

LAMPIRAN A

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

1. Data 1

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	38
2	36
3	37

2. Data 2

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

3. Data 3

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

4. Data 4

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

5. Data 5

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	41
2	46
3	42
4	44
5	51
6	50

6. Data 6

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

7. Data 7

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

8. Data 8

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

10. Data 10

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	50
2	55
3	59
4	51

11. Data 11

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	60
2	68
3	64
4	73
5	67

12. Data 12

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

13. Data 13

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

14. Data 14

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

15. Data 15

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	19
2	21
3	22

16. Data 16

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

17. Data 17

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

18. Data 18

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

19. Data 19

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

20. Data 20

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

21. Data 21

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

22. Data 22

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

23. Data 23

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

24. Data 24

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

25. Data 25

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

26. Data 26

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	96
2	75
3	90
4	78
5	75
6	76

27. Data 27

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	75
2	70
3	71

28. Data 28

Waktu proses :

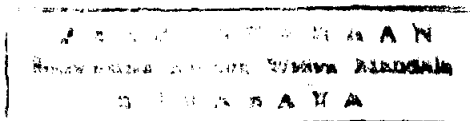
Job	Operasi					
	1	2	3	4	5	6
1	10	9	10	8	7	9
2	8	6	11	9	8	7
3	6	9	8	7	7	8
4	6	11	5	12	8	15

Mesin :

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

Due date :

Job	DD
1	80
2	60
3	70
4	85



29. Data 29

Waktu proses :

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

Mesin :

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

Due date :

Job	DD
1	75
2	67
3	65
4	68
5	66

30. Data 30

Waktu proses :

Job	Operasi				
	1	2	3	4	5
1	12	11	14	14	17
2	10	12	15	16	16
3	13	18	15	11	10

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	87
2	73
3	91

LAMPIRAN B

LAMPIRAN B

Iterasi penjadualan dengan metode *forward* untuk soal 1 :

1. *Earliest Due Date*

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0

(St) 1 1 3, (Cj) 0, (Tij) 8

(St) 2 1 2, (Cj) 0, (Tij) 5

(St) 3 1 1, (Cj) 0, (Tij) 6

Stage 2

Waktu Mesin

(1)6 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 8, (Tij) 7

(St) 2 2 1, (Cj) 6, (Tij) 7

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 3

Waktu Mesin

(1)13 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 4

Waktu Mesin

(1)13 (2)5 (3)13 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 3 2, (Cj) 13, (Tij) 6

Stage 5

Waktu Mesin

(1)20 (2)19 (3)13 (4)21

(St) 1 3 4, (Cj) 21, (Tij) 8

(St) 2 4 3, (Cj) 21, (Tij) 7

(St) 3 4 4, (Cj) 21, (Tij) 6

Stage 6

Waktu Mesin

(1)20 (2)19 (3)28 (4)27

(St) 1 3 4, (Cj) 27, (Tij) 8

Stage 7

Waktu Mesin

(1)20 (2)19 (3)28 (4)35

(St) 1 4 2, (Cj) 35, (Tij) 6

Stage 8

Waktu Mesin

(1)20 (2)41 (3)28 (4)35

Biaya Earlines = 18

Biaya Tardines = 6

Total Biaya = 24

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 3 = Awal (0), akhir (8)

1 2 1 = Awal (13), akhir (20)

1 3 4 = Awal (27), akhir (35)

1 4 2 = Awal (35), akhir (41)

Job 2

2 1 2 = Awal (0), akhir (5)

2 2 1 = Awal (6), akhir (13)

2 3 4 = Awal (13), akhir (21)

2 4 3 = Awal (21), akhir (28)

Job 3

3 1 1 = Awal (0), akhir (6)

3 2 3 = Awal (8), akhir (13)

3 3 2 = Awal (13), akhir (19)

3 4 4 = Awal (21), akhir (27)

2. *Shortest Processing Time*

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0

(St) 1 1 3, (Cj) 0, (Tij) 8

(St) 2 1 2, (Cj) 0, (Tij) 5

(St) 3 1 1, (Cj) 0, (Tij) 6

Stage 2

Waktu Mesin

(1)6 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 8, (Tij) 7

(St) 2 2 1, (Cj) 6, (Tij) 7

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 3

Waktu Mesin

(1)13 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 4

Waktu Mesin

(1)13 (2)5 (3)13 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 3 2, (Cj) 13, (Tij) 6

Stage 5

Waktu Mesin

(1)20 (2)19 (3)13 (4)21

(St) 1 3 4, (Cj) 21, (Tij) 8

(St) 2 4 3, (Cj) 21, (Tij) 7

(St) 3 4 4, (Cj) 21, (Tij) 6

Stage 6

Waktu Mesin

(1)20 (2)19 (3)28 (4)27

(St) 1 3 4, (Cj) 27, (Tij) 8

Stage 7

Waktu Mesin

(1)20 (2)19 (3)28 (4)35

(St) 1 4 2, (Cj) 35, (Tij) 6

Stage 8

Waktu Mesin

(1)20 (2)41 (3)28 (4)35

Biaya Earlines = 18

Biaya Tardines = 6

Total Biaya = 24

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 3 = Awal (0), akhir (8)

1 2 1 = Awal (13), akhir (20)

1 3 4 = Awal (27), akhir (35)

1 4 2 = Awal (35), akhir (41)

Job 2

2 1 2 = Awal (0), akhir (5)

2 2 1 = Awal (6), akhir (13)

2 3 4 = Awal (13), akhir (21)

2 4 3 = Awal (21), akhir (28)

Job 3

3 1 1 = Awal (0), akhir (6)

3 2 3 = Awal (8), akhir (13)

3 3 2 = Awal (13), akhir (19)

3 4 4 = Awal (21), akhir (27)

3. S / O P N

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0

(St) 1 1 3, (Cj) 0, (Tij) 8

(St) 2 1 2, (Cj) 0, (Tij) 5

(St) 3 1 1, (Cj) 0, (Tij) 6

Stage 2

Waktu Mesin

(1)6 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 8, (Tij) 7

(St) 2 2 1, (Cj) 6, (Tij) 7

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 3

Waktu Mesin

(1)13 (2)5 (3)8 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 2 3, (Cj) 8, (Tij) 5

Stage 4

Waktu Mesin

(1)13 (2)5 (3)13 (4)0

(St) 1 2 1, (Cj) 13, (Tij) 7

(St) 2 3 4, (Cj) 13, (Tij) 8

(St) 3 3 2, (Cj) 13, (Tij) 6

Stage 5

Waktu Mesin

(1)20 (2)19 (3)13 (4)21

(St) 1 3 4, (Cj) 21, (Tij) 8

(St) 2 4 3, (Cj) 21, (Tij) 7

(St) 3 4 4, (Cj) 21, (Tij) 6

Stage 6

Waktu Mesin

(1)20 (2)19 (3)28 (4)29

(St) 1 4 2, (Cj) 29, (Tij) 6
 (St) 3 4 4, (Cj) 29, (Tij) 6

Stage 7

Waktu Mesin

(1)20 (2)35 (3)28 (4)35

Biaya Earlines = 13

Biaya Tardines = 0

Total Biaya = 13

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 3 = Awal (0), akhir (8)

1 2 1 = Awal (13), akhir (20)

1 3 4 = Awal (21), akhir (29)

1 4 2 = Awal (29), akhir (35)

Job 2

2 1 2 = Awal (0), akhir (5)

2 2 1 = Awal (6), akhir (13)

2 3 4 = Awal (13), akhir (21)

2 4 3 = Awal (21), akhir (28)

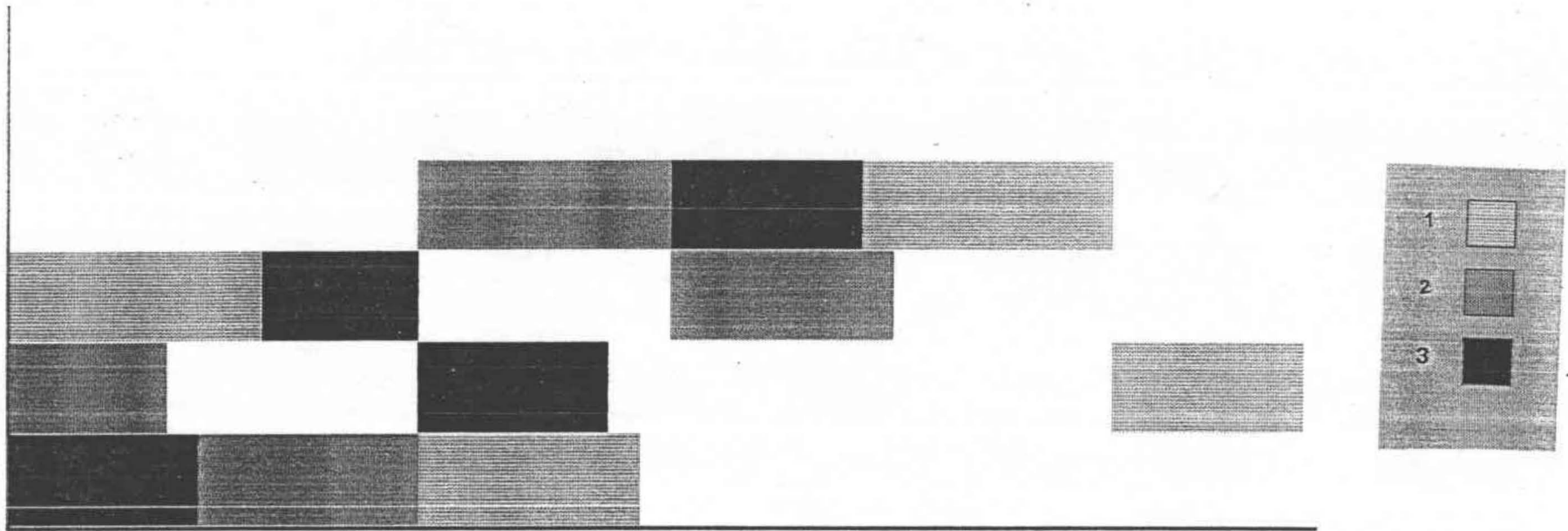
Job 3

3 1 1 = Awal (0), akhir (6)

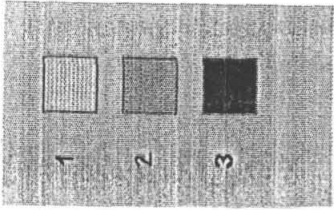
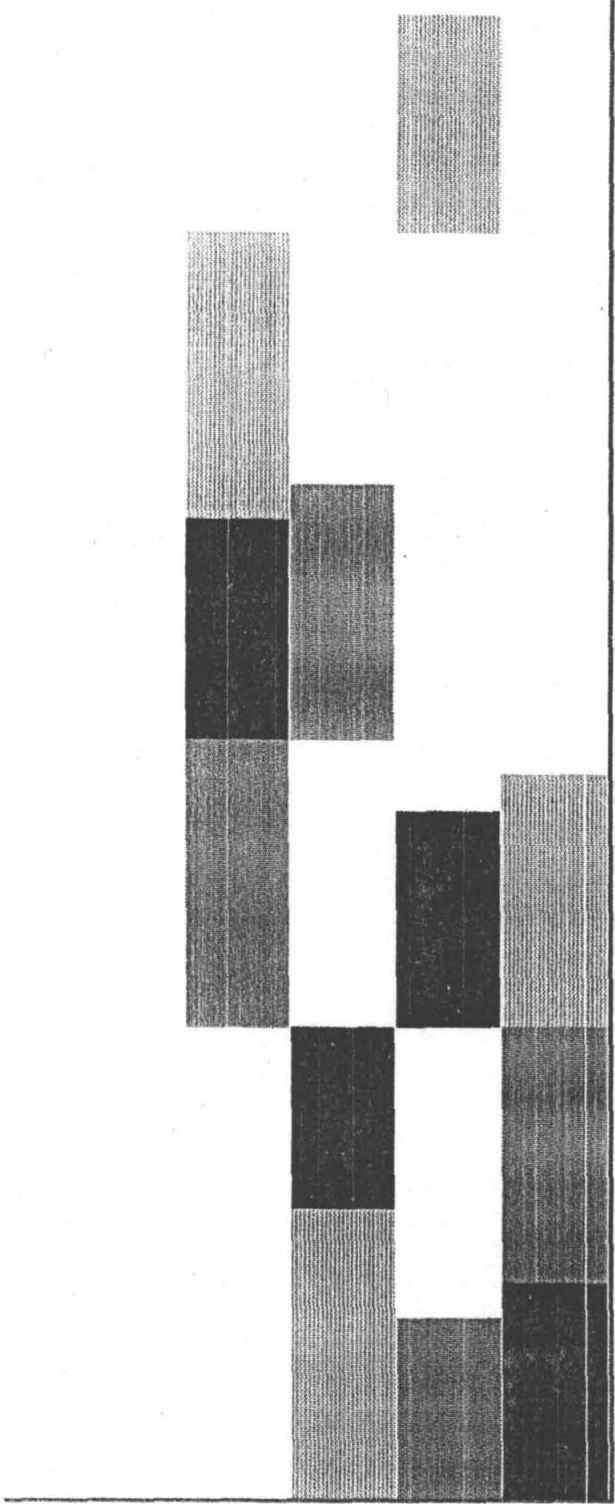
3 2 3 = Awal (8), akhir (13)

3 3 2 = Awal (13), akhir (19)

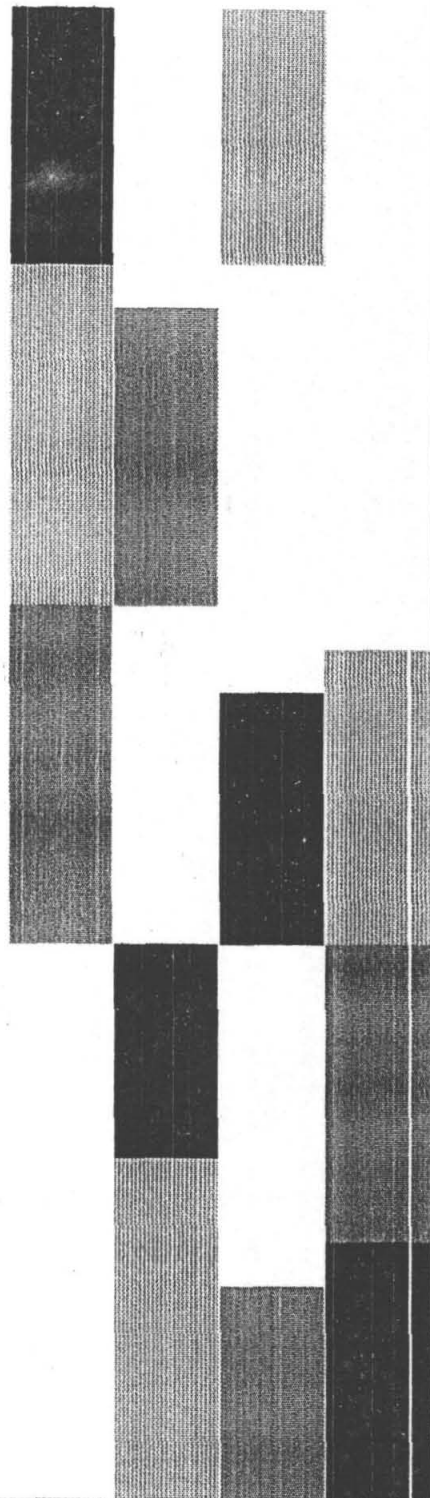
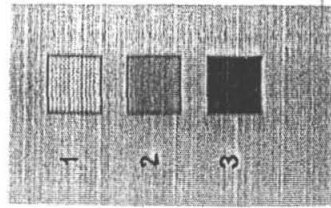
3 4 4 = Awal (29), akhir (35)



Gantt Chart penjadualan dengan metode *forward* (EDD) soal 1



Gantt Chart penjadualan dengan metode *forward* (SPT) soal 1



Gantt Chart penjadualan dengan metode *forward* (S/OPN) soal 1

Iterasi penjadwalan dengan metode *forward* untuk soal 2 :

1. Earliest Due Date

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 0, (Tij) 12

(St) 2 1 3, (Cj) 0, (Tij) 14

(St) 3 1 2, (Cj) 0, (Tij) 8

(St) 4 1 1, (Cj) 0, (Tij) 13

(St) 5 1 2, (Cj) 0, (Tij) 12

Stage 2

Waktu Mesin

(1)13 (2)12 (3)14 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 13, (Tij) 12

(St) 2 2 2, (Cj) 14, (Tij) 7

(St) 3 1 2, (Cj) 12, (Tij) 8

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

(St) 5 2 1, (Cj) 13, (Tij) 7

Stage 3

Waktu Mesin

(1)13 (2)20 (3)14 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 13, (Tij) 12

(St) 2 2 2, (Cj) 20, (Tij) 7

(St) 3 2 5, (Cj) 20, (Tij) 11

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

(St) 5 2 1, (Cj) 13, (Tij) 7

Stage 4

Waktu Mesin

(1)20 (2)20 (3)14 (4)27 (5)0 (6)0

(St) 1 1 1, (Cj) 20, (Tij) 12

(St) 2 2 2, (Cj) 20, (Tij) 7

(St) 3 2 5, (Cj) 20, (Tij) 11

(St) 4 3 2, (Cj) 27, (Tij) 9

(St) 5 3 3, (Cj) 20, (Tij) 8

Stage 5

Waktu Mesin

(1)32 (2)27 (3)28 (4)27 (5)31 (6)0

(St) 1 2 4, (Cj) 32, (Tij) 13

(St) 2 3 5, (Cj) 31, (Tij) 13

(St) 3 3 4, (Cj) 31, (Tij) 7

(St) 4 3 2, (Cj) 27, (Tij) 9

(St) 5 4 6, (Cj) 28, (Tij) 15

Stage 6

Waktu Mesin

(1)32 (2)36 (3)28 (4)27 (5)31 (6)0

(St) 1 2 4, (Cj) 32, (Tij) 13

(St) 2 3 5, (Cj) 31, (Tij) 13

(St) 3 3 4, (Cj) 31, (Tij) 7

(St) 4 4 5, (Cj) 36, (Tij) 11

(St) 5 4 6, (Cj) 28, (Tij) 15

Stage 7

Waktu Mesin

(1)32 (2)36 (3)28 (4)27 (5)31 (6)43

(St) 1 2 4, (Cj) 32, (Tij) 13

(St) 2 3 5, (Cj) 31, (Tij) 13

(St) 3 3 4, (Cj) 31, (Tij) 7

(St) 4 4 5, (Cj) 36, (Tij) 11

(St) 5 5 4, (Cj) 43, (Tij) 7

Stage 8

Waktu Mesin

(1)32 (2)36 (3)28 (4)38 (5)44 (6)43

(St) 1 2 4, (Cj) 38, (Tij) 13

(St) 2 4 1, (Cj) 44, (Tij) 10

(St) 3 4 3, (Cj) 38, (Tij) 9

(St) 4 4 5, (Cj) 44, (Tij) 11

(St) 5 5 4, (Cj) 43, (Tij) 7

Stage 9

Waktu Mesin

(1)32 (2)36 (3)47 (4)51 (5)44 (6)43

(St) 1 3 2, (Cj) 51, (Tij) 6

(St) 2 4 1, (Cj) 44, (Tij) 10

(St) 3 5 6, (Cj) 47, (Tij) 13

(St) 4 4 5, (Cj) 44, (Tij) 11

(St) 5 5 4, (Cj) 51, (Tij) 7

Stage 10

Waktu Mesin

(1)54 (2)36 (3)47 (4)51 (5)55 (6)43

(St) 1 3 2, (Cj) 51, (Tij) 6

(St) 2 5 4, (Cj) 54, (Tij) 6

(St) 3 5 6, (Cj) 47, (Tij) 13

(St) 4 5 6, (Cj) 55, (Tij) 5

(St) 5 5 4, (Cj) 51, (Tij) 7

Stage 11

Waktu Mesin

(1)54 (2)36 (3)47 (4)51 (5)55 (6)60

(St) 1 3 2, (Cj) 51, (Tij) 6

(St) 2 5 4, (Cj) 54, (Tij) 6
 (St) 3 6 1, (Cj) 60, (Tij) 11
 (St) 4 5 6, (Cj) 60, (Tij) 5
 (St) 5 5 4, (Cj) 51, (Tij) 7

Stage 12

Waktu Mesin

(1)54 (2)57 (3)47 (4)58 (5)55 (6)60

(St) 1 4 3, (Cj) 57, (Tij) 7
 (St) 2 5 4, (Cj) 58, (Tij) 6
 (St) 3 6 1, (Cj) 60, (Tij) 11
 (St) 4 5 6, (Cj) 60, (Tij) 5
 (St) 5 6 5, (Cj) 58, (Tij) 11

Stage 13

Waktu Mesin

(1)54 (2)57 (3)64 (4)58 (5)55 (6)60

(St) 1 5 6, (Cj) 64, (Tij) 9
 (St) 2 5 4, (Cj) 58, (Tij) 6
 (St) 3 6 1, (Cj) 60, (Tij) 11
 (St) 4 5 6, (Cj) 60, (Tij) 5
 (St) 5 6 5, (Cj) 58, (Tij) 11

Stage 14

Waktu Mesin

(1)54 (2)57 (3)64 (4)64 (5)69 (6)60

(St) 1 5 6, (Cj) 64, (Tij) 9
 (St) 2 6 6, (Cj) 64, (Tij) 12
 (St) 3 6 1, (Cj) 60, (Tij) 11
 (St) 4 5 6, (Cj) 60, (Tij) 5

Stage 15

Waktu Mesin

(1)71 (2)57 (3)64 (4)64 (5)69 (6)65

(St) 1 5 6, (Cj) 65, (Tij) 9
 (St) 2 6 6, (Cj) 65, (Tij) 12
 (St) 4 6 3, (Cj) 65, (Tij) 5

Stage 16

Waktu Mesin

(1)71 (2)57 (3)70 (4)64 (5)69 (6)74

(St) 1 6 5, (Cj) 74, (Tij) 9
 (St) 2 6 6, (Cj) 74, (Tij) 12

Stage 17

Waktu Mesin

(1)71 (2)57 (3)70 (4)64 (5)83 (6)86

Biaya Earlines = 76

Biaya Tardines = 0

Total Biaya = 76

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 1 = Awal (20), akhir (32)
1 2 4 = Awal (38), akhir (51)
1 3 2 = Awal (51), akhir (57)
1 4 3 = Awal (57), akhir (64)
1 5 6 = Awal (65), akhir (74)
1 6 5 = Awal (74), akhir (83)

Job 2

2 1 3 = Awal (0), akhir (14)
2 2 2 = Awal (20), akhir (27)
2 3 5 = Awal (31), akhir (44)
2 4 1 = Awal (44), akhir (54)
2 5 4 = Awal (58), akhir (64)
2 6 6 = Awal (74), akhir (86)

Job 3

3 1 2 = Awal (12), akhir (20)
3 2 5 = Awal (20), akhir (31)
3 3 4 = Awal (31), akhir (38)
3 4 3 = Awal (38), akhir (47)
3 5 6 = Awal (47), akhir (60)
3 6 1 = Awal (60), akhir (71)

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 (44), akhir (55)
4 5 6 = Awal (60), akhir (65)
4 6 3 = Awal (65), akhir (70)

Job 5

5 1 2 = Awal (0), akhir (12)
5 2 1 = Awal (13), akhir (20)
5 3 3 = Awal (20), akhir (28)
5 4 6 = Awal (28), akhir (43)
5 5 4 = Awal (51), akhir (58)
5 6 5 = Awal (58), akhir (69)

2. Shortest Processing Time

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 0, (Tij) 12

(St) 2 1 3, (Cj) 0, (Tij) 14

(St) 3 1 2, (Cj) 0, (Tij) 8

(St) 4 1 1, (Cj) 0, (Tij) 13

(St) 5 1 2, (Cj) 0, (Tij) 12

Stage 2

Waktu Mesin

(1)12 (2)8 (3)14 (4)0 (5)0 (6)0

(St) 1 2 4, (Cj) 12, (Tij) 13

(St) 2 2 2, (Cj) 14, (Tij) 7

(St) 3 2 5, (Cj) 8, (Tij) 11

(St) 4 1 1, (Cj) 12, (Tij) 13

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

Stage 3

Waktu Mesin

(1)12 (2)20 (3)14 (4)0 (5)19 (6)0

(St) 1 2 4, (Cj) 12, (Tij) 13

(St) 2 2 2, (Cj) 20, (Tij) 7

(St) 3 3 4, (Cj) 19, (Tij) 7

(St) 4 1 1, (Cj) 12, (Tij) 13

(St) 5 2 1, (Cj) 20, (Tij) 7

Stage 4

Waktu Mesin

(1)25 (2)20 (3)14 (4)25 (5)19 (6)0

(St) 1 3 2, (Cj) 25, (Tij) 6

(St) 2 2 2, (Cj) 20, (Tij) 7

(St) 3 3 4, (Cj) 25, (Tij) 7

(St) 4 2 4, (Cj) 25, (Tij) 14

(St) 5 2 1, (Cj) 25, (Tij) 7

Stage 5

Waktu Mesin

(1)25 (2)27 (3)14 (4)25 (5)19 (6)0

(St) 1 3 2, (Cj) 27, (Tij) 6

(St) 2 3 5, (Cj) 27, (Tij) 13

(St) 3 3 4, (Cj) 25, (Tij) 7

(St) 4 2 4, (Cj) 25, (Tij) 14

(St) 5 2 1, (Cj) 25, (Tij) 7

Stage 6

Waktu Mesin

(1)32 (2)27 (3)14 (4)32 (5)19 (6)0

(St) 1 3 2, (Cj) 27, (Tij) 6
 (St) 2 3 5, (Cj) 27, (Tij) 13
 (St) 3 4 3, (Cj) 32, (Tij) 9
 (St) 4 2 4, (Cj) 32, (Tij) 14
 (St) 5 3 3, (Cj) 32, (Tij) 8

Stage 7

Waktu Mesin

(1)32 (2)33 (3)14 (4)32 (5)40 (6)0

(St) 1 4 3, (Cj) 33, (Tij) 7
 (St) 2 4 1, (Cj) 40, (Tij) 10
 (St) 3 4 3, (Cj) 32, (Tij) 9
 (St) 4 2 4, (Cj) 32, (Tij) 14
 (St) 5 3 3, (Cj) 32, (Tij) 8

Stage 8

Waktu Mesin

(1)32 (2)33 (3)40 (4)46 (5)40 (6)0

(St) 1 4 3, (Cj) 40, (Tij) 7
 (St) 2 4 1, (Cj) 40, (Tij) 10
 (St) 3 4 3, (Cj) 40, (Tij) 9
 (St) 4 3 2, (Cj) 46, (Tij) 9
 (St) 5 4 6, (Cj) 40, (Tij) 15

Stage 9

Waktu Mesin

(1)50 (2)33 (3)47 (4)46 (5)40 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9
 (St) 2 5 4, (Cj) 50, (Tij) 6
 (St) 3 4 3, (Cj) 47, (Tij) 9
 (St) 4 3 2, (Cj) 46, (Tij) 9
 (St) 5 5 4, (Cj) 55, (Tij) 7

Stage 10

Waktu Mesin

(1)50 (2)55 (3)47 (4)46 (5)40 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9
 (St) 2 5 4, (Cj) 50, (Tij) 6
 (St) 3 4 3, (Cj) 47, (Tij) 9
 (St) 4 4 5, (Cj) 55, (Tij) 11
 (St) 5 5 4, (Cj) 55, (Tij) 7

Stage 11

Waktu Mesin

(1)50 (2)55 (3)56 (4)46 (5)40 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9
 (St) 2 5 4, (Cj) 50, (Tij) 6
 (St) 3 5 6, (Cj) 56, (Tij) 13
 (St) 4 4 5, (Cj) 55, (Tij) 11

(St) 5 5 4, (Cj) 55, (Tij) 7

Stage 12

Waktu Mesin

(1)50 (2)55 (3)56 (4)56 (5)40 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9

(St) 2 6 6, (Cj) 56, (Tij) 12

(St) 3 5 6, (Cj) 56, (Tij) 13

(St) 4 4 5, (Cj) 55, (Tij) 11

(St) 5 5 4, (Cj) 56, (Tij) 7

Stage 13

Waktu Mesin

(1)50 (2)55 (3)56 (4)56 (5)66 (6)64

(St) 1 6 5, (Cj) 66, (Tij) 9

(St) 2 6 6, (Cj) 64, (Tij) 12

(St) 3 5 6, (Cj) 64, (Tij) 13

(St) 4 5 6, (Cj) 66, (Tij) 5

(St) 5 5 4, (Cj) 56, (Tij) 7

Stage 14

Waktu Mesin

(1)50 (2)55 (3)56 (4)63 (5)66 (6)64

(St) 1 6 5, (Cj) 66, (Tij) 9

(St) 2 6 6, (Cj) 64, (Tij) 12

(St) 3 5 6, (Cj) 64, (Tij) 13

(St) 4 5 6, (Cj) 66, (Tij) 5

(St) 5 6 5, (Cj) 66, (Tij) 11

Stage 15

Waktu Mesin

(1)50 (2)55 (3)56 (4)63 (5)66 (6)76

(St) 1 6 5, (Cj) 66, (Tij) 9

(St) 3 5 6, (Cj) 76, (Tij) 13

(St) 4 5 6, (Cj) 76, (Tij) 5

(St) 5 6 5, (Cj) 66, (Tij) 11

Stage 16

Waktu Mesin

(1)50 (2)55 (3)56 (4)63 (5)75 (6)76

(St) 3 5 6, (Cj) 76, (Tij) 13

(St) 4 5 6, (Cj) 76, (Tij) 5

(St) 5 6 5, (Cj) 75, (Tij) 11

Stage 17

Waktu Mesin

(1)50 (2)55 (3)56 (4)63 (5)86 (6)76

(St) 3 5 6, (Cj) 76, (Tij) 13

(St) 4 5 6, (Cj) 76, (Tij) 5

Stage 18

Waktu Mesin

(1)50 (2)55 (3)56 (4)63 (5)86 (6)81

(St) 3 5 6, (Cj) 81, (Tij) 13

(St) 4 6 3, (Cj) 81, (Tij) 5

Stage 19

Waktu Mesin

(1)50 (2)55 (3)86 (4)63 (5)86 (6)94

(St) 3 6 1, (Cj) 94, (Tij) 11

Stage 20

Waktu Mesin

(1)105 (2)55 (3)86 (4)63 (5)86 (6)94

Biaya Earlines = 35

Biaya Tardines = 16

Total Biaya = 51

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 (27), akhir (33)

1 4 3 = Awal (40), akhir (47)

1 5 6 = Awal (55), akhir (64)

1 6 5 = Awal (66), akhir (75)

Job 2

2 1 3 = Awal (0), akhir (14)

2 2 2 = Awal (20), akhir (27)

2 3 5 = Awal (27), akhir (40)

2 4 1 = Awal (40), akhir (50)

2 5 4 = Awal (50), akhir (56)

2 6 6 = Awal (64), akhir (76)

Job 3

3 1 2 = Awal (0), akhir (8)

3 2 5 = Awal (8), akhir (19)

3 3 4 = Awal (25), akhir (32)

3 4 3 = Awal (47), akhir (56)

3 5 6 = Awal (81), akhir (94)

3 6 1 = Awal (94), akhir (105)

Job 4

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

4 2 4 = Awal (32), akhir (46)

4 3 2 = Awal (46), akhir (55)

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

4 5 6 = Awal (76), akhir (81)

4 6 3 = Awal (81), akhir (86)

Job 5

5 1 2 = Awal (8), akhir (20)
 5 2 1 = Awal (25), akhir (32)
 5 3 3 = Awal (32), akhir (40)
 5 4 6 = Awal (40), akhir (55)
 5 5 4 = Awal (56), akhir (63)
 5 6 5 = Awal (75), akhir (86)

3. S / O P N

Stage 1

Waktu Mesin

(1)0 (2)0 (3)0 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 0, (Tij) 12
 (St) 2 1 3, (Cj) 0, (Tij) 14
 (St) 3 1 2, (Cj) 0, (Tij) 8
 (St) 4 1 1, (Cj) 0, (Tij) 13
 (St) 5 1 2, (Cj) 0, (Tij) 12

Stage 2

Waktu Mesin

(1)13 (2)12 (3)14 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 13, (Tij) 12
 (St) 2 2 2, (Cj) 14, (Tij) 7
 (St) 3 1 2, (Cj) 12, (Tij) 8
 (St) 4 2 4, (Cj) 13, (Tij) 14
 (St) 5 2 1, (Cj) 13, (Tij) 7

Stage 3

Waktu Mesin

(1)13 (2)20 (3)14 (4)0 (5)0 (6)0

(St) 1 1 1, (Cj) 13, (Tij) 12
 (St) 2 2 2, (Cj) 20, (Tij) 7
 (St) 3 2 5, (Cj) 20, (Tij) 11
 (St) 4 2 4, (Cj) 13, (Tij) 14
 (St) 5 2 1, (Cj) 13, (Tij) 7

Stage 4

Waktu Mesin

(1)25 (2)20 (3)14 (4)27 (5)0 (6)0

(St) 1 2 4, (Cj) 27, (Tij) 13
 (St) 2 2 2, (Cj) 20, (Tij) 7
 (St) 3 2 5, (Cj) 20, (Tij) 11
 (St) 4 3 2, (Cj) 27, (Tij) 9
 (St) 5 2 1, (Cj) 25, (Tij) 7

Stage 5

Waktu Mesin

(1)25 (2)27 (3)14 (4)27 (5)31 (6)0

(St) 1 2 4, (Cj) 27, (Tij) 13
 (St) 2 3 5, (Cj) 31, (Tij) 13
 (St) 3 3 4, (Cj) 31, (Tij) 7
 (St) 4 3 2, (Cj) 27, (Tij) 9
 (St) 5 2 1, (Cj) 25, (Tij) 7

Stage 6

Waktu Mesin

(1)32 (2)27 (3)14 (4)27 (5)31 (6)0

(St) 1 2 4, (Cj) 27, (Tij) 13
 (St) 2 3 5, (Cj) 31, (Tij) 13
 (St) 3 3 4, (Cj) 31, (Tij) 7
 (St) 4 3 2, (Cj) 27, (Tij) 9
 (St) 5 3 3, (Cj) 32, (Tij) 8

Stage 7

Waktu Mesin

(1)32 (2)36 (3)14 (4)40 (5)31 (6)0

(St) 1 3 2, (Cj) 40, (Tij) 6
 (St) 2 3 5, (Cj) 31, (Tij) 13
 (St) 3 3 4, (Cj) 40, (Tij) 7
 (St) 4 4 5, (Cj) 36, (Tij) 11
 (St) 5 3 3, (Cj) 32, (Tij) 8

Stage 8

Waktu Mesin

(1)32 (2)36 (3)14 (4)40 (5)44 (6)0

(St) 1 3 2, (Cj) 40, (Tij) 6
 (St) 2 4 1, (Cj) 44, (Tij) 10
 (St) 3 3 4, (Cj) 40, (Tij) 7
 (St) 4 4 5, (Cj) 44, (Tij) 11
 (St) 5 3 3, (Cj) 32, (Tij) 8

Stage 9

Waktu Mesin

(1)32 (2)36 (3)40 (4)40 (5)44 (6)0

(St) 1 3 2, (Cj) 40, (Tij) 6
 (St) 2 4 1, (Cj) 44, (Tij) 10
 (St) 3 3 4, (Cj) 40, (Tij) 7
 (St) 4 4 5, (Cj) 44, (Tij) 11
 (St) 5 4 6, (Cj) 40, (Tij) 15

Stage 10

Waktu Mesin

(1)32 (2)46 (3)40 (4)47 (5)44 (6)55

(St) 1 4 3, (Cj) 46, (Tij) 7
 (St) 2 4 1, (Cj) 44, (Tij) 10
 (St) 3 4 3, (Cj) 47, (Tij) 9
 (St) 4 4 5, (Cj) 44, (Tij) 11

(St) 5 5 4, (Cj) 55, (Tij) 7

Stage 11

Waktu Mesin

(1)54 (2)46 (3)40 (4)47 (5)55 (6)55

(St) 1 4 3, (Cj) 46, (Tij) 7

(St) 2 5 4, (Cj) 54, (Tij) 6

(St) 3 4 3, (Cj) 47, (Tij) 9

(St) 4 5 6, (Cj) 55, (Tij) 5

(St) 5 5 4, (Cj) 55, (Tij) 7

Stage 12

Waktu Mesin

(1)54 (2)46 (3)53 (4)47 (5)55 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9

(St) 2 5 4, (Cj) 54, (Tij) 6

(St) 3 4 3, (Cj) 53, (Tij) 9

(St) 4 5 6, (Cj) 55, (Tij) 5

(St) 5 5 4, (Cj) 55, (Tij) 7

Stage 13

Waktu Mesin

(1)54 (2)46 (3)62 (4)47 (5)55 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9

(St) 2 5 4, (Cj) 54, (Tij) 6

(St) 3 5 6, (Cj) 62, (Tij) 13

(St) 4 5 6, (Cj) 55, (Tij) 5

(St) 5 5 4, (Cj) 55, (Tij) 7

Stage 14

Waktu Mesin

(1)54 (2)46 (3)62 (4)60 (5)55 (6)55

(St) 1 5 6, (Cj) 55, (Tij) 9

(St) 2 6 6, (Cj) 60, (Tij) 12

(St) 3 5 6, (Cj) 62, (Tij) 13

(St) 4 5 6, (Cj) 55, (Tij) 5

(St) 5 5 4, (Cj) 60, (Tij) 7

Stage 15

Waktu Mesin

(1)54 (2)46 (3)62 (4)60 (5)55 (6)60

(St) 1 5 6, (Cj) 60, (Tij) 9

(St) 2 6 6, (Cj) 60, (Tij) 12

(St) 3 5 6, (Cj) 62, (Tij) 13

(St) 4 6 3, (Cj) 62, (Tij) 5

(St) 5 5 4, (Cj) 60, (Tij) 7

Stage 16

Waktu Mesin

(1)54 (2)46 (3)62 (4)67 (5)55 (6)69

(St) 1 6 5, (Cj) 69, (Tij) 9
 (St) 2 6 6, (Cj) 69, (Tij) 12
 (St) 3 5 6, (Cj) 69, (Tij) 13
 (St) 4 6 3, (Cj) 62, (Tij) 5
 (St) 5 6 5, (Cj) 67, (Tij) 11

Stage 17

Waktu Mesin

(1)54 (2)46 (3)67 (4)67 (5)55 (6)69

(St) 1 6 5, (Cj) 69, (Tij) 9
 (St) 2 6 6, (Cj) 69, (Tij) 12
 (St) 3 5 6, (Cj) 69, (Tij) 13
 (St) 5 6 5, (Cj) 67, (Tij) 11

Stage 18

Waktu Mesin

(1)54 (2)46 (3)67 (4)67 (5)78 (6)69

(St) 1 6 5, (Cj) 78, (Tij) 9
 (St) 2 6 6, (Cj) 69, (Tij) 12
 (St) 3 5 6, (Cj) 69, (Tij) 13

Stage 19

Waktu Mesin

(1)54 (2)46 (3)67 (4)67 (5)78 (6)82

(St) 1 6 5, (Cj) 78, (Tij) 9
 (St) 2 6 6, (Cj) 82, (Tij) 12
 (St) 3 6 1, (Cj) 82, (Tij) 11

Stage 20

Waktu Mesin

(1)54 (2)46 (3)67 (4)67 (5)87 (6)82

(St) 2 6 6, (Cj) 82, (Tij) 12
 (St) 3 6 1, (Cj) 82, (Tij) 11

Stage 21

Waktu Mesin

(1)93 (2)46 (3)67 (4)67 (5)87 (6)94

Biaya Earlines = 36

Biaya Tardines = 0

Total Biaya = 36

Data Waktu Untuk Masing - Masing Job

1 1 1 = Awal (13), akhir (25)
 1 2 4 = Awal (27), akhir (40)
 1 3 2 = Awal (40), akhir (46)
 1 4 3 = Awal (46), akhir (53)
 1 5 6 = Awal (60), akhir (69)
 1 6 5 = Awal (78), akhir (87)

Job 2

2 1 3 = Awal (0), akhir (14)
2 2 2 = Awal (20), akhir (27)
2 3 5 = Awal (31), akhir (44)
2 4 1 = Awal (44), akhir (54)
2 5 4 = Awal (54), akhir (60)
2 6 6 = Awal (82), akhir (94)

Job 3

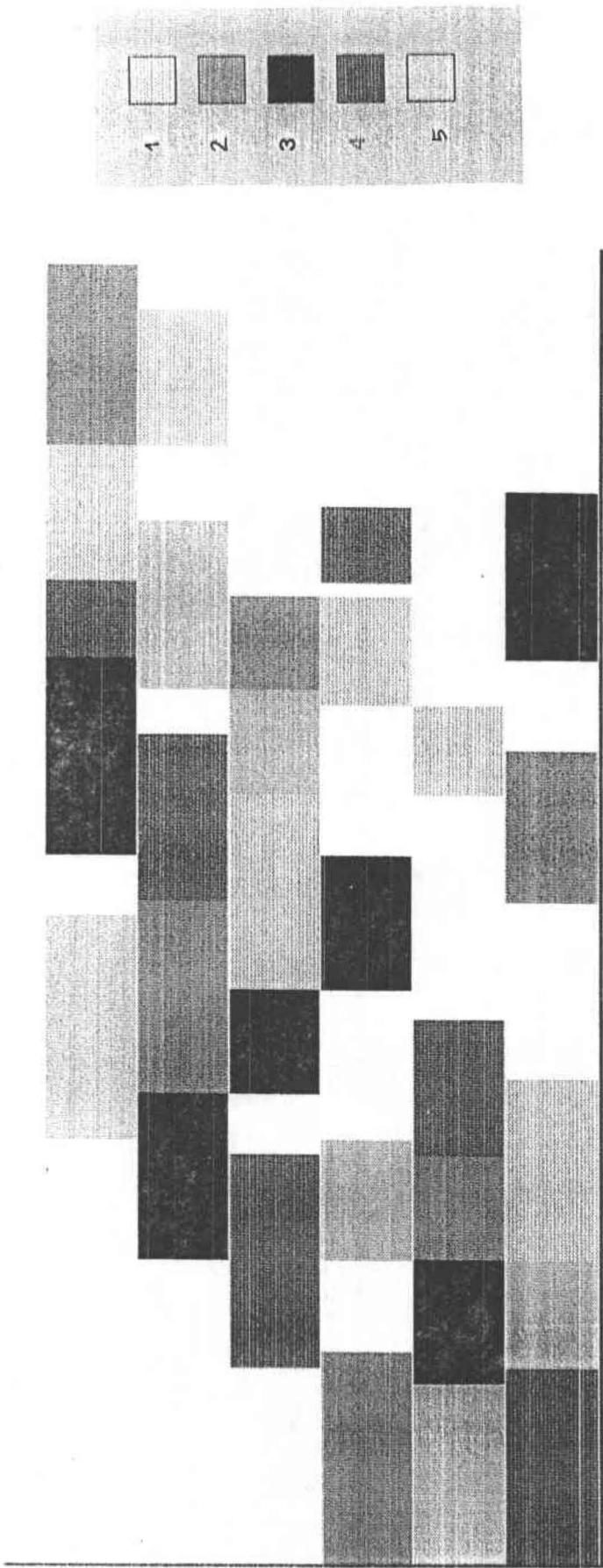
3 1 2 = Awal (12), akhir (20)
3 2 5 = Awal (20), akhir (31)
3 3 4 = Awal (40), akhir (47)
3 4 3 = Awal (53), akhir (62)
3 5 6 = Awal (69), akhir (82)
3 6 1 = Awal (82), akhir (93)

Job 4

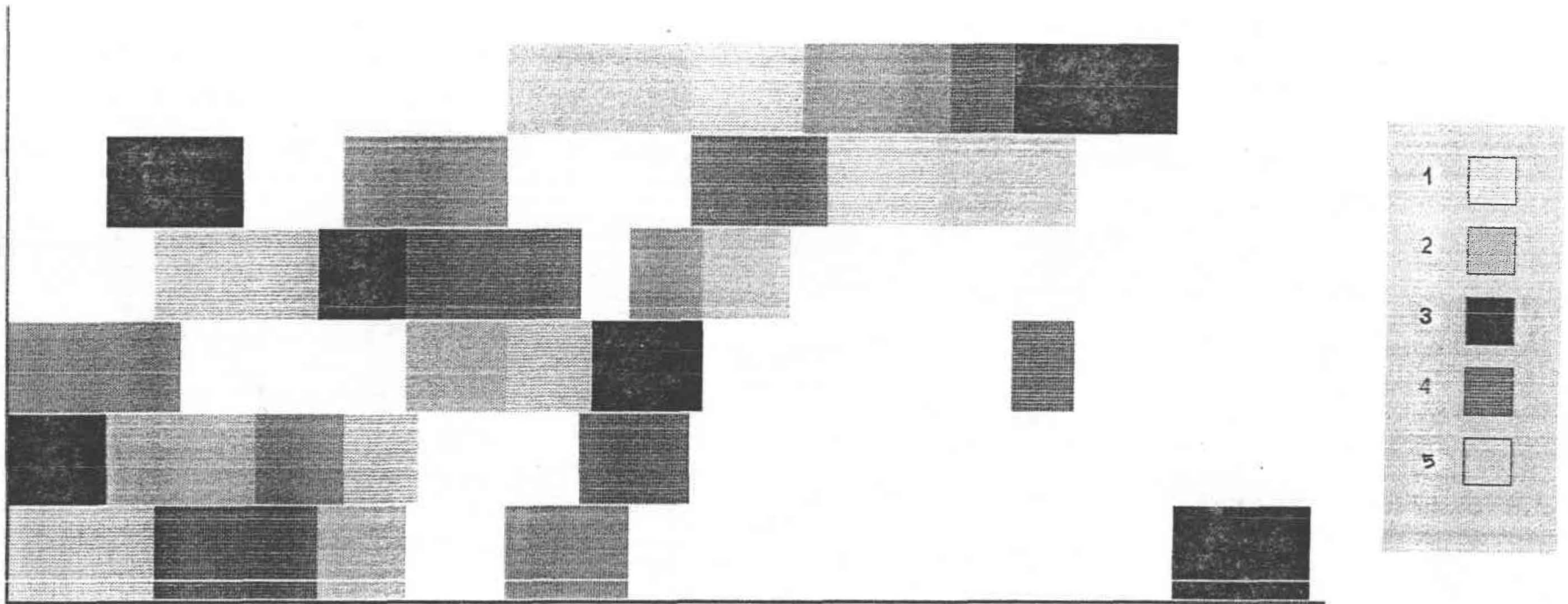
4 1 1 = Awal (0), akhir (13)
4 2 4 = Awal (13), akhir (27)
4 3 2 = Awal (27), akhir (36)
4 4 5 = Awal (44), akhir (55)
4 5 6 = Awal (55), akhir (60)
4 6 3 = Awal (62), akhir (67)

Job 5

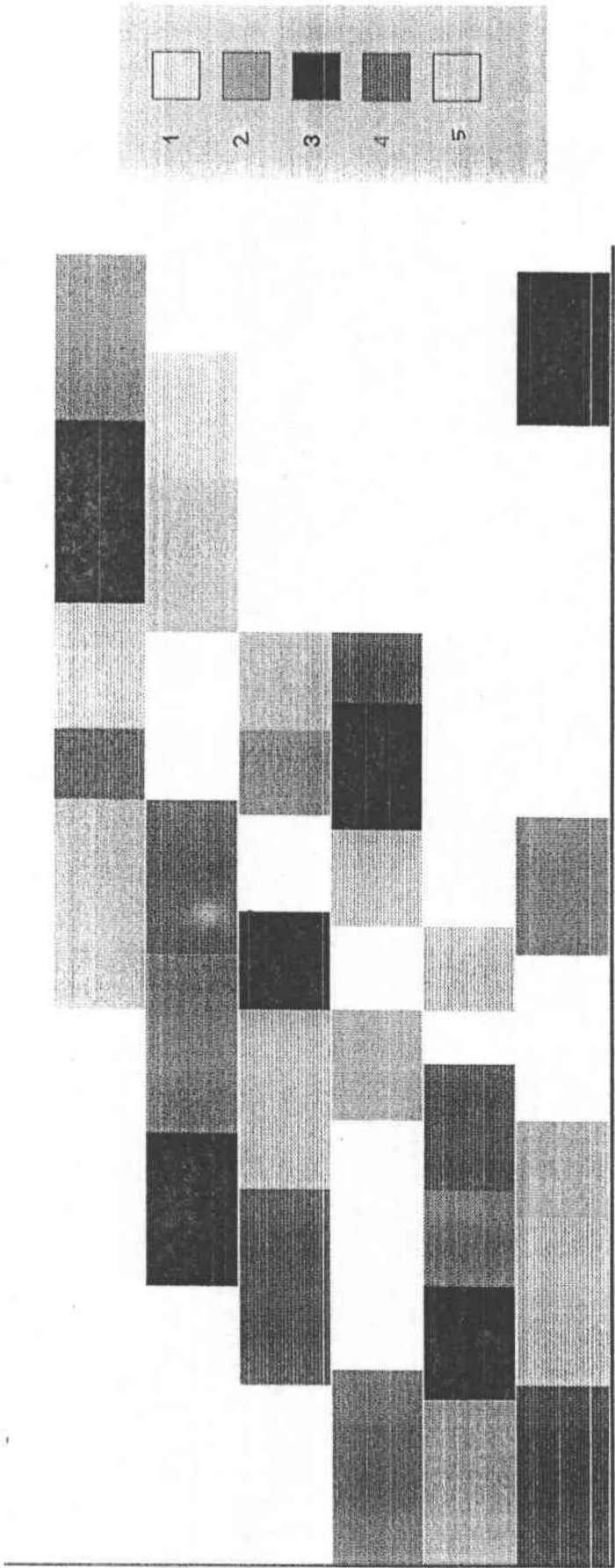
5 1 2 = Awal (0), akhir (12)
5 2 1 = Awal (25), akhir (32)
5 3 3 = Awal (32), akhir (40)
5 4 6 = Awal (40), akhir (55)
5 5 4 = Awal (60), akhir (67)
5 6 5 = Awal (67), akhir (78)



Gantt Chart penjadualan dengan metode *forward* (EDD) soal 2



Gantt Chart penjadualan dengan metode forward (SPT) soal 2



Gantt Chart penjadualan dengan metode *forward* (S / OPN) soal 2

Iterasi penjadualan dengan algoritma genetika untuk soal 1 :

S / O P N

Biaya : 13

Tardiness : 0

Earliest : 13

Iterasi ke - 1

Mesin : 3

Urutan acak 1 : 1 (1 , 1 , 3)

Urutan acak 2 : 2 (3 , 2 , 3)

Child

Mesin 1 : (3 , 1 , 1) (2 , 2 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (3 , 2 , 3) (1 , 1 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Biaya : 18

Tardiness : 10

Earliness : 8

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (3 , 1 , 1) (2 , 2 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Iterasi ke - 2

Mesin : 2

Urutan acak 1 : 1 (2 , 1 , 2)

Urutan acak 2 : 3 (1 , 4 , 2)

Kondisi Tidak memenuhi syarat

Mesin : 2

Urutan acak 1 : 1 (2 , 1 , 2)

Urutan acak 2 : 3 (1 , 4 , 2)

Kondisi Tidak memenuhi syarat

Mesin : 3

Urutan acak 1 : 1 (1 , 1 , 3)

Urutan acak 2 : 2 (3 , 2 , 3)

Child

Mesin 1 : (3 , 1 , 1) (2 , 2 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (3 , 2 , 3) (1 , 1 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Biaya : 18
 Tardiness : 10
 Earliness : 8

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (3, 1, 1) (2, 2, 1) (1, 2, 1)
 Mesin 2 : (2, 1, 2) (3, 3, 2) (1, 4, 2)
 Mesin 3 : (1, 1, 3) (3, 2, 3) (2, 4, 3)
 Mesin 4 : (2, 3, 4) (1, 3, 4) (3, 4, 4)

Iterasi ke - 3

Mesin : 1

Urutan acak 1 : 1 (3, 1, 1)
 Urutan acak 2 : 2 (2, 2, 1)

Child

Mesin 1 : (2, 2, 1) (3, 1, 1) (1, 2, 1)
 Mesin 2 : (2, 1, 2) (3, 3, 2) (1, 4, 2)
 Mesin 3 : (1, 1, 3) (3, 2, 3) (2, 4, 3)
 Mesin 4 : (2, 3, 4) (1, 3, 4) (3, 4, 4)

Biaya : 12
 Tardiness : 6
 Earliness : 6

Child dipilih sebagai Parent baru karena Biaya Child ≤ Biaya Parent Lama

Parent yang Baru

Mesin 1 : (2, 2, 1) (3, 1, 1) (1, 2, 1)
 Mesin 2 : (2, 1, 2) (3, 3, 2) (1, 4, 2)
 Mesin 3 : (1, 1, 3) (3, 2, 3) (2, 4, 3)
 Mesin 4 : (2, 3, 4) (1, 3, 4) (3, 4, 4)

Iterasi ke - 4

Mesin : 1

Urutan acak 1 : 1 (2, 2, 1)
 Urutan acak 2 : 2 (3, 1, 1)

Child

Mesin 1 : (3, 1, 1) (2, 2, 1) (1, 2, 1)
 Mesin 2 : (2, 1, 2) (3, 3, 2) (1, 4, 2)
 Mesin 3 : (1, 1, 3) (3, 2, 3) (2, 4, 3)
 Mesin 4 : (2, 3, 4) (1, 3, 4) (3, 4, 4)

Biaya : 13
 Tardiness : 10
 Earliness : 3

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (2 , 2 , 1) (3 , 1 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Iterasi ke - 5

Mesin : 2

Urutan acak 1 : 1 (2 , 1 , 2)

Urutan acak 2 : 2 (3 , 3 , 2)

Kondisi Tidak memenuhi syarat

Mesin : 1

Urutan acak 1 : 1 (2 , 2 , 1)

Urutan acak 2 : 2 (3 , 1 , 1)

Child

Mesin 1 : (3 , 1 , 1) (2 , 2 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Biaya : 13

Tardiness : 10

Earliness : 3

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (2 , 2 , 1) (3 , 1 , 1) (1 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Iterasi ke - 6

Mesin : 1

Urutan acak 1 : 1 (2 , 2 , 1)

Urutan acak 2 : 3 (1 , 2 , 1)

Child

Mesin 1 : (1 , 2 , 1) (3 , 1 , 1) (2 , 2 , 1)

Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)

Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)

Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Biaya : 64

Tardiness : 64

Earliness : 0

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (2 , 2 , 1) (3 , 1 , 1) (1 , 2 , 1)
 Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)
 Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)
 Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Sejarah = 13 12 12 12 12

Iterasi ke - 7

Mesin : 1

Urutan acak 1 : 1 (2 , 2 , 1)

Urutan acak 2 : 2 (3 , 1 , 1)

Child

Mesin 1 : (3 , 1 , 1) (2 , 2 , 1) (1 , 2 , 1)
 Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)
 Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)
 Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Biaya : 13

Tardiness : 10

Earliness : 3

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (2 , 2 , 1) (3 , 1 , 1) (1 , 2 , 1)
 Mesin 2 : (2 , 1 , 2) (3 , 3 , 2) (1 , 4 , 2)
 Mesin 3 : (1 , 1 , 3) (3 , 2 , 3) (2 , 4 , 3)
 Mesin 4 : (2 , 3 , 4) (1 , 3 , 4) (3 , 4 , 4)

Sejarah = 12 12 12 12 12

Data Waktu Untuk Masing - Masing Job

Job 1

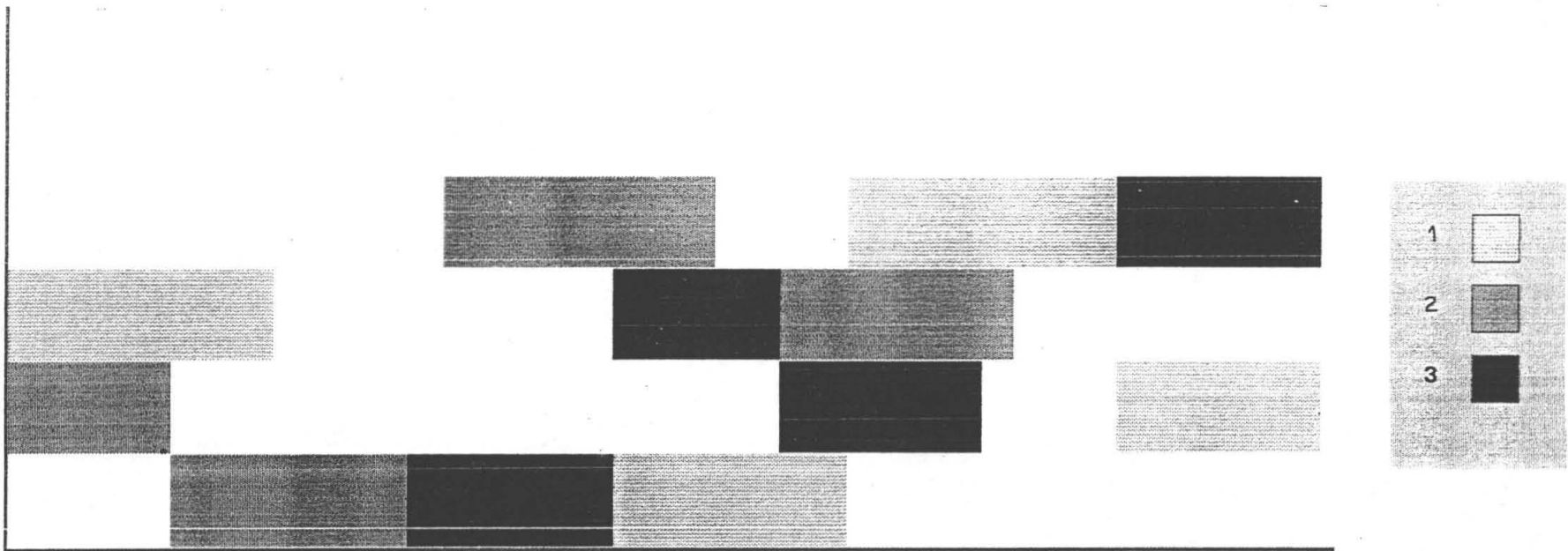
1 1 3 = Awal (0), akhir (8)
 1 2 1 = Awal (18), akhir (25)
 1 3 4 = Awal (25), akhir (33)
 1 4 2 = Awal (33), akhir (39)

Job 2

2 1 2 = Awal (0), akhir (5)
 2 2 1 = Awal (5), akhir (12)
 2 3 4 = Awal (13), akhir (21)
 2 4 3 = Awal (23), akhir (30)

Job 3

3 1 1 = Awal (12), akhir (18)
 3 2 3 = Awal (18), akhir (23)
 3 3 2 = Awal (23), akhir (29)
 3 4 4 = Awal (33), akhir (39)



Gantt Chart penjadualan dengan algoritma genetik soal 1

Iterasi penjadualan dengan algoritma genetika untuk soal 2 :

S / O P N

Biaya : 36

Tardines : 0

Earliest : 36

Iterasi ke - 1

Mesin : 6

Urutan acak 1 : 2 (4 , 5 , 6)

Urutan acak 2 : 3 (1 , 5 , 6)

Child

Mesin 1 : (4 , 1 , 1) (1 , 1 , 1) (5 , 2 , 1) (2 , 4 , 1) (3 , 6 , 1)

Mesin 2 : (5 , 1 , 2) (3 , 1 , 2) (2 , 2 , 2) (4 , 3 , 2) (1 , 3 , 2)

Mesin 3 : (2 , 1 , 3) (5 , 3 , 3) (1 , 4 , 3) (3 , 4 , 3) (4 , 6 , 3)

Mesin 4 : (4 , 2 , 4) (1 , 2 , 4) (3 , 3 , 4) (2 , 5 , 4) (5 , 5 , 4)

Mesin 5 : (3 , 2 , 5) (2 , 3 , 5) (4 , 4 , 5) (5 , 6 , 5) (1 , 6 , 5)

Mesin 6 : (5 , 4 , 6) (1 , 5 , 6) (4 , 5 , 6) (3 , 5 , 6) (2 , 6 , 6)

Biaya : 29

Tardiness : 0

Earliness : 29

Child dipilih sebagai Parent baru karena Biaya Child $\leq$ Biaya Parent Lama

Parent yang Baru

Mesin 1 : (4 , 1 , 1) (1 , 1 , 1) (5 , 2 , 1) (2 , 4 , 1) (3 , 6 , 1)

Mesin 2 : (5 , 1 , 2) (3 , 1 , 2) (2 , 2 , 2) (4 , 3 , 2) (1 , 3 , 2)

Mesin 3 : (2 , 1 , 3) (5 , 3 , 3) (1 , 4 , 3) (3 , 4 , 3) (4 , 6 , 3)

Mesin 4 : (4 , 2 , 4) (1 , 2 , 4) (3 , 3 , 4) (2 , 5 , 4) (5 , 5 , 4)

Mesin 5 : (3 , 2 , 5) (2 , 3 , 5) (4 , 4 , 5) (5 , 6 , 5) (1 , 6 , 5)

Mesin 6 : (5 , 4 , 6) (1 , 5 , 6) (4 , 5 , 6) (3 , 5 , 6) (2 , 6 , 6)

Iterasi ke - 2

Mesin : 3

Urutan acak 1 : 2 (5 , 3 , 3)

Urutan acak 2 : 5 (4 , 6 , 3)

Kondisi Tidak memenuhi syarat

Mesin : 4

Urutan acak 1 : 2 (1 , 2 , 4)

Urutan acak 2 : 5 (5 , 5 , 4)

Kondisi Tidak memenuhi syarat

Mesin : 6

Urutan acak 1 : 1 (5 , 4 , 6)

Urutan acak 2 : 2 (1 , 5 , 6)

Kondisi Tidak memenuhi syarat

Mesin : 6

Urutan acak 1 : 2 (1 , 5 , 6)

Urutan acak 2 : 5 (2 , 6 , 6)

Child

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (4, 3, 2) (1, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (2, 6, 6) (4, 5, 6) (3, 5, 6) (1, 5, 6)

Biaya : 83

Tardiness : 46

Earliness : 37

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (4, 3, 2) (1, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (1, 5, 6) (4, 5, 6) (3, 5, 6) (2, 6, 6)

Iterasi ke - 3

Mesin : 1

Urutan acak 1 : 1 (4, 1, 1)

Urutan acak 2 : 3 (5, 2, 1)

Child

Mesin 1 : (5, 2, 1) (1, 1, 1) (4, 1, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (4, 3, 2) (1, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (1, 5, 6) (4, 5, 6) (3, 5, 6) (2, 6, 6)

Biaya : 212

Tardiness : 212

Earliness : 0

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (4, 3, 2) (1, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (1, 5, 6) (4, 5, 6) (3, 5, 6) (2, 6, 6)

Iterasi ke - 4

Mesin : 5

Urutan acak 1 : 4 (5 , 6 , 5)

Urutan acak 2 : 5 (1 , 6 , 5)

Child

Mesin 1 : (4 , 1 , 1) (1 , 1 , 1) (5 , 2 , 1) (2 , 4 , 1) (3 , 6 , 1)

Mesin 2 : (5 , 1 , 2) (3 , 1 , 2) (2 , 2 , 2) (4 , 3 , 2) (1 , 3 , 2)

Mesin 3 : (2 , 1 , 3) (5 , 3 , 3) (1 , 4 , 3) (3 , 4 , 3) (4 , 6 , 3)

Mesin 4 : (4 , 2 , 4) (1 , 2 , 4) (3 , 3 , 4) (2 , 5 , 4) (5 , 5 , 4)

Mesin 5 : (3 , 2 , 5) (2 , 3 , 5) (4 , 4 , 5) (1 , 6 , 5) (5 , 6 , 5)

Mesin 6 : (5 , 4 , 6) (1 , 5 , 6) (4 , 5 , 6) (3 , 5 , 6) (2 , 6 , 6)

Biaya : 37

Tardiness : 0

Earliness : 37

Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama

Parent yang Baru

Mesin 1 : (4 , 1 , 1) (1 , 1 , 1) (5 , 2 , 1) (2 , 4 , 1) (3 , 6 , 1)

Mesin 2 : (5 , 1 , 2) (3 , 1 , 2) (2 , 2 , 2) (4 , 3 , 2) (1 , 3 , 2)

Mesin 3 : (2 , 1 , 3) (5 , 3 , 3) (1 , 4 , 3) (3 , 4 , 3) (4 , 6 , 3)

Mesin 4 : (4 , 2 , 4) (1 , 2 , 4) (3 , 3 , 4) (2 , 5 , 4) (5 , 5 , 4)

Mesin 5 : (3 , 2 , 5) (2 , 3 , 5) (4 , 4 , 5) (5 , 6 , 5) (1 , 6 , 5)

Mesin 6 : (5 , 4 , 6) (1 , 5 , 6) (4 , 5 , 6) (3 , 5 , 6) (2 , 6 , 6)

Iterasi ke - 5

Mesin : 1

Urutan acak 1 : 4 (2 , 4 , 1)

Urutan acak 2 : 5 (3 , 6 , 1)

Kondisi Tidak memenuhi syarat

Mesin : 4

Urutan acak 1 : 1 (4 , 2 , 4)

Urutan acak 2 : 4 (2 , 5 , 4)

Kondisi Tidak memenuhi syarat

Mesin : 6

Urutan acak 1 : 1 (5 , 4 , 6)

Urutan acak 2 : 2 (1 , 5 , 6)

Kondisi Tidak memenuhi syarat

Mesin : 2

Urutan acak 1 : 4 (4 , 3 , 2)

Urutan acak 2 : 5 (1 , 3 , 2)

Child

Mesin 1 : (4 , 1 , 1) (1 , 1 , 1) (5 , 2 , 1) (2 , 4 , 1) (3 , 6 , 1)

Mesin 2 : (5 , 1 , 2) (3 , 1 , 2) (2 , 2 , 2) (1 , 3 , 2) (4 , 3 , 2)

Mesin 3 : (2 , 1 , 3) (5 , 3 , 3) (1 , 4 , 3) (3 , 4 , 3) (4 , 6 , 3)

Mesin 4 : (4 , 2 , 4) (1 , 2 , 4) (3 , 3 , 4) (2 , 5 , 4) (5 , 5 , 4)

Mesin 5 : (3 , 2 , 5) (2 , 3 , 5) (4 , 4 , 5) (5 , 6 , 5) (1 , 6 , 5)

Mesin 6 : (5 , 4 , 6) (1 , 5 , 6) (4 , 5 , 6) (3 , 5 , 6) (2 , 6 , 6)

Biaya : 29
 Tardiness : 4
 Earliness : 25

Child dipilih sebagai Parent baru karena $\text{Biaya Child} \leq \text{Biaya Parent Lama}$

Parent yang Baru

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (1, 3, 2) (4, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (1, 5, 6) (4, 5, 6) (3, 5, 6) (2, 6, 6)

Iterasi ke - 6

Mesin : 4
 Urutan acak 1 : 1 (4, 2, 4)
 Urutan acak 2 : 4 (2, 5, 4)
 Kondisi Tidak memenuhi syarat

Mesin : 2
 Urutan acak 1 : 2 (3, 1, 2)
 Urutan acak 2 : 4 (1, 3, 2)
 Kondisi Tidak memenuhi syarat

Mesin : 6
 Urutan acak 1 : 2 (1, 5, 6)
 Urutan acak 2 : 4 (3, 5, 6)

Child

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (1, 3, 2) (4, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (3, 5, 6) (4, 5, 6) (1, 5, 6) (2, 6, 6)

Biaya : 55
 Tardiness : 32
 Earliness : 23

Child tidak dipilih sebagai Parent baru karena $\text{Biaya Child} > \text{Biaya Parent Lama}$

Parent yang Baru

Mesin 1 : (4, 1, 1) (1, 1, 1) (5, 2, 1) (2, 4, 1) (3, 6, 1)
 Mesin 2 : (5, 1, 2) (3, 1, 2) (2, 2, 2) (1, 3, 2) (4, 3, 2)
 Mesin 3 : (2, 1, 3) (5, 3, 3) (1, 4, 3) (3, 4, 3) (4, 6, 3)
 Mesin 4 : (4, 2, 4) (1, 2, 4) (3, 3, 4) (2, 5, 4) (5, 5, 4)
 Mesin 5 : (3, 2, 5) (2, 3, 5) (4, 4, 5) (5, 6, 5) (1, 6, 5)
 Mesin 6 : (5, 4, 6) (1, 5, 6) (4, 5, 6) (3, 5, 6) (2, 6, 6)

Sejarah = 29 29 29 29 29

Data Waktu Untuk Masing - Masing Job

Job 1

1 1 1 = Awal (13), akhir (25)
 1 2 4 = Awal (27), akhir (40)
 1 3 2 = Awal (40), akhir (46)
 1 4 3 = Awal (46), akhir (53)
 1 5 6 = Awal (55), akhir (64)
 1 6 5 = Awal (78), akhir (87)

Job 2

2 1 3 = Awal (0), akhir (14)
 2 2 2 = Awal (20), akhir (27)
 2 3 5 = Awal (31), akhir (44)
 2 4 1 = Awal (44), akhir (54)
 2 5 4 = Awal (54), akhir (60)
 2 6 6 = Awal (84), akhir (96)

Job 3

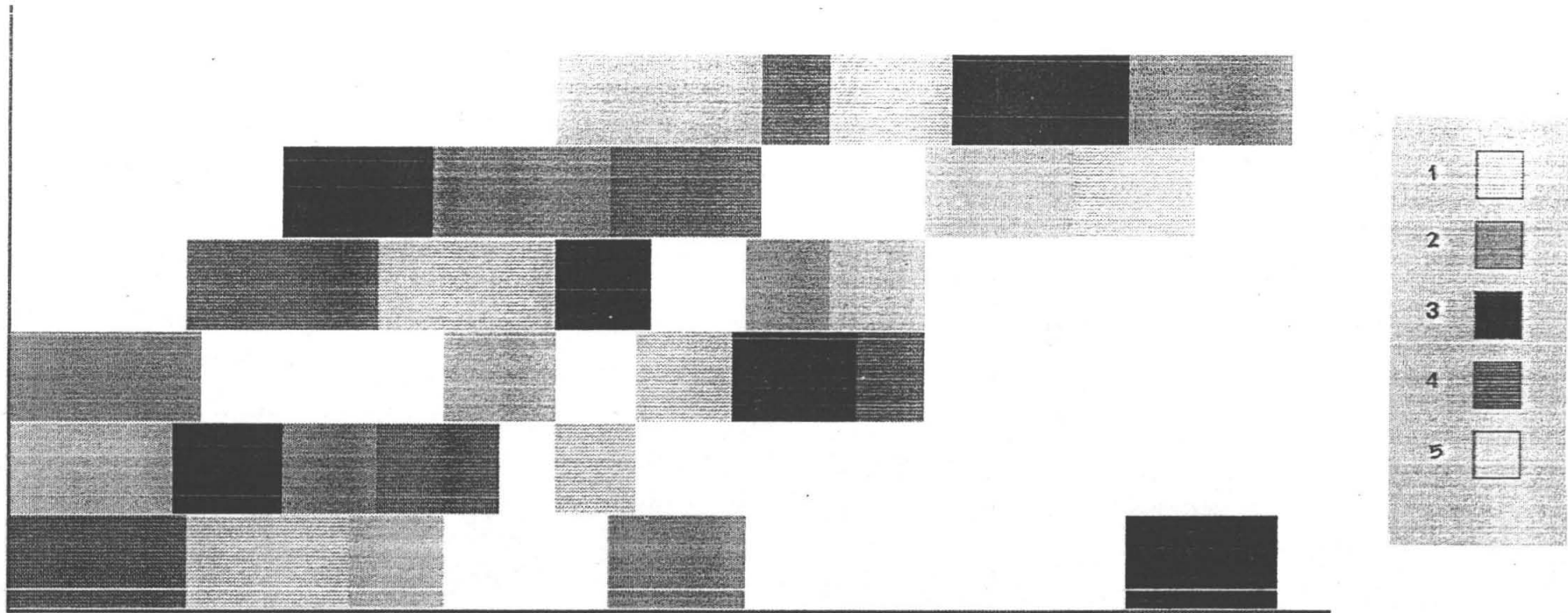
3 1 2 = Awal (12), akhir (20)
 3 2 5 = Awal (20), akhir (31)
 3 3 4 = Awal (40), akhir (47)
 3 4 3 = Awal (53), akhir (62)
 3 5 6 = Awal (71), akhir (84)
 3 6 1 = Awal (84), akhir (95)

Job 4

4 1 1 = Awal (0), akhir (13)
 4 2 4 = Awal (13), akhir (27)
 4 3 2 = Awal (46), akhir (55)
 4 4 5 = Awal (55), akhir (66)
 4 5 6 = Awal (66), akhir (71)
 4 6 3 = Awal (71), akhir (76)

Job 5

5 1 2 = Awal (0), akhir (12)
 5 2 1 = Awal (25), akhir (32)
 5 3 3 = Awal (32), akhir (40)
 5 4 6 = Awal (40), akhir (55)
 5 5 4 = Awal (60), akhir (67)
 5 6 5 = Awal (67), akhir (78)



Gantt Chart penjadualan dengan algoritma genetik soal 2

LAMPIRAN C

LAMPIRAN C

Persamaan LINDO :

1. Soal 1

Min $E14 + E24 + E34 + 2T14 + 2T24 + 2T34$

St

$C12 - C11 \geq 7$

$C13 - C12 \geq 8$

$C14 - C13 \geq 6$

$C22 - C21 \geq 7$

$C23 - C22 \geq 8$

$C24 - C23 \geq 7$

$C32 - C31 \geq 5$

$C33 - C32 \geq 6$

$C34 - C33 \geq 5$

$-C12 + C22 + 10000 Z1 \leq 9993$

$-C12 + C22 + 10000 Z1 \geq 7$

$-C12 + C31 + 10000 Z2 \leq 9993$

$-C12 + C31 + 10000 Z2 \geq 6$

$-C22 + C31 + 10000 Z3 \leq 9993$

$-C22 + C31 + 10000 Z3 \geq 6$

$-C14 + C21 + 10000 Z4 \leq 9994$

$-C14 + C21 + 10000 Z4 \geq 5$

$-C14 + C33 + 10000 Z5 \leq 9994$

$-C14 + C33 + 10000 Z5 \geq 6$

$-C21 + C33 + 10000 Z6 \leq 9995$

$-C21 + C33 + 10000 Z6 \geq 6$

$-C11 + C24 + 10000 Z7 \leq 9992$

$-C11 + C24 + 10000 Z7 \geq 7$

$-C11 + C32 + 10000 Z8 \leq 9992$

$-C11 + C32 + 10000 Z8 \geq 5$

$-C24 + C32 + 10000 Z9 \leq 9993$

$-C24 + C32 + 10000 Z9 \geq 5$

$-C13 + C23 + 10000 Z10 \leq 9994$

$-C13 + C23 + 10000 Z10 \geq 8$

$-C13 + C34 + 10000 Z11 \leq 9994$

$-C13 + C34 + 10000 Z11 \geq 5$

$-C23 + C34 + 10000 Z12 \leq 9992$

$-C23 + C34 + 10000 Z12 \geq 5$

$C11 \geq 8$

$C21 \geq 5$

$C31 \geq 6$

$C14 + E14 \geq 38$

$C14 - T14 \leq 38$
 $C24 + E24 \geq 36$
 $C24 - T24 \leq 36$
 $C34 + E34 \geq 37$
 $C34 - T34 \leq 37$
 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

2. Soal 2

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

St

$C12 - C11 \geq 13$
 $C13 - C12 \geq 6$
 $C14 - C13 \geq 7$
 $C15 - C14 \geq 9$
 $C16 - C15 \geq 9$
 $C22 - C21 \geq 7$
 $C23 - C22 \geq 13$
 $C24 - C23 \geq 10$
 $C25 - C24 \geq 6$
 $C26 - C25 \geq 12$
 $C32 - C31 \geq 11$
 $C33 - C32 \geq 7$
 $C34 - C33 \geq 9$
 $C35 - C34 \geq 13$
 $C36 - C35 \geq 11$
 $C42 - C41 \geq 14$
 $C43 - C42 \geq 9$
 $C44 - C43 \geq 11$
 $C45 - C44 \geq 5$
 $C46 - C45 \geq 5$
 $C52 - C51 \geq 7$
 $C53 - C52 \geq 8$
 $C54 - C53 \geq 15$

$C55 - C54 \geq 7$
 $C56 - C55 \geq 11$
 $-C11 + C24 + 10000 Z1 \leq 9988$
 $-C11 + C24 + 10000 Z1 \geq 10$
 $-C11 + C36 + 10000 Z2 \leq 9988$
 $-C11 + C36 + 10000 Z2 \geq 11$
 $-C11 + C41 + 10000 Z3 \leq 9988$
 $-C11 + C41 + 10000 Z3 \geq 13$
 $-C11 + C52 + 10000 Z4 \leq 9988$
 $-C11 + C52 + 10000 Z4 \geq 7$
 $-C24 + C36 + 10000 Z5 \leq 9990$
 $-C24 + C36 + 10000 Z5 \geq 11$
 $-C24 + C41 + 10000 Z6 \leq 9990$
 $-C24 + C41 + 10000 Z6 \geq 13$
 $-C24 + C52 + 10000 Z7 \leq 9990$
 $-C24 + C52 + 10000 Z7 \geq 7$
 $-C36 + C41 + 10000 Z8 \leq 9989$
 $-C36 + C41 + 10000 Z8 \geq 13$
 $-C36 + C52 + 10000 Z9 \leq 9989$
 $-C36 + C52 + 10000 Z9 \geq 7$
 $-C41 + C52 + 10000 Z10 \leq 9987$
 $-C41 + C52 + 10000 Z10 \geq 7$
 $-C13 + C22 + 10000 Z11 \leq 9994$
 $-C13 + C22 + 10000 Z11 \geq 7$
 $-C13 + C31 + 10000 Z12 \leq 9994$
 $-C13 + C31 + 10000 Z12 \geq 8$
 $-C13 + C43 + 10000 Z13 \leq 9994$
 $-C13 + C43 + 10000 Z13 \geq 9$
 $-C13 + C51 + 10000 Z14 \leq 9994$
 $-C13 + C51 + 10000 Z14 \geq 12$
 $-C22 + C31 + 10000 Z15 \leq 9993$
 $-C22 + C31 + 10000 Z15 \geq 8$
 $-C22 + C43 + 10000 Z16 \leq 9993$
 $-C22 + C43 + 10000 Z16 \geq 9$
 $-C22 + C51 + 10000 Z17 \leq 9993$
 $-C22 + C51 + 10000 Z17 \geq 12$
 $-C31 + C43 + 10000 Z18 \leq 9992$
 $-C31 + C43 + 10000 Z18 \geq 9$
 $-C31 + C51 + 10000 Z19 \leq 9992$
 $-C31 + C51 + 10000 Z19 \geq 12$
 $-C43 + C51 + 10000 Z20 \leq 9991$
 $-C43 + C51 + 10000 Z20 \geq 12$
 $-C14 + C21 + 10000 Z21 \leq 9993$
 $-C14 + C21 + 10000 Z21 \geq 14$
 $-C14 + C34 + 10000 Z22 \leq 9993$
 $-C14 + C34 + 10000 Z22 \geq 9$

-C14 + C46 + 10000 Z23 <= 9993
-C14 + C46 + 10000 Z23 >= 5
-C14 + C53 + 10000 Z24 <= 9993
-C14 + C53 + 10000 Z24 >= 8
-C21 + C34 + 10000 Z25 <= 9986
-C21 + C34 + 10000 Z25 >= 9
-C21 + C46 + 10000 Z26 <= 9986
-C21 + C46 + 10000 Z26 >= 5
-C21 + C53 + 10000 Z27 <= 9986
-C21 + C53 + 10000 Z27 >= 8
-C34 + C46 + 10000 Z28 <= 9991
-C34 + C46 + 10000 Z28 >= 5
-C34 + C53 + 10000 Z29 <= 9991
-C34 + C53 + 10000 Z29 >= 8
-C46 + C53 + 10000 Z30 <= 9995
-C46 + C53 + 10000 Z30 >= 8
-C12 + C25 + 10000 Z31 <= 9987
-C12 + C25 + 10000 Z31 >= 6
-C12 + C33 + 10000 Z32 <= 9987
-C12 + C33 + 10000 Z32 >= 7
-C12 + C42 + 10000 Z33 <= 9987
-C12 + C42 + 10000 Z33 >= 14
-C12 + C55 + 10000 Z34 <= 9987
-C12 + C55 + 10000 Z34 >= 7
-C25 + C33 + 10000 Z35 <= 9994
-C25 + C33 + 10000 Z35 >= 7
-C25 + C42 + 10000 Z36 <= 9994
-C25 + C42 + 10000 Z36 >= 14
-C25 + C55 + 10000 Z37 <= 9994
-C25 + C55 + 10000 Z37 >= 7
-C33 + C42 + 10000 Z38 <= 9993
-C33 + C42 + 10000 Z38 >= 14
-C33 + C55 + 10000 Z39 <= 9993
-C33 + C55 + 10000 Z39 >= 7
-C42 + C55 + 10000 Z40 <= 9986
-C42 + C55 + 10000 Z40 >= 7
-C16 + C23 + 10000 Z41 <= 9991
-C16 + C23 + 10000 Z41 >= 13
-C16 + C32 + 10000 Z42 <= 9991
-C16 + C32 + 10000 Z42 >= 11
-C16 + C44 + 10000 Z43 <= 9991
-C16 + C44 + 10000 Z43 >= 11
-C16 + C56 + 10000 Z44 <= 9991
-C16 + C56 + 10000 Z44 >= 11
-C23 + C32 + 10000 Z45 <= 9987
-C23 + C32 + 10000 Z45 >= 11

$-C23 + C44 + 10000 Z46 \leq 9987$
 $-C23 + C44 + 10000 Z46 \geq 11$
 $-C23 + C56 + 10000 Z47 \leq 9987$
 $-C23 + C56 + 10000 Z47 \geq 11$
 $-C32 + C44 + 10000 Z48 \leq 9989$
 $-C32 + C44 + 10000 Z48 \geq 11$
 $-C32 + C56 + 10000 Z49 \leq 9989$
 $-C32 + C56 + 10000 Z49 \geq 11$
 $-C44 + C56 + 10000 Z50 \leq 9989$
 $-C44 + C56 + 10000 Z50 \geq 11$
 $-C15 + C26 + 10000 Z51 \leq 9991$
 $-C15 + C26 + 10000 Z51 \geq 12$
 $-C15 + C35 + 10000 Z52 \leq 9991$
 $-C15 + C35 + 10000 Z52 \geq 13$
 $-C15 + C45 + 10000 Z53 \leq 9991$
 $-C15 + C45 + 10000 Z53 \geq 5$
 $-C15 + C54 + 10000 Z54 \leq 9991$
 $-C15 + C54 + 10000 Z54 \geq 15$
 $-C26 + C35 + 10000 Z55 \leq 9988$
 $-C26 + C35 + 10000 Z55 \geq 13$
 $-C26 + C45 + 10000 Z56 \leq 9988$
 $-C26 + C45 + 10000 Z56 \geq 5$
 $-C26 + C54 + 10000 Z57 \leq 9988$
 $-C26 + C54 + 10000 Z57 \geq 15$
 $-C35 + C45 + 10000 Z58 \leq 9987$
 $-C35 + C45 + 10000 Z58 \geq 5$
 $-C35 + C54 + 10000 Z59 \leq 9987$
 $-C35 + C54 + 10000 Z59 \geq 15$
 $-C45 + C54 + 10000 Z60 \leq 9995$
 $-C45 + C54 + 10000 Z60 \geq 15$
 $C11 \geq 12$
 $C21 \geq 14$
 $C31 \geq 8$
 $C41 \geq 13$
 $C51 \geq 12$
 $C16 + E15 \geq 89$
 $C16 - T16 \leq 89$
 $C26 + E26 \geq 94$
 $C26 - T26 \leq 94$
 $C36 + E36 \geq 97$
 $C36 - T36 \leq 97$
 $C46 + E46 \geq 87$
 $C46 - T46 \leq 87$
 $C56 + E56 \geq 88$
 $C56 - T56 \leq 88$

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
Int Z41
Int Z42
Int Z43
Int Z44
Int Z45

Int Z46
Int Z47
Int Z48
Int Z49
Int Z50
Int Z51
Int Z52
Int Z53
Int Z54
Int Z55
Int Z56
Int Z57
Int Z58
Int Z59
Int Z60

LAMPIRAN D

LAMPIRAN D

MDIForm1



Source Code MDIForm1 :

Option Explicit

Private Sub MDIForm_Load()

```

    Konter1 = 2
    Konter2 = 1
    MaxSejarah = 100
    MaxIterasi = 100
    WarnaJob(0) = &1C0C0FF
    WarnaJob(1) = &11FF0000
    WarnaJob(2) = &110&
    WarnaJob(3) = &11FF00FF
    WarnaJob(4) = &HC0C0C0
    WarnaJob(5) = &HFFFF80
    WarnaJob(6) = &HC0C0FF
    WarnaJob(7) = &11FF8080
    WarnaJob(8) = &HFF
    WarnaJob(9) = &HC0
    WarnaJob(10) = &H80
    WarnaJob(11) = &1140
    WarnaJob(12) = &1C0E0FF
    WarnaJob(13) = &H80C0FF
    WarnaJob(14) = &HF
    WarnaJob(15) = &H40C0
    WarnaJob(16) = &H404080
    WarnaJob(17) = &HC0FFFF
    WarnaJob(18) = &HFFF

```

```

WarnaJob(19) = &H1C0C
WarnaJob(20) = &H1808
WarnaJob(21) = &H4040
WarnaJob(22) = &HC0FFC0
WarnaJob(23) = &H80FF80
WarnaJob(24) = &HFF
WarnaJob(25) = &H1C00
WarnaJob(26) = &H1800
WarnaJob(27) = &H4000
WarnaJob(28) = &HFFFC
WarnaJob(29) = &HFFFF8
WarnaJob(30) = &HFF7F0
WarnaJob(31) = &H1C0C00
WarnaJob(32) = &H180800
WarnaJob(33) = &H400000
WarnaJob(34) = &HFFFC0C
WarnaJob(35) = &HFF808
WarnaJob(36) = &HFF000
WarnaJob(37) = &H1C0000
WarnaJob(38) = &H180000
WarnaJob(39) = &HFFC0F
WarnaJob(40) = &HFF80F
WarnaJob(41) = &HFF00F
WarnaJob(42) = &H1C000C
WarnaJob(43) = &H180008
WarnaJob(44) = &H400004
WarnaJob(45) = &HC000C
WarnaJob(46) = &H4000F
WarnaJob(47) = &H400
WarnaJob(48) = &H4001
WarnaJob(49) = &H4002
WarnaJob(50) = &H4003
WarnaJob(51) = &H4004
WarnaJob(52) = &H4005
WarnaJob(53) = &H4006
WarnaJob(54) = &H4007
WarnaJob(55) = &H4008
WarnaJob(56) = &H4009
WarnaJob(57) = &H4010
WarnaJob(58) = &H4011
WarnaJob(59) = &H4012
WarnaGaris = &HFF&
WarnaDasar = RGB(255, 255, 255)
BukaData = False
MDIForm1.mnuProject.Enabled = False
MDIForm1.mnuCloseProjectItem.Enabled = False
MDIForm1.mnuNewProjectItem.Enabled = True
MDIForm1.mnuOpenProjectItem.Enabled = True
MDIForm1.Caption = "Algoritma Genetik"
End Sub

Private Sub mnuAboutItem_Click()
    Form3.Show
End Sub

Private Sub mnuCloseProjectItem_Click()
    If BukaData = True Then
        con.Close
        BukaData = False
        MDIForm1.mnuProject.Enabled = False
        MDIForm1.mnuCloseProjectItem.Enabled = False
        MDIForm1.mnuNewProjectItem.Enabled = True
        MDIForm1.mnuOpenProjectItem.Enabled = True
        MDIForm1.Caption = "Algoritma Genetik"
    End If
End Sub

```

Form7

Forward		Algoritma Genetik	
Cost		Cost	History
20	☒ Earliest Due Date	100	100
20	☐ Shortest Processing Time		
20	☐ S/OPN		
		Konvergen ☒ Yes	☐ No
Iterasi	100	Run Forward	Run Algoritma Genetik
Tardines Cost	2	Print	Exit
Earliest Cost	1		

Source Code Form7 :

Option Explicit

Dim rs As ADODB.Recordset

Dim Acak1, Acak2, Acak3 As Integer

Dim Sejarah(100) As Long

Dim SumSejarah As Integer

Dim Iterasi As Integer

Dim Tanya As Boolean

Dim posisi(50) As Integer

Dim xWaktu(50) As Integer

Dim xJob(1, 50, 50) As Integer

Sub Tampil()

Dim i, j As Integer

KalimatWord

For i = 1 To SumMesin

 Kalimat = "Mesin " & i & " : "

 For j = 1 To SumJob

 Kalimat = Kalimat & " (" & xJob(0, i, j) & " , " & xJob(1, i, j) & " , " & i & ") "

 Next j

 KalimatWord

Next i

End Sub

Private Sub F(nomer As Integer)

Dim strSQL As String

strSQL = "select * from hasil"

Set rs = New ADODB.Recordset

rs.Open strSQL, con, adOpenKeyset

rs.MoveFirst

Do While Not rs.EOF

 If rs.Fields(0) = nomer Then

 a1(0, rs.Fields(1).Value, rs.Fields(2).Value) = rs.Fields(3).Value

 a1(1, rs.Fields(1).Value, rs.Fields(2).Value) = rs.Fields(4).Value

 End If

```

rs.MoveNext
Loop
rs.Close
If nomer = 1 Then Text1(1) = 1 hitung!
If nomer = 2 Then Text1(2) = 1 hitung!
If nomer = 3 Then Text1(3) = 1 hitung!

```

End Sub

Sub SetAwal()

```

Dim i, j, k, l As Integer
For i = 1 To SumMesin
    l = 0
    For j = 1 To SumOp
        For k = 1 To SumJob
            If i = Mesin(k, j) Then
                l = l + 1
                xJob(0, i, l) = k
                xJob(1, i, l) = j
                xWaktu(l) = a1(0, k, j)
            End If
        Next k
    Next j
    For j = 1 To SumOp - 1
        For k = j + 1 To SumOp
            If xWaktu(j) > xWaktu(k) Then
                l = xJob(0, i, j)
                xJob(0, i, j) = xJob(0, i, k)
                xJob(0, i, k) = l
                l = xJob(1, i, j)
                xJob(1, i, j) = xJob(1, i, k)
                xJob(1, i, k) = l
                l = xWaktu(j)
                xWaktu(j) = xWaktu(k)
                xWaktu(k) = l
            End If
        Next k
    Next j
Next i

```

End Sub

Sub SetWaktu()

```

Dim i, j, k, l, banyak As Integer
Dim status As Boolean
Dim status1(50) As Boolean
For i = 1 To SumJob
    For j = 1 To SumOp
        a2(0, i, j) = a1(0, i, j)
        a2(1, i, j) = a1(1, i, j)
    Next j
Next i
For i = 1 To SumMesin
    xWaktu(i) = 0
    status1(i) = False
Next i
For i = 1 To SumMesin
    For j = 1 To SumOp
        For k = 1 To SumJob
            If i = Mesin(k, j) Then
                If status1(i) = False Then
                    xWaktu(i) = a1(0, k, j)
                    status1(i) = True
                Else
                    If xWaktu(i) > a1(0, k, j) Then
                        xWaktu(i) = a1(0, k, j)
                    End If
                End If
            End If
        Next k
    Next j
Next i

```

```

    Next j
Next i
For i = 1 To SumJob
    posisi(i) = 1
Next i
banyak = 0
Do
    For j = 1 To SumJob
        For i = 1 To SumMesin
            For k = 1 To SumJob
                If xJob(1, i, j) = posisi(k) And xJob(0, i, j) = k Then
                    If xJob(1, i, j) = 1 Then ' op 1
                        If xJob(0, i, j - 1) = 0 Or j - 1 = 0 Then
                            a2(0, xJob(0, i, j), xJob(1, i, j)) = xWaktu(i)
                            a2(1, xJob(0, i, j), xJob(1, i, j)) = a2(0, xJob(0, i, j), xJob(1, i, j)) + WaktuProses(xJob(0, i, j), xJob(1, i, j))
                            xWaktu(i) = a2(1, xJob(0, i, j), xJob(1, i, j))
                            posisi(k) = posisi(k) + 1
                            xJob(0, i, j) = 0
                        End If
                    End If
                End If
            Next k
        Next i
    Next j
    status = True
    For i = 1 To SumJob
        If posisi(i) <= SumOp Then status = False
    Next i
    Loop While status = False
End Sub

```

Private Sub Jalan(nomer As Integer)

```

Dim i, j, k, l As Integer
Dim Kondisi As Boolean
Dim F1 As Form9
Dim F2 As Form11
BukaWord
MaxSejarah = Text1(4).Text
SumSejarah = 0
Iterasi = 0
F (nomer)
Kalimat = "Algoritma Genetik "
KalimatWord
KalimatWord
Set F1 = New Form9
If Option3(1).Value = True Then F1.Caption = Option3(1).Caption
If Option3(2).Value = True Then F1.Caption = Option3(2).Caption
If Option3(3).Value = True Then F1.Caption = Option3(3).Caption
Kalimat = F1.Caption
KalimatWord
F1.Show
    For i = 1 To MaxSejarah
        Sejarah(i) = 0
    Next i
    Kondisi = True
    Kalimat = "Biaya : " & Hitung1
    KalimatWord
    Kalimat = "Tardines : " & b2
    KalimatWord
    Kalimat = "Earliest : " & b1
    KalimatWord
    SetAwal
    'Tampil
    Sejarah(0) = Hitung1
    KalimatWord
    Do While Kondisi = True
        KalimatWord
        KalimatWord
        Iterasi = Iterasi + 1
    Loop

```

```

Kalimat = "Iterasi ke - " & Iterasi
KalimatWord
KalimatWord
Do
  SetAwal
  Randomize
  Acak1 = Int((SumMesin * Rnd) + 1)
  Acak2 = Int((SumJob * Rnd) + 1)
  Do
    Kondisi = True
    Acak3 = Int((SumJob * Rnd) + 1)
    If Acak2 = Acak3 Then Kondisi = False
  Loop While Kondisi = False
  Kondisi = True
  If Acak2 > Acak3 Then
    k = Acak2
    Acak2 = Acak3
    Acak3 = k
  End If
  Kalimat = "Mesin      : " & Acak1
  KalimatWord
  Kalimat = "Urutan acak 1 : " & Acak2 & " ( " & xJob(0, Acak1, Acak2) & " , " & xJob(1, Acak1, Acak2) & " , " &
  Acak1 & " ) "
  KalimatWord
  Kalimat = "Urutan acak 2 : " & Acak3 & " ( " & xJob(0, Acak1, Acak3) & " , " & xJob(1, Acak1, Acak3) & " , " &
  Acak1 & " ) "
  KalimatWord
  If xJob(1, Acak1, Acak2) > 1 Then
    If a2(0, xJob(0, Acak1, Acak3), xJob(1, Acak1, Acak3)) < a2(0, xJob(0, Acak1, Acak2), xJob(1, Acak1, Acak2) -
  1) Then Kondisi = False
    End If
    If xJob(1, Acak1, Acak3) > 1 Then
      If a2(0, xJob(0, Acak1, Acak2), xJob(1, Acak1, Acak2)) < a2(0, xJob(0, Acak1, Acak3), xJob(1, Acak1, Acak3) -
  1) Then Kondisi = False
      (Acak3), xJob(1, Acak1, Acak3) + 1) Then kondisi = False
    End If
    If Kondisi = False Then
      Kalimat = "Kondisi Tidak memenuhi syarat"
      KalimatWord
      KalimatWord
    Else
      i = xJob(0, Acak1, Acak2)
      xJob(0, Acak1, Acak2) = xJob(0, Acak1, Acak3)
      xJob(0, Acak1, Acak3) = i
      i = xJob(1, Acak1, Acak2)
      xJob(1, Acak1, Acak2) = xJob(1, Acak1, Acak3)
      xJob(1, Acak1, Acak3) = i
    End If
  Loop While Kondisi = False
  KalimatWord
  Kalimat = "Child"
  KalimatWord
  Tampil
  KalimatWord
  SetWaktu
  KalimatWord
  'backword
  Kalimat = "Biaya      : " & Hitung2
  KalimatWord
  Kalimat = "Tardiness : " & b2
  KalimatWord
  Kalimat = "Earliness : " & b1
  KalimatWord
  KalimatWord
  If Hitung1 >= Hitung2 Then
    Kalimat = "Child dipilih sebagai Parent baru karena Biaya Child <= Biaya Parent Lama"
    For i = 1 To SumJob
      For j = 1 To SumOp
        a1(0, i, j) = a2(0, i, j)
      Next j
    Next i
  End If
End Sub

```

```

        a1(1, i, j) = a2(1, i, j)
    Next j
Next i
Else
    Kalimat = "Child tidak dipilih sebagai Parent baru karena Biaya Child > Biaya Parent Lama"
End If
SetAwal
SetWaktu
KalimatWord
KalimatWord
Kalimat = "Parent yang Baru"
KalimatWord
Tampil
KalimatWord
KalimatWord
Kondisi = True
If Tanya = True Then
    If SumSejarah = MaxSejarah Then
        For i = 1 To SumSejarah - 1
            Sejarah(i) = Sejarah(i + 1)
        Next i
        KalimatWord
        Sejarah(SumSejarah) = Hitung1
        Kondisi = False
        Kalimat = "Sejarah = " & Sejarah(1) & " "
        For i = 2 To MaxSejarah
            If Sejarah(1) <> Sejarah(i) Then
                Kondisi = True
            End If
            Kalimat = Kalimat & Sejarah(i) & " "
        Next i
        KalimatWord
        KalimatWord
    Else
        SumSejarah = SumSejarah + 1
        Sejarah(SumSejarah) = Hitung1
    End If
End If
If Iterasi >= MaxIterasi Then Kondisi = False
Loop
KalimatWord
KalimatWord
Kalimat = "Data Waktu Untuk Masing - Masing Job "
KalimatWord
KalimatWord
For i = 1 To SumJob
    Kalimat = "Job " & i
    KalimatWord
    For j = 1 To SumOp
        Kalimat = i & " " & j & " " & Mesin(i, j) & " = " & "Awal (" & a1(0, i, j) & "), akhir (" & a1(1, i, j) & ")"
        KalimatWord
    Next j
    KalimatWord
Next i
TutupWord
Text1(0) = b1 + b2
Set F2 = New Form11
F2.Caption = "Algoritma Genetik"
F2.Show

```

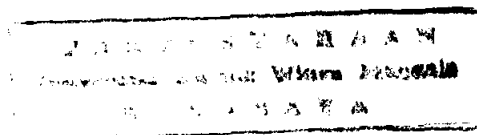
End Sub

Private Sub Command1_Click()

```

    On Error GoTo Salah_Command1
    Konter1 = Text8.Text
    Konter2 = Text9.Text
    F_1
    F_2
    F_3

```



```
Exit Sub
Salah_Cammand1:
MsgBox "Kesalahan Proses (periksa data project)!", vbOKOnly + vbInformation, "Error"
End Sub
```

Private Sub Command4_Click()

```
On Error GoTo Salah_Cammand4
MaxIterasi = Text7.Text
Konter1 = Text8.Text
Konter2 = Text9.Text
If Text1(1) = "" Then F (1)
If Text1(2) = "" Then F (2)
If Text1(3) = "" Then F (3)
If Option2(0).Value = True Then
Tanya = True
Else
Tanya = False
End If
If Option3(1).Value = True Then Jalan (1)
If Option3(2).Value = True Then Jalan (2)
If Option3(3).Value = True Then Jalan (3)
Exit Sub
Salah_Cammand4:
MsgBox "Kesalahan Proses (periksa data project)!", vbOKOnly + vbInformation, "Error"
End Sub
```

Private Sub Form_Load()

```
Text8.Text = Konter1
Text9.Text = Konter2
Text7.Text = MaxIterasi
Text1(4).Text = MaxSejarah
End Sub
```

Form1

Source Code Form1 :

```
Option Explicit
Dim rs As ADODB.Recordset
Dim strSQL As String
Private Sub Command1_Click()
On Error GoTo Salah
Text4.Text = Text3.Text
If Trim(Text1.Text) <> "" And Trim(Text2.Text) <> "" And _
Trim(Text3.Text) <> "" And Trim(Text4.Text) <> "" Then
Dim nError As Byte
```

```

nama = Trim(Text1.Text) & ".mdb"
nError = CopyFile(App.Path & "asli.mdb", App.Path & "save" & nama, 1)
If nError = 0 Then
    MsgBox "Nama Project Sudah Ada !", vbOKOnly + vbInformation, "Error"
    Text1.Text = ""
    Text1.SetFocus
Else
    Dim i, j, k As Integer
    If OpenProject(nama) = True Then
        strsql = "select * from jumlah"
        Set rs = New ADODB.Recordset
        rs.Open strsql, con, adOpenKeyset
        strsql = "insert into jumlah values " &
            "(" & Text2.Text & "," & Text3.Text & "," & Text4.Text & ",1)"
        con.Execute strsql
        rs.Requery
        rs.Close
        SumJob = Text2.Text
        SumOp = Text3.Text
        SumMesin = Text4.Text
        strsql = "select * from due_date"
        Set rs = New ADODB.Recordset
        rs.Open strsql, con, adOpenKeyset
        For i = 1 To SumJob
            strsql = "insert into due_date values " &
                "(" & i & ",1)"
            con.Execute strsql
            rs.Requery
            D(i) = 1
        Next i
        rs.Close
        strsql = "select * from data"
        Set rs = New ADODB.Recordset
        rs.Open strsql, con, adOpenKeyset
        For i = 1 To SumJob
            For j = 1 To SumOp
                WaktuProses(i, j) = 1
                Mesin(i, j) = 1
                strsql = "insert into data values " &
                    "(" & i & "," & j & ",1,1)"
                con.Execute strsql
                rs.Requery
            Next j
        Next i
        rs.Close
        strsql = "select * from hasil"
        Set rs = New ADODB.Recordset
        rs.Open strsql, con, adOpenKeyset
        For i = 1 To 6
            For j = 1 To SumJob
                For k = 1 To SumOp
                    strsql = "insert into hasil values " &
                        "(" & i & "," & j & "," & k & ",0,0)"
                    con.Execute strsql
                    rs.Requery
                Next k
            Next j
        Next i
        BukaData = True
        MIDForm1.mnuProject.Enabled = True
        MIDForm1.mnuCloseProjectItem.Enabled = True
        MIDForm1.mnuNewProjectItem.Enabled = False
        MIDForm1.mnuOpenProjectItem.Enabled = False
        MsgBox "Project Sudah Tersimpan !", vbOKOnly + vbInformation, "Save"
        MIDForm1.Caption = "Jadwal Job Shop - (" & nama & ")"
        Unload Me
    Else
        Text1.Text = ""
        Text1.SetFocus
    End If
End If

```

```

        End If
    End If
Else
    Text1.SetFocus
End If
Exit Sub
Salah:
    MsgBox "Salah Aturan Penamaan Project !", vbOKOnly + vbInformation, "Error"
    Text1.SetFocus

```

End Sub

Private Sub Text1_KeyPress(KeyAscii As Integer)

```

    If KeyAscii = 13 Then Text2.SetFocus

```

End Sub

Private Sub Text2_KeyPress(KeyAscii As Integer)

```

    On Error GoTo Salah_text2
    If KeyAscii = 13 Then
        If Text2.Text > 50 Then
            MsgBox "Maximal 50 Job"
            Text2.Text = ""
            Text2.SetFocus
        Else
            Text3.SetFocus
        End If
    End If
    Exit Sub

```

End Sub

Private Sub Text3_KeyPress(KeyAscii As Integer)

```

    On Error GoTo Salah_text3
    If KeyAscii = 13 Then
        If Text3.Text > 50 Then
            MsgBox "Maximal 50 Operasi"
            Text3.Text = ""
            Text3.SetFocus
        Else
            Text4.Text = Text3.Text
            Command1.SetFocus
        End If
    End If
    Exit Sub
Salah_text3:
    MsgBox "Error Project !", vbOKOnly + vbInformation, "Error"
    Text3.Text = ""
    Text3.SetFocus

```

End Sub

Form2

The image shows a standard Windows dialog box with the title bar 'Open Project'. Inside the dialog, there is a text input field with the label 'Project Name' to its left. Below the text field, there are two buttons: 'Cancel' on the left and 'Yes' on the right. The dialog box has a standard Windows XP-style border with a close button (X) in the top right corner.

Source Code Form2 :**Option Explicit****Dim rs As ADODB.Recordset****Private Sub Command1_Click()**

On Error GoTo Salah

If Text1.Text <> "" Then

nama = Trim(Text1.Text) & ".mdb"

If OpenProject(nama) = True Then

Dim strSQL As String

strSQL = "select * from jumlah"

Set rs = New ADODB.Recordset

rs.Open strSQL, con, adOpenKeyset

rs.MoveFirst

SumJob = rs.Fields(0).Value

SumOp = rs.Fields(1).Value

SumMesin = rs.Fields(2).Value

rs.Close

strSQL = "select * from data"

Set rs = New ADODB.Recordset

rs.Open strSQL, con, adOpenKeyset

rs.MoveFirst

Do While Not rs.EOF

WaktuProses(rs.Fields(0).Value, rs.Fields(1).Value) = rs.Fields(3).Value

Mesin(rs.Fields(0).Value, rs.Fields(1).Value) = rs.Fields(2).Value

rs.MoveNext

Loop

rs.Close

strSQL = "select * from due_date"

Set rs = New ADODB.Recordset

rs.Open strSQL, con, adOpenKeyset

rs.MoveFirst

Do While Not rs.EOF

D(rs.Fields(0).Value) = rs.Fields(1).Value

rs.MoveNext

Loop

rs.Close

MsgBox "Project Sudah Dibuka !", vbOKOnly + vbInformation, "Sukses"

BukaData = True

MDIForm1.mnuProject.Enabled = True

MDIForm1.mnuCloseProjectItem.Enabled = True

MDIForm1.mnuNewProjectItem.Enabled = False

MDIForm1.mnuOpenProjectItem.Enabled = False

MDIForm1.Caption = "Jadwal Job Shop - (" & nama & ")"

Unload Me

Else

MsgBox "Project gagal dibuka", vbOKOnly + vbInformation, "Data tidak ditemukan"

Text1.Text = ""

Text1.SetFocus

End If

Else

Text1.SetFocus

End If

Exit Sub

Salah:

MsgBox "Proses gagal, inputkan lagi nama project", vbOKOnly + vbInformation, "Error"

Text1.SetFocus

End Sub**Private Sub Text1_KeyPress(KeyAscii As Integer)**

If KeyAscii = 13 Then Command1.SetFocus

End Sub

Form4

Job \ Op	1	2	3	4	5
1	0	6	9	7	10
2	10	7	6	8	9
3	11	8	7	7	9

Exit Save Print Add Data Delete Data

Source Code Form4 :**Option Explicit****Dim rs As ADODB.Recordset****Dim Awal_X, Awal_Y As Integer****Dim X, Y As Integer****Dim i, j As Integer****Dim posisi As Integer****Private Sub Gambar()**

On Error GoTo SalahGambar

For i = 0 To 120

Text1(i).Visible = False

Next i

For i = 0 To 10

Label1(i).Visible = False

Label2(i).Visible = False

Next i

For i = 0 To 10

If i + Awal_X < SumOp Then

Label1(i).Visible = True

X = i + Awal_X

Label1(i).Caption = Str(X + 1)

End If

If i + Awal_Y < SumJob Then

Label2(i).Visible = True

Y = i + Awal_Y

Label2(i).Caption = Str(Y + 1)

End If

Next i

For i = 0 To 10

If i + Awal_X < SumOp Then

For j = 0 To 10

If j + Awal_Y < SumJob Then

posisi = i + (j * 11)

Text1(posisi).Visible = True

Text1(posisi).Text = Str(WaktuProses(j + Awal_Y + 1, i + Awal_X + 1))

Text1(posisi).Enabled = True

End If

Next j

End If

Next i

If Awal_X = 0 And Awal_Y = 0 Then

```

        Command3(0).Enabled = False
    Else
        Command3(0).Enabled = True
    End If
    If Awal_X + 10 > SumOp And Awal_Y + 10 > SumJob Then
        Command3(1).Enabled = False
    Else
        Command3(1).Enabled = True
    End If
    Exit Sub
SalahGambar:
    MsgBox "Data kerancuan Dalam Gambar!", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Form_Load()

```

On Error GoTo SalahFormLoad
Dim strSQL As String
strSQL = "select * from data"
Set rs = New ADODB.Recordset
rs.Open strSQL, con, adOpenKeyset
Awal_X = 0
Awal_Y = 0
Gambar
Exit Sub
SalahFormLoad:
    MsgBox "Coba koreksi data Project !", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Command1_Click()

```

On Error GoTo SalahCommand1Click
For i = 0 To 10
    If i + Awal_X < SumOp Then
        For j = 0 To 10
            If j + Awal_Y < SumJob Then
                posisi = i + (j * 11)
                WaktuProses(j + Awal_Y + 1, i + Awal_X + 1) = Val(Text1(posisi).Text)
            End If
        Next j
    End If
Next i
Exit Sub
SalahCommand1Click:
    MsgBox "Data tidak disimpan karena ada kesalahan Input!", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Command3_Click(Index As Integer)

```

On Error GoTo SalahCommand3Click
Command1_Click
If Index = 0 Then
    If Awal_X = 0 Then
        Awal_Y = Awal_Y - 10
    Else
        Awal_X = Awal_X - 10
    End If
Else
    If Awal_X + 10 < SumOp Then
        Awal_X = Awal_X + 10
    Else
        Awal_X = 0
        Awal_Y = Awal_Y + 10
    End If
End If
Gambar
Exit Sub
SalahCommand3Click:
    MsgBox "Data kerancuan Data!", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Command4_Click()

```

On Error GoTo SalahCommand4Click
Dim strSQL As String
Command1_Click
For i = 1 To SumJob
    For j = 1 To SumOp
        strSQL = "update data " & _
            "set waktu=" & Str(WaktuProses(i, j)) & " where (job=" & i & " and op=" & j & ")"
        con.Execute strSQL
        rs.Requery
    Next j
Next i
Unload Me
Exit Sub
SalahCommand4Click:
MsgBox "Data kerancuan Data!", vbOKOnly + vbInformation, "Error"
End Sub

```

Form5

Job	Op	1	2	3	4	5
1	3	5	2	1	4	
2	5	1	3	4	2	
3	2	5	4	1	3	

Exit Save Print Go Back

Source Code Form5 :**Option Explicit**

```
Dim rs As ADODB.Recordset
```

```
Dim i, j As Integer
```

```
Dim Awal_X, Awal_Y As Integer
```

```
Dim X, Y As Integer
```

```
Dim posisi As Integer
```

Private Sub Gambar()

```

On Error GoTo SalahGambar
For i = 0 To 120
    Text1(i).Visible = False
Next i
For i = 0 To 10
    Label1(i).Visible = False
    Label2(i).Visible = False
Next i
For i = 0 To 10
    If i + Awal_X < SumOp Then
        Label1(i).Visible = True
        X = i + Awal_X
        Label1(i).Caption = Str(X + 1)
    End If
    If i + Awal_Y < SumJob Then
        Label2(i).Visible = True
        Y = i + Awal_Y
    End If

```

```

        Label2(i).Caption = Str(Y + 1)
    End If
Next i
For i = 0 To 10
    If i + Awal_X < SumOp Then
        For j = 0 To 10
            If j + Awal_Y < SumJob Then
                posisi = i + (j * 11)
                Text1(posisi).Visible = True
                Text1(posisi).Text = Str(Mesin(j + Awal_Y + 1, i + Awal_X + 1))
                Text1(posisi).Enabled = True
            End If
        Next j
    End If
Next i
If Awal_X = 0 And Awal_Y = 0 Then
    Command3(0).Enabled = False
Else
    Command3(0).Enabled = True
End If
If Awal_X + 10 > SumOp And Awal_Y + 10 > SumJob Then
    Command3(1).Enabled = False
Else
    Command3(1).Enabled = True
End If
Exit Sub
SalahGambar:
MsgBox "Data kerancuan Dalam Gambar!", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Form_Load()

```

On Error GoTo SalahFormLoad
Dim strSQL As String
strSQL = "select * from data"
Set rs = New ADODB.Recordset
rs.Open strSQL, con, adOpenKeyset
Awal_X = 0
Awal_Y = 0
Gambar
Exit Sub
SalahFormLoad:
MsgBox "Coba koreksi data Project !", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Command1_Click()

```

On Error GoTo SalahCommand1Click
For i = 0 To 10
    If i + Awal_X < SumOp Then
        For j = 0 To 10
            If j + Awal_Y < SumJob Then
                posisi = i + (j * 11)
                Mesin(j + Awal_Y + 1, i + Awal_X + 1) = Val(Text1(posisi).Text)
            End If
        Next j
    End If
Next i
Exit Sub
SalahCommand1Click:
MsgBox "Data tidak disimpan karena ada kesalahan Input!", vbOKOnly + vbInformation, "Error"
End Sub

```

Private Sub Command3_Click(Index As Integer)

```

On Error GoTo SalahCommand3Click
Command1_Click
If Index = 0 Then
    If Awal_X = 0 Then
        Awal_Y = Awal_Y - 10
    End If
End If

```

```
Else
    Awal_X = Awal_X - 10
End If
Else
    If Awal_X + 10 < SumOp Then
        Awal_X = Awal_X + 10
    Else
        Awal_X = 0
        Awal_Y = Awal_Y + 10
    End If
End If
Gambar
Exit Sub
SalahCommand3Click:
    MsgBox "Data kerancuan Data!", vbOKOnly + vbInformation, "Error"
End Sub
```

```
Private Sub Command4_Click()
    On Error GoTo SalahComunand4Click
    Dim strSQL As String
    Command1_Click
    For i = 1 To SumJob
        For j = 1 To SumOp
            strSQL = "update data " & _
                "set mesin=" & Str(Mesin(i, j)) & " where (job=" & i & " and op=" & j & ")"
            con.Execute strSQL
            rs.Requery
        Next j
    Next i
    Unload Me
    Exit Sub
SalahCommand4Click:
    MsgBox "Data kerancuan Data!", vbOKOnly + vbInformation, "Error"
End Sub
```

Form6

Job	Due Date
1	45
2	45
3	45

Source Code Form6 :
Option Explicit
Dim rs As ADODB.Recordset

Private Sub Command1_Click()

```

On Error GoTo SalahCommand1
Dim a As Integer
Dim strSQL As String
a = Text1.Text
strSQL = "update due_date " & ...
"set due=" & Text2.Text & " where (job=" & Text1.Text & ")"
con.Execute strSQL
rs.Requery
D(Text1.Text) = Text2.Text
List1(1).List(Val(Text1.Text) - 1) = Text2.Text
Text2.Text = ""
Text1.Text = ""
Text1.SetFocus
Exit Sub
SalahCommand1:
MsgBox "Kesalahan Input !", vbOKOnly + vbInformation, "Error"
Text2.Text = ""
Text2.SetFocus

```

End Sub**Private Sub Form_Load()**

```

On Error GoTo SalahFormLoad
Dim strSQL As String
strSQL = "select * from due_date"
Set rs = New ADODB.Recordset
rs.Open strSQL, con, adOpenKeyset
Dim i As Integer
For i = 1 To SumJob
    List1(0).AddItem (i)
    List1(1).AddItem (D(i))
Next i
Exit Sub
SalahFormLoad:
MsgBox "Kesalahan Data Project !", vbOKOnly + vbInformation, "Error"

```

End Sub**Private Sub List1_Click(Index As Integer)**

```

List1(1).Selected(List1(Index).ListIndex) = _
List1(Index).Selected(List1(Index).ListIndex)

```

End Sub**Private Sub List1_DblClick(Index As Integer)**

```

Text1.Text = List1(0).List(List1(0).ListIndex)
Text2.Text = List1(1).List(List1(1).ListIndex)
Text2.SetFocus

```

End Sub**Private Sub Text1_KeyPress(KeyAscii As Integer)**

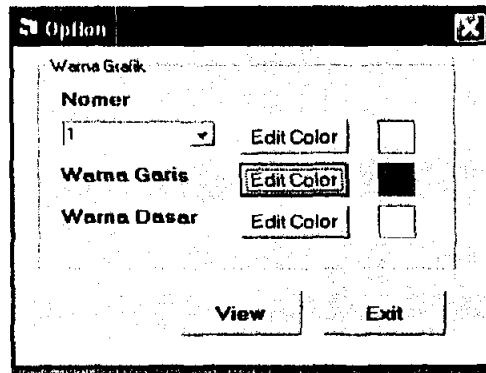
```

On Error GoTo SalahText1_KeyPress
If KeyAscii = 13 Then
    If Text1.Text > SumJob Or Text1.Text <= 0 Then
        MsgBox "Job Tidak ada!", vbOKOnly + vbInformation, "Error"
        Text1.Text = ""
        Text1.SetFocus
    Else
        Text2.SetFocus
    End If
End If
Exit Sub
SalahText1_KeyPress:
MsgBox "Salah Input !", vbOKOnly + vbInformation, "Error"

```

End Sub

Form8



Source Code Form8 :

Option Explicit

Private Sub Combo1_Click()

```
On Error GoTo salah_combo1_Click
Shape1.FillColor = WarnaJob(Combo1.ListIndex)
Exit Sub
```

salah_combo1_Click:

```
MsgBox ("Ada Kesalahan Proses Manipulasi Data")
```

End Sub

Private Sub Command1_Click()

```
On Error GoTo salah_Command1_Click
cd1.Flags = &H1&
cd1.ShowColor
WarnaJob(Combo1.ListIndex) = cd1.Color
Shape1.FillColor = WarnaJob(Combo1.ListIndex)
Exit Sub
```

salah_Command1_Click:

```
MsgBox ("Ada Kesalahan Proses Manipulasi Data Warna")
```

End Sub

Private Sub Command3_Click()

```
On Error GoTo Salah_Command3_Click
cd1.Flags = &H11&
cd1.ShowColor
WarnaGaris = cd1.Color
Shape2.FillColor = WarnaGaris
Exit Sub
```

Salah_Command3_Click:

```
MsgBox ("Ada Kesalahan Proses Manipulasi Data Warna")
```

End Sub

Private Sub Command4_Click()

```
On Error GoTo Salah_Command4_Click
cd1.Flags = &H11&
cd1.ShowColor
WarnaDasar = cd1.Color
Shape3.FillColor = WarnaDasar
Exit Sub
```

Salah_Command4_Click:

```
MsgBox ("Ada Kesalahan Proses Manipulasi Data Warna")
```

End Sub

Private Sub Form_Load()

```
Dim i As Integer
On Error GoTo Salah_Form_Load
```

P E R P E S T A K A N

Sistematisasi dan Wawasan

R I K A B A W A

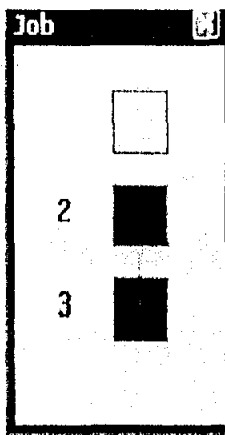
```

For i = 0 To 49
    Combo1.List(i) = i + 1
Next i
Combo1.ListIndex = 0
Shape1.FillColor = WarnaJob(0)
Shape2.FillColor = WarnaGaris
Shape3.FillColor = WarnaDasar
Exit Sub
Salah_Form_Load:
MsgBox ("Ada Kesalahan Proses Manipulasi Data")
Unload Me
End Sub

```

Form10

Source Code Form10 :



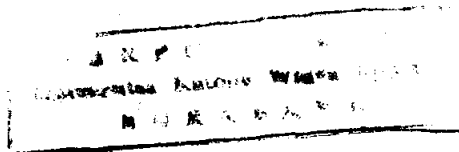
Option Explicit

Private Sub Form_Load()

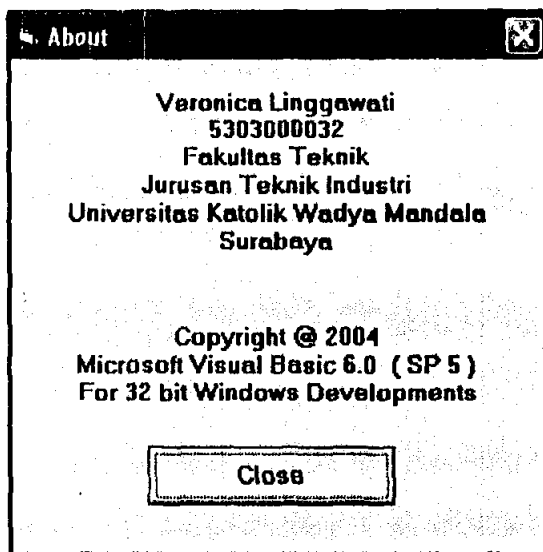
```

Dim i, j, k As Integer
For i = 0 To 50
    Shape1(i).Visible = False
    Label1(i).Visible = False
Next i
j = 0
k = 0
For i = 0 To SumJob - 1
    Shape1(i).Visible = True
    Shape1(i).BackStyle = 1
    Shape1(i).BackColor = WarnaJob(i)
    Shape1(i).BorderColor = WarnaGaris
    Shape1(i).Width = 400
    Shape1(i).Height = 400
    Shape1(i).Top = 300 + j * 600
    Shape1(i).Left = 700 + k * 1200
    Label1(i).Visible = True
    Label1(i).Caption = i + 1
    Label1(i).Top = 350 + j * 600
    Label1(i).Left = 300 + k * 1200
    Label1(i).AutoSize = True
    Label1(i).ForeColor = WarnaJob(i)
    j = j + 1
    If i = SumJob - 1 Then
        Form10.Width = 1600 + 1200 * k
        If k = 0 Then
            Form10.Height = 1000 + j * 600
        Else
            Form10.Height = 7000
        End If
    End If
    If j = 10 Then
        j = 0
        k = k + 1
    End If
Next i
End Sub

```



Form3



Source Code Form3 :

Option Explicit

Private Sub Form_Load()

MDIForm1.Enabled = False

End Sub

Private Sub Form_Unload(Cancel As Integer)

MDIForm1.Enabled = True

End Sub

Source Code Form9 (grafik) :

Option Explicit

Dim i, j As Integer

Dim SkalaMesin As Integer

Dim SkalaWaktu As Integer

Dim WaktuAkhir As Integer

Dim a1(1, 50, 50) As Integer

Dim Awal As Integer

Dim cek1 As Boolean

Function Berapa()

b1 = 0

b2 = 0

For i = 1 To SumJob

If a1(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a1(1, i, SumOp)) * Konter2

If a1(1, i, SumOp) > D(i) Then b2 = b2 + (a1(1, i, SumOp) - D(i)) * Konter1

Next i

Berapa = b1 + b2

End Function

Private Sub Gambar_Grafik()

Scale (0, 10000)-(10000, 0)

Line (100, 100)-(120, 9900), WarnaGaris, BF

Line (100, 100)-(9900, 120), WarnaGaris, BF

For i = 1 To SumJob

For j = 1 To SumOp

Line (Awal + a1(0, i, j) * SkalaWaktu, Awal + 10 + (Mesin(i, j) - 1) * SkalaMesin)-

(Awal + a1(1, i, j) * SkalaWaktu, Awal + (Mesin(i, j) * SkalaMesin) - 1), WarnaJob(i - 1), BF

```

    Next j
    Next i
End Sub

Private Sub Form_Click()
    On Error GoTo SalahFormLoad
    Me.Cls
    Me.BackColor = WarnaDasar
    If (WaktuAkhir <= 9700) Then
        SkalaWaktu = 9700 \ WaktuAkhir
        If cek1 = False Then
            cek1 = True
            Me.Caption = Me.Caption & " ( Time = " & WaktuAkhir & " )" & " and ( Cost = " & Berapa & " )"
        End If
        Gambar_Grafik
    Else
        MsgBox "Kapasitas melebihi"
    End If
    Exit Sub
SalahFormLoad:
    MsgBox "Coba koreksi data Project !", vbOKOnly + vbInformation, "Error"
End Sub

```

```

Private Sub Form_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then
        Printer.Scale (0, 10000)-(10000, 0)
        Printer.Print Me.Caption
        Printer.Line (100, 100)-(120, 9900), WarnaGaris, BF
        Printer.Line (100, 100)-(9900, 120), WarnaGaris, BF
        For i = 1 To SumJob
            For j = 1 To SumOp
                Printer.Line (Awal + a1(0, i, j) * SkalaWaktu, Awal + 10 + (Mesin(i, j) - 1) * SkalaMesin)-
                    (Awal + a1(1, i, j) * SkalaWaktu, Awal + (Mesin(i, j) * SkalaMesin) - 1), WarnaJob(i - 1), BF
            Next j
        Next i
        Printer.EndDoc
    End If
End Sub

```

```

Private Sub Form_Load()
    Me.Width = 10000
    Me.Height = 10000
    For i = 1 To SumJob
        For j = 1 To SumOp
            a1(0, i, j) = a(0, i, j)
            a1(1, i, j) = a(1, i, j)
        Next j
    Next i
    Awal = 121
    If SumMesin <= 20 Then
        SkalaMesin = 485
    Else
        SkalaMesin = 9700 \ SumMesin
    End If
    WaktuAkhir = 0
    For i = 1 To SumJob
        If a1(1, i, SumOp) > WaktuAkhir Then WaktuAkhir = a1(1, i, SumOp)
    Next i
    cek1 = False
End Sub

```

Source Code Form11 (grafik) :

```

Dim i, j As Integer
Dim SkalaMesin As Integer

```

Dim SkalaWaktu As Integer

Dim WaktuAkhir As Integer

Dim Awal As Integer

Dim cek1 As Boolean

Function Berapa()

b1 = 0

b2 = 0

For i = 1 To SumJob

If a(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a(1, i, SumOp)) * Konter2

If a(1, i, SumOp) > D(i) Then b2 = b2 + (a(1, i, SumOp) - D(i)) * Konter1

Next i

Berapa = b1 + b2

End Function

Private Sub Gambar_Grafik()

Scale (0, 10000)-(10000, 0)

Line (100, 100)-(120, 9900), WarnaGaris, BF

Line (100, 100)-(9900, 120), WarnaGaris, BF

For i = 1 To SumJob

For j = 1 To SumOp

Line (Awal + a(0, i, j) * SkalaWaktu, Awal + 10 + (Mesin(i, j) - 1) * SkalaMesin)-

(Awal + a(1, i, j) * SkalaWaktu, Awal + (Mesin(i, j) * SkalaMesin) - 1), WarnaJob(i - 1), BF

Next j

Next i

End Sub

Private Sub Form_Click()

On Error GoTo SalahFormLoad

Me.Cls

Me.BackColor = WarnaDasar

If (WaktuAkhir <= 9700) Then

SkalaWaktu = 9700 \ WaktuAkhir

If cek1 = False Then

cek1 = True

Me.Caption = Me.Caption & " (Time = " & WaktuAkhir & ") " & " and (Cost = " & Berapa & ") "

End If

Gambar_Grafik

Else

MsgBox "Kapasitas melebihi"

End If

Exit Sub

SalahFormLoad:

MsgBox "Coba koreksi data Project !", vbOKOnly + vbInformation, "Error"

End Sub

Private Sub Form_KeyPress(KeyAscii As Integer)

If KeyAscii = 13 Then

Printer.Scale (0, 10000)-(10000, 0)

Printer.Print Me.Caption

Printer.Line (100, 100)-(120, 9900), WarnaGaris, BF

Printer.Line (100, 100)-(9900, 120), WarnaGaris, BF

For i = 1 To SumJob

For j = 1 To SumOp

Printer.Line (Awal + a(0, i, j) * SkalaWaktu, Awal + 10 + (Mesin(i, j) - 1) * SkalaMesin)-

(Awal + a(1, i, j) * SkalaWaktu, Awal + (Mesin(i, j) * SkalaMesin) - 1), WarnaJob(i - 1), BF

Next j

Next i

Printer.EndDoc

End If

End Sub

Private Sub Form_Load()

Me.Width = 10000

Me.Height = 10000

```

For i = 1 To SumJob
    For j = 1 To SumOp
        a(0, i, j) = a1(0, i, j)
        a(1, i, j) = a1(1, i, j)
    Next j
Next i
Awal = 121
If SumMesin <= 20 Then
    SkalaMesin = 485
Else
    SkalaMesin = 9700 \ SumMesin
End If
WaktuAkhir = 0
For i = 1 To SumJob
    If a(1, i, SumOp) > WaktuAkhir Then WaktuAkhir = a(1, i, SumOp)
Next i
cek1 = False
End Sub

```

Source Code Module1 :

Option Explicit

Public con As ADODB.Connection

```

'warna untuk grafik
Public WarnaJob(50) As Variant
Public WarnaGaris As Variant
Public WarnaDasar As Variant
'Data base
Public nama As String
Public BukaData As Boolean
'Copy file
Declare Function CopyFile Lib "kernel32.dll" Alias "CopyFileA" (ByVal lpExistingFileName As String, ByVal lpNewFileName As String, ByVal bfFailIfExists As Long) As Long
'Data
Public SumJob As Integer
Public SumOp As Integer
Public SumMesin As Integer
Public WaktuProses(50, 50) As Integer
Public Mesin(50, 50) As Integer
Public D(50) As Integer
Public WaktuMesin(50) As Integer
Public WaktuMesinTemp(50) As Integer
Public Cj(50) As Integer
Public Cjtemp(50) As Integer
Public posisi(50) As Integer
Public positemp(50) As Integer
Public b1, b2 As Long
Public a(1, 50, 50) As Integer
Public Konter1, Konter2 As Integer
Public MaxIterasi As Integer
Public MaxSejarah As Integer
Public a1(1, 50, 50) As Integer
Public a2(1, 50, 50) As Integer
Public a3(1, 50, 50) As Integer

```

Function Hitung()

```

Dim i As Integer
b1 = 0
b2 = 0
For i = 1 To SumJob
    If a(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a(1, i, SumOp)) * Konter2
    If a(1, i, SumOp) > D(i) Then b2 = b2 + (a(1, i, SumOp) - D(i)) * Konter1
Next i
Hitung = b1 + b2

```

End Function

Function Hitung1()

```

Dim i As Integer
b1 = 0

```

```

b2 = 0
For i = 1 To SumJob
    If a1(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a1(1, i, SumOp)) * Konter2
    If a1(1, i, SumOp) > D(i) Then b2 = b2 + (a1(1, i, SumOp) - D(i)) * Konter1
Next i
Hitung1 = b1 + b2

```

End Function

Function Hitung2()

```

Dim i As Integer
b1 = 0
b2 = 0
For i = 1 To SumJob
    If a2(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a2(1, i, SumOp)) * Konter2
    If a2(1, i, SumOp) > D(i) Then b2 = b2 + (a2(1, i, SumOp) - D(i)) * Konter1
Next i
Hitung2 = b1 + b2

```

End Function

Function Hitung3()

```

Dim i As Integer
b1 = 0
b2 = 0
For i = 1 To SumJob
    If a3(1, i, SumOp) < D(i) Then b1 = b1 + (D(i) - a3(1, i, SumOp)) * Konter2
    If a3(1, i, SumOp) > D(i) Then b2 = b2 + (a3(1, i, SumOp) - D(i)) * Konter1
Next i
Hitung3 = b1 + b2

```

End Function

Sub SetNilaiNull()

```

Dim i, j As Integer
For i = 1 To SumMesin
    WaktuMesin(i) = 0
Next i
For i = 1 To SumJob
    Cj(i) = 0
    posisi(i) = 1
    For j = 1 To SumOp
        a(0, i, j) = 0
        a(1, i, j) = 0
    Next j
Next i

```

End Sub

Sub ShowDataFinal(urutan, k, judul, metode)

```

Dim i, j As Integer
k = k + 1
Hitung
Form7.Text1(urutan).Text = b1 + b2
Dim rs As ADODB.Recordset
Dim strSQL As String
strSQL = "select * from hasil"
Set rs = New ADODB.Recordset
rs.Open strSQL, con, adOpenKeyset
For i = 1 To SumJob
    For j = 1 To SumOp
        strSQL = "update hasil " & _
            "set awal=" & Str(a(0, i, j)) & ", akhir=" & Str(a(1, i, j)) & " where (job=" & i & " and op=" & j & " and Urut=" &
            urutan & ")"
        con.Execute strSQL
        rs.Requery
    Next j
Next i
Dim G As Form9
Set G = New Form9

```

G.Caption = judul

G.Show

End Sub

Function ProsesForward(k, wk)

Dim i As Integer

wk = 10000

For i = 1 To SumJob

 If Cj(i) < WaktuMesin(Mesin(i, posisi(i))) Then

 Cj(i) = WaktuMesin(Mesin(i, posisi(i)))

 End If

 Cjtemp(i) = Cj(i)

 posisitemp(i) = posisi(i)

Next i

'cek Cj yang terkecil

For i = 1 To SumJob

 If posisi(i) <= SumOp Then

 If wk > Cj(i) Then wk = Cj(i)

 End If

Next i

ProsesForward = wk

End Function

'due date

Sub F_1()

Dim i, j, k, wk As Integer

Dim cek, Jalan As Boolean

SetNilaiNull

cek = True

k = 0

Do While cek = True

 k = k + 1

 wk = ProsesForward(k, wk)

 For i = 1 To SumJob

 If posisi(i) <= SumOp And wk = Cj(i) Then

 'cek ada mesin yang sama

 Jalan = True

 For j = 1 To SumJob

 If i <> j And posisi(j) <= SumOp And wk = Cj(j) Then

 If Mesin(i, posisi(i)) = Mesin(j, posisi(j)) And D(i) > D(j) Then

 Jalan = False

 End If

 If Mesin(i, posisi(i)) = Mesin(j, posisi(j)) And D(i) = D(j) And i < j Then

 Jalan = False

 End If

 End If

 Next j

 If Jalan = True Then

 a(0, i, posisi(i)) = Cj(i)

 a(1, i, posisi(i)) = Cj(i) + WaktuProses(i, posisi(i))

 Cjtemp(i) = Cjtemp(i) + WaktuProses(i, posisi(i))

 WaktuMesin(Mesin(i, posisi(i))) = a(1, i, posisi(i))

 posisitemp(i) = posisitemp(i) + 1

 End If

End If

Next i

cek = SalinData1(cek)

Loop

Call ShowDataFinal(1, k, "Forward -- Earliest Due Date", False)

End Sub

'short prosesing time

Sub F_2()

Dim i, j, k, wk As Integer

Dim cek, Jalan As Boolean

```

SetNilaiNull
cek = True
k = 0
Do While cek = True
    k = k + 1
    wk = ProsesForward(k, wk)
    For i = 1 To SumJob
        If posisi(i) <= SumOp And wk = Cj(i) Then
            'cek ada mesin yang sama
            Jalan = True
            For j = 1 To SumJob
                If i <> j And posisi(j) <= SumOp And wk = Cj(j) Then
                    If Mesin(i, posisi(i)) = Mesin(j, posisi(j)) And WaktuProses(i, posisi(i)) > WaktuProses(j, posisi(j)) Then
                        Jalan = False
                    End If
                    If Mesin(i, posisi(i)) = Mesin(j, posisi(j)) And WaktuProses(i, posisi(i)) = WaktuProses(j, posisi(j)) And i < j
Then
                        Jalan = False
                    End If
                End If
            Next j
            If Jalan = True Then
                a(0, i, posisi(i)) = Cj(i)
                a(1, i, posisi(i)) = Cj(i) + WaktuProses(i, posisi(i))
                Cjtemp(i) = Cjtemp(i) + WaktuProses(i, posisi(i))
                WaktuMesin(Mesin(i, posisi(i))) = a(1, i, posisi(i))
                posisitemp(i) = posisitemp(i) + 1
            End If
        End If
    Next i
    cek = SalinData1(cek)
Loop
Call ShowDataFinal(2, k, "Forward -- Shortest Processing Time", False)
End Sub

```

'critical ratio

Sub F 3()

```

Dim i, j, k, wk As Integer
Dim cek, Jalan As Boolean
SetNilaiNull
cek = True
k = 0
Do While cek = True
    k = k + 1
    wk = ProsesForward(k, wk)
    For i = 1 To SumJob
        If posisi(i) <= SumOp And wk = Cj(i) Then
            'cek ada mesin yang sama
            Jalan = True
            For j = 1 To SumJob
                If i <> j And posisi(j) <= SumOp And wk = Cj(j) Then
                    If Mesin(i, posisi(i)) = Mesin(j, posisi(j)) Then
                        If posisi(i) < SumOp And posisi(j) < SumOp Then
                            If (D(i) - Cj(i)) / (SumOp - posisi(i)) > (D(j) - Cj(j)) / (SumOp - posisi(j)) Then Jalan = False
                            If (D(i) - Cj(i)) / (SumOp - posisi(i)) = (D(j) - Cj(j)) / (SumOp - posisi(j)) And i < j Then Jalan = False
                        Else
                            If posisi(i) = SumOp And posisi(j) = SumOp Then
                                If D(i) - Cj(i) < D(j) - Cj(j) Then Jalan = False
                                If D(i) - Cj(i) = D(j) - Cj(j) And i < j Then Jalan = False
                            Else
                                If posisi(i) = SumOp Then Jalan = False
                            End If
                        End If
                    End If
                End If
            Next j
            If Jalan = True Then
                a(0, i, posisi(i)) = Cj(i)

```

```

        a(1, i, posisi(i)) = Cj(i) + WaktuProses(i, posisi(i))
        Cjtemp(i) = Cjtemp(i) + WaktuProses(i, posisi(i))
        WaktuMesin(Mesin(i, posisi(i))) = a(1, i, posisi(i))
        posisitemp(i) = posisitemp(i) + 1
    End If
End If
Next i
cek = SalinData1(cek)
Loop
Call ShowDataFinal(3, k, "Forward -- S / O P N", False)
End Sub

```

Source: Code Module2 :

Option Explicit

Dim CekBukaData As Boolean

Function OpenProject(nama As String) As Boolean

```

    On Error GoTo GAGAL_OPEN
    Set con = New ADODB.Connection
    con.CursorLocation = adUseClient
    con.Open "Provider=Microsoft.Jet.OLEDB.4.0;Data Source=" & App.Path & "\save\" & nama & ".User
    Id=admin;?assword=;"

```

```

    CekBukaData = True

```

```

    OpenProject = True

```

```

Exit Function

```

GAGAL_OPEN:

```

    MsgBox "Project Tidak Ditemukan", vbOKOnly + vbInformation

```

```

    CekBukaData = False

```

```

    OpenProject = False

```

End Function

Source: Code Module3 :

Option Explicit

' Microsoft Word Aplikasi

Public wordApp As Object

Public pw As Object

Public Kalimat As String

Sub BukaWord()

```

    Set wordApp = CreateObject("Word.Application")

```

```

    With wordApp

```

```

        .Visible = True

```

```

        .Documents.Add

```

```

    End With

```

End Sub

Sub TutupWord()

```

    With wordApp

```

```

        .Quit

```

```

    End With

```

End Sub

Sub KalimatWord()

```

    With wordApp

```

```

        .ActiveDocument.Content.Text = .ActiveDocument.Content.Text & Kalimat

```

```

        Kalimat = ""

```

```

    End With

```

End Sub