**Problem – B (Assembly) 🡪 DATA**

**Test Instance-1:** TAS1C1D1 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-2:** TAS1C1D2 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-3:** TAS1C1D3 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-4:** TAS1C1D4 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-5:** TAS1C1D5 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-6:** TAS1C1D6 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-7:** TAS1C1D7 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-8:** TAS1C1D8 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-9:** TAS1C1D9 (Test Assembly Setup-Profile\_1 Capacity-Profile\_1 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,377.7778,711.1111];

**Test Instance-10:** TAS1C2D1 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-11:** TAS1C2D2 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-12:** TAS1C2D3 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-13:** TAS1C2D4 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-14:** TAS1C2D5 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-15:** TAS1C2D6 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-16:** TAS1C2D7 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-17:** TAS1C2D8 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-18:** TAS1C2D9 (Test Assembly Setup-Profile\_1 Capacity-Profile\_2 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,485.7143,914.2857];

**Test Instance-19:** TAS1C3D1 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-20:** TAS1C3D2 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-21:** TAS1C3D3 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-22:** TAS1C3D4 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-23:** TAS1C3D5 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-24:** TAS1C3D6 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-25:** TAS1C3D7 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-26:** TAS1C3D8 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-27:** TAS1C3D9 (Test Assembly Setup-Profile\_1 Capacity-Profile\_3 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,680.0000,1280.0000];

**Test Instance-28:** TAS1C4D1 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-29:** TAS1C4D2 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-30:** TAS1C4D3 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-31:** TAS1C4D4 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-32:** TAS1C4D5 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-33:** TAS1C4D6 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-34:** TAS1C4D7 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-35:** TAS1C4D8 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-36:** TAS1C4D9 (Test Assembly Setup-Profile\_1 Capacity-Profile\_4 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,485.7143,1280.0000];

**Test Instance-37:** TAS1C5D1 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-38:** TAS1C5D2 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-39:** TAS1C5D3 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-40:** TAS1C5D4 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-41:** TAS1C5D5 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-42:** TAS1C5D6 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-43:** TAS1C5D7 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-44:** TAS1C5D8 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Test Instance-45:** TAS1C5D9 (Test Assembly Setup-Profile\_1 Capacity-Profile\_5 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - I

setuptime = [10,10,15,15,10,10,5,5,5,5];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,485.7143,711.1111];

**Setup Profile – II**

**Test Instance-1:** TAS2C1D1 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-2:** TAS2C1D2 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-3:** TAS2C1D3 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-4:** TAS2C1D4 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-5:** TAS2C1D5 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-6:** TAS2C1D6 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-7:** TAS2C1D7 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-8:** TAS2C1D8 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-9:** TAS2C1D9 (Test Assembly Setup-Profile\_2 Capacity-Profile\_1 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - I (90%)

productstagecapacity = [122.2222,355.5556,755.5556];

**Test Instance-10:** TAS2C2D1 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-11:** TAS2C2D2 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-12:** TAS2C2D3 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-13:** TAS2C2D4 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-14:** TAS2C2D5 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-15:** TAS2C2D6 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-16:** TAS2C2D7 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-17:** TAS2C2D8 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-18:** TAS2C2D9 (Test Assembly Setup-Profile\_2 Capacity-Profile\_2 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - 2 (70%)

productstagecapacity = [157.1429,457.1429, 971.4286];

**Test Instance-19:** TAS2C3D1 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-20:** TAS2C3D2 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-21:** TAS2C3D3 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-22:** TAS2C3D4 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-23:** TAS2C3D5 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-24:** TAS2C3D6 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-25:** TAS2C3D7 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-26:** TAS2C3D8 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-27:** TAS2C3D9 (Test Assembly Setup-Profile\_2 Capacity-Profile\_3 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - III (50%)

productstagecapacity = [220.0000,640.0000,1360.0000];

**Test Instance-28:** TAS2C4D1 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-29:** TAS2C4D2 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-30:** TAS2C4D3 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-31:** TAS2C4D4 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-32:** TAS2C4D5 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-33:** TAS2C4D6 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-34:** TAS2C4D7 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-35:** TAS2C4D8 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-36:** TAS2C4D9 (Test Assembly Setup-Profile\_2 Capacity-Profile\_4 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - IV (90%, 70%, 50%)

productstagecapacity = [122.2222,457.1429,1360.0000];

**Test Instance-37:** TAS2C5D1 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_1)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 1

primary\_demand = [[101.0000,100.0100,100.0001,100.0000]];

secondary\_demand = [

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000],

[101.0000,100.0100,100.0001,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-38:** TAS2C5D2 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_2)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 2

primary\_demand = [[116.0000,100.1600,100.0016,100.0000]];

secondary\_demand = [

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000],

[116.0000,100.1600,100.0016,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-39:** TAS2C5D3 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_3)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 3

primary\_demand = [[149.0000,100.4900,100.0049,100.0000]];

secondary\_demand = [

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000],

[149.0000,100.4900,100.0049,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-40:** TAS2C5D4 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_4)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 4

primary\_demand = [[102.2500,100.0506,100.0011,100.0000]];

secondary\_demand = [

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000],

[102.2500,100.0506,100.0011,100.0000]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-41:** TAS2C5D5 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_5)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 5

primary\_demand = [[136.0000,100.8100,100.0182,100.0004]];

secondary\_demand = [

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004],

[136.0000,100.8100,100.0182,100.0004]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-42:** TAS2C5D6 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_6)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 6

primary\_demand = [[210.2500,102.4806,100.0558,100.0013]];

secondary\_demand = [

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013],

[210.2500,102.4806,100.0558,100.0013]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-43:** TAS2C5D7 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_7)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 7

primary\_demand = [[104.0000,100.1600,100.0064,100.0003]];

secondary\_demand = [

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003],

[104.0000,100.1600,100.0064,100.0003]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-44:** TAS2C5D8 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_8)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 8

primary\_demand = [[164.0000,102.5600,100.1024,100.0041]];

secondary\_demand = [

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041],

[164.0000,102.5600,100.1024,100.0041]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];

**Test Instance-45:** TAS2C5D9 (Test Assembly Setup-Profile\_2 Capacity-Profile\_5 Demand-Series\_9)

FP = 1;

RP = 10;

J = 10;

L = 3;

T = 4;

S = 12;

allproductsonstage1 = {5,6,7,8,9,10};

allproductsonstage2 = {2,3,4};

allproductsonstage3 = {1};

family1stage1 = {5,6};

family2stage1 = {7,8};

family3stage1 = {9,10};

family1stage2 = {2};

family2stage2 = {3};

family3stage2 = {4};

family1stage3 = {1};

microperiods1tomacroperiod = {1,2,3};

microperiods2tomacroperiod = {4,5,6};

microperiods3tomacroperiod = {7,8,9};

microperiods4tomacroperiod = {10,11,12};

min\_lotsize = 1;

production\_cost = 1;

production\_time = 1;

standby\_cost = 1;

BOM = 1;

BigM = 10000;

holdingcost = [10,3,3,3,1,1,1,1,1,1];

// Product Demand - Series# 9

primary\_demand = [[296.0000,107.8400,100.3136,100.0125]];

secondary\_demand = [

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125],

[296.0000,107.8400,100.3136,100.0125]];

// Setup Profile - II

setuptime = [10,10,5,5,10,10,15,15,15,15];

setupcost = [50,50,50,50,50,50,50,50,50,50];

// Capacity Utilization Profile - V (50%, 70%, 90%)

productstagecapacity = [220.0000,457.1429,755.5556];