T1 {P: 5, E: 2.5, D: 5}, T2 {P: 15, E: 4.5, D: 15}, T3 {P: 20, E: 3.5, D: 20}

Calculate the URM

U = 2.5/5 + 4.5/15 + 3.5/20 = 0.975

URM = 3(2^(1/3) – 1) = 0.779

Because U>URM we get that the system is not schedulable

Calculate the time demand analysis

For task 1

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) = 2.5 < D = 5 so we have T1 is schedulable

For task 2

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(6) = 4.5 + (6/5)*2.5 = 9.5
W(7) = 4.5 + (7/5)*2.5 = 9.5
…….
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) = 12 < D = 15 so we have T2 is schedulable

For task 3

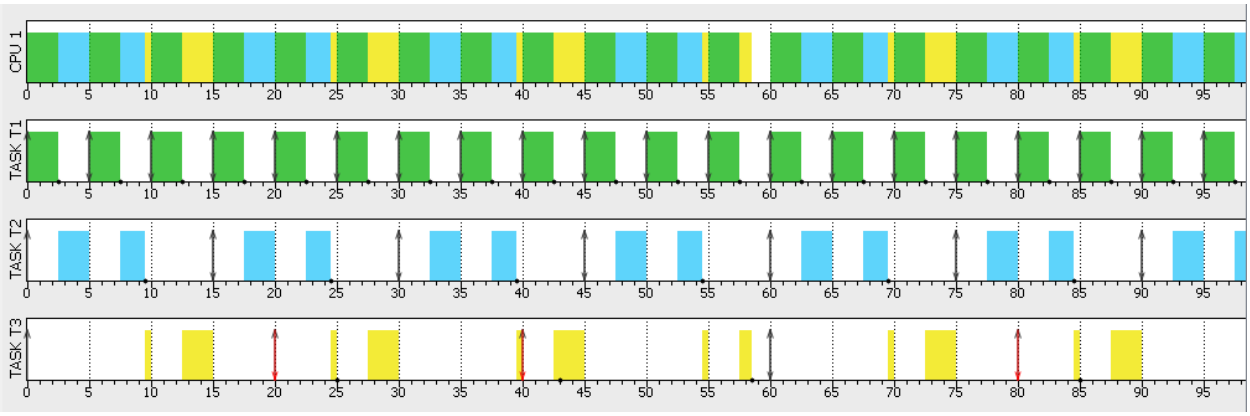
W(1) = 3.5 + (1/5)*2.5 + (1/15)*4.5 = 10.5
W(2) = 3.5 + (2/5)*2.5 + (2/15)*4.5
……
W(6) = 3.5 + (6/5)*2.5 + (6/15)*4.5 =

……
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(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(20) = 22.5 > D = 20 so we have T3 is not schedulable

Modeling using Simso



By modeling the tasks using Simso using a rate monotonic scheduler on a time span of 100ms, it can be seen that T1 and T2 are schedulable and don't miss their deadlines while T3 is not as verified by the results above.