

LAMPIRAN A

Data – data yang digunakan dalam pengolahan data adalah sebagai berikut :

1. Data 1

Waktu proses :

Job	Operasi					
	1	2	3	4	5	6
1	12	13	6	7	9	9
2	14	7	13	10	6	12
3	8	11	7	9	13	11
4	13	14	9	11	5	5
5	12	7	8	15	7	11

Mesin :

Job	Operasi					
	1	2	3	4	5	6
1	1	4	2	3	6	5
2	3	2	5	1	4	6
3	2	5	4	3	6	1
4	1	4	2	5	6	3
5	2	1	3	6	4	5

Due date :

Job	DD
1	89
2	94
3	97
4	87
5	88

2. Data 2

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	6	7	4	8	9
2	9	8	8	7	6
3	5	4	7	8	7
4	8	6	7	9	6
5	7	9	6	8	7

Mesin :

Job	Operasi				
	1	2	3	4	5
1	4	3	1	2	5
2	1	2	3	4	5
3	1	4	3	5	2
4	5	1	4	3	2
5	4	5	1	2	3

Due date :

Job	DD
1	48
2	50
3	52
4	53
5	51

3. Data 3

Waktu proses :

Job	Operasi					
	1	2	3	4	5	6
1	10	9	10	8	7	9
2	8	6	11	5	8	7
3	6	10	8	7	7	8
4	6	11	5	12	8	10

Mesin :

Job	Operasi					
	1	2	3	4	5	6
1	5	4	3	1	6	2
2	3	4	2	5	1	6
3	6	5	3	1	2	4
4	1	3	5	2	4	6

Due date :

Job	DD
1	70
2	62
3	58
4	67

4. Data 4

Waktu proses :

Job	Operasi					
	1	2	3	4	5	6
1	12	13	5	7	9	9
2	14	7	13	10	6	14
3	8	11	7	9	13	11
4	13	14	9	11	7	6
5	12	7	8	8	7	6
6	7	10	12	14	10	14

Mesin :

Job	Operasi					
	1	2	3	4	5	6
1	1	4	2	3	6	5
2	3	2	5	1	4	6
3	2	5	4	3	6	1
4	1	4	2	5	6	3
5	2	1	3	6	4	5
6	5	6	2	4	1	3

Due date :

Job	DD
1	90
2	95
3	91
4	92
5	89
6	88

5. Data 5

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	10	10	13	9	11
2	5	5	7	11	11
3	13	13	11	8	10
4	7	7	14	14	14
5	9	9	7	9	14
6	8	8	10	6	11

Mesin :

Job	Operasi				
	1	2	3	4	5
1	3	5	4	2	1
2	1	4	5	2	3
3	1	2	4	3	5
4	4	5	2	1	3
5	3	4	2	5	1
6	1	2	3	4	5

Due date :

Job	DD
1	80
2	85
3	79
4	98
5	84
6	82

6. Data 6

Waktu proses :

Job	Operasi			
	1	2	3	4
1	3	7	7	2
2	3	4	4	6
3	5	2	3	4
4	4	2	4	7

Mesin :

Job	Operasi			
	1	2	3	4
1	1	2	3	4
2	2	4	1	3
3	4	2	1	3
4	2	3	1	4

Due date :

Job	DD
1	36
2	26
3	21
4	20

7. Data 7

Waktu proses :

Job	Operasi			
	1	2	3	4
1	6	6	7	5
2	6	4	4	7
3	5	7	7	4
4	4	5	6	3
5	3	7	3	4

Mesin :

Job	Operasi			
	1	2	3	4
1	1	4	3	2
2	1	2	4	3
3	1	3	4	2
4	3	1	4	2
5	3	2	4	1

Due date :

Job	DD
1	35
2	38
3	37
4	36
5	30

8. Data 8

Waktu proses :

Job	Operasi		
	1	2	3
1	5	5	6
2	8	3	5
3	6	6	6

Mesin :

Job	Operasi		
	1	2	3
1	1	3	2
2	3	1	2
3	1	2	3

Due date :

Job	DD
1	25
2	24
3	23

9. Data 9

Waktu proses :

Job	Operasi					
	1	2	3	4	5	6
1	12	11	2	8	5	5
2	12	9	7	13	7	4
3	6	5	4	11	10	8

Mesin :

Job	Operasi					
	1	2	3	4	5	6
1	4	3	2	6	5	1
2	1	5	3	2	6	4
3	3	2	4	1	5	6

Due date :

Job	DD
1	46
2	58
3	56

10. Data 10

Waktu proses :

Job	Operasi			
	1	2	3	4
1	10	6	5	5
2	8	4	7	4
3	11	5	10	8

Mesin :

Job	Operasi			
	1	2	3	4
1	4	2	1	3
2	1	4	2	3
3	3	2	4	1

Due date :

Job	DD
1	30
2	38
3	40

11. Data 11

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	8	6	9	7	10
2	10	7	6	8	9
3	11	8	7	7	9

Mesin :

Job	Operasi				
	1	2	3	4	5
1	3	5	2	1	4
2	5	1	3	4	2
3	2	5	4	1	3

Due date :

Job	DD
1	52
2	45
3	49

12. Data 12

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	7	9	9	6	8
2	5	7	7	10	7
3	4	7	9	9	9

Mesin :

Job	Operasi				
	1	2	3	4	5
1	2	1	3	4	5
2	1	5	3	2	4
3	3	4	1	2	5

Due date :

Job	DD
1	48
2	45
3	55

13. Data 13

Waktu proses :

Job	Operasi		
	1	2	3
1	7	9	5
2	9	6	8
3	6	7	7
4	8	5	7

Mesin :

Job	Operasi		
	1	2	3
1	2	3	1
2	1	2	3
3	1	3	2
4	3	2	1

Due date :

Job	DD
1	32
2	35
3	30
4	29

14. Data 14

Waktu proses :

Job	Operasi			
	1	2	3	4
1	10	12	10	9
2	9	12	11	8
3	8	10	9	9
4	11	9	11	13

Mesin :

Job	Operasi			
	1	2	3	4
1	3	4	2	1
2	2	4	3	1
3	1	3	2	4
4	1	2	4	3

Due date :

Job	DD
1	60
2	45
3	55
4	61

15. Data 15

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	9	7	10	5	11
2	7	8	12	10	8
3	7	6	9	9	9
4	10	9	7	11	8

Mesin :

Job	Operasi				
	1	2	3	4	5
1	2	3	1	5	4
2	3	1	5	4	2
3	1	3	5	4	2
4	2	5	3	1	4

Due date :

Job	DD
1	70
2	71
3	65
4	66

16. Data 16

Waktu proses :

Job	Operasi		
	1	2	3
1	9	11	10
2	12	9	13
3	15	13	11
4	14	12	10
5	11	14	14

Mesin :

Job	Operasi		
	1	2	3
1	1	3	2
2	2	1	3
3	1	2	3
4	3	2	1
5	2	1	3

Due date :

Job	DD
1	70
2	68
3	82
4	66
5	75

17. Data 17

Waktu proses :

Job	Operasi			
	1	2	3	4
1	8	10	6	9
2	5	9	10	12
3	12	10	8	6
4	7	8	10	11
5	6	9	10	11

Mesin :

Job	Operasi			
	1	2	3	4
1	1	4	2	3
2	2	3	1	4
3	1	2	4	3
4	3	4	1	2
5	4	1	2	3

Due date :

Job	DD
1	60
2	65
3	80
4	68
5	66

18. Data 18

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	9	12	10	8	6
2	10	6	9	10	11
3	9	10	13	10	7
4	11	9	10	8	12
5	10	10	7	10	7

Mesin :

Job	Operasi				
	1	2	3	4	5
1	1	4	2	3	5
2	1	2	5	4	3
3	2	3	1	5	4
4	2	1	3	4	5
5	3	5	4	1	2

Due date :

Job	DD
1	69
2	68
3	78
4	80
5	66

19. Data 19

Waktu proses :

Job	Operasi		
	1	2	3
1	12	7	11
2	8	10	10
3	10	7	9
4	6	9	11
5	12	8	10
6	7	12	8

Mesin :

Job	Operasi		
	1	2	3
1	1	2	3
2	2	3	1
3	2	1	3
4	1	3	2
5	3	1	2
6	2	3	1

Due date :

Job	DD
1	68
2	48
3	57
4	59
5	50
6	55

20. Data 20

Waktu proses :

Job	Operasi			
	1	2	3	4
1	5	4	6	7
2	3	7	6	3
3	5	5	7	6
4	4	7	7	4
5	6	5	3	6
6	5	6	6	6

Mesin :

Job	Operasi			
	1	2	3	4
1	2	1	3	4
2	1	2	4	3
3	2	4	3	1
4	3	2	1	4
5	1	3	2	4
6	4	1	2	3

Due date :

Job	DD
1	48
2	49
3	45
4	43
5	55
6	46

LAMPIRAN B

Iterasi penjadualan dengan metode *backward* untuk soal 1 :

1. *Last Due Date*

Stage 1

Waktu Mesin

(1)97 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94

(St) 3 6 1, (Cj) 97, (Tij) 11 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 2

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94

(St) 3 5 6, (Cj) 86, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 3

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)82

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94

(St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 4

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)80 (6)82

(St) 1 5 6, (Cj) 80, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94

(St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 5

Waktu Mesin

(1)86 (2)66 (3)82 (4)82 (5)80 (6)82

(St) 1 5 6, (Cj) 80, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94

(St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97

(St) 4 5 6, (Cj) 82, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 6

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)80 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89

(St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94

(St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97

(St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 7

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89

(St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94

(St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97

(St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87

(St) 5 5 4, (Cj) 69, (Tij) 7 (Di) 88

Stage 8

Waktu Mesin

(1)66 (2)66 (3)82 (4)76 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89

(St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94

(St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97

(St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87

(St) 5 5 4, (Cj) 69, (Tij) 7 (Di) 88

Stage 9

Waktu Mesin

(1)66 (2)66 (3)60 (4)62 (5)69 (6)60

(St) 1 4 3, (Cj) 60, (Tij) 7 (Di) 89

(St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94

(St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97
 (St) 4 5 6, (Cj) 60, (Tij) 5 (Di) 87
 (St) 5 4 6, (Cj) 60, (Tij) 15 (Di) 88

Stage 10

Waktu Mesin

(1)66 (2)66 (3)60 (4)62 (5)53 (6)60

(St) 1 4 3, (Cj) 60, (Tij) 7 (Di) 89
 (St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94
 (St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97
 (St) 4 5 6, (Cj) 60, (Tij) 5 (Di) 87
 (St) 5 4 6, (Cj) 60, (Tij) 15 (Di) 88

Stage 11

Waktu Mesin

(1)66 (2)66 (3)53 (4)53 (5)53 (6)45

(St) 1 3 2, (Cj) 53, (Tij) 6 (Di) 89
 (St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94
 (St) 3 2 5, (Cj) 53, (Tij) 11 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 45, (Tij) 8 (Di) 88

Stage 12

Waktu Mesin

(1)66 (2)46 (3)53 (4)53 (5)42 (6)45

(St) 1 3 2, (Cj) 46, (Tij) 6 (Di) 89
 (St) 2 1 3, (Cj) 46, (Tij) 14 (Di) 94
 (St) 3 1 2, (Cj) 42, (Tij) 8 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 45, (Tij) 8 (Di) 88

Stage 13

Waktu Mesin

(1)66 (2)40 (3)32 (4)53 (5)42 (6)45

(St) 1 2 4, (Cj) 40, (Tij) 13 (Di) 89
 (St) 3 1 2, (Cj) 40, (Tij) 8 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 32, (Tij) 8 (Di) 88

Stage 14

Waktu Mesin

(1)66 (2)40 (3)32 (4)53 (5)42 (6)40

(St) 1 2 4, (Cj) 40, (Tij) 13 (Di) 89

(St) 3 1 2, (Cj) 40, (Tij) 8 (Di) 97

(St) 4 4 5, (Cj) 40, (Tij) 11 (Di) 87

(St) 5 3 3, (Cj) 32, (Tij) 8 (Di) 88

Stage 15

Waktu Mesin

(1)66 (2)32 (3)32 (4)27 (5)29 (6)40

(St) 1 1 1, (Cj) 27, (Tij) 12 (Di) 89

(St) 4 3 2, (Cj) 29, (Tij) 9 (Di) 87

(St) 5 3 3, (Cj) 32, (Tij) 8 (Di) 88

Stage 16

Waktu Mesin

(1)66 (2)32 (3)24 (4)27 (5)29 (6)40

(St) 1 1 1, (Cj) 27, (Tij) 12 (Di) 89

(St) 4 3 2, (Cj) 29, (Tij) 9 (Di) 87

(St) 5 2 1, (Cj) 24, (Tij) 7 (Di) 88

Stage 17

Waktu Mesin

(1)66 (2)20 (3)24 (4)27 (5)29 (6)40

(St) 1 1 1, (Cj) 27, (Tij) 12 (Di) 89

(St) 4 2 4, (Cj) 20, (Tij) 14 (Di) 87

(St) 5 2 1, (Cj) 24, (Tij) 7 (Di) 88

Stage 18

Waktu Mesin

(1)15 (2)20 (3)24 (4)27 (5)29 (6)40

(St) 4 2 4, (Cj) 20, (Tij) 14 (Di) 87

(St) 5 2 1, (Cj) 15, (Tij) 7 (Di) 88

Stage 19

Waktu Mesin

(1)15 (2)20 (3)24 (4)6 (5)29 (6)40

(St) 4 1 1, (Cj) 6, (Tij) 13 (Di) 87

(St) 5 2 1, (Cj) 15, (Tij) 7 (Di) 88

Stage 20

Waktu Mesin

(1)8 (2)20 (3)24 (4)6 (5)29 (6)40

(St) 4 1 1, (Cj) 6, (Tij) 13 (Di) 87

(St) 5 1 2, (Cj) 8, (Tij) 12 (Di) 88

Stage 21

Waktu Mesin

(1)8 (2)-4 (3)24 (4)6 (5)29 (6)40

(St) 4 1 1, (Cj) 6, (Tij) 13 (Di) 87

Stage 22

Waktu Mesin

(1)-7 (2)-4 (3)24 (4)6 (5)29 (6)40

Biaya Earlines = 1

Biaya Tardines = 56

Total Biaya = 57

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 1 = Awal (22), akhir (34)

1 2 4 = Awal (34), akhir (47)

1 3 2 = Awal (47), akhir (53)

1 4 3 = Awal (60), akhir (67)

1 5 6 = Awal (67), akhir (76)

1 6 5 = Awal (87), akhir (96)

Job 2

2 1 3 = Awal (39), akhir (53)

2 2 2 = Awal (53), akhir (60)

2 3 5 = Awal (60), akhir (73)

2 4 1 = Awal (73), akhir (83)

2 5 4 = Awal (83), akhir (89)

2 6 6 = Awal (89), akhir (101)

Job 3

3 1 2 = Awal (39), akhir (47)

3 2 5 = Awal (49), akhir (60)

3 3 4 = Awal (60), akhir (67)

3 4 3 = Awal (67), akhir (76)

3 5 6 = Awal (76), akhir (89)
 3 6 1 = Awal (93), akhir (104)

Job 4

4 1 1 = Awal (0), akhir (13)
 4 2 4 = Awal (13), akhir (27)
 4 3 2 = Awal (27), akhir (36)
 4 4 5 = Awal (36), akhir (47)
 4 5 6 = Awal (47), akhir (52)
 4 6 3 = Awal (89), akhir (94)

Job 5

5 1 2 = Awal (3), akhir (15)
 5 2 1 = Awal (15), akhir (22)
 5 3 3 = Awal (31), akhir (39)
 5 4 6 = Awal (52), akhir (67)
 5 5 4 = Awal (69), akhir (76)
 5 6 5 = Awal (76), akhir (87)

2. Longest Processing Time

Stage 1

Waktu Mesin

(1)97 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89
 (St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94
 (St) 3 6 1, (Cj) 97, (Tij) 11 (Di) 97
 (St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87
 (St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 2

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89
 (St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94
 (St) 3 5 6, (Cj) 86, (Tij) 13 (Di) 97
 (St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87
 (St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 3

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)82

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94
 (St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97
 (St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87
 (St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 4

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)78 (6)82

(St) 1 6 5, (Cj) 78, (Tij) 9 (Di) 89
 (St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94
 (St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97
 (St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 78, (Tij) 7 (Di) 88

Stage 5

Waktu Mesin

(1)86 (2)66 (3)82 (4)82 (5)78 (6)82

(St) 1 6 5, (Cj) 78, (Tij) 9 (Di) 89
 (St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94
 (St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97
 (St) 4 5 6, (Cj) 82, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 78, (Tij) 7 (Di) 88

Stage 6

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)78 (6)69

(St) 1 6 5, (Cj) 78, (Tij) 9 (Di) 89
 (St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 76, (Tij) 7 (Di) 88

Stage 7

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89
 (St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 76, (Tij) 7 (Di) 88

Stage 8

Waktu Mesin

(1)66 (2)66 (3)82 (4)69 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89
 (St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 4 6, (Cj) 69, (Tij) 15 (Di) 88

Stage 9

Waktu Mesin

(1)66 (2)66 (3)60 (4)69 (5)69 (6)54

(St) 1 5 6, (Cj) 54, (Tij) 9 (Di) 89
 (St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94
 (St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97
 (St) 4 5 6, (Cj) 54, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 54, (Tij) 8 (Di) 88

Stage 10

Waktu Mesin

(1)66 (2)66 (3)60 (4)69 (5)53 (6)54

(St) 1 5 6, (Cj) 54, (Tij) 9 (Di) 89
 (St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94
 (St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97
 (St) 4 5 6, (Cj) 54, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 54, (Tij) 8 (Di) 88

Stage 11

Waktu Mesin

(1)66 (2)66 (3)60 (4)53 (5)53 (6)54

(St) 1 5 6, (Cj) 54, (Tij) 9 (Di) 89
 (St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94
 (St) 3 2 5, (Cj) 53, (Tij) 11 (Di) 97
 (St) 4 5 6, (Cj) 54, (Tij) 5 (Di) 87
 (St) 5 3 3, (Cj) 54, (Tij) 8 (Di) 88

Stage 12

Waktu Mesin

(1)66 (2)66 (3)46 (4)53 (5)53 (6)45

(St) 1 4 3, (Cj) 45, (Tij) 7 (Di) 89

(St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94
 (St) 3 2 5, (Cj) 53, (Tij) 11 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 2 1, (Cj) 46, (Tij) 7 (Di) 88

Stage 13

Waktu Mesin

(1)66 (2)46 (3)46 (4)53 (5)42 (6)45

(St) 1 4 3, (Cj) 45, (Tij) 7 (Di) 89
 (St) 2 1 3, (Cj) 46, (Tij) 14 (Di) 94
 (St) 3 1 2, (Cj) 42, (Tij) 8 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 2 1, (Cj) 46, (Tij) 7 (Di) 88

Stage 14

Waktu Mesin

(1)39 (2)46 (3)32 (4)53 (5)42 (6)45

(St) 1 4 3, (Cj) 32, (Tij) 7 (Di) 89
 (St) 3 1 2, (Cj) 42, (Tij) 8 (Di) 97
 (St) 4 5 6, (Cj) 45, (Tij) 5 (Di) 87
 (St) 5 1 2, (Cj) 39, (Tij) 12 (Di) 88

Stage 15

Waktu Mesin

(1)39 (2)46 (3)32 (4)53 (5)42 (6)40

(St) 1 4 3, (Cj) 32, (Tij) 7 (Di) 89
 (St) 3 1 2, (Cj) 42, (Tij) 8 (Di) 97
 (St) 4 4 5, (Cj) 40, (Tij) 11 (Di) 87
 (St) 5 1 2, (Cj) 39, (Tij) 12 (Di) 88

Stage 16

Waktu Mesin

(1)39 (2)34 (3)32 (4)53 (5)42 (6)40

(St) 1 4 3, (Cj) 32, (Tij) 7 (Di) 89
 (St) 4 4 5, (Cj) 40, (Tij) 11 (Di) 87
 (St) 5 1 2, (Cj) 34, (Tij) 12 (Di) 88

Stage 17

Waktu Mesin

(1)39 (2)34 (3)32 (4)53 (5)29 (6)40

(St) 1 4 3, (Cj) 32, (Tij) 7 (Di) 89

(St) 4 3 2, (Cj) 29, (Tij) 9 (Di) 87

(St) 5 1 2, (Cj) 34, (Tij) 12 (Di) 88

Stage 18

Waktu Mesin

(1)39 (2)22 (3)32 (4)53 (5)29 (6)40

(St) 1 4 3, (Cj) 32, (Tij) 7 (Di) 89

(St) 4 3 2, (Cj) 22, (Tij) 9 (Di) 87

Stage 19

Waktu Mesin

(1)39 (2)22 (3)25 (4)53 (5)29 (6)40

(St) 1 3 2, (Cj) 22, (Tij) 6 (Di) 89

(St) 4 3 2, (Cj) 22, (Tij) 9 (Di) 87

Stage 20

Waktu Mesin

(1)39 (2)13 (3)25 (4)53 (5)29 (6)40

(St) 1 3 2, (Cj) 13, (Tij) 6 (Di) 89

(St) 4 2 4, (Cj) 13, (Tij) 14 (Di) 87

Stage 21

Waktu Mesin

(1)39 (2)7 (3)25 (4)-1 (5)29 (6)40

(St) 1 2 4, (Cj) -1, (Tij) 13 (Di) 89

(St) 4 1 1, (Cj) -1, (Tij) 13 (Di) 87

Stage 22

Waktu Mesin

(1)-14 (2)7 (3)25 (4)-14 (5)29 (6)40

(St) 1 1 1, (Cj) -14, (Tij) 12 (Di) 89

Stage 23

Waktu Mesin

(1)-26 (2)7 (3)25 (4)-14 (5)29 (6)40

Biaya Earlines = 0

Biaya Tardines = 240

Total Biaya = 240

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 1 = Awal (0), akhir (12)

1 2 4 = Awal (12), akhir (25)

1 3 2 = Awal (33), akhir (39)

1 4 3 = Awal (51), akhir (58)

1 5 6 = Awal (71), akhir (80)

1 6 5 = Awal (95), akhir (104)

Job 2

2 1 3 = Awal (58), akhir (72)

2 2 2 = Awal (72), akhir (79)

2 3 5 = Awal (79), akhir (92)

2 4 1 = Awal (92), akhir (102)

2 5 4 = Awal (102), akhir (108)

2 6 6 = Awal (108), akhir (120)

Job 3

3 1 2 = Awal (60), akhir (68)

3 2 5 = Awal (68), akhir (79)

3 3 4 = Awal (79), akhir (86)

3 4 3 = Awal (86), akhir (95)

3 5 6 = Awal (95), akhir (108)

3 6 1 = Awal (112), akhir (123)

Job 4

4 1 1 = Awal (12), akhir (25)

4 2 4 = Awal (25), akhir (39)

4 3 2 = Awal (39), akhir (48)

4 4 5 = Awal (55), akhir (66)

4 5 6 = Awal (66), akhir (71)

4 6 3 = Awal (108), akhir (113)

Job 5

5 1 2 = Awal (48), akhir (60)

5 2 1 = Awal (65), akhir (72)

5 3 3 = Awal (72), akhir (80)

5 4 6 = Awal (80), akhir (95)

5 5 4 = Awal (95), akhir (102)

5 6 5 = Awal (104), akhir (115)

3. S / O P N

Stage 1

Waktu Mesin

(1)97 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94

(St) 3 6 1, (Cj) 97, (Tij) 11 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 2

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)94

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 6 6, (Cj) 94, (Tij) 12 (Di) 94

(St) 3 5 6, (Cj) 86, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 3

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)89 (6)82

(St) 1 6 5, (Cj) 89, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94

(St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 89, (Tij) 11 (Di) 88

Stage 4

Waktu Mesin

(1)86 (2)66 (3)87 (4)82 (5)80 (6)82

(St) 1 5 6, (Cj) 80, (Tij) 9 (Di) 89

(St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94

(St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97

(St) 4 6 3, (Cj) 87, (Tij) 5 (Di) 87

(St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 5

Waktu Mesin

(1)86 (2)66 (3)82 (4)82 (5)80 (6)82

(St) 1 5 6, (Cj) 80, (Tij) 9 (Di) 89
 (St) 2 5 4, (Cj) 82, (Tij) 6 (Di) 94
 (St) 3 5 6, (Cj) 82, (Tij) 13 (Di) 97
 (St) 4 5 6, (Cj) 82, (Tij) 5 (Di) 87
 (St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 6

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)80 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89
 (St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 6 5, (Cj) 80, (Tij) 11 (Di) 88

Stage 7

Waktu Mesin

(1)86 (2)66 (3)82 (4)76 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89
 (St) 2 4 1, (Cj) 76, (Tij) 10 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 69, (Tij) 7 (Di) 88

Stage 8

Waktu Mesin

(1)66 (2)66 (3)82 (4)76 (5)69 (6)69

(St) 1 5 6, (Cj) 69, (Tij) 9 (Di) 89
 (St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94
 (St) 3 4 3, (Cj) 69, (Tij) 9 (Di) 97
 (St) 4 5 6, (Cj) 69, (Tij) 5 (Di) 87
 (St) 5 5 4, (Cj) 69, (Tij) 7 (Di) 88

Stage 9

Waktu Mesin

(1)66 (2)66 (3)60 (4)62 (5)69 (6)60

(St) 1 4 3, (Cj) 60, (Tij) 7 (Di) 89
 (St) 2 3 5, (Cj) 66, (Tij) 13 (Di) 94
 (St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97
 (St) 4 5 6, (Cj) 60, (Tij) 5 (Di) 87
 (St) 5 4 6, (Cj) 60, (Tij) 15 (Di) 88

Stage 10

Waktu Mesin

(1)66 (2)66 (3)60 (4)62 (5)53 (6)60

(St) 1 4 3, (Cj) 60, (Tij) 7 (Di) 89

(St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94

(St) 3 3 4, (Cj) 60, (Tij) 7 (Di) 97

(St) 4 5 6, (Cj) 60, (Tij) 5 (Di) 87

(St) 5 4 6, (Cj) 60, (Tij) 15 (Di) 88

Stage 11

Waktu Mesin

(1)66 (2)66 (3)53 (4)53 (5)53 (6)55

(St) 1 3 2, (Cj) 53, (Tij) 6 (Di) 89

(St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94

(St) 3 2 5, (Cj) 53, (Tij) 11 (Di) 97

(St) 4 4 5, (Cj) 53, (Tij) 11 (Di) 87

(St) 5 4 6, (Cj) 55, (Tij) 15 (Di) 88

Stage 12

Waktu Mesin

(1)66 (2)66 (3)53 (4)53 (5)53 (6)40

(St) 1 3 2, (Cj) 53, (Tij) 6 (Di) 89

(St) 2 2 2, (Cj) 53, (Tij) 7 (Di) 94

(St) 3 2 5, (Cj) 53, (Tij) 11 (Di) 97

(St) 4 4 5, (Cj) 53, (Tij) 11 (Di) 87

(St) 5 3 3, (Cj) 40, (Tij) 8 (Di) 88

Stage 13

Waktu Mesin

(1)66 (2)47 (3)53 (4)53 (5)42 (6)40

(St) 1 2 4, (Cj) 47, (Tij) 13 (Di) 89

(St) 2 2 2, (Cj) 47, (Tij) 7 (Di) 94

(St) 3 2 5, (Cj) 42, (Tij) 11 (Di) 97

(St) 4 3 2, (Cj) 42, (Tij) 9 (Di) 87

(St) 5 3 3, (Cj) 40, (Tij) 8 (Di) 88

Stage 14

Waktu Mesin

(1)66 (2)40 (3)53 (4)34 (5)42 (6)40

(St) 1 1 1, (Cj) 34, (Tij) 12 (Di) 89

(St) 2 1 3, (Cj) 40, (Tij) 14 (Di) 94

(St) 3 2 5, (Cj) 42, (Tij) 11 (Di) 97

(St) 4 3 2, (Cj) 40, (Tij) 9 (Di) 87
 (St) 5 3 3, (Cj) 40, (Tij) 8 (Di) 88

Stage 15

Waktu Mesin

(1)66 (2)40 (3)53 (4)34 (5)31 (6)40

(St) 1 1 1, (Cj) 34, (Tij) 12 (Di) 89
 (St) 2 1 3, (Cj) 40, (Tij) 14 (Di) 94
 (St) 3 1 2, (Cj) 31, (Tij) 8 (Di) 97
 (St) 4 3 2, (Cj) 40, (Tij) 9 (Di) 87
 (St) 5 3 3, (Cj) 40, (Tij) 8 (Di) 88

Stage 16

Waktu Mesin

(1)66 (2)31 (3)32 (4)34 (5)31 (6)40

(St) 1 1 1, (Cj) 34, (Tij) 12 (Di) 89
 (St) 2 1 3, (Cj) 32, (Tij) 14 (Di) 94
 (St) 3 1 2, (Cj) 31, (Tij) 8 (Di) 97
 (St) 4 2 4, (Cj) 31, (Tij) 14 (Di) 87
 (St) 5 2 1, (Cj) 32, (Tij) 7 (Di) 88

Stage 17

Waktu Mesin

(1)22 (2)31 (3)32 (4)34 (5)31 (6)40

(St) 2 1 3, (Cj) 32, (Tij) 14 (Di) 94
 (St) 3 1 2, (Cj) 31, (Tij) 8 (Di) 97
 (St) 4 2 4, (Cj) 31, (Tij) 14 (Di) 87
 (St) 5 2 1, (Cj) 22, (Tij) 7 (Di) 88

Stage 18

Waktu Mesin

(1)22 (2)31 (3)18 (4)34 (5)31 (6)40

(St) 3 1 2, (Cj) 31, (Tij) 8 (Di) 97
 (St) 4 2 4, (Cj) 31, (Tij) 14 (Di) 87
 (St) 5 2 1, (Cj) 22, (Tij) 7 (Di) 88

Stage 19

Waktu Mesin

(1)22 (2)23 (3)18 (4)17 (5)31 (6)40

(St) 4 1 1, (Cj) 17, (Tij) 13 (Di) 87
 (St) 5 2 1, (Cj) 22, (Tij) 7 (Di) 88

Stage 20

Waktu Mesin

(1)15 (2)23 (3)18 (4)17 (5)31 (6)40

(St) 4 1 1, (Cj) 15, (Tij) 13 (Di) 87

(St) 5 1 2, (Cj) 15, (Tij) 12 (Di) 88

Stage 21

Waktu Mesin

(1)2 (2)3 (3)18 (4)17 (5)31 (6)40

Biaya Earlines = 8

Biaya Tardines = 0

Total Biaya = 8

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 1 = Awal (22), akhir (34)

1 2 4 = Awal (34), akhir (47)

1 3 2 = Awal (47), akhir (53)

1 4 3 = Awal (53), akhir (60)

1 5 6 = Awal (60), akhir (69)

1 6 5 = Awal (80), akhir (89)

Job 2

2 1 3 = Awal (18), akhir (32)

2 2 2 = Awal (40), akhir (47)

2 3 5 = Awal (53), akhir (66)

2 4 1 = Awal (66), akhir (76)

2 5 4 = Awal (76), akhir (82)

2 6 6 = Awal (82), akhir (94)

Job 3

3 1 2 = Awal (23), akhir (31)

3 2 5 = Awal (31), akhir (42)

3 3 4 = Awal (53), akhir (60)

3 4 3 = Awal (60), akhir (69)

3 5 6 = Awal (69), akhir (82)

3 6 1 = Awal (86), akhir (97)

Job 4

4 1 1 = Awal (2), akhir (15)

4 2 4 = Awal (17), akhir (31)

4 3 2 = Awal (31), akhir (40)

4 4 5 = Awal (42), akhir (53)

4 5 6 = Awal (55), akhir (60)

4 6 3 = Awal (82), akhir (87)

Job 5

5 1 2 = Awal (3), akhir (15)

5 2 1 = Awal (15), akhir (22)

5 3 3 = Awal (32), akhir (40)

5 4 6 = Awal (40), akhir (55)

5 5 4 = Awal (62), akhir (69)

5 6 5 = Awal (69), akhir (80)

LAMPIRAN C

Data yang digunakan dalam pengolahan data adalah

Data 1

Waktu proses :

Job	Operasi					
	1	2	3	4	5	6
1	12	13	6	7	9	9
2	14	7	13	10	6	12
3	8	11	7	9	13	11
4	13	14	9	11	5	5
5	12	7	8	15	7	11

Mesin :

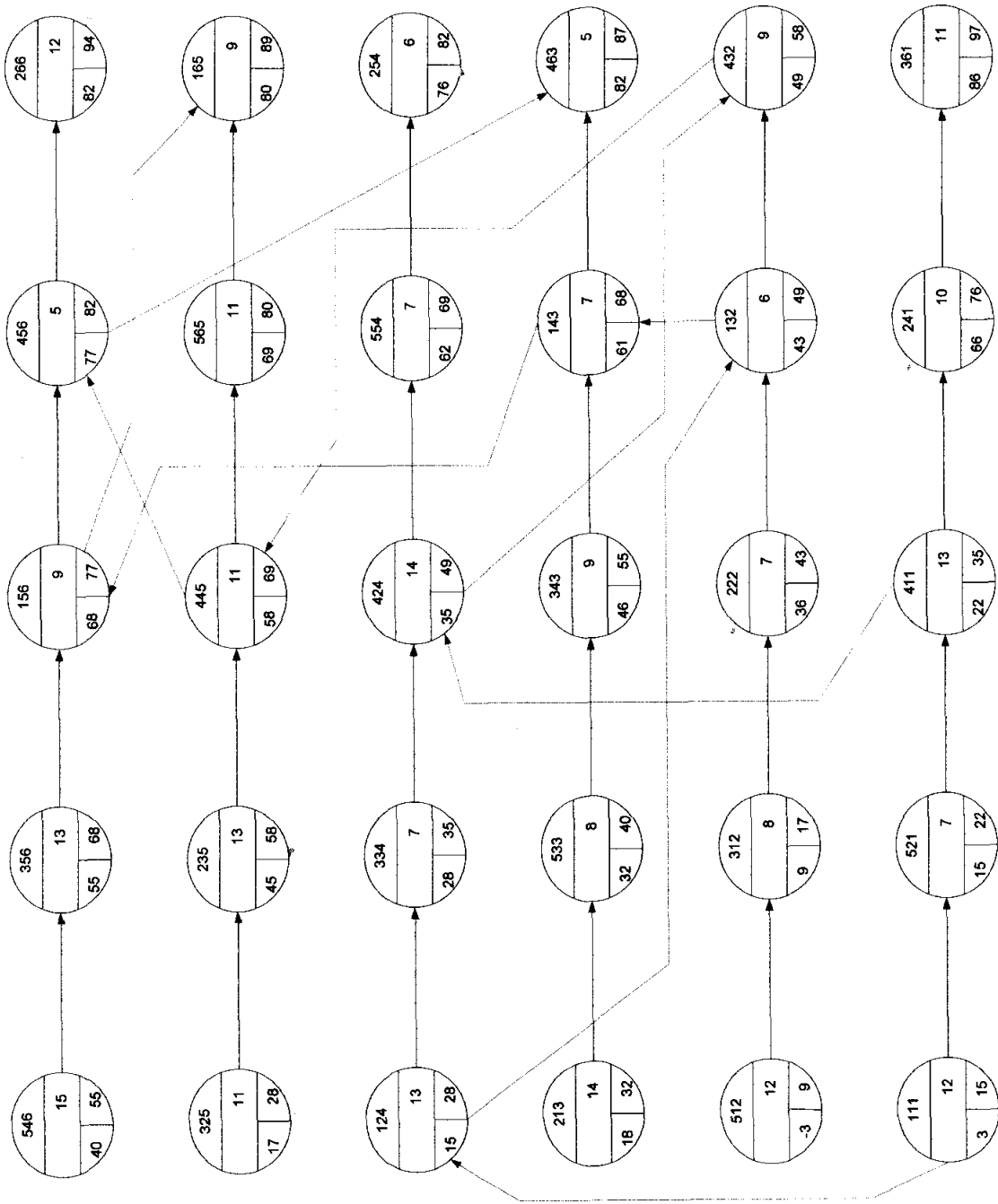
Job	Operasi					
	1	2	3	4	5	6
1	1	4	2	3	6	5
2	3	2	5	1	4	6
3	2	5	4	3	6	1
4	1	4	2	5	6	3
5	2	1	3	6	4	5

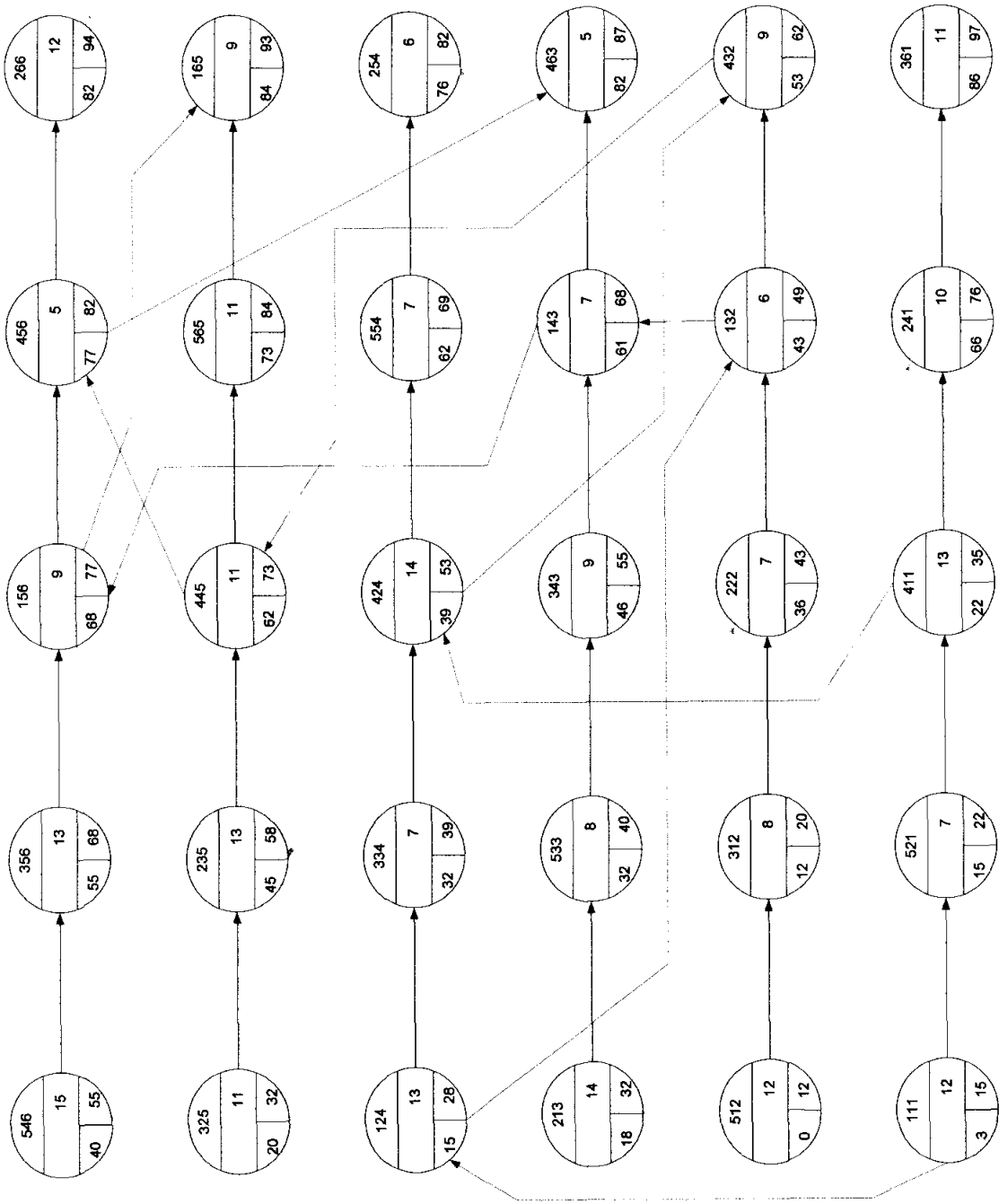
Due date :

Job	DD
1	89
2	94
3	97
4	87
5	88

Non-delay backward dengan *priority control S/OPN*, LDD, MWKR dikerjakan dengan algoritma *Non-delay backward time inserted* dan ditunjukkan dengan *Scheduling graph*. Total biaya *earliness* dan *tardiness* adalah 12.

stage	1	2	3	4	5	6	Si	Ci	Tij	Rij	m*	Psi
							165	89	9	80	5	165
							266	94	12	82	6	266
							361	97	11	86	1	361
							463	87	5	82	3	463
							565	88	11	77	5	
	86		82		80	82	565	80	11	69	5	565
							156	80	9	71	6	
							254	82	6	76	4	254
							356	82	13	69	6	
							456	82	5	77	6	456
	86		82	76	69	77	156	77	9	68	6	156
							356	77	13	64	6	
							554	69	7	62	4	554
							241	76	10	66	1	241
							445	69	11	58	5	445
	66		82	62	58	68	356	68	13	55	6	356
							143	68	7	61	3	143
							546	62	15	47	6	
							235	58	13	45	5	235
							432	58	9	49	2	432
	66	49	61	68	45	55	343	55	9	46	3	343
							546	55	15	40	6	546
							132	49	6	43	2	132
							222	45	7	38	2	
							424	49	14	35	4	424
	66	43	46	35	45	40	334	35	7	28	4	334
							533	40	8	32	3	533
							124	35	13	22	4	
							222	43	7	36	2	222
							411	35	13	22	1	411
	22	36	32	28	45	40	124	28	13	15	4	124
							325	28	11	17	5	325
							521	22	7	15	1	521
							213	32	14	18	3	213
	15	36	18	15	17	40	111	15	12	3	1	111
							312	17	8	9	2	312
							512	15	12	3	2	
	3	9	18	15	17	40	512	9	12	-3	2	512





Data 7

Waktu proses :

Job	Operasi			
	1	2	3	4
1	6	6	7	5
2	6	4	4	7
3	5	7	7	4
4	4	5	6	3
5	3	7	3	4

Mesin :

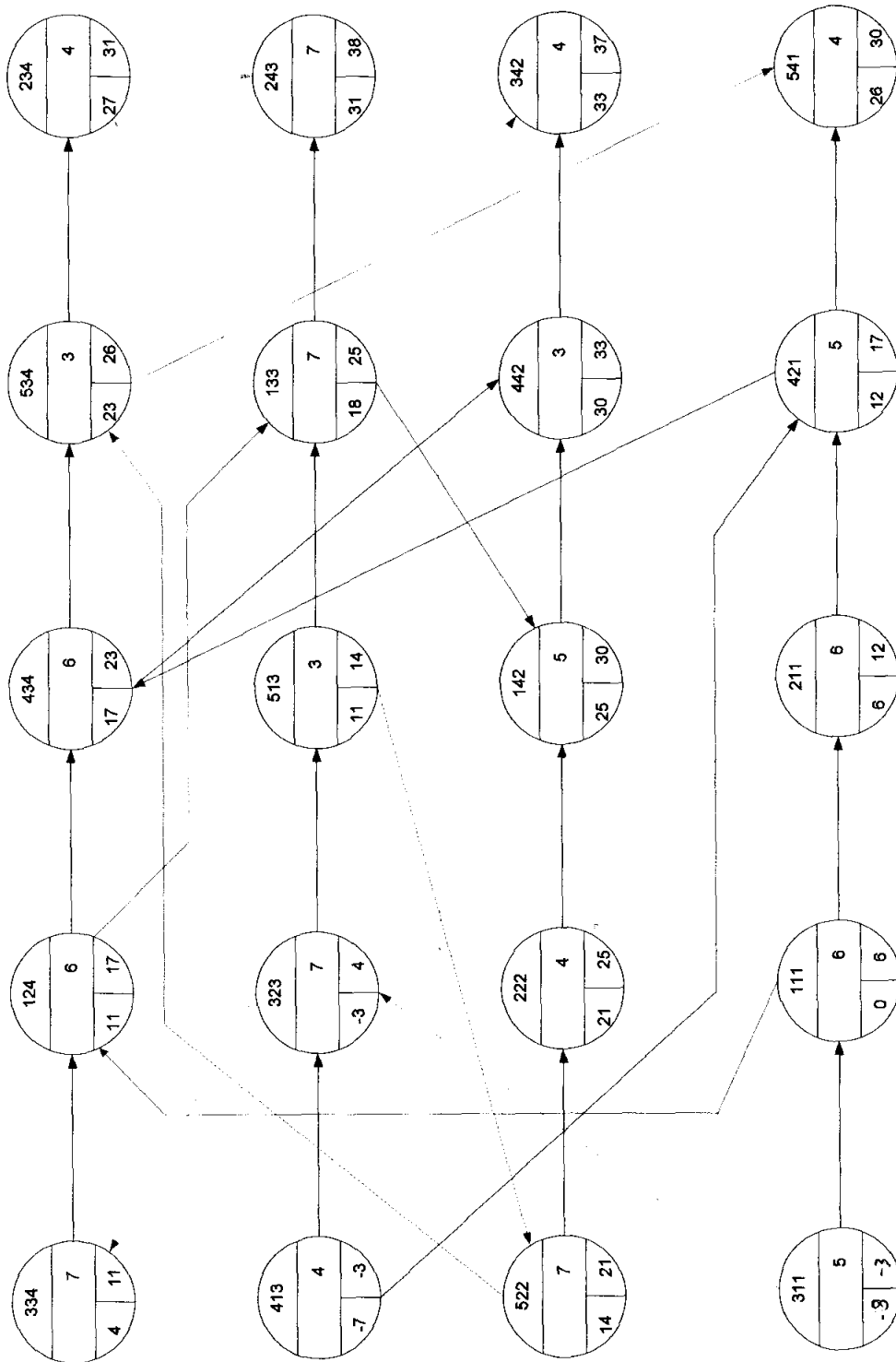
Job	Operasi			
	1	2	3	4
1	1	4	3	2
2	1	2	4	3
3	1	3	4	2
4	3	1	4	2
5	3	2	4	1

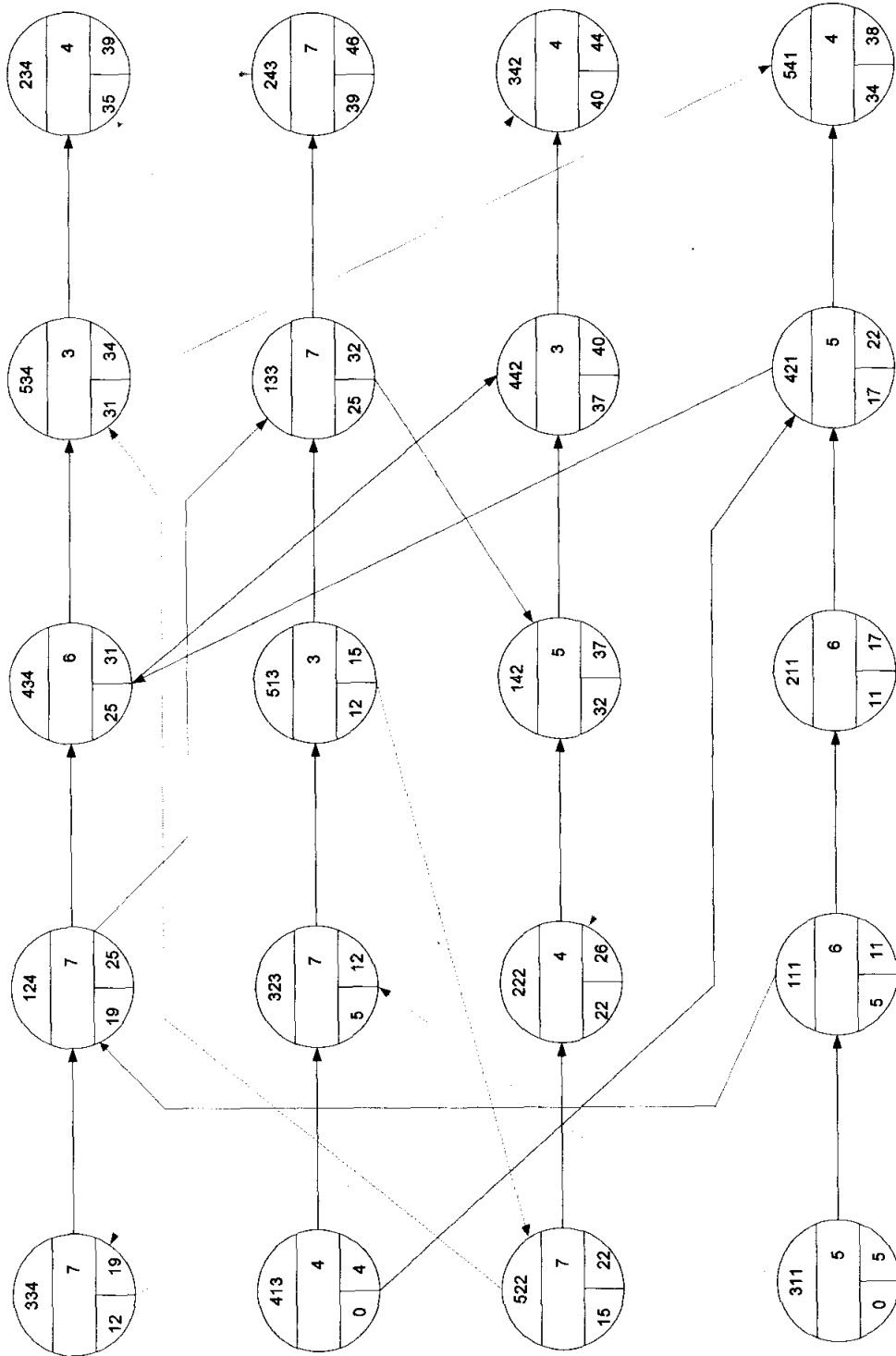
Due date :

Job	DD
1	35
2	38
3	37
4	36
5	30

Non-delay backward dengan *priority control S/OPN* dimana prioritas terbesar diberikan kepada *job* yang memiliki *slack time* yang paling besar dikerjakan dengan algoritma *Non-delay backward*, dan ditunjukkan dengan *Scheduling graph*. Total biaya *earliness* dan *tardiness* adalah 58.

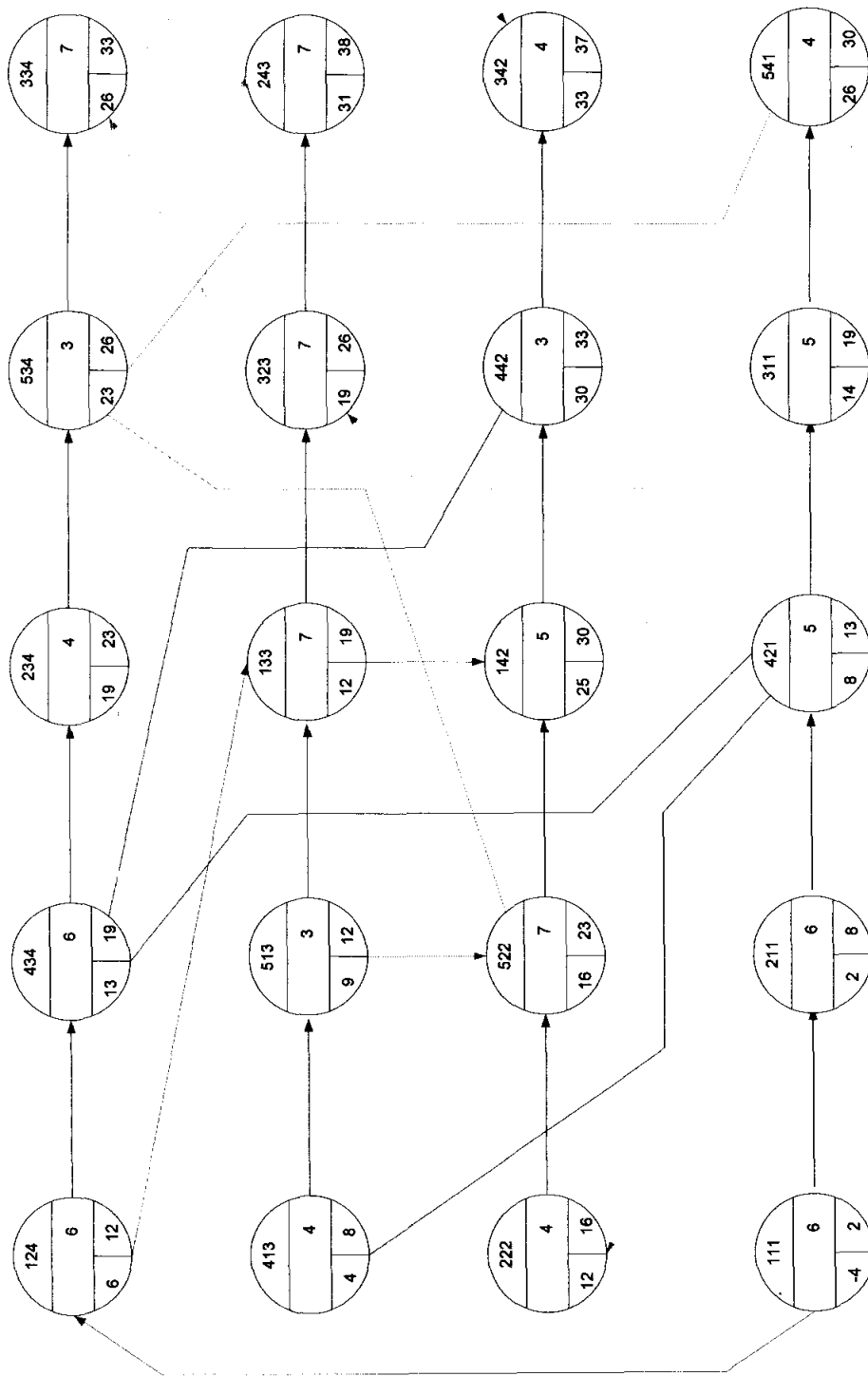
stage	1	2	3	4	Si	Ci	Tij	Rij	m*	Psi
					142	35	5	30	2	
					243	38	7	31	3	243
					342	37	4	33	2	342
					442	36	3	33	2	
					541	30	4	26	1	541
	26	33	31		142	33	5	28	2	
					442	33	3	30	2	442
					234	31	4	27	4	234
					334	33	7	26	4	
					534	26	3	23	4	
	26	30	31	27	142	30	5	25	2	142
					334	27	7	20	4	
					434	27	6	21	4	
					534	26	3	23	4	534
					222	27	4	23	2	
	26	25	31	23	133	25	7	18	3	133
					334	23	7	16	4	
					434	23	6	17	4	434
					222	25	4	21	2	222
					522	23	7	16	2	
	26	21	18	17	334	17	7	10	4	
					124	17	6	11	4	124
					421	17	5	12	1	421
					522	21	7	14	2	522
					211		6	-6		
	12	14	18	11	334	11	7	4	4	334
					111	11	6	5	1	
					211	12	6	6	1	211
					413	12	4	8	3	
					513	14	3	11	3	513
	6	14	11	4	323	4	7	-3	3	323
					111	6	6	0	1	111
					413	11	4	7	3	
	0	14	-3	4	311	-3	5	-3	1	311
					413	-3	4	-7	3	413

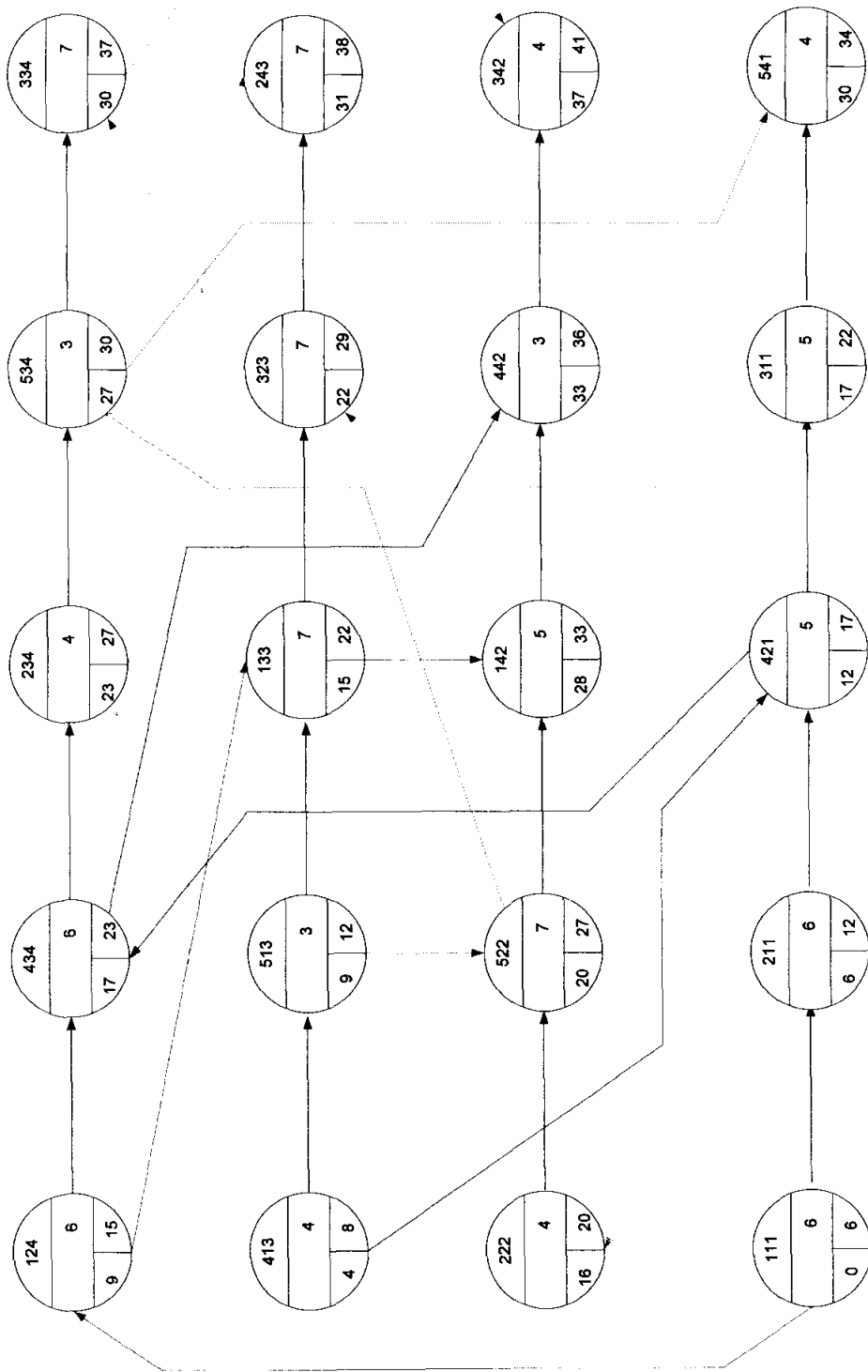




Non-delay backward dengan *priority control* LDD dimana prioritas terbesar diberikan kepada *job* dengan waktu jatuh tempo (*due date*) yang paling besar terlebih dahulu, dan MWKR dimana prioritas terbesar diberikan kepada *job* yang mempunyai urutan proses yang lebih dulu, dikerjakan dengan algoritma *Non-delay backward* dan ditunjukkan dengan *Schedulling graph Priority control* LDD dan MWKR memiliki jalan penjadualan operasi yang sama. Total biaya *earliness* dan *tardiness* adalah 18.

stage	1	2	3	4	Si	Ci	Tij	Rij	m*	Psi
					142	35	5	30	2	
					243	38	7	31	3	243
					342	37	4	33	2	342
					442	36	3	33	2	
					541	30	4	26	1	541
	26	33	31		142	33	5	28	2	
					442	33	3	30	2	442
					234	31	4	27	4	
					334	33	7	26	4	334
					534	26	3	23	4	
	26	30	31	26	142	30	5	25	2	142
					234	26	4	22	4	
					434	26	6	20	4	
					534	26	3	23	4	534
					323	26	7	19	3	323
	26	25	19	23	133	19	7	12	3	133
					234	23	4	19	4	234
					434	23	6	17	4	
					311	19	5	14	1	311
	14	25	12	19	434	19	6	13	4	434
					124	12	6	6	4	
					522	23	7	16	2	522
	14	16	12	13	124	12	6	6	4	124
					222	16	4	12	2	222
					421	13	5	8	1	421
					513	12	3	9	3	513
	8	12	9	6	111	6	6	0	1	
					211	8	6	2	1	211
					413	8	4	4	3	413
	2	12	4	6	111	2	6	-4	1	111





LAMPIRAN D

Persamaan LINDO :

1. Soal 1

Min $E16+E26+E36+E46+E56+2T16+2T26+2T36+2T46+2T56$

St

$$C12 - C11 \geq 13$$

$$C13 - C12 \geq 6$$

$$C14 - C13 \geq 7$$

$$C15 - C14 \geq 9$$

$$C16 - C15 \geq 9$$

$$C22 - C21 \geq 7$$

$$C23 - C22 \geq 13$$

$$C24 - C23 \geq 10$$

$$C25 - C24 \geq 6$$

$$C26 - C25 \geq 12$$

$$C32 - C31 \geq 11$$

$$C33 - C32 \geq 7$$

$$C34 - C33 \geq 9$$

$$-C11 + C24 + 10000 Z1 \leq 9988$$

$$-C11 + C24 + 10000 Z1 \geq 10$$

$$-C11 + C36 + 10000 Z2 \leq 9988$$

$$-C11 + C36 + 10000 Z2 \geq 11$$

$$-C11 + C41 + 10000 Z3 \leq 9988$$

$$-C11 + C41 + 10000 Z3 \geq 13$$

$$-C11 + C52 + 10000 Z4 \leq 9988$$

$$-C11 + C52 + 10000 Z4 \geq 7$$

$$-C24 + C36 + 10000 Z5 \leq 9990$$

$$-C24 + C36 + 10000 Z5 \geq 11$$

$$-C24 + C41 + 10000 Z6 \leq 9990$$

$$-C24 + C41 + 10000 Z6 \geq 13$$

$$-C24 + C52 + 10000 Z7 \leq 9990$$

$$-C24 + C52 + 10000 Z7 \geq 7$$

$$-C36 + C41 + 10000 Z8 \leq 9989$$

$$-C36 + C41 + 10000 Z8 \geq 13$$

$$-C36 + C52 + 10000 Z9 \leq 9989$$

$$-C36 + C52 + 10000 Z9 \geq 7$$

$$-C41 + C52 + 10000 Z10 \leq 9987$$

$$-C41 + C52 + 10000 Z10 \geq 7$$

$$-C13 + C22 + 10000 Z11 \leq 9994$$

$$-C13 + C22 + 10000 Z11 \geq 7$$

$$-C13 + C31 + 10000 Z12 \leq 9994$$

$$-C13 + C31 + 10000 Z12 \geq 8$$

$$-C13 + C43 + 10000 Z13 \leq 9994$$

$$C35 - C34 \geq 13$$

$$C36 - C35 \geq 11$$

$$C42 - C41 \geq 14$$

$$C43 - C42 \geq 9$$

$$C44 - C43 \geq 11$$

$$C45 - C44 \geq 5$$

$$C46 - C45 \geq 5$$

$$C52 - C51 \geq 7$$

$$C53 - C52 \geq 8$$

$$C54 - C53 \geq 15$$

$$C55 - C54 \geq 7$$

$$C56 - C55 \geq 11$$

$$-C13 + C43 + 10000 Z13 \geq 9$$

$$-C13 + C51 + 10000 Z14 \leq 9994$$

$$-C13 + C51 + 10000 Z14 \geq 12$$

$$-C22 + C31 + 10000 Z15 \leq 9993$$

$$-C22 + C31 + 10000 Z15 \geq 8$$

$$-C22 + C43 + 10000 Z16 \leq 9993$$

$$-C22 + C43 + 10000 Z16 \geq 9$$

$$-C22 + C51 + 10000 Z17 \leq 9993$$

$$-C22 + C51 + 10000 Z17 \geq 12$$

$$-C31 + C43 + 10000 Z18 \leq 9992$$

$$-C31 + C43 + 10000 Z18 \geq 9$$

$$-C31 + C51 + 10000 Z19 \leq 9992$$

$$-C31 + C51 + 10000 Z19 \geq 12$$

$$-C43 + C51 + 10000 Z20 \leq 9991$$

$$-C43 + C51 + 10000 Z20 \geq 12$$

$$-C14 + C21 + 10000 Z21 \leq 9993$$

$$-C14 + C21 + 10000 Z21 \geq 14$$

$$-C14 + C34 + 10000 Z22 \leq 9993$$

$$-C14 + C34 + 10000 Z22 \geq 9$$

$$-C14 + C46 + 10000 Z23 \leq 9993$$

$$-C14 + C46 + 10000 Z23 \geq 5$$

$$-C14 + C53 + 10000 Z24 \leq 9993$$

$$-C14 + C53 + 10000 Z24 \geq 8$$

$$-C21 + C34 + 10000 Z25 \leq 9986$$

$$-C21 + C34 + 10000 Z25 \geq 9$$

-C21 + C46 + 10000 Z26 <= 9986	-C16 + C44 + 10000 Z43 >= 11
-C21 + C46 + 10000 Z26 >= 5	-C16 + C56 + 10000 Z44 <= 9991
-C21 + C53 + 10000 Z27 <= 9986	-C16 + C56 + 10000 Z44 >= 11
-C21 + C53 + 10000 Z27 >= 8	-C23 + C32 + 10000 Z45 <= 9987
-C34 + C46 + 10000 Z28 <= 9991	-C23 + C32 + 10000 Z45 >= 11
-C34 + C46 + 10000 Z28 >= 5	-C23 + C44 + 10000 Z46 <= 9987
-C34 + C53 + 10000 Z29 <= 9991	-C23 + C44 + 10000 Z46 >= 11
-C34 + C53 + 10000 Z29 >= 8	-C23 + C56 + 10000 Z47 <= 9987
-C46 + C53 + 10000 Z30 <= 9995	-C23 + C56 + 10000 Z47 >= 11
-C46 + C53 + 10000 Z30 >= 8	-C32 + C44 + 10000 Z48 <= 9989
-C12 + C25 + 10000 Z31 <= 9987	-C32 + C44 + 10000 Z48 >= 11
-C12 + C25 + 10000 Z31 >= 6	-C32 + C56 + 10000 Z49 <= 9989
-C12 + C33 + 10000 Z32 <= 9987	-C32 + C56 + 10000 Z49 >= 11
-C12 + C33 + 10000 Z32 >= 7	-C44 + C56 + 10000 Z50 <= 9989
-C12 + C42 + 10000 Z33 <= 9987	-C44 + C56 + 10000 Z50 >= 11
-C12 + C42 + 10000 Z33 >= 14	-C15 + C26 + 10000 Z51 <= 9991
-C12 + C55 + 10000 Z34 <= 9987	-C15 + C26 + 10000 Z51 >= 12
-C12 + C55 + 10000 Z34 >= 7	-C15 + C35 + 10000 Z52 <= 9991
-C25 + C33 + 10000 Z35 <= 9994	-C15 + C35 + 10000 Z52 >= 13
-C25 + C33 + 10000 Z35 >= 7	-C15 + C45 + 10000 Z53 <= 9991
C25 + C42 + 10000 Z36 <= 9994	-C15 + C45 + 10000 Z53 >= 5
-C25 + C42 + 10000 Z36 >= 14	-C15 + C54 + 10000 Z54 <= 9991
-C25 + C55 + 10000 Z37 <= 9994	-C15 + C54 + 10000 Z54 >= 15
-C25 + C55 + 10000 Z37 >= 7	-C26 + C35 + 10000 Z55 <= 9988
-C33 + C42 + 10000 Z38 <= 9993	-C26 + C35 + 10000 Z55 >= 13
-C33 + C42 + 10000 Z38 >= 14	-C26 + C45 + 10000 Z56 <= 9988
C33 + C55 + 10000 Z39 <= 9993	-C26 + C45 + 10000 Z56 >= 5
-C33 + C55 + 10000 Z39 >= 7	-C26 + C54 + 10000 Z57 <= 9988
-C42 + C55 + 10000 Z40 <= 9986	-C26 + C54 + 10000 Z57 >= 15
-C42 + C55 + 10000 Z40 >= 7	-C35 + C45 + 10000 Z58 <= 9987
-C16 + C23 + 10000 Z41 <= 9991	-C35 + C45 + 10000 Z58 >= 5
-C16 + C23 + 10000 Z41 >= 13	-C35 + C54 + 10000 Z59 <= 9987
C16 + C32 + 10000 Z42 <= 9991	C35 + C54 + 10000 Z59 >= 15
-C16 + C32 + 10000 Z42 >= 11	-C45 + C54 + 10000 Z60 <= 9995
-C16 + C44 + 10000 Z43 <= 9991	-C45 + C54 + 10000 Z60 >= 15
C11 >= 12	C41 >= 13
C21 >= 14	C51 >= 12
C31 >= 8	
C16 + E15 >= 89	C36 - T36 <= 97
C16 - T16 <= 89	C46 + E46 >= 87
C26 + E26 >= 94	C46 - T46 <= 87
C26 - T26 <= 94	C56 + E56 >= 88
C36 + E36 >= 97	C56 - T56 <= 88
End	
Int Z1	Int Z3
Int Z2	Int Z4

Int Z5	Int Z33
Int Z6	Int Z34
Int Z7	Int Z35
Int Z8	Int Z36
Int Z9	Int Z37
Int Z10	Int Z38
Int Z11	Int Z39
Int Z12	Int Z40
Int Z13	Int Z41
Int Z14	Int Z42
Int Z15	Int Z43
Int Z16	Int Z44
Int Z17	Int Z45
Int Z18	Int Z46
Int Z19	Int Z47
Int Z20	Int Z48
Int Z21	Int Z49
Int Z22	Int Z50
Int Z23	Int Z51
Int Z24	Int Z52
Int Z25	Int Z53
Int Z26	Int Z54
Int Z27	Int Z55
Int Z28	Int Z56
Int Z29	Int Z57
Int Z30	Int Z58
Int Z31	Int Z59
Int Z32	Int Z60

Objective function value

1) 8.000000

VARIABLE	VALUE	REDUCED COST
Z6	1.000000	0.000000
Z7	1.000000	0.000000
Z8	1.000000	0.000000
Z9	1.000000	0.000000
Z11	1.000000	0.000000
Z12	1.000000	40000.000000
Z14	1.000000	0.000000
Z17	1.000000	0.000000
Z19	1.000000	0.000000
Z20	1.000000	0.000000
Z21	1.000000	0.000000

Z29	1.000000	0.000000
Z30	1.000000	0.000000
Z35	1.000000	0.000000
Z36	1.000000	0.000000
Z37	1.000000	0.000000
Z38	1.000000	0.000000
Z41	1.000000	0.000000
Z42	1.000000	0.000000
Z55	1.000000	0.000000
Z56	1.000000	20000.000000
Z57	1.000000	0.000000
Z59	1.000000	40000.000000
Z60	1.000000	0.000000
T26	2.000000	0.000000
T46	2.000000	0.000000
E15	23.000000	0.000000
C12	29.000000	0.000000
C11	12.000000	0.000000
C13	35.000000	0.000000
C14	42.000000	0.000000
C15	51.000000	0.000000
C16	66.000000	0.000000
C22	21.000000	0.000000
C21	14.000000	0.000000
C23	34.000000	0.000000
C24	73.000000	0.000000
C25	79.000000	0.000000
C26	96.000000	0.000000
C32	50.000000	0.000000
C31	29.000000	0.000000
C33	57.000000	0.000000
C34	66.000000	0.000000
C35	79.000000	0.000000
C36	97.000000	0.000000
C42	43.000000	0.000000
C41	29.000000	0.000000
C43	52.000000	0.000000
C44	77.000000	0.000000
C45	84.000000	0.000000
C46	89.000000	0.000000
C52	43.000000	0.000000
C51	14.000000	0.000000
C53	51.000000	0.000000
C54	66.000000	0.000000
C55	73.000000	0.000000
C56	88.000000	0.000000

Data 7

Min E14+E24+E34+E44+E54+2T14+2T24+2T34+2T44+2T54

St

C12 - C11 \geq 6	C34 - C33 \geq 4
C13 - C12 \geq 7	C42 - C41 \geq 5
C14 - C13 \geq 5	C43 - C42 \geq 6
C22 - C21 \geq 4	C44 - C43 \geq 3
C23 - C22 \geq 4	C52 - C51 \geq 7
C24 - C23 \geq 7	C53 - C52 \geq 3
C32 - C31 \geq 7	C54 - C53 \geq 4
C33 - C32 \geq 7	
-C11 + C21 + 10000 Z1 \leq 9994	-C44 + C52 + 10000 Z20 \geq 7
-C11 + C21 + 10000 Z1 \geq 6	-C13 + C24 + 10000 Z21 \leq 9993
-C11 + C31 + 10000 Z2 \leq 9994	-C13 + C24 + 10000 Z21 \geq 7
-C11 + C31 + 10000 Z2 \geq 5	-C13 + C32 + 10000 Z22 \leq 9993
-C11 + C42 + 10000 Z3 \leq 9994	-C13 + C32 + 10000 Z22 \geq 7
-C11 + C42 + 10000 Z3 \geq 5	-C13 + C41 + 10000 Z23 \leq 9993
-C11 + C54 + 10000 Z4 \leq 9994	-C13 + C41 + 10000 Z23 \geq 4
-C11 + C54 + 10000 Z4 \geq 4	-C13 + C51 + 10000 Z24 \leq 9993
-C21 + C31 + 10000 Z5 \leq 9994	-C13 + C51 + 10000 Z24 \geq 3
-C21 + C31 + 10000 Z5 \geq 5	-C24 + C32 + 10000 Z25 \leq 9993
-C21 + C42 + 10000 Z6 \leq 9994	-C24 + C32 + 10000 Z25 \geq 7
-C21 + C42 + 10000 Z6 \geq 5	-C24 + C41 + 10000 Z26 \leq 9993
-C21 + C54 + 10000 Z7 \leq 9994	-C24 + C41 + 10000 Z26 \geq 4
-C21 + C54 + 10000 Z7 \geq 4	-C24 + C51 + 10000 Z27 \leq 9993
-C31 + C42 + 10000 Z8 \leq 9995	-C24 + C51 + 10000 Z27 \geq 3
-C31 + C42 + 10000 Z8 \geq 5	-C32 + C41 + 10000 Z28 \leq 9993
-C31 + C54 + 10000 Z9 \leq 9995	-C32 + C41 + 10000 Z28 \geq 4
-C31 + C54 + 10000 Z9 \geq 4	-C32 + C51 + 10000 Z29 \leq 9993
-C42 + C54 + 10000 Z10 \leq 9995	-C23 + C51 + 10000 Z29 \geq 3
-C42 + C54 + 10000 Z10 \geq 4	-C41 + C51 + 10000 Z30 \leq 9996
-C14 + C22 + 10000 Z11 \leq 9995	-C41 + C51 + 10000 Z30 \geq 3
-C14 + C22 + 10000 Z11 \geq 4	-C12 + C23 + 10000 Z31 \leq 9994
-C14 + C34 + 10000 Z12 \leq 9995	-C12 + C23 + 10000 Z31 \geq 4
-C14 + C34 + 10000 Z12 \geq 4	-C12 + C33 + 10000 Z32 \leq 9994
-C14 + C44 + 10000 Z13 \leq 9995	-C12 + C33 + 10000 Z32 \geq 7
-C14 + C44 + 10000 Z13 \geq 3	-C12 + C43 + 10000 Z33 \leq 9994
-C14 + C52 + 10000 Z14 \leq 9995	-C12 + C43 + 10000 Z33 \geq 6
-C14 + C52 + 10000 Z14 \geq 7	-C12 + C53 + 10000 Z34 \leq 9994
-C22 + C34 + 10000 Z15 \leq 9996	-C12 + C53 + 10000 Z34 \geq 3
-C22 + C34 + 10000 Z15 \geq 4	-C23 + C33 + 10000 Z35 \leq 9996
-C22 + C44 + 10000 Z16 \leq 9996	-C23 + C33 + 10000 Z35 \geq 7
-C22 + C44 + 10000 Z16 \geq 3	-C23 + C43 + 10000 Z36 \leq 9996
-C22 + C52 + 10000 Z17 \leq 9996	-C23 + C43 + 10000 Z36 \geq 6
-C22 + C52 + 10000 Z17 \geq 7	-C23 + C53 + 10000 Z37 \leq 9996
-C34 + C44 + 10000 Z18 \leq 9996	-C23 + C53 + 10000 Z37 \geq 3
-C34 + C44 + 10000 Z18 \geq 3	-C33 + C43 + 10000 Z38 \leq 9993
-C34 + C52 + 10000 Z19 \leq 9996	-C33 + C43 + 10000 Z38 \geq 6
-C34 + C52 + 10000 Z19 \geq 7	-C33 + C53 + 10000 Z39 \leq 9993
-C44 + C52 + 10000 Z20 \leq 9997	-C33 + C53 + 10000 Z39 \geq 3

$-C43 + C53 + 10000 Z40 \leq 9994$

$C11 \geq 6$

$C21 \geq 6$

$C31 \geq 5$

$C14 + E14 \geq 35$

$C14 - T14 \leq 35$

$C24 + E24 \geq 38$

$C24 - T24 \leq 38$

$C34 + E34 \geq 37$

End

Int Z1

Int Z2

Int Z3

Int Z4

Int Z5

Int Z6

Int Z7

Int Z8

Int Z9

Int Z10

Int Z11

Int Z12

Int Z13

Int Z14

Int Z15

Int Z16

Int Z17

Int Z18

Int Z19

Int Z20

Int Z21

Int Z22

Int Z23

Int Z24

Int Z25

Int Z26

Int Z27

Int Z28

Int Z29

Int Z30

Int Z31

Int Z32

Int Z33

Int Z34

Int Z35

Int Z36

Int Z37

Int Z38

Int Z39

Int Z40

$-C43 + C53 + 10000 Z40 \geq 3$

$C41 \geq 4$

$C51 \geq 3$

$C34 - T34 \leq 37$

$C44 + E44 \geq 36$

$C44 - T44 \leq 36$

$C54 + E54 \geq 30$

$C54 - T54 \leq 30$

Dari *linear programming* diatas akan menghasilkan :

Objective function value

1) 18.00000

VARIABLE	VALUE	REDUCED COST
Z1	1.000000	0.000000
Z2	1.000000	30000.000000
Z11	1.000000	0.000000
Z14	1.000000	0.000000
Z19	1.000000	0.000000
Z20	1.000000	0.000000
Z22	1.000000	0.000000
Z23	1.000000	0.000000
Z24	1.000000	0.000000
Z25	1.000000	0.000000
Z26	1.000000	0.000000
Z27	1.000000	0.000000
Z29	1.000000	0.000000
Z30	1.000000	0.000000
Z31	1.000000	0.000000
Z39	1.000000	0.000000
Z40	1.000000	0.000000
T34	2.000000	0.000000
T44	6.000000	0.000000
T54	1.000000	0.000000
C12	23.000000	0.000000
C11	17.000000	0.000000
C13	30.000000	0.000000
C14	35.000000	0.000000
C22	13.000000	0.000000
C21	6.000000	0.000000
C23	17.000000	0.000000
C24	38.000000	0.000000
C32	18.000000	0.000000
C31	11.000000	0.000000
C33	33.000000	0.000000
C34	39.000000	0.000000
C42	27.000000	0.000000
C41	22.000000	0.000000
C43	39.000000	0.000000
C44	42.000000	0.000000
C52	20.000000	0.000000
C51	3.000000	0.000000
C53	26.000000	0.000000
C54	31.000000	0.000000
C54	31.000000	0.000000