Rate-Monotonic utilization bound

U = (2.5 / 5) + (4.5 / 15) + (3.5 / 20) = 0.975
Urm = 3 * (2^(1/3) - 1) = 0.799

∵ U > Urm
∴ System guaranteed not schedulable

Time demand analysis

Assuming T1 is the highest priority, then T2, then T3.

Time Demand for T1

- W(1) = 2.5 + ⌈(0)⌉ = 2.5
- W(2) = 2.5 + ⌈(0)⌉ = 2.5
- W(3) = 2.5 + ⌈(0)⌉ = 2.5
- W(4) = 2.5 + ⌈(0)⌉ = 2.5
- W(5) = 2.5 + ⌈(0)⌉ = 2.5

∵ W(5) < D = 2.5 < 5
∴ T1 is schedulable.

Time Demand for T2

- W(1) = 4.5 + ⌈(1/5) * 2.5⌉ = 7
- W(2) = 4.5 + ⌈(2/5) * 2.5⌉ = 7
- W(3) = 4.5 + ⌈(3/5) * 2.5⌉ = 7
- W(4) = 4.5 + ⌈(4/5) * 2.5⌉ = 7
- W(5) = 4.5 + ⌈(5/5) * 2.5⌉ = 7
- W(6) = 4.5 + ⌈(6/5) * 2.5⌉ = 9.5
- W(7) = 4.5 + ⌈(8/5) * 2.5⌉ = 9.5
- W(8) = 4.5 + ⌈(7/5) * 2.5⌉ = 9.5
- W(9) = 4.5 + ⌈(9/5) * 2.5⌉ = 9.5
- W(10) = 4.5 + ⌈(10/5) * 2.5⌉ = 9.5
- W(11) = 4.5 + ⌈(11/5) * 2.5⌉ = 12
- W(12) = 4.5 + ⌈(12/5) * 2.5⌉ = 12
- W(13) = 4.5 + ⌈(13/5) * 2.5⌉ = 12
- W(14) = 4.5 + ⌈(14/5) * 2.5⌉ = 12
- W(15) = 4.5 + ⌈(15/5) * 2.5⌉ = 12

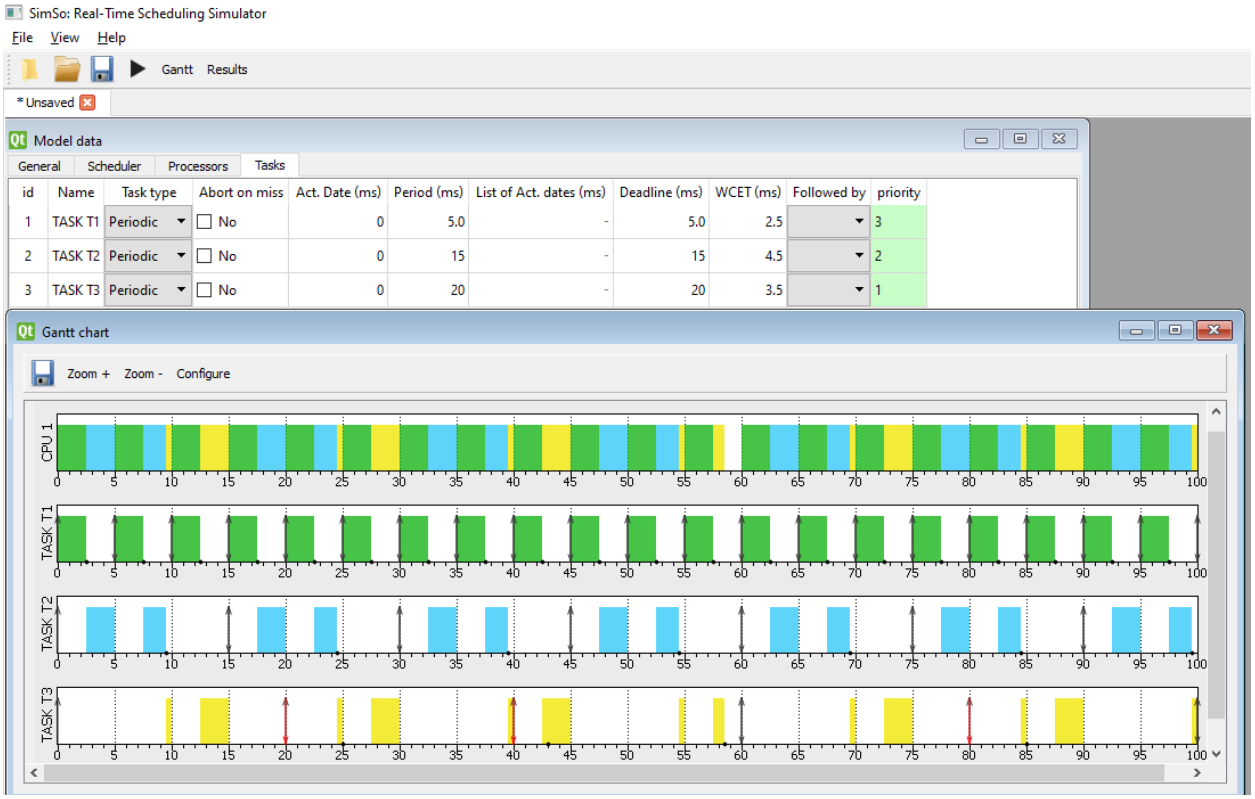
∵ W(15) < D = 12 < 15
∴ T2 is schedulable.

Time Demand for T3

- W(1) = 3.5 + ⌈(1/5) * 2.5⌉ + ⌈(1/15) * 4.5⌉ = 10.5
- W(2) = 3.5 + ⌈(2/5) * 2.5⌉ + ⌈(2/15) * 4.5⌉ = 10.5
- W(3) = 3.5 + ⌈(3/5) * 2.5⌉ + ⌈(3/15) * 4.5⌉ = 10.5
- W(4) = 3.5 + ⌈(4/5) * 2.5⌉ + ⌈(4/15) * 4.5⌉ = 10.5
- W(5) = 3.5 + ⌈(5/5) * 2.5⌉ + ⌈(5/15) * 4.5⌉ = 10.5
- W(6) = 3.5 + ⌈(6/5) * 2.5⌉ + ⌈(6/15) * 4.5⌉ = 13
- W(7) = 3.5 + ⌈(7/5) * 2.5⌉ + ⌈(7/15) * 4.5⌉ = 13
- W(8) = 3.5 + ⌈(8/5) * 2.5⌉ + ⌈(8/15) * 4.5⌉ = 13
- W(9) = 3.5 + ⌈(9/5) * 2.5⌉ + ⌈(9/15) * 4.5⌉ = 13
- W(10) = 3.5 + ⌈(10/5) * 2.5⌉ + ⌈(10/15) * 4.5⌉ = 13
- W(11) = 3.5 + ⌈(11/5) * 2.5⌉ + ⌈(11/15) * 4.5⌉ = 15.5
- W(12) = 3.5 + ⌈(12/5) * 2.5⌉ + ⌈(12/15) * 4.5⌉ = 15.5
- W(13) = 3.5 + ⌈(13/5) * 2.5⌉ + ⌈(13/15) * 4.5⌉ = 15.5
- W(14) = 3.5 + ⌈(14/5) * 2.5⌉ + ⌈(14/15) * 4.5⌉ = 15.5
- W(15) = 3.5 + ⌈(15/5) * 2.5⌉ + ⌈(15/15) * 4.5⌉ = 15.5
- W(16) = 3.5 + ⌈(16/5) * 2.5⌉ + ⌈(16/15) * 4.5⌉ = 22.5
- W(17) = 3.5 + ⌈(17/5) * 2.5⌉ + ⌈(17/15) * 4.5⌉ = 22.5
- W(18) = 3.5 + ⌈(18/5) * 2.5⌉ + ⌈(18/15) * 4.5⌉ = 22.5
- W(19) = 3.5 + ⌈(19/5) * 2.5⌉ + ⌈(19/15) * 4.5⌉ = 22.5
- W(20) = 3.5 + ⌈(20/5) * 2.5⌉ + ⌈(20/15) * 4.5⌉ = 22.5

∵ W(15) > D = 22.5 > 20
∴ T3 is not schedulable.

Simso Model



From the model we can validate that the system is guaranteed to be not schedulable, and T3 is the one that is not schedulable.