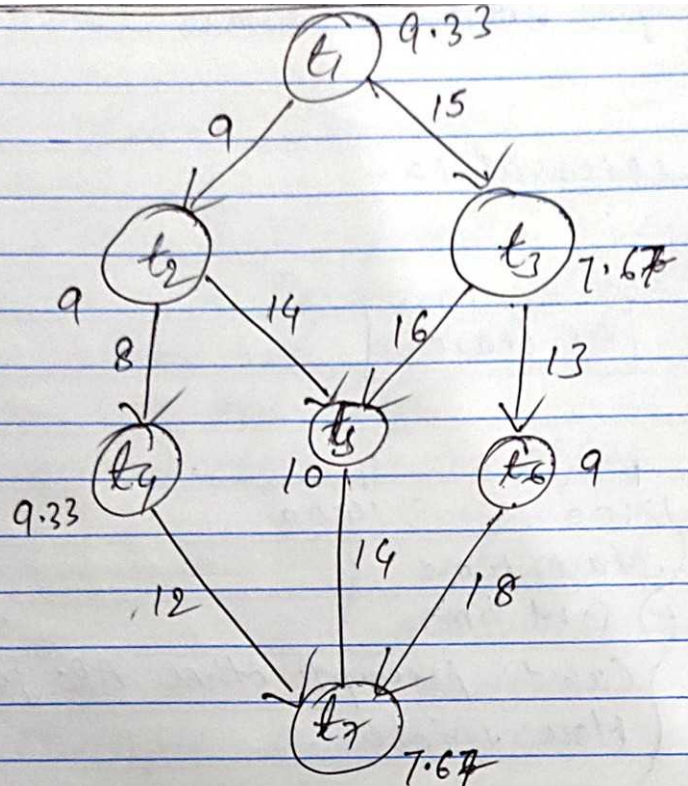


	t_1	t_2	t_3	t_4	t_5	t_6	t_7
VM_1	10	11	5	11	9	5	6
VM_2	8	11	11	6	11	11	8
VM_3	10	5	7	11	10	11	9

Acc(t_i) =	9.33	9	7.67	9.33	10	9	7.67

B-level $t(7)$ = Acc(t_7) = 7.67

B-level (t_6) = 9 + 18 + 7.67 = 34.67

B-level (t_4) = 9.33 + 12 + 7.67 = 29

B-level (t_5) = 10 + 14 + 7.67 = 31.67

B-level (t_2) = max { 9 + 14 + blevel of t_5, 9 + 8 + blevel of t_4 }

= max { 23 + 31.67 , 17 + 29 }

= max { 54.67 , 46 }

= 54.67

B-level of (t_3) = max { 7·67 + 13 + blevel of (t_6), 7·67 + 16 + blevel of (t_5) }

= max { 20·67 + 34·67, 23·67 + 31·67 }

= max { 55·34, 55·34 }

≈ 55·34

B-level of (t_1) = max { 9 + 9·33 + blevel (t_2), 9·33 + 15 + blevel (t_3) }

= max { 18·33 + 54·67, 24·33 + 55·34 }

= max { 73·00, 79·67 }

= 79·67

Task (i)	t_1	t_2	t_3	t_4	t_5	t_6	t_7
	79·67	54·67	55·34	29	31·67	34·67	7·67

Arrange in non-increasing order

$t_1 > t_3 > t_2 > t_6 > t_5 > t_4 > t_7$

Order of execution of task

Mapping

EST $(t_1, VM_1) = 0$, EST $(t_1, VM_2) = 0$, EST $(t_1, VM_3) = 0$

EFT (t_1)

EFT $(t_1, VM_1) = 0 + 10 = 10$

EFT $(t_1, VM_2) = 0 + 8 = 8$ (Best suitable VM)

$VM_3 = 0 + 10 = 10$

EST (t_3, VM_1) = max. { 0, 8 + 15 } = 23

VM_2 = max { 8, 8 + 0 } = 8 – Best suitable

VM_3 = max { 0, 8 + 15 } = 23

EFT (t_3, VM_1) = 23 + 5 = 28

EFT (t_3, VM_2) = 8 + 11 = 19 — Best suited

EFT (t_3, VM_3) = 23 + 7 = 36

EST (t_2, VM_1) = max { 0, 8 + 9 } = 17
= max { 19, 8 + 0 } = 19
= max { 0, 8 + 9 } = 17

EFT (t_2, VM_1) = 17 + 11 = 28

EFT (t_2, VM_2) = 19 + 11 = 30

EFT (t_2, VM_3) = 17 + 5 = 22 — Best suit

EST (t_6, VM_1) = max { 0, 19 + 13 } = 32
max { 19, 19 + 0 } = 19
max { 22, 19 + 13 } = 32

EFT (t_6, VM_1) = 32 + 5 = 37

EFT (t_6, VM_2) = 19 + 11 = 30 — Best suited

EFT (t_6, VM_3) = 32 + 11 = 43

EST (t_5, VM_1) = max { 0, max { 22 + 14, 19 + 16 } = 36
= max { 19, max { 22 + 14, 19 + 0 } } = 36
= max { 22, max { 22 + 14, 19 + 16 } = 36

EFT (t_5, VM_1) = 36 + 9 = 45 ← Best

EFT (t_5, VM_2) = 36 + 11 = 47

EFT (t_5, VM_3) = 36 + 10 = 46

EST (t_4, VM_1) = max { 45, 8 + 22 } = 45
max { 30, 8 + 22 } = 30
max { 22, 22 + 0 } = 22

EFT (t_4, VM_1) = 45 + 11 = 56

EFT (t_4, VM_2) 30 + 6 = 36

EFT (t_4, VM_3) 22 + 11 = 33 ← Best suited

t_5 t_4 t_6

EST (t_7, VM_1) = max {45, max{45+0, 33+12, 30+18}
{30, max{45+14, 33+12, 30+0}
{33}, max{45+14, 33+0, 30+18}

= max {45, max{45, 45, 48}
max {30, max{59, 45, 30}
max {33, max{59, 33, 48}

~~EFT~~ EST (t_7, VM_1) = ~~max~~ 48

EST (t_7, VM_2) = 59

EST (t_7, VM_2) = 59

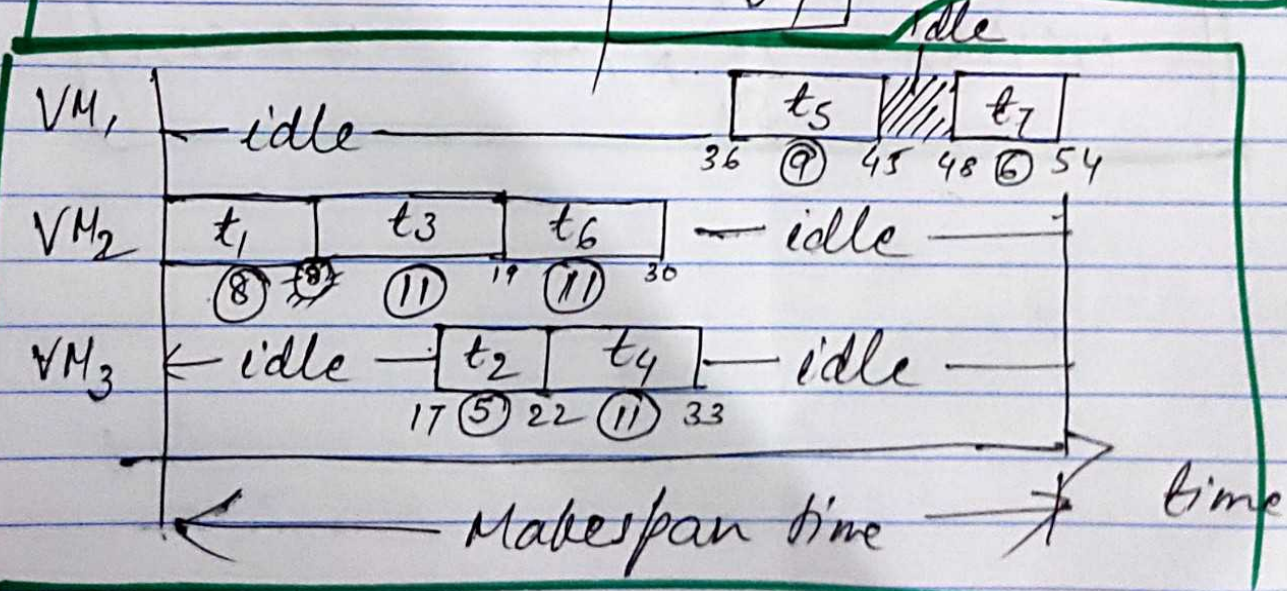
EFT(t_7, VM_1) = 48 + 6 = 54 ← best suited

EFT(t_7, VM_2) = 59 + 8 = 67

EFT(t_7, VM_3) = 59 + 9 = 68

Make span time = min{EFT(t_{exit})}

= 54



GANTT Chart

$U(VM_j) = \frac{\text{Working time of } Vm}{\text{Makespan}} * 100$

average utilization = $\frac{\text{(Sum of all VM utilization}}{\text{Total No. of VM)}}$

$= \frac{\sum U(VM_j)}{|VM|}$

$= U(VM_1) + U(VM_2) + U(VM_3)$

$= \frac{(9+6) + (8+11+11) + (5+11)}{54 * 3}$

$= \frac{15 + 30 + 16}{54 * 3}$

$= \frac{61}{54 * 3} * 100$

Average Utilization $= \frac{6100}{162} = 37.65\%$

$U(VM_1) = \frac{15}{54} * 100 = 27.78\%$

$U(VM_2) = \frac{30}{54} * 100 = 55.55\%$

$U(VM_3) = \frac{16}{54} * 100 = 29.63\%$