

Table 1: Processing times, setup times, and size factors. Transfer times are assumed to zero. The list of tasks for each product represents the tasks required to produce that product.

Product	Task	Processing Time (hour)	Setup Time (hour)	Size Factor (m ³ /1000kg)
A	1	96.000	96.000	4.845
	2	84.000	0.000	0.100
B	1	132.000	120.000	0.934
	2	78.000	0.000	0.100
	3	58.000	0.000	0.100
C	1	94.000	44.000	0.595
	2	64.000	0.000	0.100
	3	48.000	0.000	0.100
D	1	124.000	48.000	1.794
	2	96.000	0.000	0.100
	3	68.000	0.000	0.100
E	1	144.000	192.000	0.577
	2	24.000	0.000	0.100
	3	36.000	0.000	0.100
F	1	58.000	72.000	1.420
	2	36.000	0.000	0.100
G	1	90.000	48.000	1.340
	2	48.000	0.000	0.100
H	1	72.000	48.000	3.279
	2	72.000	0.000	0.100
	3	48.000	0.000	0.100

Table 2: Processing times, setup times, and size factors (continued).

Product	Task	Processing Time (hour)	Setup Time (hour)	Size Factor (m ³ /1000kg)
I	1	96.000	72.000	0.215
	2	0.000	0.000	0.100
	3	48.000	0.000	0.100
J	1	120.000	312.000	1.012
	2	58.000	0.000	0.100
	3	48.000	0.000	0.100
K	1	48.000	24.000	2.185
	2	64.000	0.000	0.100
	3	36.000	0.000	0.100
L	1	126.000	72.000	0.267
	3	88.000	0.000	0.100
M	1	60.000	72.000	0.980
	2	36.000	0.000	0.100
N	1	118.000	72.000	1.982
	2	64.000	0.000	0.100
	3	72.000	0.000	0.100
O	1	24.000	72.000	6.250
	2	96.000	0.000	0.100
	3	56.000	0.000	0.100
P	1	98.000	272.000	2.818
	2	0.000	0.000	0.100

Table 3: Processing times, setup times, and size factors (continued).

Product	Task	Processing Time (hour)	Setup Time (hour)	Size Factor (m ³ /1000kg)
Q	1	184.000	268.000	1.144
	2	72.000	0.000	0.100
R	1	240.000	96.000	2.098
	2	24.000	0.000	0.100
S	1	126.000	240.000	1.605
	2	96.000	0.000	0.100
	3	72.000	0.000	0.100
T	1	24.000	48.000	1.307
	2	36.000	0.000	0.100
	3	12.000	0.000	0.100
U	1	92.000	144.000	1.015
	2	56.000	0.000	0.100
	3	48.000	0.000	0.100
V	1	72.000	72.000	0.494
	2	58.000	0.000	0.100
	3	36.000	0.000	0.100
W	1	120.000	24.000	3.454
	2	120.000	0.000	0.100
X	1	24.000	144.000	1.988
	2	48.000	0.000	0.100

Table 4: Processing times, setup times, and size factors (continued).

Product	Task	Processing Time (hour)	Setup Time (hour)	Size Factor (m ³ /1000kg)
Y	1	120.000	192.000	1.188
	2	48.000	0.000	0.100
	3	36.000	0.000	0.100
Z	1	36.000	24.000	2.575
	2	24.000	0.000	0.100
	3	36.000	0.000	0.100
a	1	84.000	168.000	2.060
	2	24.000	0.000	0.100
	3	48.000	0.000	0.100
b	1	72.000	48.000	0.464
	2	36.000	0.000	0.100
	3	48.000	0.000	0.100
c	1	72.000	168.000	1.486
	2	96.000	0.000	0.100
	3	96.000	0.000	0.100
d	1	172.000	24.000	1.780
	2	148.000	0.000	0.100

Table 5: Product values, raw material and processing costs and setup costs. The product value, raw material and processing costs are set to zero.

Product	Product Value (\$/kg)	Raw Material Cost (\$/kg)	Changeover Cost (\$)
A	1592.00	524.11	1900.00
R	0.00	0.00	2500.00
S	0.00	0.00	500.00
B	485.00	184.21	2500.00
C	760.00	272.15	400.00
T	0.00	0.00	1100.00
U	0.00	0.00	1200.00
V	0.00	0.00	1000.00
D	719.00	452.00	1000.00
W	0.00	0.00	350.00
X	0.00	0.00	2000.00
E	453.00	171.22	1500.00
F	126.00	64.25	2100.00
G	88.00	29.07	800.00
H	863.00	295.50	900.00
Z	0.00	0.00	800.00
a	0.00	0.00	3500.00
I	9.46	1.67	2600.00
J	678.20	275.00	45000.00
b	0.00	0.00	1500.00
K	875.00	221.63	850.00
c	0.00	0.00	2900.00
L	7.25	1.47	1300.00
M	82.22	38.68	1500.00
N	365.00	42.14	900.00
O	136.00	41.89	31950.00
P	96.37	21.43	31500.00
Q	475.00	187.16	3500.00
Y	210.00	71.60	1300.00
d	640.50	324.20	2500.00

Table 6: Product demands and due dates

Product	Due Date (hour)	Amount (1000kg)	Product	Due Date (hour)	Amount (1000kg)
A	2880.00	2560.00	F	6480.00	2200.00
A	5040.00	2560.00	F	7200.00	2200.00
A	7200.00	2560.00	F	7920.00	2200.00
B	4320.00	9270.00	G	1440.00	1045.00
B	6480.00	9270.00	G	2880.00	1045.00
B	8640.00	6180.00	G	4320.00	1045.00
C	1440.00	1800.00	G	5760.00	1045.00
C	2160.00	1800.00	G	6480.00	1045.00
C	2880.00	1800.00	H	3600.00	1200.00
C	3600.00	1800.00	H	5040.00	1200.00
C	4320.00	2700.00	H	6480.00	1200.00
C	5040.00	1800.00	H	8640.00	600.00
C	5760.00	1800.00	I	2160.00	15100.00
C	6480.00	1800.00	I	4320.00	20100.00
C	7200.00	1800.00	I	7200.00	20100.00
C	7920.00	2700.00	I	8640.00	25100.00
C	8640.00	1800.00	J	2880.00	3692.00
D	1440.00	1120.00	J	4320.00	7384.00
D	2160.00	1120.00	J	7200.00	7384.00
D	3600.00	1120.00	J	8640.00	7384.00
D	4320.00	1120.00	K	7200.00	466.00
D	5760.00	1120.00	L	720.00	14100.00
D	6480.00	1120.00	L	2880.00	28130.00
D	7920.00	1120.00	L	5040.00	28130.00
E	720.00	1785.00	L	8640.00	28130.00
E	5040.00	1785.00	M	720.00	1200.00
E	7920.00	1785.00	M	1440.00	600.00
F	720.00	2200.00	M	2160.00	600.00
F	1440.00	2200.00	M	2880.00	600.00
F	2160.00	2200.00	M	3600.00	600.00
F	2880.00	2200.00	M	4320.00	600.00
F	3600.00	2200.00	M	5040.00	600.00
F	4320.00	2200.00	M	5760.00	600.00
F	5760.00	2200.00	M	6480.00	600.00

Table 7: Product demands and due dates (continued)

Product	Due Date (hour)	Amount (1000kg)	Product	Due Date (hour)	Amount (1000kg)
M	7200.00	600.00	P	2880.00	2700.00
M	7920.00	600.00	P	5760.00	2700.00
M	8640.00	1200.00	P	6480.00	2700.00
N	720.00	1986.00	P	7200.00	2700.00
N	1440.00	984.00	P	7920.00	2700.00
N	2160.00	984.00	P	8640.00	2700.00
N	2880.00	1986.00	Q	7200.00	10930.00
N	3600.00	984.00	Q	8640.00	10930.00
N	4320.00	984.00	R	8640.00	6528.00
N	5040.00	984.00	S	8640.00	3002.88
N	5760.00	984.00	T	8640.00	43200.00
N	6480.00	1986.00	U	8640.00	32400.00
N	7200.00	984.00	V	8640.00	8640.00
N	7920.00	984.00	W	8640.00	3292.80
N	8640.00	984.00	X	8640.00	3920.00
O	720.00	510.00	Y	1440.00	2700.00
O	1440.00	255.00	Y	2880.00	5400.00
O	2160.00	255.00	Y	4320.00	5400.00
O	2880.00	510.00	Y	5760.00	5400.00
O	3600.00	255.00	Y	7200.00	5400.00
O	4320.00	255.00	Y	8640.00	2700.00
O	5040.00	255.00	Z	8640.00	3780.00
O	5760.00	255.00	a	8640.00	5670.00
O	6480.00	510.00	b	8640.00	9045.40
O	7200.00	255.00	c	8640.00	466.00
O	7920.00	255.00	d	1440.00	6510.00
O	8640.00	255.00	d	3600.00	6510.00
P	720.00	2700.00	d	5760.00	8680.00
P	1440.00	2700.00	d	7200.00	8680.00
P	2160.00	2700.00			

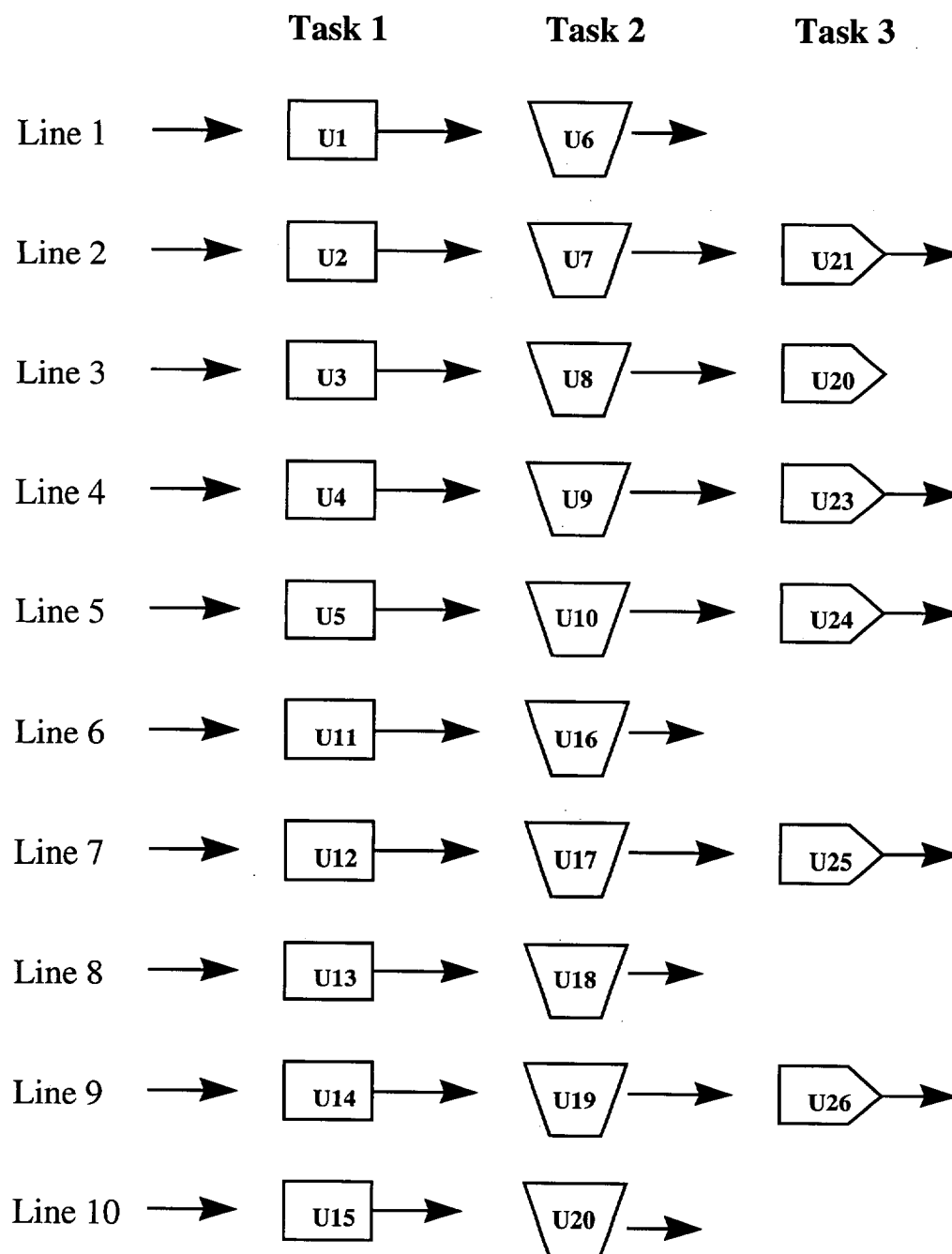


Figure 1: Process structure