Designing a Real Time System

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- Number of tasks is 5 :
  1. LCD
  2. Blood pressure sensor
  3. Heartbeat sensor
  4. Temperature sensor
  5. Alert

- Task parameters:

```
T1 { p:100 , E:2 , D: 100 , pr :1 }
```

```
T2 { p:12.5 , E:3 , D: 12.5 , pr :2 }
```

```
T3 { p:50 , E:1.5 , D: 50 , pr :2 }
```

```
T4 { p:10 , E:2.5 , D: 10 , pr :2 }
```

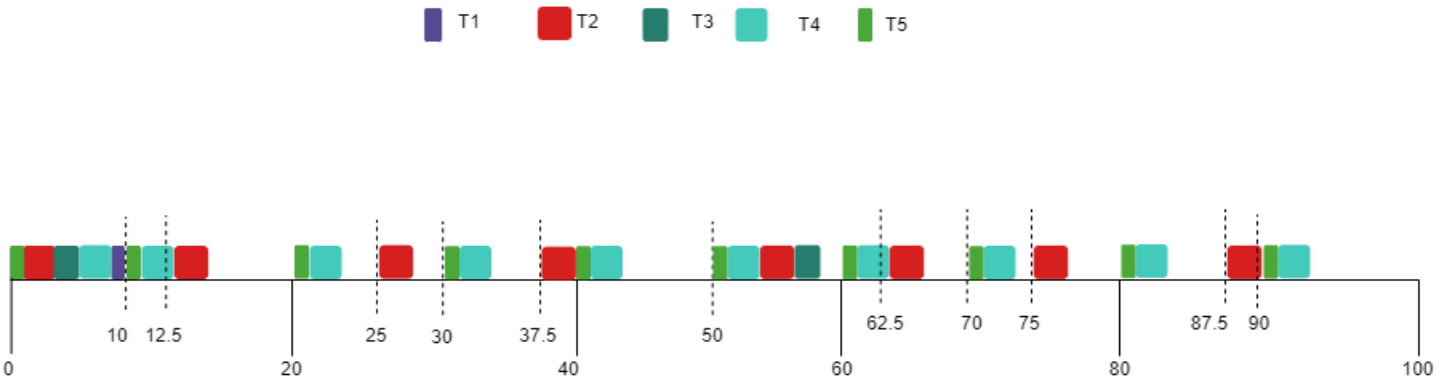
```
T5 { p:10 , E:1 , D: 10 , pr :3 }
```

- Total Execution time = 2+3+1.5+2.5+1 = 10ms so TICK TIME will be 20ms

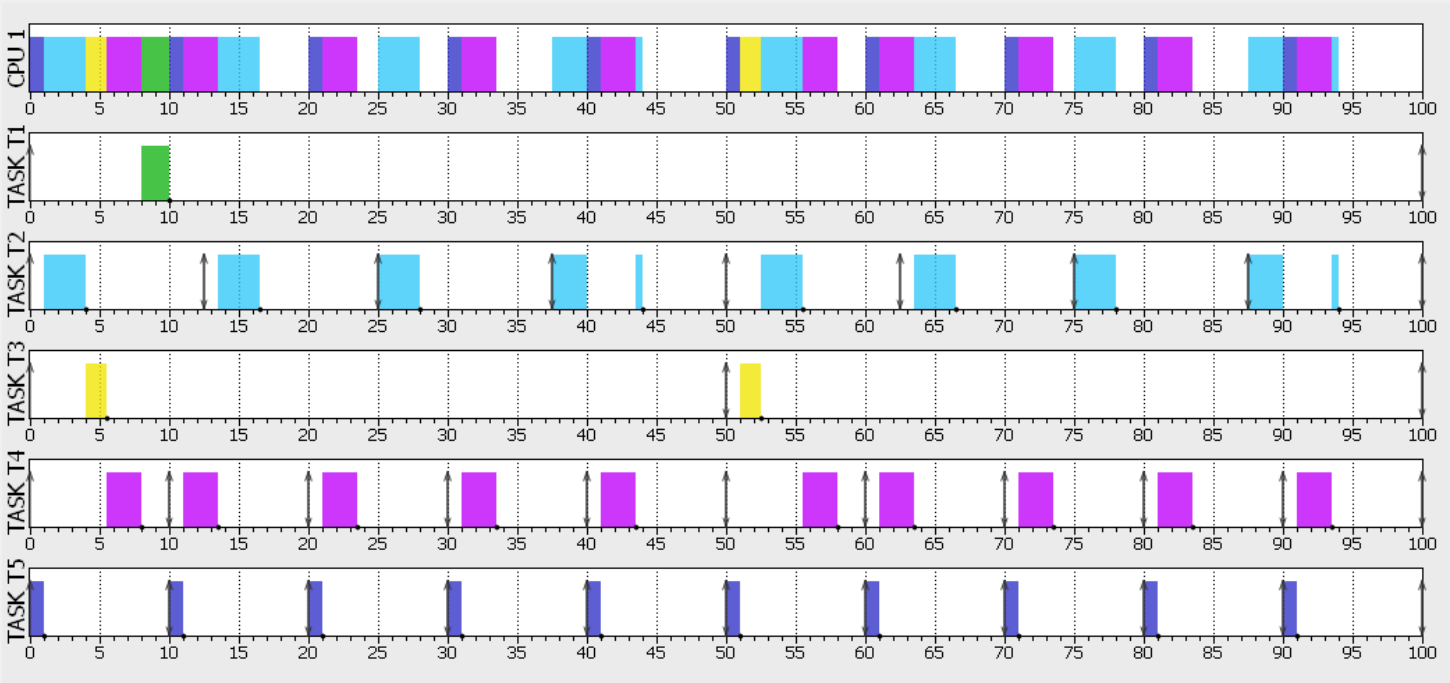
- HYPERPERIOD = 100ms

- CPU load = R/C =
  (2 + (3*8) +(1.5*2)+(2.5*10)+(1*10))/ 100
  = .64 = 64%

- MANUAL DESIGN:



- SIMSO :



Model data

General | Scheduler | Processors | Tasks

id	Name	Task type	Abort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by	priority
1	TASK T1	Periodic	Yes	0	100	-	100	2		1
2	TASK T2	Periodic	Yes	0	12.5	-	12.5	3		2
3	TASK T3	Periodic	Yes	0	50	-	50	1.5		2
4	TASK T4	Periodic	Yes	0	10	-	10	2.5		2
5	TASK T5	Periodic	Yes	0	10	-	10	1		3

Edit data fields...

Remove selected task(s) | Add task | Generate Task Set

Results

General | Logs | Tasks | Scheduler | Processors

Observation Window:

from 0.00 to 100.00 ms | Configure...

	Total load	Payload	System load
CPU 1	0.6400	0.6400	0.0000
Average	0.6400	0.6400	0.0000

- COMMENTS:

1. No task miss deadline
2. All tasks follow Nyquist rate except task 4
3. To reduce CPU load I make task 4 don't follow Nyquist rate
4. Alert is the highest priority
5. 3 sensors are same priority because they are critical cases
6. If we want to reduce the CPU load more than 64% we can reduce execution time of tasks
7. Execution time of all tasks is 10ms so I choose system tick = 20ms
8. System is predictable
9. System is feasible
10. System is loaded