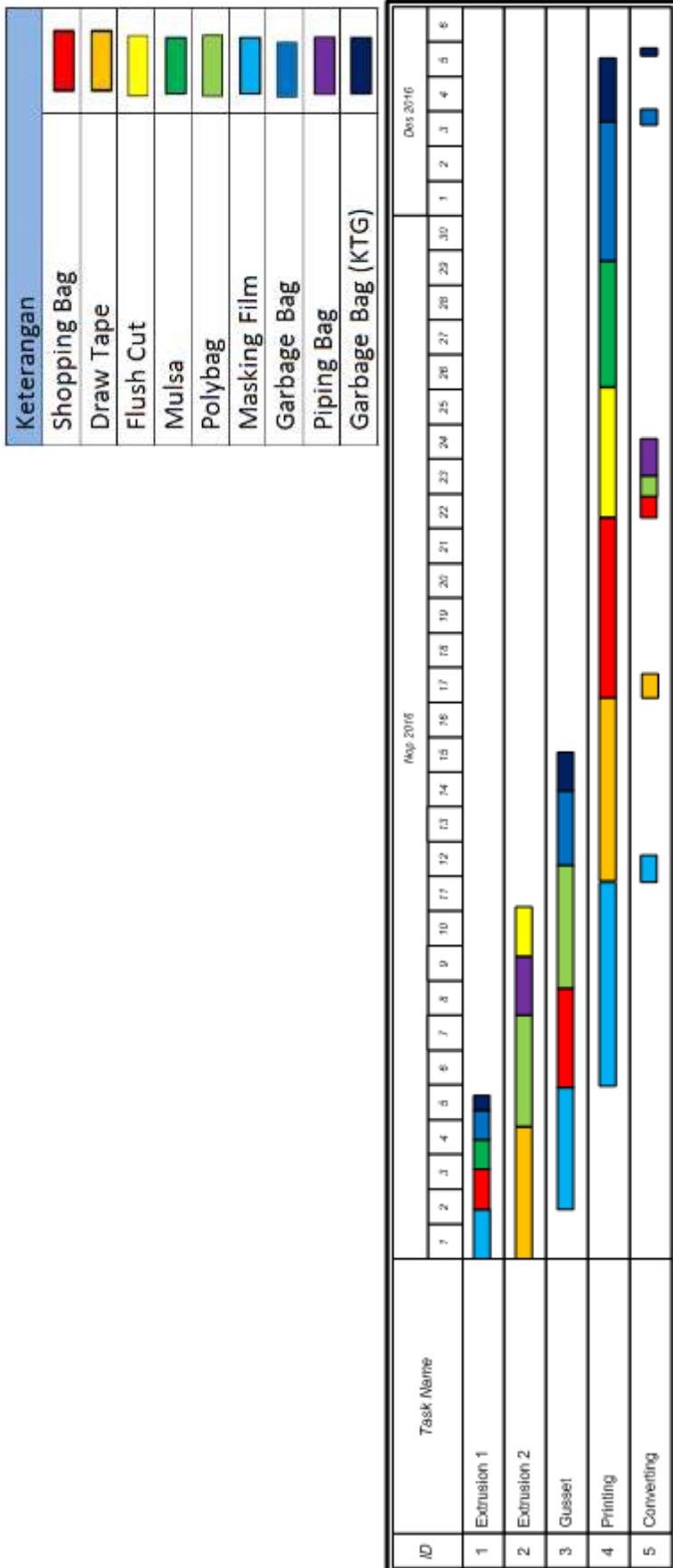


Lampiran 1 *Gantt Chart* Penjadwalan *Existing* Bulan November 2016



Lampiran 2 Formulasi Model *Mixed Integer Linear Programming*

Model:

Title Test Penjadwalan 2;

Sets:

stage/1..5/::

job/1..9/::

process(stage,job):t;

completion(stage,job):c;

predecesor(stage,job,job):y;

Endsets

Data:

!process time;

t=	0	0	0	21.09	0	34.42	27.75	21.09	11.09
	77.75	40.25	34.92	0	92.75	0	0	0	0
	86.12	0	0	0	0	85.42	68.75	52.09	27.09
	0	0	90.28	86.81	128.5	142.4	125	94.7	45.14
	14.66	26.67	0	0	17.5	19.39	15.61	11.83	6.15

!big time value;

u= 9999;

Enddata

!Objective function;

Min=Cmax;

!Subject to;

!all jon on the right stage (1);

@for(stage(i):

@for(job(j):

c(i,j)>=t(i,j));

!add complexion time (2);

@for(stage(i)|i#GT#1:

@for(job(j):

c(i,j)>=c(i-1,j)+t(i,j));

!Enforce sequence constrains for all job on each stage (3);

@for(stage(i):

@for(job(j):

@for(job(k)|j#GT#k:

(c(i,j)-c(i,k))+u*y(i,j,k)>=t(i,j));

!Enforce sequence constrains for all job on each stage (4);

@for(stage(i):

@for(job(j):

@for(job(k)|j#GT#k:

(c(i,k)-c(i,j))+u*(1-y(i,j,k))>=t(i,k));

!Complexion time on last stage (5);

@for(stage(i)|i#EQ#5:

@for(job(j):

cmax>=(c(i,j));

!Constrain completion (6);

```
@for(stage(i):
@for(job(j):
c(i,j)>=0));

!Constrain maximum completion           (7);
cmax>=0;

!Binary constraint                       (8);
@for(stage(i):
@for(job(j):
@for(job(k) | j#GT#k:
@bin(y(i,j,k)))));

!Binary sum                              (9);
@for(stage(i):
@for(job(j):
@for(job(k) | j#GT#k:
y(i,j,k)+y(i,k,j)=1)));

End
```

Lampiran 3 Hasil *Output* Lingo 11.0

Feasible solution found.

Objective value:	733.9200
Objective bound:	618.5257
Infeasibilities:	0.5684342E-12
Extended solver steps:	53786
Total solver iterations:	1861190

Model Title: Test Penjadwalan 2

Variable	Value	Reduced Cost
U	9999.000	0.000000
CMAX	733.9200	0.000000
T(1, 1)	0.000000	0.000000
T(1, 2)	0.000000	0.000000
T(1, 3)	0.000000	0.000000
T(1, 4)	21.09000	0.000000
T(1, 5)	0.000000	0.000000
T(1, 6)	34.42000	0.000000
T(1, 7)	27.75000	0.000000
T(1, 8)	21.09000	0.000000
T(1, 9)	11.09000	0.000000
T(2, 1)	77.75000	0.000000
T(2, 2)	40.25000	0.000000
T(2, 3)	34.92000	0.000000
T(2, 4)	0.000000	0.000000
T(2, 5)	92.75000	0.000000
T(2, 6)	0.000000	0.000000
T(2, 7)	0.000000	0.000000
T(2, 8)	0.000000	0.000000
T(2, 9)	0.000000	0.000000
T(3, 1)	86.12000	0.000000
T(3, 2)	0.000000	0.000000
T(3, 3)	0.000000	0.000000
T(3, 4)	0.000000	0.000000
T(3, 5)	0.000000	0.000000
T(3, 6)	85.42000	0.000000
T(3, 7)	68.75000	0.000000
T(3, 8)	52.09000	0.000000
T(3, 9)	27.09000	0.000000
T(4, 1)	0.000000	0.000000
T(4, 2)	0.000000	0.000000
T(4, 3)	90.28000	0.000000
T(4, 4)	86.81000	0.000000
T(4, 5)	128.5000	0.000000
T(4, 6)	142.4000	0.000000
T(4, 7)	125.0000	0.000000
T(4, 8)	94.70000	0.000000
T(4, 9)	45.14000	0.000000
T(5, 1)	14.66000	0.000000
T(5, 2)	26.67000	0.000000
T(5, 3)	0.000000	0.000000
T(5, 4)	0.000000	0.000000
T(5, 5)	17.50000	0.000000
T(5, 6)	19.39000	0.000000
T(5, 7)	15.61000	0.000000
T(5, 8)	11.83000	0.000000
T(5, 9)	6.150000	0.000000
C(1, 1)	0.000000	1.000000

C(1, 2)	0.000000	0.000000
C(1, 3)	0.000000	0.000000
C(1, 4)	21.09000	0.000000
C(1, 5)	0.000000	0.000000
C(1, 6)	173.7700	0.000000
C(1, 7)	59.93000	0.000000
C(1, 8)	81.02000	0.000000
C(1, 9)	32.18000	0.000000
C(2, 1)	255.9000	0.000000
C(2, 2)	376.2400	0.000000
C(2, 3)	290.8200	0.000000
C(2, 4)	21.09000	0.000000
C(2, 5)	173.7700	0.000000
C(2, 6)	173.7700	0.000000
C(2, 7)	173.7700	0.000000
C(2, 8)	81.02000	0.000000
C(2, 9)	32.18000	0.000000
C(3, 1)	643.6400	0.000000
C(3, 2)	376.2400	0.000000
C(3, 3)	290.8200	0.000000
C(3, 4)	21.09000	0.000000
C(3, 5)	173.7700	0.000000
C(3, 6)	376.2400	0.000000
C(3, 7)	242.5200	0.000000
C(3, 8)	133.1100	0.000000
C(3, 9)	59.27000	0.000000
C(4, 1)	643.6400	0.000000
C(4, 2)	376.2400	0.000000
C(4, 3)	733.9200	0.000000
C(4, 4)	107.9000	0.000000
C(4, 5)	376.2400	0.000000
C(4, 6)	518.6400	0.000000
C(4, 7)	643.6400	0.000000
C(4, 8)	247.7400	0.000000
C(4, 9)	153.0400	0.000000
C(5, 1)	733.9200	0.000000
C(5, 2)	402.9100	0.000000
C(5, 3)	733.9200	0.000000
C(5, 4)	659.2500	0.000000
C(5, 5)	676.7500	0.000000
C(5, 6)	538.0300	0.000000
C(5, 7)	659.2500	0.000000
C(5, 8)	549.8600	0.000000
C(5, 9)	556.0100	0.000000
Y(1, 1, 1)	0.000000	0.000000
Y(1, 1, 2)	1.000000	0.000000
Y(1, 1, 3)	1.000000	0.000000
Y(1, 1, 4)	1.000000	0.000000
Y(1, 1, 5)	1.000000	0.000000
Y(1, 1, 6)	1.000000	0.000000
Y(1, 1, 7)	1.000000	0.000000
Y(1, 1, 8)	1.000000	0.000000
Y(1, 1, 9)	1.000000	0.000000
Y(1, 2, 1)	0.000000	0.000000
Y(1, 2, 2)	0.000000	0.000000
Y(1, 2, 3)	1.000000	0.000000
Y(1, 2, 4)	1.000000	0.000000
Y(1, 2, 5)	1.000000	0.000000
Y(1, 2, 6)	1.000000	0.000000
Y(1, 2, 7)	1.000000	0.000000
Y(1, 2, 8)	1.000000	0.000000

Y(1, 2, 9)	1.000000	0.000000
Y(1, 3, 1)	0.000000	0.000000
Y(1, 3, 2)	0.000000	0.000000
Y(1, 3, 3)	0.000000	0.000000
Y(1, 3, 4)	1.000000	0.000000
Y(1, 3, 5)	1.000000	0.000000
Y(1, 3, 6)	1.000000	0.000000
Y(1, 3, 7)	1.000000	0.000000
Y(1, 3, 8)	1.000000	0.000000
Y(1, 3, 9)	1.000000	0.000000
Y(1, 4, 1)	0.000000	-9999.000
Y(1, 4, 2)	0.000000	0.000000
Y(1, 4, 3)	0.000000	0.000000
Y(1, 4, 4)	0.000000	0.000000
Y(1, 4, 5)	0.000000	0.000000
Y(1, 4, 6)	1.000000	0.000000
Y(1, 4, 7)	1.000000	0.000000
Y(1, 4, 8)	1.000000	0.000000
Y(1, 4, 9)	1.000000	0.000000
Y(1, 5, 1)	0.000000	0.000000
Y(1, 5, 2)	0.000000	0.000000
Y(1, 5, 3)	0.000000	0.000000
Y(1, 5, 4)	1.000000	0.000000
Y(1, 5, 5)	0.000000	0.000000
Y(1, 5, 6)	1.000000	0.000000
Y(1, 5, 7)	1.000000	0.000000
Y(1, 5, 8)	1.000000	0.000000
Y(1, 5, 9)	1.000000	0.000000
Y(1, 6, 1)	0.000000	0.000000
Y(1, 6, 2)	0.000000	0.000000
Y(1, 6, 3)	0.000000	0.000000
Y(1, 6, 4)	0.000000	0.000000
Y(1, 6, 5)	0.000000	0.000000
Y(1, 6, 6)	0.000000	0.000000
Y(1, 6, 7)	0.000000	0.000000
Y(1, 6, 8)	0.000000	0.000000
Y(1, 6, 9)	0.000000	0.000000
Y(1, 7, 1)	0.000000	0.000000
Y(1, 7, 2)	0.000000	0.000000
Y(1, 7, 3)	0.000000	0.000000
Y(1, 7, 4)	0.000000	0.000000
Y(1, 7, 5)	0.000000	0.000000
Y(1, 7, 6)	1.000000	0.000000
Y(1, 7, 7)	0.000000	0.000000
Y(1, 7, 8)	1.000000	0.000000
Y(1, 7, 9)	0.000000	0.000000
Y(1, 8, 1)	0.000000	0.000000
Y(1, 8, 2)	0.000000	0.000000
Y(1, 8, 3)	0.000000	0.000000
Y(1, 8, 4)	0.000000	0.000000
Y(1, 8, 5)	0.000000	0.000000
Y(1, 8, 6)	1.000000	0.000000
Y(1, 8, 7)	0.000000	0.000000
Y(1, 8, 8)	0.000000	0.000000
Y(1, 8, 9)	0.000000	0.000000
Y(1, 9, 1)	0.000000	0.000000
Y(1, 9, 2)	0.000000	0.000000
Y(1, 9, 3)	0.000000	0.000000
Y(1, 9, 4)	0.000000	0.000000
Y(1, 9, 5)	0.000000	0.000000
Y(1, 9, 6)	1.000000	0.000000

Y(1, 9, 7)	1.000000	0.000000
Y(1, 9, 8)	1.000000	0.000000
Y(1, 9, 9)	0.000000	0.000000
Y(2, 1, 1)	0.000000	0.000000
Y(2, 1, 2)	1.000000	0.000000
Y(2, 1, 3)	1.000000	0.000000
Y(2, 1, 4)	0.000000	0.000000
Y(2, 1, 5)	0.000000	0.000000
Y(2, 1, 6)	0.000000	0.000000
Y(2, 1, 7)	0.000000	0.000000
Y(2, 1, 8)	0.000000	0.000000
Y(2, 1, 9)	0.000000	0.000000
Y(2, 2, 1)	0.000000	0.000000
Y(2, 2, 2)	0.000000	0.000000
Y(2, 2, 3)	0.000000	0.000000
Y(2, 2, 4)	0.000000	0.000000
Y(2, 2, 5)	0.000000	0.000000
Y(2, 2, 6)	0.000000	0.000000
Y(2, 2, 7)	0.000000	0.000000
Y(2, 2, 8)	0.000000	0.000000
Y(2, 2, 9)	0.000000	0.000000
Y(2, 3, 1)	0.000000	0.000000
Y(2, 3, 2)	1.000000	0.000000
Y(2, 3, 3)	0.000000	0.000000
Y(2, 3, 4)	0.000000	0.000000
Y(2, 3, 5)	0.000000	0.000000
Y(2, 3, 6)	0.000000	0.000000
Y(2, 3, 7)	0.000000	0.000000
Y(2, 3, 8)	0.000000	0.000000
Y(2, 3, 9)	0.000000	0.000000
Y(2, 4, 1)	1.000000	0.000000
Y(2, 4, 2)	1.000000	0.000000
Y(2, 4, 3)	1.000000	0.000000
Y(2, 4, 4)	0.000000	0.000000
Y(2, 4, 5)	1.000000	0.000000
Y(2, 4, 6)	1.000000	0.000000
Y(2, 4, 7)	1.000000	0.000000
Y(2, 4, 8)	1.000000	0.000000
Y(2, 4, 9)	1.000000	0.000000
Y(2, 5, 1)	1.000000	0.000000
Y(2, 5, 2)	1.000000	0.000000
Y(2, 5, 3)	1.000000	0.000000
Y(2, 5, 4)	0.000000	0.000000
Y(2, 5, 5)	0.000000	0.000000
Y(2, 5, 6)	1.000000	0.000000
Y(2, 5, 7)	1.000000	0.000000
Y(2, 5, 8)	0.000000	0.000000
Y(2, 5, 9)	0.000000	0.000000
Y(2, 6, 1)	1.000000	0.000000
Y(2, 6, 2)	1.000000	0.000000
Y(2, 6, 3)	1.000000	0.000000
Y(2, 6, 4)	0.000000	0.000000
Y(2, 6, 5)	0.000000	0.000000
Y(2, 6, 6)	0.000000	0.000000
Y(2, 6, 7)	1.000000	0.000000
Y(2, 6, 8)	0.000000	0.000000
Y(2, 6, 9)	0.000000	0.000000
Y(2, 7, 1)	1.000000	0.000000
Y(2, 7, 2)	1.000000	0.000000
Y(2, 7, 3)	1.000000	0.000000
Y(2, 7, 4)	0.000000	0.000000

Y(2, 7, 5)	0.000000	0.000000
Y(2, 7, 6)	0.000000	0.000000
Y(2, 7, 7)	0.000000	0.000000
Y(2, 7, 8)	0.000000	0.000000
Y(2, 7, 9)	0.000000	0.000000
Y(2, 8, 1)	1.000000	0.000000
Y(2, 8, 2)	1.000000	0.000000
Y(2, 8, 3)	1.000000	0.000000
Y(2, 8, 4)	0.000000	0.000000
Y(2, 8, 5)	1.000000	0.000000
Y(2, 8, 6)	1.000000	0.000000
Y(2, 8, 7)	1.000000	0.000000
Y(2, 8, 8)	0.000000	0.000000
Y(2, 8, 9)	0.000000	0.000000
Y(2, 9, 1)	1.000000	0.000000
Y(2, 9, 2)	1.000000	0.000000
Y(2, 9, 3)	1.000000	0.000000
Y(2, 9, 4)	0.000000	0.000000
Y(2, 9, 5)	1.000000	0.000000
Y(2, 9, 6)	1.000000	0.000000
Y(2, 9, 7)	1.000000	0.000000
Y(2, 9, 8)	1.000000	0.000000
Y(2, 9, 9)	0.000000	0.000000
Y(3, 1, 1)	0.000000	0.000000
Y(3, 1, 2)	0.000000	0.000000
Y(3, 1, 3)	0.000000	0.000000
Y(3, 1, 4)	0.000000	0.000000
Y(3, 1, 5)	0.000000	0.000000
Y(3, 1, 6)	0.000000	0.000000
Y(3, 1, 7)	0.000000	0.000000
Y(3, 1, 8)	0.000000	0.000000
Y(3, 1, 9)	0.000000	0.000000
Y(3, 2, 1)	1.000000	0.000000
Y(3, 2, 2)	0.000000	0.000000
Y(3, 2, 3)	0.000000	0.000000
Y(3, 2, 4)	0.000000	0.000000
Y(3, 2, 5)	0.000000	0.000000
Y(3, 2, 6)	0.000000	0.000000
Y(3, 2, 7)	0.000000	0.000000
Y(3, 2, 8)	0.000000	0.000000
Y(3, 2, 9)	0.000000	0.000000
Y(3, 3, 1)	1.000000	0.000000
Y(3, 3, 2)	1.000000	0.000000
Y(3, 3, 3)	0.000000	0.000000
Y(3, 3, 4)	0.000000	0.000000
Y(3, 3, 5)	0.000000	0.000000
Y(3, 3, 6)	1.000000	0.000000
Y(3, 3, 7)	0.000000	0.000000
Y(3, 3, 8)	0.000000	0.000000
Y(3, 3, 9)	0.000000	0.000000
Y(3, 4, 1)	1.000000	0.000000
Y(3, 4, 2)	1.000000	0.000000
Y(3, 4, 3)	1.000000	0.000000
Y(3, 4, 4)	0.000000	0.000000
Y(3, 4, 5)	1.000000	0.000000
Y(3, 4, 6)	1.000000	0.000000
Y(3, 4, 7)	1.000000	0.000000
Y(3, 4, 8)	1.000000	0.000000
Y(3, 4, 9)	1.000000	0.000000
Y(3, 5, 1)	1.000000	0.000000
Y(3, 5, 2)	1.000000	0.000000

Y(3, 5, 3)	1.000000	0.000000
Y(3, 5, 4)	0.000000	0.000000
Y(3, 5, 5)	0.000000	0.000000
Y(3, 5, 6)	1.000000	0.000000
Y(3, 5, 7)	1.000000	0.000000
Y(3, 5, 8)	0.000000	0.000000
Y(3, 5, 9)	0.000000	0.000000
Y(3, 6, 1)	1.000000	0.000000
Y(3, 6, 2)	1.000000	0.000000
Y(3, 6, 3)	0.000000	0.000000
Y(3, 6, 4)	0.000000	0.000000
Y(3, 6, 5)	0.000000	0.000000
Y(3, 6, 6)	0.000000	0.000000
Y(3, 6, 7)	0.000000	0.000000
Y(3, 6, 8)	0.000000	0.000000
Y(3, 6, 9)	0.000000	0.000000
Y(3, 7, 1)	1.000000	0.000000
Y(3, 7, 2)	1.000000	0.000000
Y(3, 7, 3)	1.000000	0.000000
Y(3, 7, 4)	0.000000	0.000000
Y(3, 7, 5)	0.000000	0.000000
Y(3, 7, 6)	1.000000	0.000000
Y(3, 7, 7)	0.000000	0.000000
Y(3, 7, 8)	0.000000	0.000000
Y(3, 7, 9)	0.000000	0.000000
Y(3, 8, 1)	1.000000	0.000000
Y(3, 8, 2)	1.000000	0.000000
Y(3, 8, 3)	1.000000	0.000000
Y(3, 8, 4)	0.000000	0.000000
Y(3, 8, 5)	1.000000	0.000000
Y(3, 8, 6)	1.000000	0.000000
Y(3, 8, 7)	1.000000	0.000000
Y(3, 8, 8)	0.000000	0.000000
Y(3, 8, 9)	0.000000	0.000000
Y(3, 9, 1)	1.000000	0.000000
Y(3, 9, 2)	1.000000	0.000000
Y(3, 9, 3)	1.000000	0.000000
Y(3, 9, 4)	0.000000	0.000000
Y(3, 9, 5)	1.000000	0.000000
Y(3, 9, 6)	1.000000	0.000000
Y(3, 9, 7)	1.000000	0.000000
Y(3, 9, 8)	1.000000	0.000000
Y(3, 9, 9)	0.000000	0.000000
Y(4, 1, 1)	0.000000	0.000000
Y(4, 1, 2)	0.000000	0.000000
Y(4, 1, 3)	1.000000	0.000000
Y(4, 1, 4)	0.000000	0.000000
Y(4, 1, 5)	0.000000	0.000000
Y(4, 1, 6)	0.000000	0.000000
Y(4, 1, 7)	0.000000	0.000000
Y(4, 1, 8)	0.000000	0.000000
Y(4, 1, 9)	0.000000	0.000000
Y(4, 2, 1)	1.000000	0.000000
Y(4, 2, 2)	0.000000	0.000000
Y(4, 2, 3)	1.000000	0.000000
Y(4, 2, 4)	0.000000	0.000000
Y(4, 2, 5)	0.000000	0.000000
Y(4, 2, 6)	1.000000	0.000000
Y(4, 2, 7)	1.000000	0.000000
Y(4, 2, 8)	0.000000	0.000000
Y(4, 2, 9)	0.000000	0.000000

Y(4, 3, 1)	0.000000	0.000000
Y(4, 3, 2)	0.000000	0.000000
Y(4, 3, 3)	0.000000	0.000000
Y(4, 3, 4)	0.000000	0.000000
Y(4, 3, 5)	0.000000	0.000000
Y(4, 3, 6)	0.000000	0.000000
Y(4, 3, 7)	0.000000	0.000000
Y(4, 3, 8)	0.000000	0.000000
Y(4, 3, 9)	0.000000	0.000000
Y(4, 4, 1)	1.000000	0.000000
Y(4, 4, 2)	1.000000	0.000000
Y(4, 4, 3)	1.000000	0.000000
Y(4, 4, 4)	0.000000	0.000000
Y(4, 4, 5)	1.000000	0.000000
Y(4, 4, 6)	1.000000	0.000000
Y(4, 4, 7)	1.000000	0.000000
Y(4, 4, 8)	1.000000	0.000000
Y(4, 4, 9)	1.000000	0.000000
Y(4, 5, 1)	1.000000	0.000000
Y(4, 5, 2)	1.000000	0.000000
Y(4, 5, 3)	1.000000	0.000000
Y(4, 5, 4)	0.000000	0.000000
Y(4, 5, 5)	0.000000	0.000000
Y(4, 5, 6)	1.000000	0.000000
Y(4, 5, 7)	1.000000	0.000000
Y(4, 5, 8)	0.000000	0.000000
Y(4, 5, 9)	0.000000	0.000000
Y(4, 6, 1)	1.000000	0.000000
Y(4, 6, 2)	0.000000	0.000000
Y(4, 6, 3)	1.000000	0.000000
Y(4, 6, 4)	0.000000	0.000000
Y(4, 6, 5)	0.000000	-9999.000
Y(4, 6, 6)	0.000000	0.000000
Y(4, 6, 7)	1.000000	0.000000
Y(4, 6, 8)	0.000000	0.000000
Y(4, 6, 9)	0.000000	0.000000
Y(4, 7, 1)	1.000000	0.000000
Y(4, 7, 2)	0.000000	0.000000
Y(4, 7, 3)	1.000000	9999.000
Y(4, 7, 4)	0.000000	0.000000
Y(4, 7, 5)	0.000000	0.000000
Y(4, 7, 6)	0.000000	-9999.000
Y(4, 7, 7)	0.000000	0.000000
Y(4, 7, 8)	0.000000	0.000000
Y(4, 7, 9)	0.000000	0.000000
Y(4, 8, 1)	1.000000	0.000000
Y(4, 8, 2)	1.000000	0.000000
Y(4, 8, 3)	1.000000	0.000000
Y(4, 8, 4)	0.000000	0.000000
Y(4, 8, 5)	1.000000	9999.000
Y(4, 8, 6)	1.000000	0.000000
Y(4, 8, 7)	1.000000	0.000000
Y(4, 8, 8)	0.000000	0.000000
Y(4, 8, 9)	0.000000	0.000000
Y(4, 9, 1)	1.000000	0.000000
Y(4, 9, 2)	1.000000	0.000000
Y(4, 9, 3)	1.000000	0.000000
Y(4, 9, 4)	0.000000	-9999.000
Y(4, 9, 5)	1.000000	0.000000
Y(4, 9, 6)	1.000000	0.000000
Y(4, 9, 7)	1.000000	0.000000

Y(4, 9, 8)	1.000000	9999.000
Y(4, 9, 9)	0.000000	0.000000
Y(5, 1, 1)	0.000000	0.000000
Y(5, 1, 2)	0.000000	0.000000
Y(5, 1, 3)	1.000000	0.000000
Y(5, 1, 4)	0.000000	0.000000
Y(5, 1, 5)	0.000000	0.000000
Y(5, 1, 6)	0.000000	0.000000
Y(5, 1, 7)	0.000000	0.000000
Y(5, 1, 8)	0.000000	0.000000
Y(5, 1, 9)	0.000000	0.000000
Y(5, 2, 1)	1.000000	0.000000
Y(5, 2, 2)	0.000000	0.000000
Y(5, 2, 3)	1.000000	0.000000
Y(5, 2, 4)	1.000000	0.000000
Y(5, 2, 5)	1.000000	0.000000
Y(5, 2, 6)	1.000000	0.000000
Y(5, 2, 7)	1.000000	0.000000
Y(5, 2, 8)	1.000000	0.000000
Y(5, 2, 9)	1.000000	0.000000
Y(5, 3, 1)	0.000000	0.000000
Y(5, 3, 2)	0.000000	0.000000
Y(5, 3, 3)	0.000000	0.000000
Y(5, 3, 4)	0.000000	0.000000
Y(5, 3, 5)	0.000000	0.000000
Y(5, 3, 6)	0.000000	0.000000
Y(5, 3, 7)	0.000000	0.000000
Y(5, 3, 8)	0.000000	0.000000
Y(5, 3, 9)	0.000000	0.000000
Y(5, 4, 1)	1.000000	0.000000
Y(5, 4, 2)	0.000000	0.000000
Y(5, 4, 3)	1.000000	0.000000
Y(5, 4, 4)	0.000000	0.000000
Y(5, 4, 5)	1.000000	0.000000
Y(5, 4, 6)	0.000000	0.000000
Y(5, 4, 7)	0.000000	0.000000
Y(5, 4, 8)	0.000000	0.000000
Y(5, 4, 9)	0.000000	0.000000
Y(5, 5, 1)	1.000000	0.000000
Y(5, 5, 2)	0.000000	0.000000
Y(5, 5, 3)	1.000000	0.000000
Y(5, 5, 4)	0.000000	0.000000
Y(5, 5, 5)	0.000000	0.000000
Y(5, 5, 6)	0.000000	0.000000
Y(5, 5, 7)	0.000000	0.000000
Y(5, 5, 8)	0.000000	0.000000
Y(5, 5, 9)	0.000000	0.000000
Y(5, 6, 1)	1.000000	0.000000
Y(5, 6, 2)	0.000000	0.000000
Y(5, 6, 3)	1.000000	0.000000
Y(5, 6, 4)	1.000000	0.000000
Y(5, 6, 5)	1.000000	0.000000
Y(5, 6, 6)	0.000000	0.000000
Y(5, 6, 7)	1.000000	0.000000
Y(5, 6, 8)	1.000000	0.000000
Y(5, 6, 9)	1.000000	0.000000
Y(5, 7, 1)	1.000000	0.000000
Y(5, 7, 2)	0.000000	0.000000
Y(5, 7, 3)	1.000000	0.000000
Y(5, 7, 4)	1.000000	0.000000
Y(5, 7, 5)	1.000000	0.000000

Y(5, 7, 6)	0.000000	0.000000
Y(5, 7, 7)	0.000000	0.000000
Y(5, 7, 8)	0.000000	0.000000
Y(5, 7, 9)	0.000000	0.000000
Y(5, 8, 1)	1.000000	0.000000
Y(5, 8, 2)	0.000000	0.000000
Y(5, 8, 3)	1.000000	0.000000
Y(5, 8, 4)	1.000000	0.000000
Y(5, 8, 5)	1.000000	0.000000
Y(5, 8, 6)	0.000000	0.000000
Y(5, 8, 7)	1.000000	0.000000
Y(5, 8, 8)	0.000000	0.000000
Y(5, 8, 9)	1.000000	0.000000
Y(5, 9, 1)	1.000000	0.000000
Y(5, 9, 2)	0.000000	0.000000
Y(5, 9, 3)	1.000000	0.000000
Y(5, 9, 4)	1.000000	0.000000
Y(5, 9, 5)	1.000000	0.000000
Y(5, 9, 6)	0.000000	0.000000
Y(5, 9, 7)	1.000000	0.000000
Y(5, 9, 8)	0.000000	0.000000
Y(5, 9, 9)	0.000000	0.000000

Row	Slack or Surplus	Dual Price
1	733.9200	-1.000000
2	0.000000	0.000000
3	0.000000	0.000000
4	0.000000	0.000000
5	0.000000	0.000000
6	0.000000	0.000000
7	139.3500	0.000000
8	32.18000	0.000000
9	59.93000	0.000000
10	21.09000	0.000000
11	178.1500	0.000000
12	335.9900	0.000000
13	255.9000	0.000000
14	21.09000	0.000000
15	81.02000	0.000000
16	173.7700	0.000000
17	173.7700	0.000000
18	81.02000	0.000000
19	32.18000	0.000000
20	557.5200	0.000000
21	376.2400	0.000000
22	290.8200	0.000000
23	21.09000	0.000000
24	173.7700	0.000000
25	290.8200	0.000000
26	173.7700	0.000000
27	81.02000	0.000000
28	32.18000	0.000000
29	643.6400	0.000000
30	376.2400	0.000000
31	643.6400	0.000000
32	21.09000	0.000000
33	247.7400	0.000000
34	376.2400	0.000000
35	518.6400	0.000000
36	153.0400	0.000000
37	107.9000	0.000000

38	719.2600	0.000000
39	376.2400	0.000000
40	733.9200	0.000000
41	659.2500	0.000000
42	659.2500	0.000000
43	518.6400	0.000000
44	643.6400	0.000000
45	538.0300	0.000000
46	549.8600	0.000000
47	178.1500	0.000000
48	335.9900	0.000000
49	255.9000	0.000000
50	0.000000	-1.000000
51	81.02000	0.000000
52	0.000000	0.000000
53	113.8400	0.000000
54	0.000000	0.000000
55	0.000000	0.000000
56	301.6200	0.000000
57	0.000000	0.000000
58	0.000000	0.000000
59	0.000000	-1.000000
60	0.000000	0.000000
61	117.0500	0.000000
62	0.000000	0.000000
63	0.000000	0.000000
64	0.000000	0.000000
65	0.000000	0.000000
66	0.000000	0.000000
67	352.8200	0.000000
68	0.000000	-1.000000
69	73.97000	0.000000
70	0.000000	0.000000
71	276.1200	0.000000
72	19.93000	0.000000
73	48.63000	0.000000
74	75.62000	0.000000
75	0.000000	0.000000
76	0.000000	-1.000000
77	551.3500	0.000000
78	283.0100	0.000000
79	0.000000	0.000000
80	0.000000	0.000000
81	290.2900	0.000000
82	396.8200	0.000000
83	0.000000	0.000000
84	0.000000	0.000000
85	0.000000	0.000000
86	0.000000	-1.000000
87	0.000000	0.000000
88	0.000000	0.000000
89	0.000000	0.000000
90	0.000000	0.000000
91	0.000000	0.000000
92	9977.910	0.000000
93	139.3500	0.000000
94	139.3500	0.000000
95	139.3500	0.000000
96	118.2600	0.000000
97	139.3500	0.000000
98	32.18000	0.000000

99	32.18000	0.000000
100	32.18000	0.000000
101	11.09000	0.000000
102	32.18000	0.000000
103	9857.410	0.000000
104	59.93000	0.000000
105	59.93000	0.000000
106	59.93000	0.000000
107	38.84000	0.000000
108	59.93000	0.000000
109	9885.160	0.000000
110	0.000000	0.000000
111	21.09000	0.000000
112	21.09000	0.000000
113	21.09000	0.000000
114	0.000000	0.000000
115	21.09000	0.000000
116	9846.320	0.000000
117	9960.160	0.000000
118	9939.070	0.000000
119	80.09000	0.000000
120	0.000000	0.000000
121	9878.660	0.000000
122	9764.190	0.000000
123	9643.850	0.000000
124	9729.270	0.000000
125	9824.120	0.000000
126	9703.780	0.000000
127	9789.200	0.000000
128	59.93000	0.000000
129	9916.870	0.000000
130	9796.530	0.000000
131	9881.950	0.000000
132	152.6800	0.000000
133	0.000000	0.000000
134	9916.870	0.000000
135	9796.530	0.000000
136	9881.950	0.000000
137	152.6800	0.000000
138	0.000000	0.000000
139	0.000000	0.000000
140	9824.120	0.000000
141	9703.780	0.000000
142	9789.200	0.000000
143	59.93000	0.000000
144	9906.250	0.000000
145	9906.250	0.000000
146	9906.250	0.000000
147	9775.280	0.000000
148	9654.940	0.000000
149	9740.360	0.000000
150	11.09000	0.000000
151	9857.410	0.000000
152	9857.410	0.000000
153	9857.410	0.000000
154	9950.160	0.000000
155	9731.600	0.000000
156	9646.180	0.000000
157	9913.580	0.000000
158	9376.450	0.000000
159	9643.850	0.000000

160	9729.270	0.000000
161	9529.130	0.000000
162	9796.530	0.000000
163	9881.950	0.000000
164	152.6800	0.000000
165	9646.180	0.000000
166	9913.580	0.000000
167	0.000000	0.000000
168	269.7300	0.000000
169	117.0500	0.000000
170	9529.130	0.000000
171	9796.530	0.000000
172	9881.950	0.000000
173	152.6800	0.000000
174	0.000000	0.000000
175	9796.530	0.000000
176	9436.380	0.000000
177	9703.780	0.000000
178	9789.200	0.000000
179	59.93000	0.000000
180	9906.250	0.000000
181	9703.780	0.000000
182	9837.500	0.000000
183	9387.540	0.000000
184	9654.940	0.000000
185	9740.360	0.000000
186	11.09000	0.000000
187	9857.410	0.000000
188	9654.940	0.000000
189	9788.660	0.000000
190	9898.070	0.000000
191	9731.600	0.000000
192	0.000000	0.000000
193	267.4000	0.000000
194	9376.450	0.000000
195	9643.850	0.000000
196	9286.170	0.000000
197	9603.100	0.000000
198	9870.500	0.000000
199	9512.820	0.000000
200	139.8400	0.000000
201	9731.600	0.000000
202	0.000000	0.000000
203	9641.320	0.000000
204	268.3400	0.000000
205	0.000000	-1.000000
206	9874.000	0.000000
207	142.4000	0.000000
208	9783.720	0.000000
209	410.7400	0.000000
210	142.4000	0.000000
211	0.000000	-1.000000
212	9508.400	0.000000
213	9775.800	0.000000
214	9418.120	0.000000
215	45.14000	0.000000
216	9775.800	0.000000
217	9633.400	0.000000
218	9508.400	0.000000
219	9463.260	0.000000
220	9730.660	0.000000

221	9372.980	0.000000
222	0.000000	-1.000000
223	9730.660	0.000000
224	9588.260	0.000000
225	9463.260	0.000000
226	9859.160	0.000000
227	9641.320	0.000000
228	0.000000	0.000000
229	331.0100	0.000000
230	9924.330	0.000000
231	256.3400	0.000000
232	9924.330	0.000000
233	9924.330	0.000000
234	256.3400	0.000000
235	9924.330	0.000000
236	0.000000	0.000000
237	9783.720	0.000000
238	115.7300	0.000000
239	9783.720	0.000000
240	9858.390	0.000000
241	9840.890	0.000000
242	9908.720	0.000000
243	240.7300	0.000000
244	9908.720	0.000000
245	9983.390	0.000000
246	9965.890	0.000000
247	105.6100	0.000000
248	9803.110	0.000000
249	135.1200	0.000000
250	9803.110	0.000000
251	9877.780	0.000000
252	9860.280	0.000000
253	0.000000	0.000000
254	9877.780	0.000000
255	9814.940	0.000000
256	146.9500	0.000000
257	9814.940	0.000000
258	9889.610	0.000000
259	9872.110	0.000000
260	11.83000	0.000000
261	9889.610	0.000000
262	0.000000	0.000000
263	9999.000	0.000000
264	9999.000	0.000000
265	9999.000	0.000000
266	9977.910	0.000000
267	9977.910	0.000000
268	9977.910	0.000000
269	9999.000	0.000000
270	9999.000	0.000000
271	9999.000	0.000000
272	0.000000	0.000000
273	9825.230	0.000000
274	9825.230	0.000000
275	9825.230	0.000000
276	9825.230	0.000000
277	9825.230	0.000000
278	9939.070	0.000000
279	9939.070	0.000000
280	9939.070	0.000000
281	9939.070	0.000000

282	9939.070	0.000000
283	79.42000	0.000000
284	9917.980	0.000000
285	9917.980	0.000000
286	9917.980	0.000000
287	9917.980	0.000000
288	9917.980	0.000000
289	58.33000	0.000000
290	9950.160	0.000000
291	9966.820	0.000000
292	9966.820	0.000000
293	9966.820	0.000000
294	9966.820	0.000000
295	9966.820	0.000000
296	107.1700	0.000000
297	0.000000	0.000000
298	27.75000	0.000000
299	9800.910	0.000000
300	9886.330	0.000000
301	45.17000	0.000000
302	157.0600	0.000000
303	314.9000	0.000000
304	234.8100	0.000000
305	4.380000	0.000000
306	162.2200	0.000000
307	82.13000	0.000000
308	9846.320	0.000000
309	4.380000	0.000000
310	162.2200	0.000000
311	82.13000	0.000000
312	9846.320	0.000000
313	9906.250	0.000000
314	4.380000	0.000000
315	162.2200	0.000000
316	82.13000	0.000000
317	9846.320	0.000000
318	9906.250	0.000000
319	9999.000	0.000000
320	97.13000	0.000000
321	254.9700	0.000000
322	174.8800	0.000000
323	9939.070	0.000000
324	0.000000	0.000000
325	92.75000	0.000000
326	92.75000	0.000000
327	145.9700	0.000000
328	303.8100	0.000000
329	223.7200	0.000000
330	9987.910	0.000000
331	48.84000	0.000000
332	141.5900	0.000000
333	141.5900	0.000000
334	48.84000	0.000000
335	181.2800	0.000000
336	266.7000	0.000000
337	85.42000	0.000000
338	536.4300	0.000000
339	355.1500	0.000000
340	269.7300	0.000000
341	383.7500	0.000000
342	202.4700	0.000000

343	117.0500	0.000000
344	9846.320	0.000000
345	181.2800	0.000000
346	0.000000	0.000000
347	9913.580	0.000000
348	9643.850	0.000000
349	9796.530	0.000000
350	315.0000	0.000000
351	133.7200	0.000000
352	48.30000	0.000000
353	9777.570	0.000000
354	9930.250	0.000000
355	48.30000	0.000000
356	424.4100	0.000000
357	243.1300	0.000000
358	157.7100	0.000000
359	9886.980	0.000000
360	40.66000	0.000000
361	157.7100	0.000000
362	40.66000	0.000000
363	498.2500	0.000000
364	316.9700	0.000000
365	231.5500	0.000000
366	9960.820	0.000000
367	114.5000	0.000000
368	231.5500	0.000000
369	114.5000	0.000000
370	21.75000	0.000000
371	267.4000	0.000000
372	9908.720	0.000000
373	9641.320	0.000000
374	535.7400	0.000000
375	268.3400	0.000000
376	535.7400	0.000000
377	267.4000	0.000000
378	0.000000	0.000000
379	267.4000	0.000000
380	9643.850	0.000000
381	125.0000	0.000000
382	9856.600	0.000000
383	125.0000	0.000000
384	9501.450	0.000000
385	9728.100	0.000000
386	0.000000	0.000000
387	9731.600	0.000000
388	0.000000	-1.000000
389	9376.450	0.000000
390	9603.100	0.000000
391	9731.600	0.000000
392	395.9000	0.000000
393	128.5000	0.000000
394	395.9000	0.000000
395	9772.350	0.000000
396	0.000000	-1.000000
397	128.5000	0.000000
398	270.9000	0.000000
399	490.6000	0.000000
400	223.2000	0.000000
401	490.6000	0.000000
402	9867.050	0.000000
403	94.70000	0.000000

404	223.2000	0.000000
405	365.6000	0.000000
406	0.000000	-1.000000
407	316.3500	0.000000
408	9984.340	0.000000
409	9641.320	0.000000
410	60.01000	0.000000
411	9715.990	0.000000
412	74.67000	0.000000
413	42.51000	0.000000
414	9698.490	0.000000
415	57.17000	0.000000
416	9981.500	0.000000
417	181.2300	0.000000
418	9837.210	0.000000
419	195.8900	0.000000
420	121.2200	0.000000
421	121.2200	0.000000
422	60.01000	0.000000
423	9715.990	0.000000
424	74.67000	0.000000
425	0.000000	0.000000
426	0.000000	0.000000
427	9858.390	0.000000
428	169.4000	0.000000
429	9825.380	0.000000
430	184.0600	0.000000
431	109.3900	0.000000
432	109.3900	0.000000
433	9967.780	0.000000
434	93.78000	0.000000
435	163.2500	0.000000
436	9819.230	0.000000
437	177.9100	0.000000
438	103.2400	0.000000
439	103.2400	0.000000
440	9961.630	0.000000
441	87.63000	0.000000
442	9981.020	0.000000
443	0.000000	0.000000
444	331.0100	0.000000
445	0.000000	-1.000000
446	74.67000	0.000000
447	57.17000	0.000000
448	195.8900	0.000000
449	74.67000	0.000000
450	184.0600	0.000000
451	177.9100	0.000000
452	0.000000	0.000000
453	0.000000	0.000000
454	0.000000	0.000000
455	21.09000	0.000000
456	0.000000	0.000000
457	173.7700	0.000000
458	59.93000	0.000000
459	81.02000	0.000000
460	32.18000	0.000000
461	255.9000	0.000000
462	376.2400	0.000000
463	290.8200	0.000000
464	21.09000	0.000000

465	173.7700	0.000000
466	173.7700	0.000000
467	173.7700	0.000000
468	81.02000	0.000000
469	32.18000	0.000000
470	643.6400	0.000000
471	376.2400	0.000000
472	290.8200	0.000000
473	21.09000	0.000000
474	173.7700	0.000000
475	376.2400	0.000000
476	242.5200	0.000000
477	133.1100	0.000000
478	59.27000	0.000000
479	643.6400	0.000000
480	376.2400	0.000000
481	733.9200	0.000000
482	107.9000	0.000000
483	376.2400	0.000000
484	518.6400	0.000000
485	643.6400	0.000000
486	247.7400	0.000000
487	153.0400	0.000000
488	733.9200	0.000000
489	402.9100	0.000000
490	733.9200	0.000000
491	659.2500	0.000000
492	676.7500	0.000000
493	538.0300	0.000000
494	659.2500	0.000000
495	549.8600	0.000000
496	556.0100	0.000000
497	733.9200	0.000000
498	0.000000	0.000000
499	0.000000	0.000000
500	0.000000	0.000000
501	0.000000	0.000000
502	0.000000	0.000000
503	0.000000	0.000000
504	0.000000	0.000000
505	0.000000	0.000000
506	0.000000	0.000000
507	0.000000	0.000000
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526	0.000000	0.000000
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529	0.000000	0.000000
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533	0.000000	0.000000
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536	0.000000	0.000000
537	0.000000	0.000000
538	0.000000	0.000000
539	0.000000	0.000000
540	0.000000	0.000000
541	0.000000	0.000000
542	0.000000	0.000000
543	0.000000	0.000000
544	0.000000	0.000000
545	0.000000	0.000000
546	0.000000	0.000000
547	0.000000	0.000000
548	0.000000	0.000000
549	0.000000	0.000000
550	0.000000	0.000000
551	0.000000	0.000000
552	0.000000	0.000000
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Lampiran 4 Pengurutan Variabel *Completion Time* Berdasarkan Waktu

Jenis Penyelesaian (Ci,j)	Compeltion Time	Urutan Kerja
C(1,1)	0	1
C(1,2)	0	2
C(1,3)	0	3
C(1,5)	0	4
C(1,4)	21.09	5
C(2,4)	21.09	6
C(3,4)	21.09	7
C(1,9)	32.18	8
C(2,9)	32.18	9
C(3,9)	59.27	10
C(1,7)	59.93	11
C(1,8)	81.02	12
C(2,8)	81.02	13
C(4,4)	107.9	14
C(3,8)	133.11	15
C(4,9)	153.04	16
C(1,6)	173.77	17
C(2,5)	173.77	18
C(2,6)	173.77	19
C(2,7)	173.77	20
C(3,5)	173.77	21
C(3,7)	242.52	22
C(4,8)	247.74	23
C(2,1)	255.9	24
C(2,3)	290.82	25
C(3,3)	290.82	26
C(3,2)	376.24	27
C(3,6)	376.24	28
C(4,2)	376.24	29
C(4,5)	376.24	30
C(2,2)	379.24	31
C(5,2)	402.91	32
C(4,6)	518.64	33
C(5,6)	538.03	34
C(5,8)	549.86	35
C(5,9)	556.01	36
C(3,1)	643.64	37
C(4,1)	643.64	38

Jenis Penyelesaian (Ci,j)	Compelction Time	Urutan Kerja
C(4,7)	643.64	39
C(5,4)	659.25	40
C(5,7)	659.25	41
C(5,5)	676.75	42
C(4,3)	733.92	43
C(5,1)	733.92	44
C(5,3)	733.92	45

Lampiran 6 Perhitungan *Complementation Time* Jadwal Model *Mixed Integer Linear Programming*

Stage Extrusion (a)

$$\begin{aligned} \text{Mulsa} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(0; 0) + 21,09 \\ &= 21,09 \end{aligned}$$

$$\begin{aligned} \text{Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(21,09; 0) + 11,09 \\ &= 32,18 \end{aligned}$$

$$\begin{aligned} \text{Shopping Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(32,18; 0) + 27,75 \\ &= 59,93 \end{aligned}$$

$$\begin{aligned} \text{Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(59,93; 0) + 21,09 \\ &= 81,02 \end{aligned}$$

$$\begin{aligned} \text{Masking Film} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(81,02; 0) + 34,42 \\ &= 115,44 \end{aligned}$$

Stage Extrusion (b)

$$\begin{aligned} \text{Drawtape} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(0; 0) + 92,75 \\ &= 92,75 \end{aligned}$$

$$\begin{aligned} \text{Polybag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(92,75; 0) + 77,75 \\ &= 170,5 \end{aligned}$$

$$\begin{aligned} \text{Flush Cut} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(170,5; 0) + 34,92 \\ &= 205,42 \end{aligned}$$

$$\begin{aligned} \text{Piping Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(205,42; 0) + 40,25 \\ &= 245,67 \end{aligned}$$

Stage Gusset

$$\begin{aligned}
 \text{Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(32,18; 0) + 27,09 \\
 &= 59,27
 \end{aligned}$$

$$\begin{aligned}
 \text{Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(81,02; 59,27) + 52,09 \\
 &= 133,11
 \end{aligned}$$

$$\begin{aligned}
 \text{Shopping Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(59,93; 133,11) + 68,75 \\
 &= 201,86
 \end{aligned}$$

$$\begin{aligned}
 \text{Masking Film} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(115,44; 201,86) + 85,42 \\
 &= 287,28
 \end{aligned}$$

$$\begin{aligned}
 \text{Polybag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(170,5; 287,28) + 86,12 \\
 &= 373,4
 \end{aligned}$$

Stage Printing

$$\begin{aligned}
 \text{Mulsa} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(21,09; 0) + 86,81 \\
 &= 107,9
 \end{aligned}$$

$$\begin{aligned}
 \text{Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(59,27; 107,9) + 45,14 \\
 &= 153,04
 \end{aligned}$$

$$\begin{aligned}
 \text{Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(133,11; 153,04) + 94,7 \\
 &= 247,74
 \end{aligned}$$

$$\begin{aligned}
 \text{Drawtape} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(92,75; 247,74) + 128,5 \\
 &= 376,24
 \end{aligned}$$

$$\begin{aligned}
 \text{Masking Film} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(287,28; 376,24) + 142,4 \\
 &= 518,64
 \end{aligned}$$

$$\begin{aligned}
 \textit{Shopping Bag} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(201,86; 376,24) + 125 \\
 &= 643,64
 \end{aligned}$$

$$\begin{aligned}
 \textit{Flush Cut} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(205,42; 643,64) + 90,28 \\
 &= 733,92
 \end{aligned}$$

Stage Converting

$$\begin{aligned}
 \textit{Piping Bag} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(245,67; 0) + 26,67 \\
 &= 272,34
 \end{aligned}$$

$$\begin{aligned}
 \textit{Masking Film} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(518,64; 272,34) + 19,39 \\
 &= 538,03
 \end{aligned}$$

$$\begin{aligned}
 \textit{Garbage Bag} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(247,74; 538,03) + 11,83 \\
 &= 549,86
 \end{aligned}$$

$$\begin{aligned}
 \textit{Garbage Bag KTG} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(153,04; 549,86) + 6,15 \\
 &= 556,01
 \end{aligned}$$

$$\begin{aligned}
 \textit{Shopping Bag} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(643,64; 556,01) + 15,61 \\
 &= 659,25
 \end{aligned}$$

$$\begin{aligned}
 \textit{Drawtape} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(376,24; 659,25) + 17,5 \\
 &= 676,75
 \end{aligned}$$

$$\begin{aligned}
 \textit{Polybag} &= \text{Max}(\textit{Job Pendahulu}; \textit{Stage Pendahulu}) + \text{Waktu Proses} \\
 &= \text{Max}(373,4; 676,75) + 14,66 \\
 &= 691,41
 \end{aligned}$$

Lampiran 7 Perhitungan *Complementation Time* Jadwal Sisa Produk Model *Mixed Integer Linear Programming*

Stage Extrusion (a)

$$\begin{aligned} \text{Sisa Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(115,44; 0) + 0,56 \\ &= 116 \end{aligned}$$

$$\begin{aligned} \text{Sisa Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(116; 0) + 3,68 \\ &= 119,68 \end{aligned}$$

Stage Gusset

$$\begin{aligned} \text{Sisa Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(116; 373,4) + 1,38 \\ &= 374,78 \end{aligned}$$

$$\begin{aligned} \text{Sisa Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(119,68; 374,78) + 8,99 \\ &= 383,77 \end{aligned}$$

Stage Printing

$$\begin{aligned} \text{Sisa Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(374,78; 733,92) + 2,51 \\ &= 736,43 \end{aligned}$$

$$\begin{aligned} \text{Sisa Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(383,77; 736,43) + 14,97 \\ &= 751,4 \end{aligned}$$

Stage Converting

$$\begin{aligned} \text{Sisa Garbage Bag} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(736,43; 691,41) + 0,32 \\ &= 736,75 \end{aligned}$$

$$\begin{aligned} \text{Sisa Garbage Bag KTG} &= \text{Max}(\text{Job Pendahulu; Stage Pendahulu}) + \text{Waktu Proses} \\ &= \text{Max}(751,4; 736,75) + 2,04 \\ &= 753,44 \end{aligned}$$

Lampiran 8 *Gantt Chart* Penjadwalan Sisa Produk Model *Mixed Integer Linear Programming*

