

Priority Based (Dynamic) Scheduling

- How do we assign priority?
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 - What do we know:
 - Period, task runs every Xms
 - Deadline, #ms to when it must complete
 - Execution time, avg or worst case
 - What don't we know the start time of the task
 - Within a period

E.g. period = 100, deadline = 50

Start time affects meeting our deadline (w.r.t. Execution time)

- a) Start at 0, we have 50ms
- b) Start at 25, we have 25ms
 - If deadline is relative to period
- c) Start at 75
 - i) 25ms before period
 - ii) If deadline is relative to period: -25ms

Fixed Priority:

- Set priority once, at task creation
- 1) Rate monotonic algorithm (RM)
 - Priority is based on period
 - Shorter => higher priority
 - Higher rate => higher priority
- 2) Deadline monotonic algorithm (DM)
 - Priority is based on our relative deadline
 - To start time or period
 - Begin execution, not Queue entry
 - Shorter deadline => higher priority
 - Period is fixed but start time isn't
 - Period based deadlines are harder to realize
 - Meet all deadlines
 - When deadlines are start based, DM outperforms RM
 - RM cannot provide a feasible schedule but DM can
 - If DM can't give a feasible schedule, RM can't

E.g. 3 tasks with (period, deadline, execution time, phase(inject time))

Task1 (50,100,25,50)

Task2 (62.5,20,10,0)

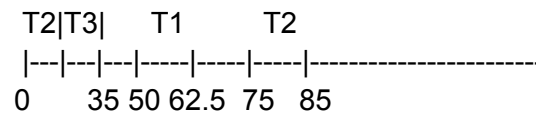
Task3 (125,50,25,0)

Priority orders:

RM: T1, T2, T3

DM: T2, T3, T1

RM timeline:



RM timeline:

0ms : T2 execute until 10ms

10ms : T3 execute until 35ms

50ms: T1 executed until 75ms while at 62.5ms T2 enqueued

75ms: T2 executed