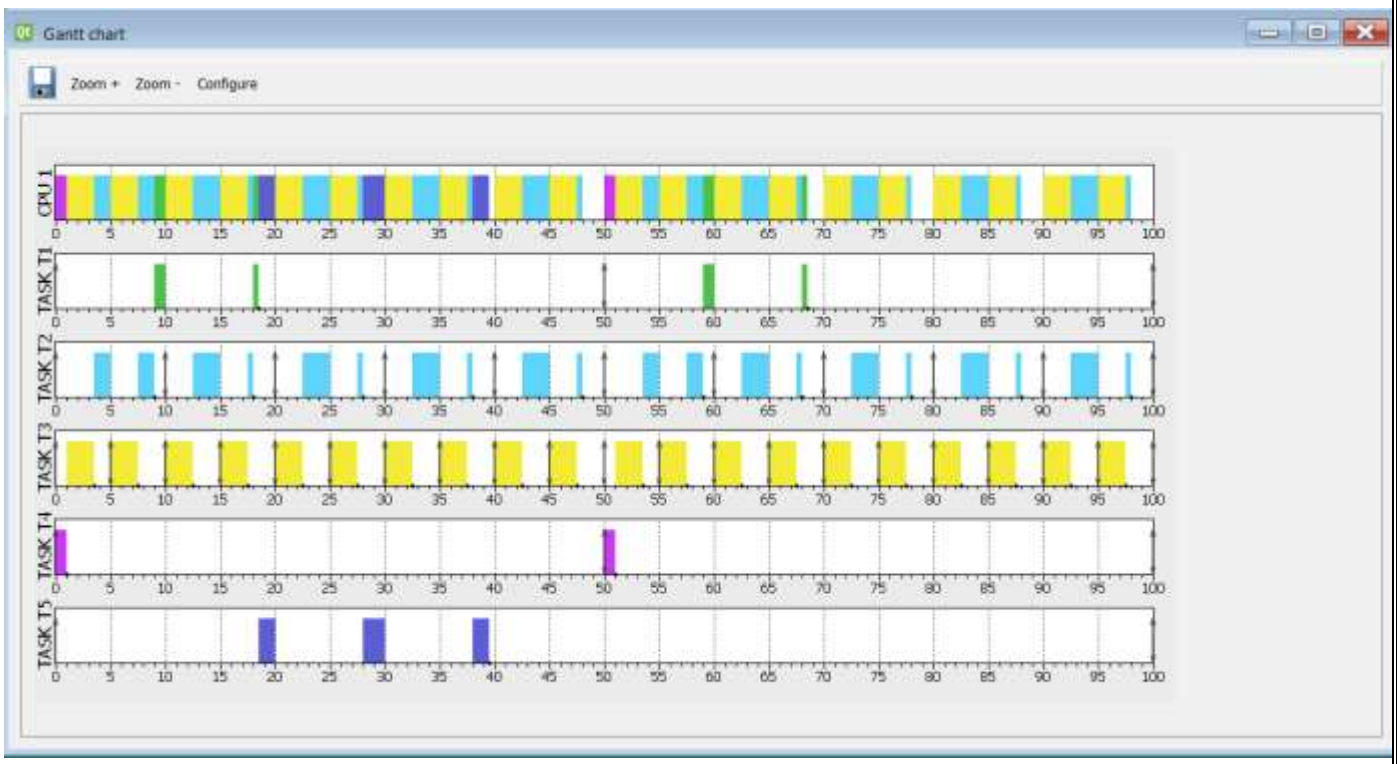
Comment:

The CPU loud value isn't good, so we can improve this value by decreasing the execution time for the tasks.

Tasks timeline:

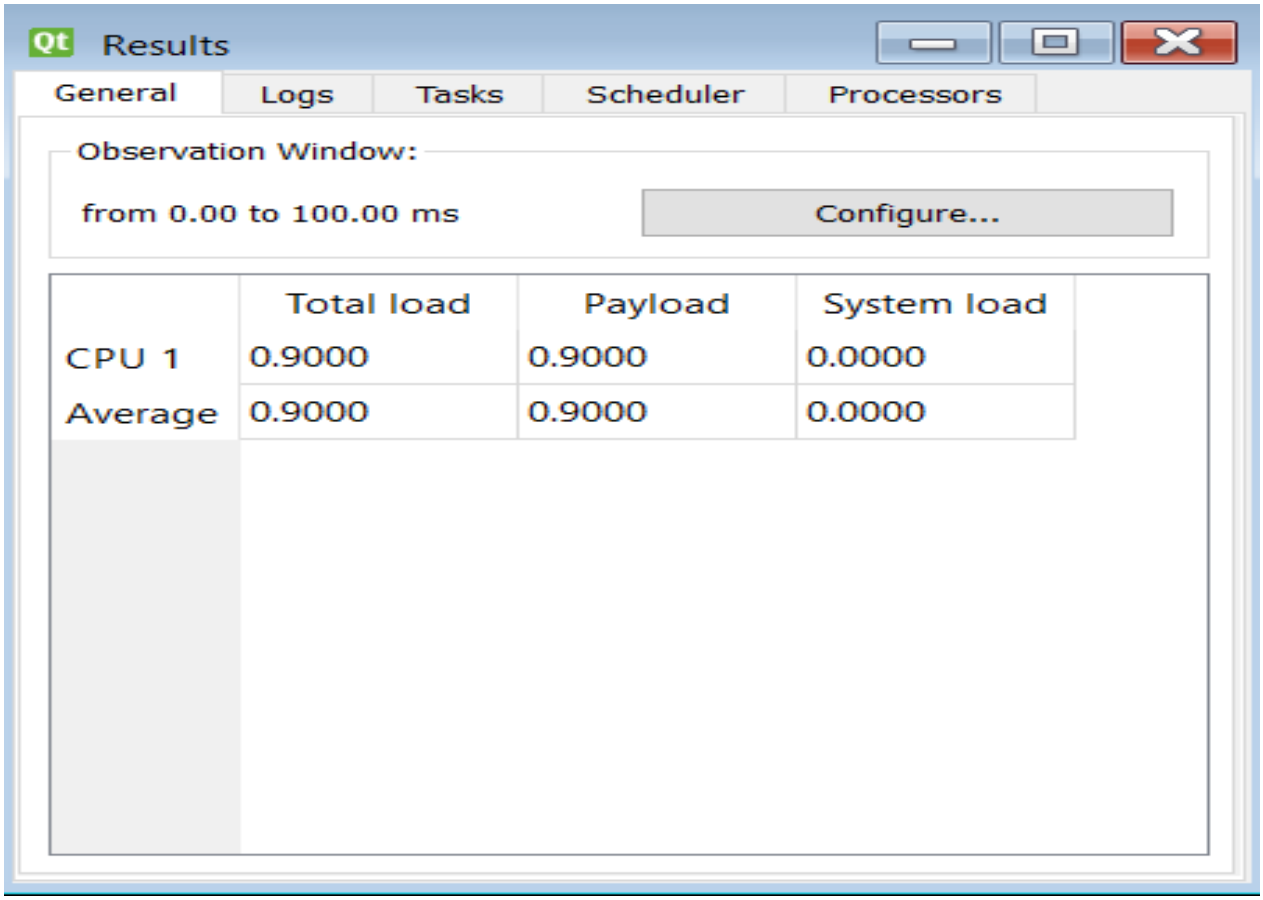


SIMSO Results:



Comment:

From the above figures, we see that all tasks execute without missing their deadline.



Comment:

We already know from the given task set that the CPU load is (90%) using analytical approach. Also the simulation verifies the same output.