

# Embedded Systems Scheduling

## Exercise #4

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You will likely want to make use of the `leviRTS` software to complete this exercise.

1. Assume a single-processor system running three tasks according to rate monotonic (RM) scheduling:
  - T1:  $p_1 = 5, c_1 = 2$
  - T2:  $p_2 = 8, c_2 = 2$
  - (a) Will preemption occur?
  - (b) What is the utilization of the processor? If it is not 100%, explain why.
  - (c) Will any tasks miss their deadline?
2. Now assume the same system scheduling three tasks with RM:
  - T1:  $p_1 = 5, c_1 = 2$
  - T2:  $p_2 = 8, c_2 = 2$
  - T3:  $p_3 = 3, c_3 = 1$
  - (a) What is the utilization of the processor?
  - (b) Are the three tasks schedulable with RM?
  - (c) What happens to T2? Is this fair?
  - (d) After how many clock cycles does the pattern repeat?
3. Instead of RM, consider the behaviour of earliest deadline first (EDF) periodic scheduling.
  - (a) Will preemption occur?
  - (b) After how many clock cycles does the pattern repeat?
  - (c) What are the tradeoffs between RM and EDF scheduling in this case?
4. Now let's change the period of task T3:
  - T1:  $p_1 = 5, c_1 = 2$
  - T2:  $p_2 = 8, c_2 = 2$
  - T3:  $p_3 = 4, c_3 = 1$
  - (a) Are the three tasks schedulable with RM? Is this result surprising?
  - (b) What happens now to T2?