Final Computation HW

Analysis and Test cases of HW3

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AMPL CODE (for both Large Data Set and small test cases)

```
# master sets
set raw; #set of raw materials
set cap; #set of non invertible capacities
set prod; #set of products

#derived sets for problem statement
set material := raw union prod ; #set of materials (raw U prod)
set resources := material union cap ; #set of resources (raw U cap U prod, basically everything)
```

```
set supplies := raw union cap; #set of supply items (raw U prod)

#time periods
param T > 0 integer;    #time period in which demand is created
param Ts > 0 integer;   #time period in which demand is served or sold

## Defining params
param supply {supplies,1..T} >= 0; #Supply of raw material/capacity in supplies at time T
param demand {material,1..T} >= 0; # Demand for material at time T (or later)
param revenue {material,1..T, 1..Ts} >= 0;# Revenue from selling material M to demand in time T when
supplied at Ts, this covers constraints of delayed revenues (with 5% Penalty)
param scr_cost {resources,1..T} >= 0; #Scrapping cost for resource at time t
param inv_cost {material,1..T} >= 0; #Inventory cost for material at time t
param aij {prod,resources} >=0; # how many resources are required for one unit of product

## Defining variables
var demand_served {material,1..T,1..Ts} integer >= 0; # Units of material M sold to demand in T at Ts ,
Ts more than equal to T
var made {prod,1..T} integer >= 0; # Units of product P made in T
var scr {resources,1..T} integer >= 0; # Units of resource R scrapped in T
var inv {material,1..T} integer >= 0; # Units of material M inventoried in T

## Defining objective
maximize total_profit:
        sum {t in 1..T} ( sum {mat in material} (sum {ts in t..Ts} revenue [mat,t,ts] * demand_served
[mat,t,ts])
                - sum {r in resources} scr_cost [r,t]*scr [r,t]
                - sum {m in material} (inv_cost [m,t]*inv [m,t]) );

                # revenue by selling products of demand t in ts - sum of scrapping cost - sum of inventory
cost



## Defining constraints

#constraint 1.1: Material balance for product for periods more than 2.

s.t. material_balance_product_1 {j in prod, t in 2..T}:
        sum {i in prod} aij[i,j] * made[i,t] + scr[j,t] + inv[j,t] + sum {ts in 1..t} demand_served [j,t,ts] =
made[j,t] + inv[j,t-1] ;

#constraint 2.1: Material balance for raw for periods more than 2.

s.t. material_balance_raw_1 {j in raw, t in 2..T}:
        sum {i in prod} aij[i,j] * made[i,t] + scr[j,t] + inv[j,t] + sum {ts in 1..t} demand_served [j,t,ts] =
supply[j,t] + inv[j,t-1] ;

#constraint 1.2 : Material balance for product for period equal 1.

s.t. material_balance_product_2 {j in prod}:
        sum {i in prod} (aij[i,j] * made[i,1]) + scr[j,1] + inv[j,1] + demand_served [j,1,1] = made[j,1] ;
```

```
#constraint 1.3: Material balance for raw for period equal to 1.

s.t. material_balance_raw_2 {j in raw}:
        sum {i in prod} (aij[i,j]* made[i,1]) + scr[j,1] + inv[j,1] + demand_served [j,1,1] = supply[j,1];

#constraint 2 :  balance for capacity

s.t. cap_balance {j in cap, t in 1..T}:
        sum {i in prod} aij[i,j]*made[i,t] + scr[j,t] = supply[j,t] ;

#constraint 6 : Demand served till time T is less than equal to demand till time T.
s.t. demand_balance {j in material, t in 1..T}:
        sum {ts in 1..Ts} demand_served [j,t,ts] <=  demand [j,t] ;
```

[Pass][Final HW] Unit case 1

Description:

No production, single raw material and demand and supply (kind of a trading function).

INPUT

```
set raw := A;
set cap := ;
set prod := ;

#Only one raw material in this test case ;

param T := 3;
param Ts := 3;

## Defining Variables
param supply:=
A       1       5
A       2       7
A       3       1
;

param demand:=
A       1       10
A       2       0
A       3       4
;

param revenue:=
A       1       1       9
A       1       2       7
A       1       3       0
```

```
A       2       2       8
A       2       3       6
A       3       3       5
;

param scr_cost:=
A       1       0
A       2       0
A       3       0
;

param inv_cost:=
A       1       0
A       2       0
A       3       0

;

param aij:=
;
```

OUTPUT

total_profit = 100

```
demand_served :=
A 1 1   5
A 1 2   5
A 1 3   0
A 2 1   0
A 2 2   0
A 2 3   0
A 3 1   0
A 3 2   0
A 3 3   4
;

made; #empty

scr :=
A 1   0
A 2   0
A 3   4
;

inv :=
A 1   0
A 2   7
A 3   0
```

;

[Pass][Final HW] Unit case 2

Description:

One product being made from 3 raw materials. (other details similar to big problems) For first period's demand there is revenue if filled in later periods. As expected, the model does not build for unfulfilled demand of first period in later periods.

INPUT

```
set raw := MetalRods MetalLegs MetalCutter;
set cap := ;
set prod := 36_30_frame;

#Only one raw material in this test case ;

param T := 3;
param Ts := 3;

## Defining Variables
param supply:=
MetalRods       1       1320
MetalRods       2       1320
MetalRods       3       1320
MetalLegs       1       20
MetalLegs       2       60
MetalLegs       3       40
MetalCutter  1   100
MetalCutter  2   70
MetalCutter  3   140
;

param demand:=
36_30_frame  1          10
36_30_frame  2          10
36_30_frame  3          10
MetalRods       1       0
MetalRods       2       0
MetalRods       3       0
MetalLegs       1       0
MetalLegs       2       0
MetalLegs       3       0
MetalCutter  1   0
```

```
MetalCutter  2   0
MetalCutter  3   0;

param revenue:=
36_30_frame  1          1       5
36_30_frame  1          2       0
36_30_frame  1          3       0
36_30_frame  2          2       7
36_30_frame  2          3       3
36_30_frame  3          3       10
MetalRods       1       1       0
MetalRods       1       2       0
MetalRods       1       3       0
MetalRods       2       2       0
MetalRods       2       3       0
MetalRods       3       3       0
MetalLegs       1       1       0
MetalLegs       1       2       0
MetalLegs       1       3       0
MetalLegs       2       2       0
MetalLegs       2       3       0
MetalLegs       3       3       0
MetalCutter  1   1       0
MetalCutter  1   2       0
MetalCutter  1   3       0
MetalCutter  2   2       0
MetalCutter  2   3       0
MetalCutter  3   3       0
;

param scr_cost:=
MetalRods       1       0
MetalRods       2       0
MetalRods       3       0
MetalLegs       1       0
MetalLegs       2       0
MetalLegs       3       0
MetalCutter  1   0
MetalCutter  2   0
MetalCutter  3   0
36_30_frame  1          0
36_30_frame  2          0
36_30_frame  3          0
;

param inv_cost:=
MetalRods       1       0
MetalRods       2       0
```

```
MetalRods       3       0
MetalLegs       1       0
MetalLegs       2       0
MetalLegs       3       0
MetalCutter  1   0
MetalCutter  2   0
MetalCutter  3   0
36_30_frame  1          0
36_30_frame  2          0
36_30_frame  3          0
;

param aij:=
36_30_frame  MetalRods          132
36_30_frame  MetalLegs          4
36_30_frame  MetalCutter  10
36_30_frame  36_30_frame  0
```

OUTPUT

```
total_profit = 195

demand_served [*,1,*]
:          1   2   3 :=
36_30_frame   5   0   0
MetalCutter   0   0   0
MetalLegs     0   0   0
MetalRods     0   0   0

 [*,2,*]
:          1   2     3         :=
36_30_frame   0   10   0
MetalCutter   0    0   0
MetalLegs     0    0   0
MetalRods     0    0   0

 [*,3,*]
:          1   2   3           :=
36_30_frame   0   0   10
MetalCutter   0   0         0
MetalLegs     0   0     0
MetalRods     0   0     0
;

made :=
36_30_frame 1  5
36_30_frame 2   12
36_30_frame 3  8
```

;

scr :=
36_30_frame 1 0
36_30_frame 2 0
36_30_frame 3 0
MetalCutter 1   0
MetalCutter 2   0
MetalCutter 3   60
MetalLegs   1   0
MetalLegs   2   0
MetalLegs   3   20
MetalRods   1   0
MetalRods   2   0
MetalRods   3   660
;

inv :=
36_30_frame 1 0
36_30_frame 2 2
36_30_frame 3 0
MetalCutter 1   50
MetalCutter 2   0
MetalCutter 3   0
MetalLegs   1   0
MetalLegs   2   12
MetalLegs   3   0
MetalRods   1   660
MetalRods   2   396
MetalRods   3   0

[Pass][Final HW] Unit case 3 - Own use case

Description:

Product P is made from 2 capacities A and B. There is no revenue for delivering late. Scrapping and inventory cost of P is very high as compared to revenue. Scrapping cost of Aand B is 0. As expected, model only build for the demand in each period and then scrap the resources A and B.

INPUT

```
set raw := ;
set cap := A B;
set prod := P;

#Only one raw material in this test case ;

param T := 3;
```

```
param Ts := 3;

## Defining Variables
param supply:=
A	1	10
A	2	10
A	3	10
B	1	10
B	2	10
B	3	10
;

param demand:=
P	1	2
P	2	4
P	3	0
;

param revenue:=
P	1	1	5
P	1	2	0
P	1	3	0
P	2	2	5
P	2	3	0
P	3	3	5
;

param scr_cost:=
P	1	100
P	2	100
P	3	100
A	1	0
A	2	0
A	3	0
B	1	0
B	2	0
B	3	0
;

param inv_cost:=
P	1	100
P	2	100
P	3	100
;

param aij:=
P	A	2
P	B	1
P	P	0
;
```

OUTPUT

```
total_profit = 30

demand_served :=
P 1 1   2
P 1 2   0
P 1 3   0
P 2 1   0
P 2 2   4
P 2 3   0
P 3 1   0
P 3 2   0
P 3 3   0
;

made :=
P 1   2
P 2   4
P 3   0
;

scr :=
A 1       6
A 2       2
A 3   10
B 1       8
B 2       6
B 3   10
P 1       0
P 2       0
P 3       0
;

inv :=
P 1   0
P 2   0
P 3   0
;
```

Solution of Large Dataset [Original Problem]

With integer constraint on variables

(as shown in code above)

Objective 4810.881
3894636 MIP simplex iterations
2158692 branch-and-bound nodes

absmipgap = 22.4552, relmipgap = 0.00466758

Without integer constraint on variables

(removing integer constraint in above solution)

CPLEX 12.9.0.0: optimal solution; **objective 4842.173447**
166 dual simplex iterations (0 in phase I)

Large Data Set Solution Analysis

Note that i will be referring to non integer objective function for these directional tests and test cases for quicker execution.

[Final HW] Checking feasibility by reducing supply

[Pass] Test case: Making a Raw material supply 0, products that use this raw material should not be produced.

As expected, all the products which needed PadFab, are no longer produced. Production of other products increased in lieu of them.

PadFab supply	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Original Problem	3000	0	0	0	0	0	0
Test case	0	0	0	0	0	0	0

Products	Units of PadFab required per unit of product	Products made in original solution (week 1 to 7)	Products made in test solution (week 1 to 7)
24x18Flec	0	22	44
24x18Pad	22	1	0
24x18PVC	0	41	59

24x18PVCFlec	0	22	44
24x18PVCPad	0	1	0
30x24Flec	0	16	18
30x24M	0	26	17
30x24MFlec	0	11	13
30x24MPad	0	14	0
30x24Pad	28	19	0
30x24PVC	0	58	40
30x24PVCFlec	0	5	5
30x24PVCPad	0	5	0
36x30Flec	0	12	26
36x30M	0	24	33
36x30MFlec	0	12	26
36x30MPad	0	11	0
36x30Pad	34	11	0

[Pass] Test case: Reducing a raw material by excess amount (scrapped) in original problem should improve solution by value of scrapping cost saved,

Raw material:FlecFab	Supply in first week	Scrap in first week	Excess
Original problem	5000	3588	Yes
Test problem	1500	88	Yes

Original solution	4842		
Test solution	4912		
Improvement	70		
per unit Scrapping cost	0.02		
Units less scrapped	3500		
Savings	70		

[Final HW] Adjusting revenue levels and ensuring solution moves in right direction

[Pass] Test case: Increasing revenue should increase the Objective function value and vice versa

24x18PVCPad	Original problem	Testcase 1	Test case 2
Base Revenue	15	55	5
Objective function	4842	4922	4822
		Increased as expected	Reduced as expected

[Final HW] Adjusting supply levels and ensuring solution moves in right direction

[Pass] Increasing supply of resources in the original problem should increase the objective function.

Supply of raw	Original Problem	Test case 1	Test case 3	Test case 3	Test case 4

mateirals					
PadFab	3000	6000	1500	300	0
FlecFab	5000	5000	2500	500	0
MetRod	6500	13000	3250	650	0
PVCRod	10500	21000	5250	1050	0
MetLeg	200	400	100	20	0
PVCLeg	400	800	200	40	0
Package	400	800	200	40	0
Objective valve	4842	4906	4191	1810	831
		Increase as expected	decrease as expected	decrease as expected	decrease as expected

Verification of resource and material balance constraints

Following balance equation is verified and found true:

used for other products + scrap + inventory this week + demand served = inventory last week + made/supply this week

Verification of resource constraint on "Cap"

Product made in period 1	Fabcut_cap	Metalcut_cap
24x18Flec	0	0
24x18Pad	11.2	0
24x18PVC	0	0
24x18PVCFlec	0	0

24x18PVCPad	0	0
30x24Flec	80.8	0
30x24M	0	0
30x24MFlec	0	0
30x24MPad	0	0
30x24Pad	0	0
30x24PVC	0	0
30x24PVCFlec	0	0
30x24PVCPad	0	0
36x30Flec	101	0
36x30M	0	180
36x30MFlec	0	0
36x30MPad	0	0
36x30Pad	28	0
used for other products	221	180
supply	240	180
scrap	19	0
inventory	0	0
Balance = supply - used for other products-scrap - inventory	0	0

Verification of resource constraint on “Raw”

Product made in period 1	raw_FlecFab	raw_PVCrod
24x18Flec	0	0
24x18Pad	0	0
24x18PVC	0	0
24x18PVCFlec	0	0
24x18PVCPad	0	0
30x24Flec	224	0
30x24M	0	0
30x24MFlec	0	0
30x24MPad	0	0
30x24Pad	0	0
30x24PVC	0	3240
30x24PVCFlec	0	0
30x24PVCPad	0	0
36x30Flec	400	0
36x30M	0	0
36x30MFlec	0	0
36x30MPad	0	0
36x30Pad	0	0
used for other products	624	3240
supply	5000	10500
scrap	3588	792
inventory	788	6468

Balance = supply - used for other products-scrap - inventory	0	0

Verification of resource constraint on “Product”

Week_5	prod_30x24M
24x18Flec	0
24x18Pad	0
24x18PVC	0
24x18PVCFlec	0
24x18PVCPad	0
30x24Flec	0
30x24M	0
30x24MFlec	7
30x24MPad	2
30x24Pad	0
30x24PVC	0
30x24PVCFlec	0
30x24PVCPad	0
36x30Flec	0
36x30M	0
36x30MFlec	0
36x30MPad	0
36x30Pad	0

used for other products	9
made	0
scrap	0
inventory last week	10
inventory this week	1
demand	0
Balance = inventory last week + made - used for other products - scrap - inventory this week - demand served	0

Verification of Demand served

1. Solution ensures that no demand is met before the time it is created.

Verification of Week 1 demand served:

Demand of week 1	Demand of week 1 filled	demand of week 1 dropped
24x18Flec	1	0
24x18Pad	0	0
24x18PVC	0	0
24x18PVCFlec	2	0
24x18PVCPad	2	0
30x24Flec	2	0
30x24M	0	0
30x24MFlec	1	0
30x24MPad	1	0

30x24Pad	0	0
30x24PVC	1	0
30x24PVCFlec	0	0
30x24PVCPad	0	0
36x30Flec	0	0
36x30M	0	0
36x30MFlec	0	0
36x30MPad	2	0
36x30Pad	0	0
FlecFab	0	0
MetLeg	4	0
MetRod	0	0
Package	0	0
PadFab	0	0
PVCLeg	2	0
PVCRod	0	0

Verification of Week 2 demand served:

Demand of week 2	**Demand of week 2 filled**	**demand of week 2 dropped**	**demand filled before time**
24x18Flec	1	0	0
24x18Pad	1	0	0
24x18PVC	2	0	0
24x18PVCFlec	0	0	0

24x18PVCPad	3	0	0
30x24Flec	0	0	0
30x24M	2	0	0
30x24MFlec	0	0	0
30x24MPad	0	0	0
30x24Pad	0	0	0
30x24PVC	3	0	0
30x24PVCFlec	0	0	0
30x24PVCPad	2	0	0
36x30Flec	0	0	0
36x30M	0	0	0
36x30MFlec	2	0	0
36x30MPad	3	0	0
36x30Pad	1	0	0
FlecFab	0	0	0
MetLeg	0	0	0
MetRod	0	0	0
Package	0	0	0
PadFab	0	0	0
PVCLeg	0	0	0
PVCRod	0	0	0

Verification of Week 7 demand served:

Demand of week 7	**Demand of week 7 filled**	**demand of week 7 dropped**	**demand filled before time**
24x18Flec	0	0	0
24x18Pad	0	0	0
24x18PVC	6	0	0
24x18PVCFlec	22	2	0
24x18PVCPad	1	22	0
30x24Flec	0	0	0
30x24M	1	0	0
30x24MFlec	11	0	0
30x24MPad	14	0	0
30x24Pad	0	0	0
30x24PVC	8	0	0
30x24PVCFlec	5	0	0
30x24PVCPad	5	7	0
36x30Flec	0	0	0
36x30M	0	0	0
36x30MFlec	12	0	0
36x30MPad	11	0	0
36x30Pad	0	1	0
FlecFab	0	0	0
MetLeg	0	0	0
MetRod	0	0	0
Package	0	0	0

PadFab	0	0	0
PVCLeg	4	0	0
PVCRod	0	0	0

Appendix: Complete Solution for Larger Dataset

Products made in each period

made in period	1	2	3	4	5	6	7
24x18Flec	0	2	0	18	2	0	0
24x18Pad	1	0	0	0	0	0	0
24x18PVC	0	2	30	9	0	0	0
24x18PVCFlec	0	0	0	20	2	0	0
24x18PVCPad	0	0	1	0	0	0	0
30x24Flec	8	2	0	0	6	0	0
30x24M	0	12	14	0	0	0	0
30x24MFlec	0	0	4	0	7	0	0
30x24MPad	0	0	10	2	2	0	0
30x24Pad	0	15	0	2	2	0	0
30x24PVC	30	28	0	0	0	0	0
30x24PVCFlec	0	0	5	0	0	0	0
30x24PVCPad	0	0	5	0	0	0	0
36x30Flec	10	0	0	2	0	0	0
36x30M	18	6	0	0	0	0	0

36x30MFlec	0	0	0	4	8	0	0
36x30MPad	0	0	0	5	6	0	0
36x30Pad	4	1	0	0	6	0	0

Scrap in each period

scr	1	2	3	4	5	6	7
24x18Flec	0	0	0	0	0	0	0
24x18Pad	0	0	0	0	0	0	0
24x18PVC	0	0	0	0	0	0	0
24x18PVCFlec	0	0	0	0	0	0	0
24x18PVCPad	0	0	0	0	0	0	0
30x24Flec	0	0	0	0	0	0	0
30x24M	0	0	0	0	0	0	0
30x24MFlec	0	0	0	0	0	0	0
30x24MPad	0	0	0	0	0	0	0
30x24Pad	0	0	0	0	0	0	0
30x24PVC	0	0	0	0	0	0	0
30x24PVCFlec	0	0	0	0	0	0	0
30x24PVCPad	0	0	0	0	0	0	0
36x30Flec	0	0	0	0	0	0	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	0	0	0	0	0
36x30MPad	0	0	0	0	0	0	0

36x30Pad	0	0	0	0	0	0	0
FabCut	19	9	240	15	147	0	0
FabSew	4	8	0	0	0	0	0
FlecFab	3588	0	0	0	0	0	0
KitAssm	240	240	10	0	0	0	0
MetalCut	0	0	40	180	150	0	0
MetLeg	0	0	0	0	0	0	0
MetRod	524	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	2072	0	0	0	0	0	0
PVCCut	0	0	0	168	240	0	0
PVCLeg	0	0	0	0	0	0	0
PVCRod	792	0	0	0	0	0	0

Inventory in each period

inv	1	2	3	4	5	6	7
24x18Flec	0	2	2	0	0	0	0
24x18Pad	1	1	0	0	0	0	0
24x18PVC	0	0	29	15	13	9	3
24x18PVCFlec	0	0	0	20	22	22	0
24x18PVCPad	0	0	1	1	1	1	0
30x24Flec	8	10	1	1	0	0	0
30x24M	0	12	12	10	1	1	0

30x24MFlec	0	0	4	4	11	11	0
30x24MPad	0	0	10	12	14	14	0
30x24Pad	0	15	0	0	0	0	0
30x24PVC	29	54	40	38	37	31	23
30x24PVCFlec	0	0	5	5	5	5	0
30x24PVCPad	0	0	5	5	5	5	0
36x30Flec	10	10	10	8	0	0	0
36x30M	18	24	23	14	0	0	0
36x30MFlec	0	0	0	4	12	12	0
36x30MPad	0	0	0	5	11	11	0
36x30Pad	4	5	5	0	0	0	0
FlecFab	788	688	688	212	0	0	0
MetLeg	128	56	0	0	0	0	0
MetRod	3600	1512	0	0	0	0	0
Package	400	400	375	344	319	319	319
PadFab	770	316	316	260	0	0	0
PVCLeg	280	160	40	4	4	4	0
PVCRod	6468	3276	756	0	0	0	0

Demand filled in each period

Week 1	1	2	3	4	5	6	7 :=
24x18Flec	0	1	0	0	0	0	0

24x18PVC	0	0	0	0	0	0	0
24x18PVCFlec	0	2	0	0	0	0	0
24x18PVCPad	0	2	0	0	0	0	0
24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	2	0	0	0	0	0
30x24M	0	0	0	0	0	0	0
30x24MFlec	0	1	0	0	0	0	0
30x24MPad	0	1	0	0	0	0	0
30x24PVC	1	0	0	0	0	0	0
30x24PVCFlec	0	0	0	0	0	0	0
30x24PVCPad	0	0	0	0	0	0	0
30x24Pad	0	0	0	0	0	0	0
36x30Flec	0	0	0	0	0	0	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	0	0	0	0	0
36x30MPad	0	2	0	0	0	0	0
36x30Pad	0	0	0	0	0	0	0

FlecFab	0	0	0	0	0	0	0
MetLeg	0	4	0	0	0	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	2	0	0	0	0	0
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0
Week 2							
:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	1	0	0	0	0
24x18PVC	0	2	0	0	0	0	0
24x18PVCFlec	0	0	0	0	0	0	0
24x18PVCPad	0	0	3	0	0	0	0
24x18Pad	0	0	1	0	0	0	0
30x24Flec	0	0	0	0	0	0	0

30x24M	0	0	2	0	0	0	0
30x24MFlec	0	0	0	0	0	0	0
30x24MPad	0	0	0	0	0	0	0
30x24PVC	0	3	0	0	0	0	0
30x24PVCFlec	0	0	0	0	0	0	0
30x24PVCPad	0	0	2	0	0	0	0
30x24Pad	0	0	0	0	0	0	0
36x30Flec	0	0	0	0	0	0	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	2	0	0	0	0
36x30MPad	0	0	3	0	0	0	0
36x30Pad	0	0	1	0	0	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	0	0	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	0	0	0

PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0
Week 3							
:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	0	0	0	0	0
24x18PVC	0	0	0	0	0	0	0
24x18PVCFlec	0	0	0	2	0	0	0
24x18PVCPad	0	0	0	2	0	0	0
24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	0	0	1	0	0	0
30x24M	0	0	0	0	0	0	0
30x24MFlec	0	0	0	2	0	0	0
30x24MPad	0	0	0	2	0	0	0
30x24PVC	0	0	4	0	0	0	0
30x24PVCFlec	0	0	0	2	0	0	0

30x24PVCPad	0	0	0	0	0	0	0
30x24Pad	0	0	0	2	0	0	0
36x30Flec	0	0	0	1	0	0	0
36x30M	0	0	1	1	0	0	0
36x30MFlec	0	0	0	3	0	0	0
36x30MPad	0	0	0	2	0	0	0
36x30Pad	0	0	0	0	0	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	8	0	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	0	0	0
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0
Week 4							

:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	0	0	0	0	0
24x18PVC	0	0	0	3	0	0	0
24x18PVCFlec	0	0	0	0	3	0	0
24x18PVCPad	0	0	0	0	1	0	0
24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	0	0	0	1	0	0
30x24M	0	0	0	0	1	0	0
30x24MFlec	0	0	0	0	3	0	0
30x24MPad	0	0	0	0	2	0	0
30x24PVC	0	0	0	2	0	0	0
30x24PVCFlec	0	0	0	0	2	0	0
30x24PVCPad	0	0	0	0	3	0	0
30x24Pad	0	0	0	0	0	0	0
36x30Flec	0	0	0	0	1	0	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	0	0	6	0	0

36x30MPad	0	0	0	0	5	0	0
36x30Pad	0	0	0	0	1	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	0	6	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	6	0	0
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0
Week 5							
:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	0	0	0	2	0
24x18PVC	0	0	0	0	0	0	0
24x18PVCFlec	0	0	0	0	0	0	0
24x18PVCPad	0	0	0	0	0	0	0

24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	0	0	0	0	0	0
30x24M	0	0	0	0	0	0	0
30x24MFlec	0	0	0	0	0	2	0
30x24MPad	0	0	0	0	0	3	0
30x24PVC	0	0	0	0	1	0	0
30x24PVCFlec	0	0	0	0	0	0	0
30x24PVCPad	0	0	0	0	0	2	0
30x24Pad	0	0	0	0	0	0	0
36x30Flec	0	0	0	0	0	2	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	0	0	0	0	0
36x30MPad	0	0	0	0	0	3	0
36x30Pad	0	0	0	0	0	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	0	0	0	0

MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	0	0	0
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0
Week 6							
:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	0	0	0	0	0
24x18PVC	0	0	0	0	0	4	0
24x18PVCFlec	0	0	0	0	0	0	13
24x18PVCPad	0	0	0	0	0	0	24
24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	0	0	0	0	0	2
30x24M	0	0	0	0	0	0	0
30x24MFlec	0	0	0	0	0	0	12

30x24MPad	0	0	0	0	0	0	24
30x24PVC	0	0	0	0	0	6	0
30x24PVCFlec	0	0	0	0	0	0	3
30x24PVCPad	0	0	0	0	0	0	9
30x24Pad	0	0	0	0	0	0	1
36x30Flec	0	0	0	0	0	0	0
36x30M	0	0	0	0	0	0	1
36x30MFlec	0	0	0	0	0	0	8
36x30MPad	0	0	0	0	0	0	8
36x30Pad	0	0	0	0	0	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	0	0	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	0	0	0
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0

PadFab	0	0	0	0	0	0	0
Week 7							
:	1	2	3	4	5	6	7 :=
24x18Flec	0	0	0	0	0	0	0
24x18PVC	0	0	0	0	0	0	6
24x18PVCFlec	0	0	0	0	0	0	22
24x18PVCPad	0	0	0	0	0	0	1
24x18Pad	0	0	0	0	0	0	0
30x24Flec	0	0	0	0	0	0	0
30x24M	0	0	0	0	0	0	1
30x24MFlec	0	0	0	0	0	0	11
30x24MPad	0	0	0	0	0	0	14
30x24PVC	0	0	0	0	0	0	8
30x24PVCFlec	0	0	0	0	0	0	5
30x24PVCPad	0	0	0	0	0	0	5
30x24Pad	0	0	0	0	0	0	0

36x30Flec	0	0	0	0	0	0	0
36x30M	0	0	0	0	0	0	0
36x30MFlec	0	0	0	0	0	0	12
36x30MPad	0	0	0	0	0	0	11
36x30Pad	0	0	0	0	0	0	0
FlecFab	0	0	0	0	0	0	0
MetLeg	0	0	0	0	0	0	0
MetRod	0	0	0	0	0	0	0
PVCLeg	0	0	0	0	0	0	4
PVCRod	0	0	0	0	0	0	0
Package	0	0	0	0	0	0	0
PadFab	0	0	0	0	0	0	0

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