LAMPIRAN

Lampiran 1 Hasil Agregasi

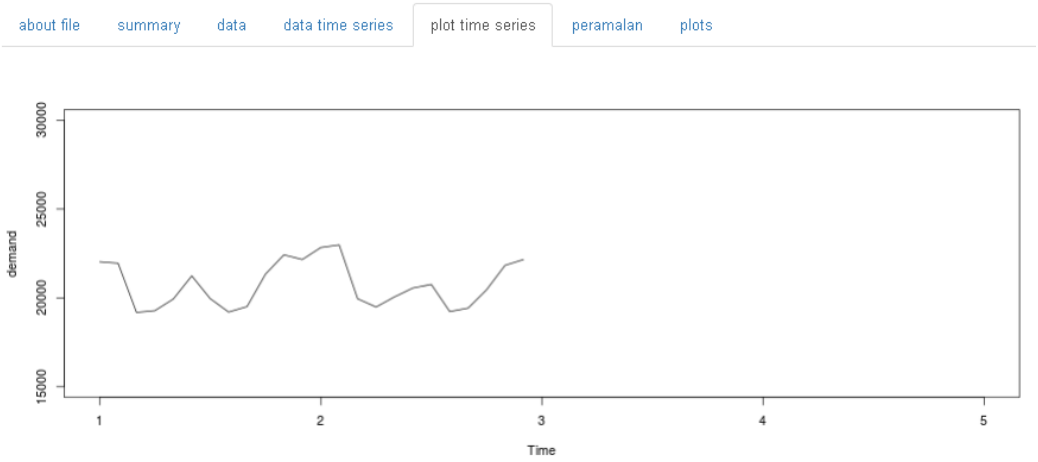
Sepatu	Periode 1							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
Kulit	10395	8610	9660	9345	9450	10290	9975	10185
Vinyl	11638	13340	9522	9936	10488	10948	9982	9016
Total	22033	21950	19182	19281	19938	21238	19957	19201

Sepatu	Periode 1				Periode 2			
	Jul	Agust	Sep	Okt	Nov	Des	Jan	Feb
Kulit	10080	9975	8715	9555	10920	9135	10290	9135
Vinyl	9430	11362	13708	12604	11914	13846	9660	10350
Total	19510	21337	22423	22159	22834	22981	19950	19485

Sepatu	Periode 2							
	Mar	Apr	Mei	Jun	Jul	Agust	Sep	Okt
Kulit	9660	9975	10500	9660	9765	9555	9135	10290
Vinyl	10396	10580	10258	9568	9660	10902	12696	11868
Total	20056	20555	20758	19228	19425	20457	21831	22158

Sepatu	Total	Proporsi
Kulit	234255	0.4705
Vinyl	263672	0.5205
Total	497927	1

Lampiran 2 Plot Data Hasil Agregasi



Lampiran 3 Metode Peramalan dan Hasil Peramalan

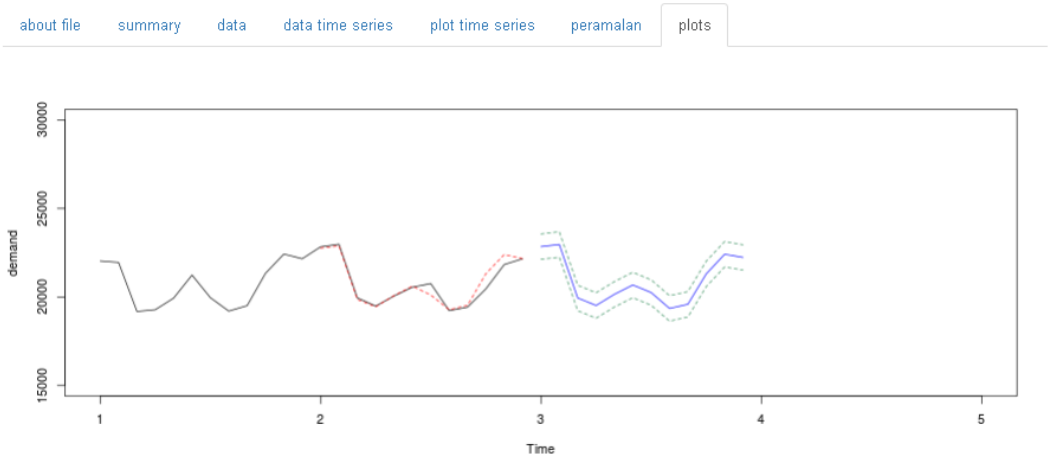
```
Holt-Winters exponential smoothing with trend and additive seasonal component.

Call:
HoltWinters(x = c)

Smoothing parameters:
 alpha: 0
 beta : 0
 gamma: 0.1

Coefficients:
            [,1]
a   20903.038462
b       6.156614
s1   1935.490304
s2   2050.824643
s3   -978.616018
s4  -1408.044180
s5   -782.459841
s6   -261.838003
s7   -697.178664
s8  -1599.894325
s9  -1370.172487
s10   340.261852
s11  1442.371190
s12  1258.043029
          fit      upr      lwr
Jan 3 22844.69 23562.87 22126.50
Feb 3 22966.18 23684.36 22247.99
Mar 3 19942.89 20661.08 19224.70
Apr 3 19519.62 20237.81 18801.43
May 3 20151.36 20869.55 19433.17
Jun 3 20678.14 21396.33 19959.95
Jul 3 20248.96 20967.14 19530.77
Aug 3 19352.40 20070.59 18634.21
Sep 3 19588.28 20306.46 18870.09
Oct 3 21304.87 22023.05 20586.68
Nov 3 22413.13 23131.32 21694.94
Dec 3 22234.96 22953.15 21516.77
```

Lampiran 4 Plot Hasil Peramalan

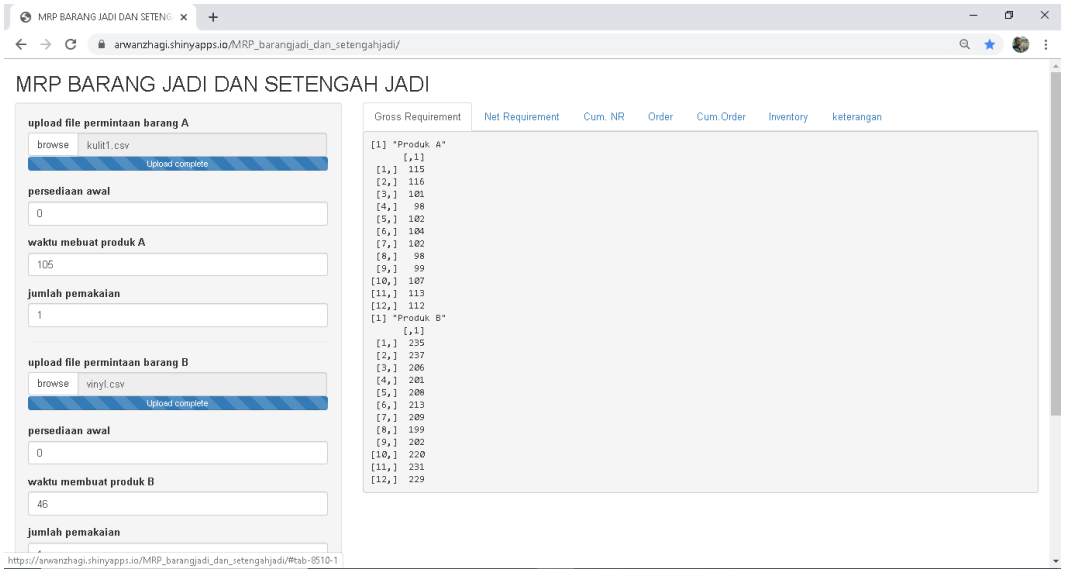


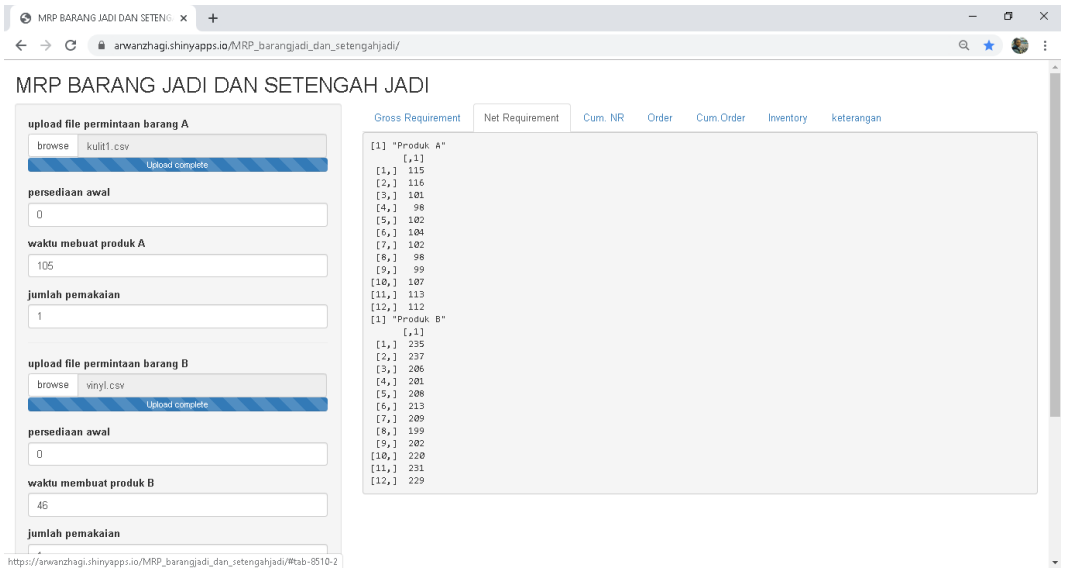
Lampiran 5 MPS

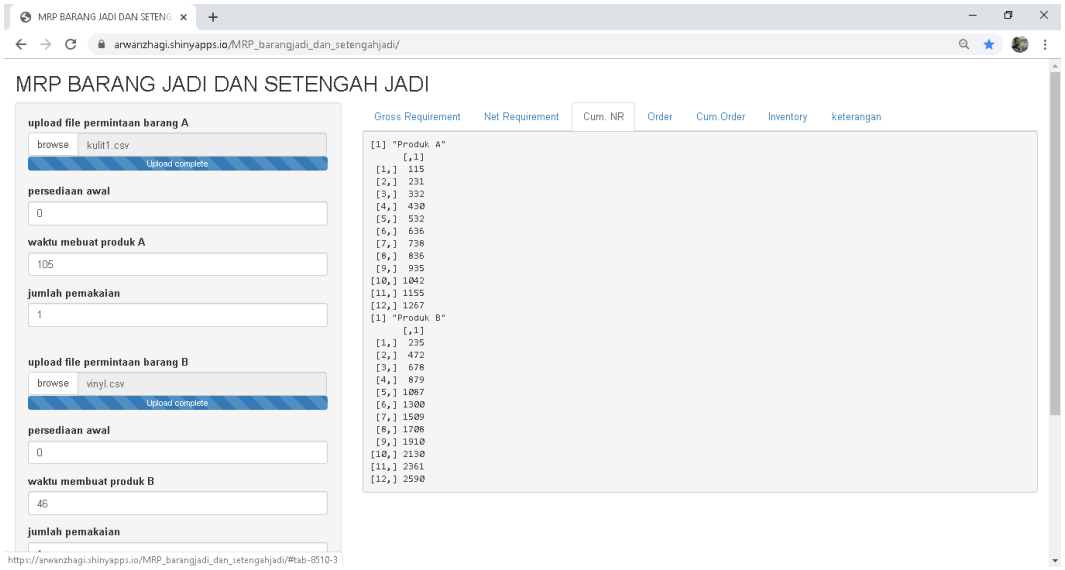
Sepatu	Periode 3							
	Proporsi	Nov	Des	Jan	Feb	Mar	Apr	Mei
Kulit	0.4705	115	116	101	98	102	104	102
Vinyl	0.5205	235	237	206	201	208	213	209

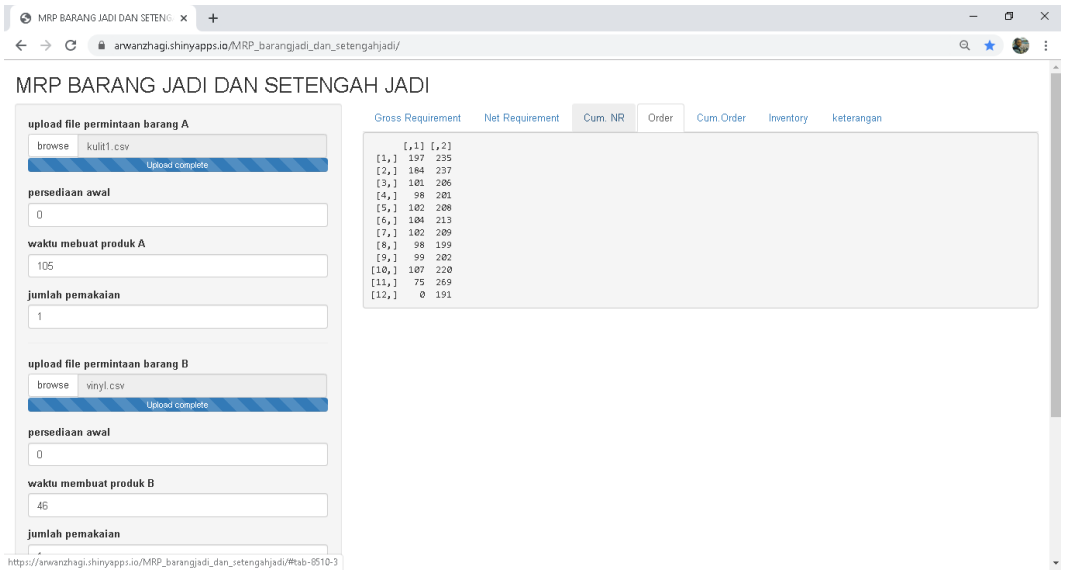
Sepatu	Periode 3				
	Jun	Jul	Agust	Sep	Okt
Kulit	98	99	107	113	112
Vinyl	199	202	220	231	229

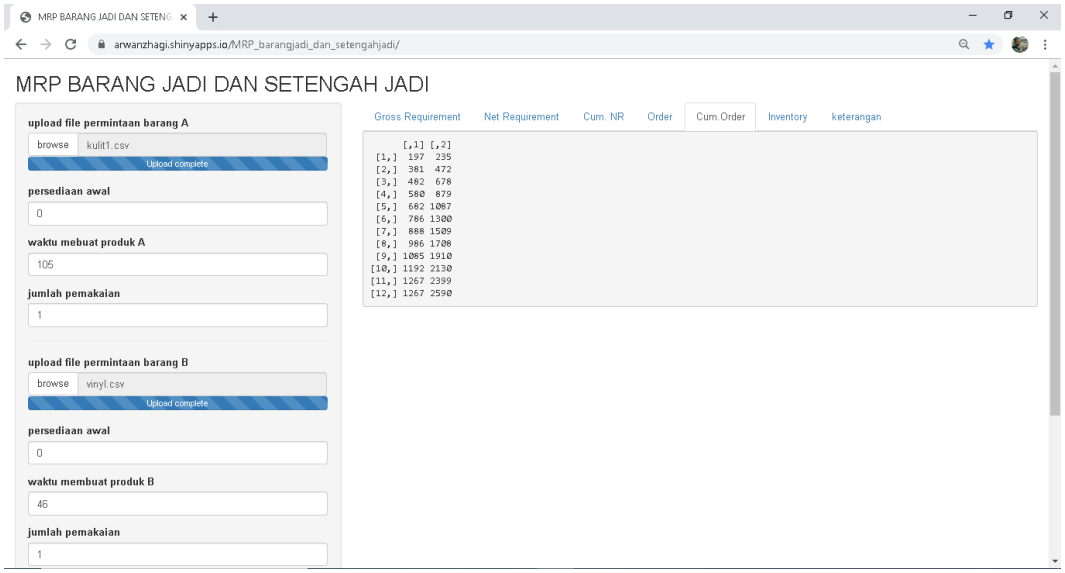
Lampiran 6 Hasil Output Program Aplikasi Perencanaan Produksi dan Pengendalian Persediaan untuk Barang Jadi

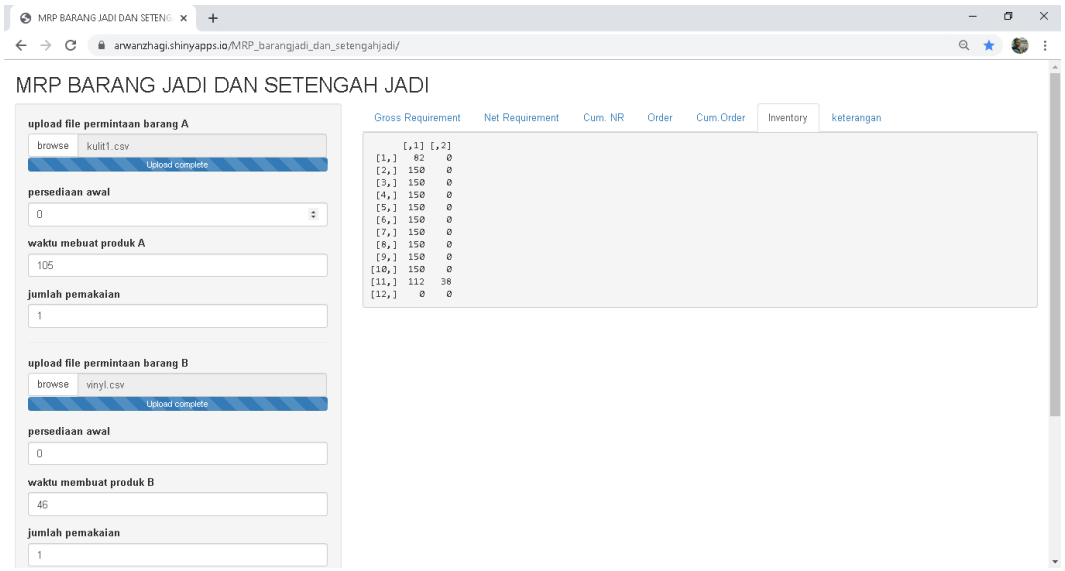


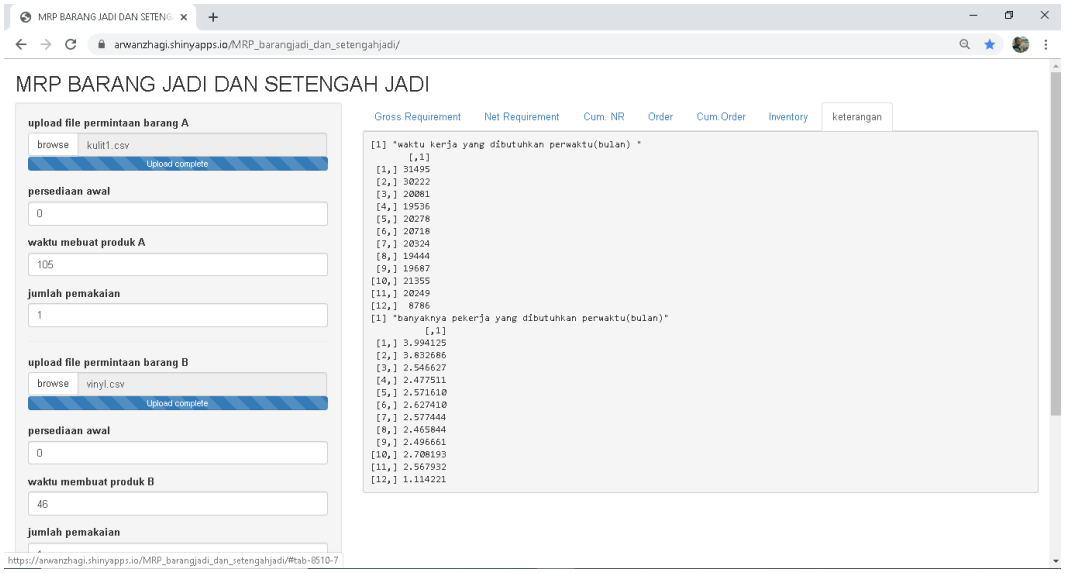



MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
kulit1.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
105
jumlah pemakaian
1
upload file permintaan barang B
browse
vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
46
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[1] "Produk A"
[,1]
[1,] 115
[2,] 231
[3,] 332
[4,] 430
[5,] 532
[6,] 636
[7,] 738
[8,] 836
[9,] 935
[10,] 1042
[11,] 1155
[12,] 1267
[1] "Produk B"
[,1]
[1,] 235
[2,] 472
[3,] 678
[4,] 879
[5,] 1067
[6,] 1300
[7,] 1509
[8,] 1708
[9,] 1910
[10,] 2130
[11,] 2361
[12,] 2590
https://arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/#tab-8510-3

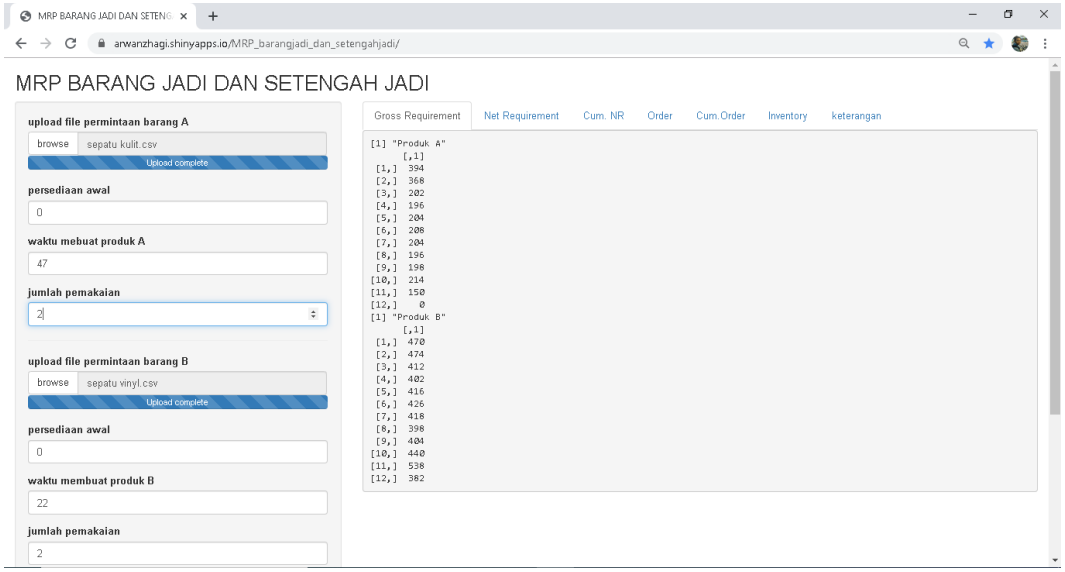

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
kulit1.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
105
jumlah pemakaian
1
upload file permintaan barang B
browse
vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
46
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 197 235
[2,] 184 237
[3,] 101 206
[4,] 98 201
[5,] 102 208
[6,] 104 213
[7,] 102 209
[8,] 98 199
[9,] 99 202
[10,] 107 220
[11,] 75 269
[12,] 0 191
https://arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/#tab-8510-3

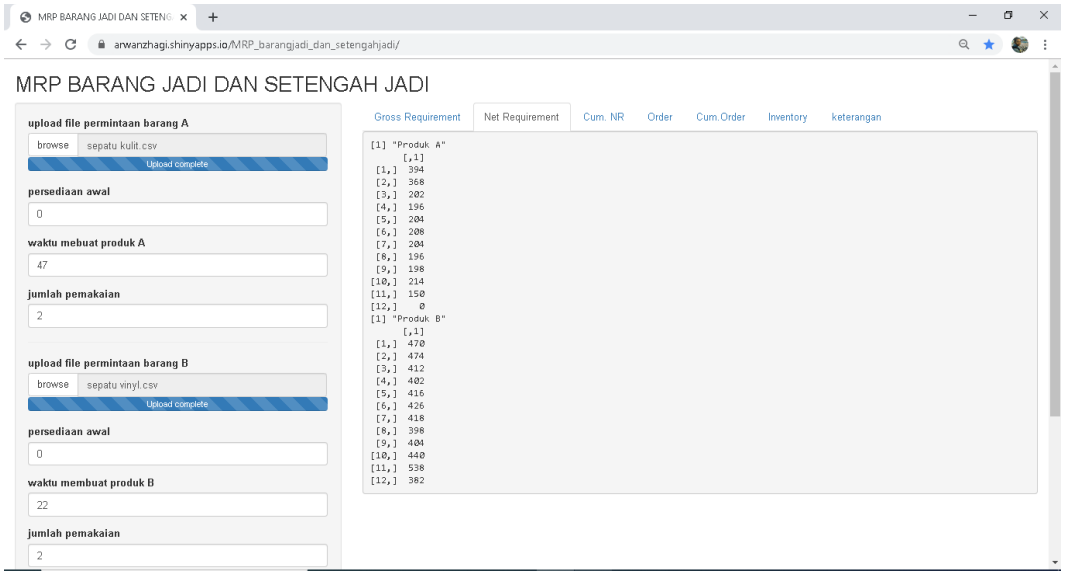

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
kulit1.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
105
jumlah pemakaian
1
upload file permintaan barang B
browse
vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
46
jumlah pemakaian
1
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 197 235
[2,] 381 472
[3,] 482 678
[4,] 580 879
[5,] 682 1087
[6,] 786 1300
[7,] 888 1509
[8,] 986 1708
[9,] 1085 1910
[10,] 1192 2130
[11,] 1267 2399
[12,] 1267 2590

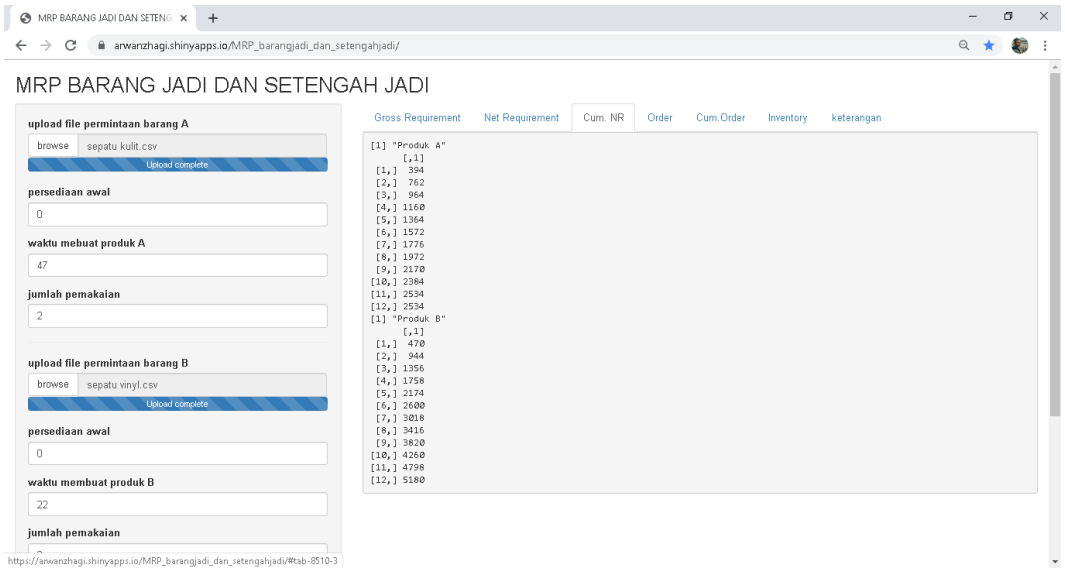

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
kulit1.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
105
jumlah pemakaian
1
upload file permintaan barang B
browse
vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
46
jumlah pemakaian
1
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 82 0
[2,] 150 0
[3,] 150 0
[4,] 150 0
[5,] 150 0
[6,] 150 0
[7,] 150 0
[8,] 150 0
[9,] 150 0
[10,] 150 0
[11,] 112 38
[12,] 0 0



Lampiran 7 Hasil Output Program Aplikasi Perencanaan Produksi dan Pengendalian Persediaan untuk Barang Setengah Jadi (Body)




MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
2
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[1] "Produk A"
[,1]
[1,] 394
[2,] 368
[3,] 202
[4,] 196
[5,] 204
[6,] 208
[7,] 204
[8,] 196
[9,] 198
[10,] 214
[11,] 150
[12,] 0
[1] "Produk B"
[,1]
[1,] 470
[2,] 474
[3,] 412
[4,] 402
[5,] 416
[6,] 426
[7,] 418
[8,] 398
[9,] 404
[10,] 440
[11,] 538
[12,] 382


MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[1] "Produk A"
[,1]
[1,] 394
[2,] 762
[3,] 964
[4,] 1160
[5,] 1364
[6,] 1572
[7,] 1776
[8,] 1972
[9,] 2170
[10,] 2384
[11,] 2534
[12,] 2534
[1] "Produk B"
[,1]
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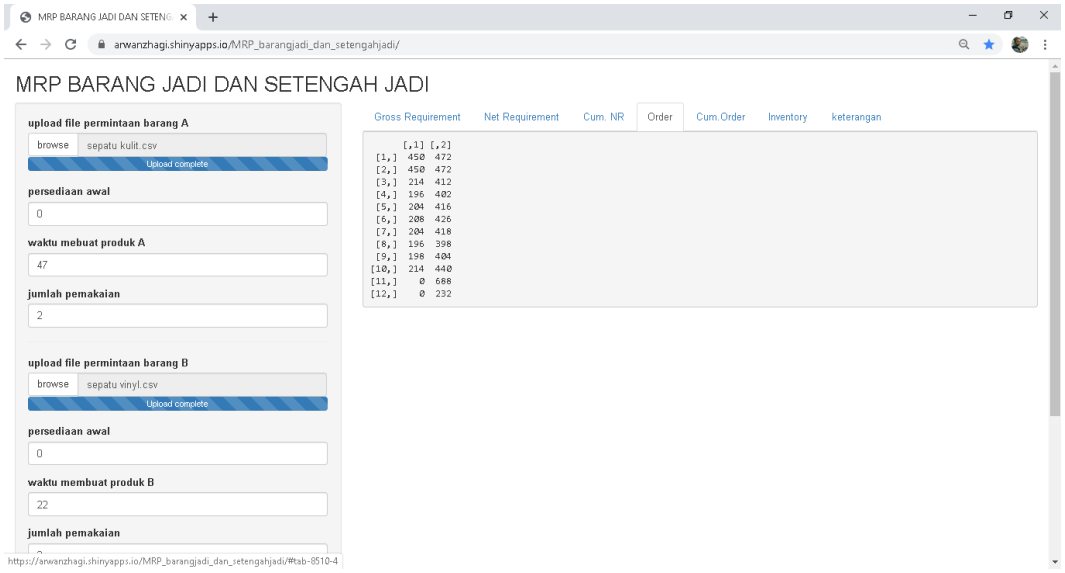
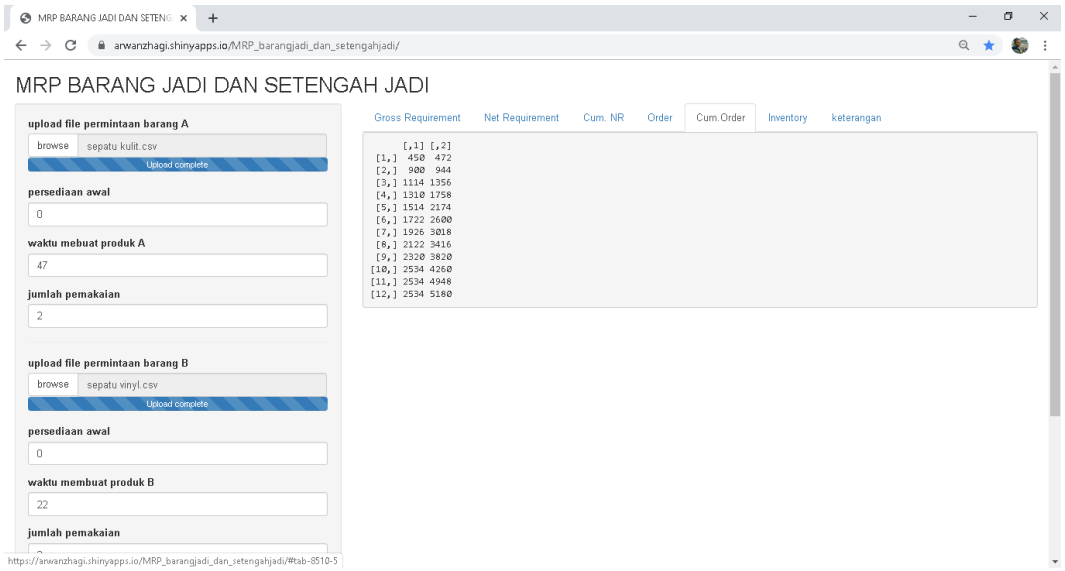
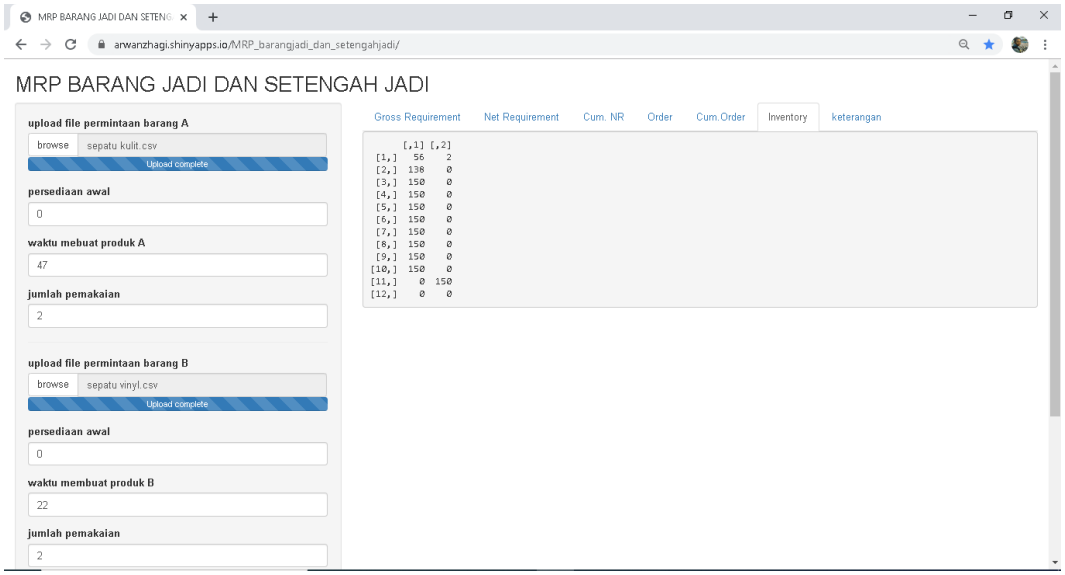
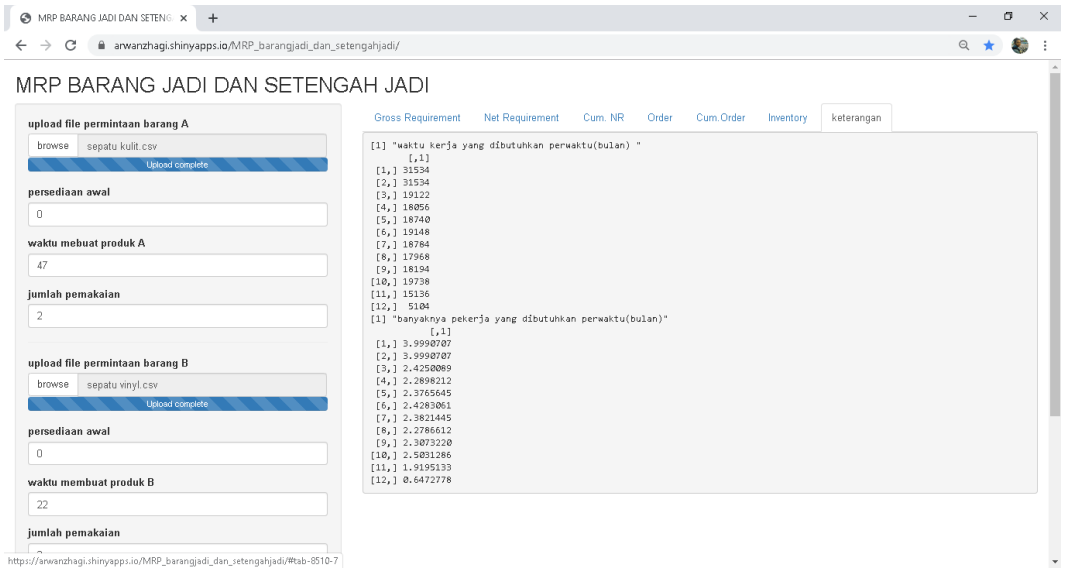
[2,] 944
[3,] 1356
[4,] 1758
[5,] 2174
[6,] 2600
[7,] 3018
[8,] 3416
[9,] 3820
[10,] 4260
[11,] 4798
[12,] 5180

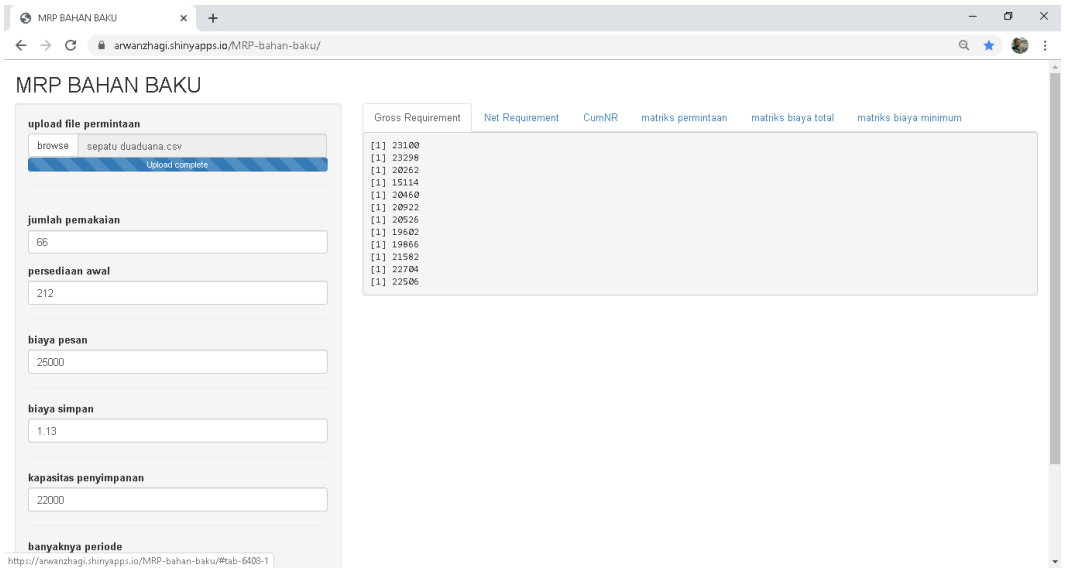

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 450 472
[2,] 450 472
[3,] 214 412
[4,] 196 402
[5,] 204 416
[6,] 208 426
[7,] 204 418
[8,] 196 398
[9,] 198 404
[10,] 214 440
[11,] 0 688
[12,] 0 232
https://arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/#tab-8510-4

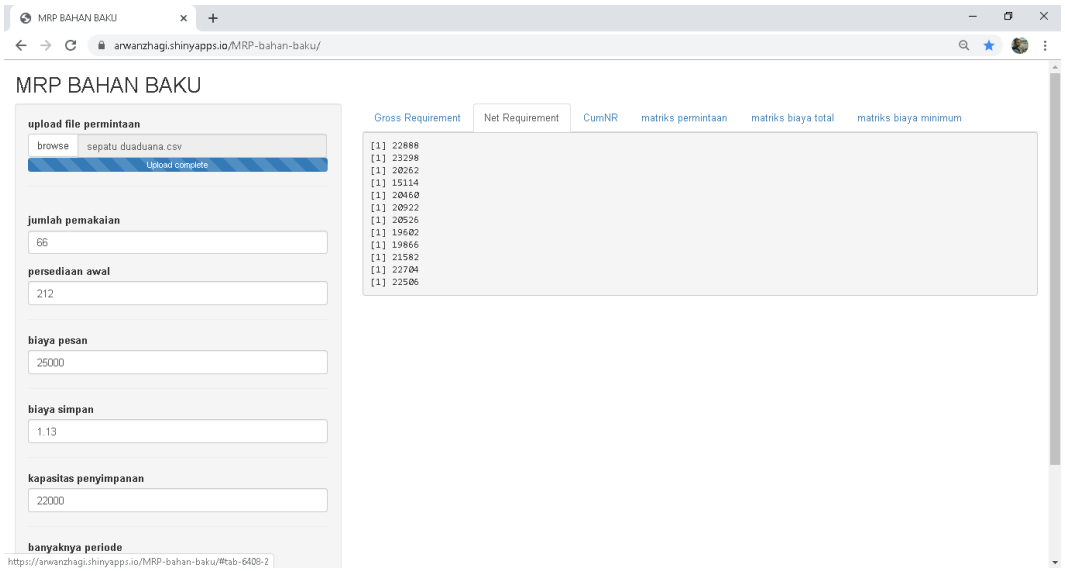

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 450 472
[2,] 900 944
[3,] 1114 1356
[4,] 1310 1758
[5,] 1514 2174
[6,] 1722 2600
[7,] 1926 3018
[8,] 2122 3416
[9,] 2320 3820
[10,] 2534 4260
[11,] 2534 4948
[12,] 2534 5180
https://arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/#tab-8510-5

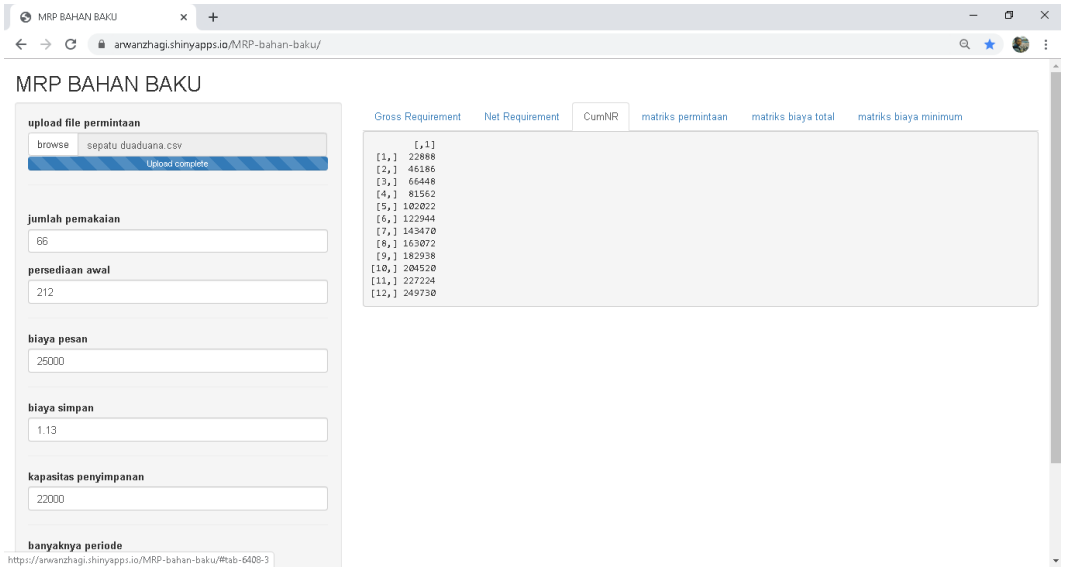

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
2
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[,1] [,2]
[1,] 56 2
[2,] 138 0
[3,] 150 0
[4,] 150 0
[5,] 150 0
[6,] 150 0
[7,] 150 0
[8,] 150 0
[9,] 150 0
[10,] 150 0
[11,] 0 150
[12,] 0 0

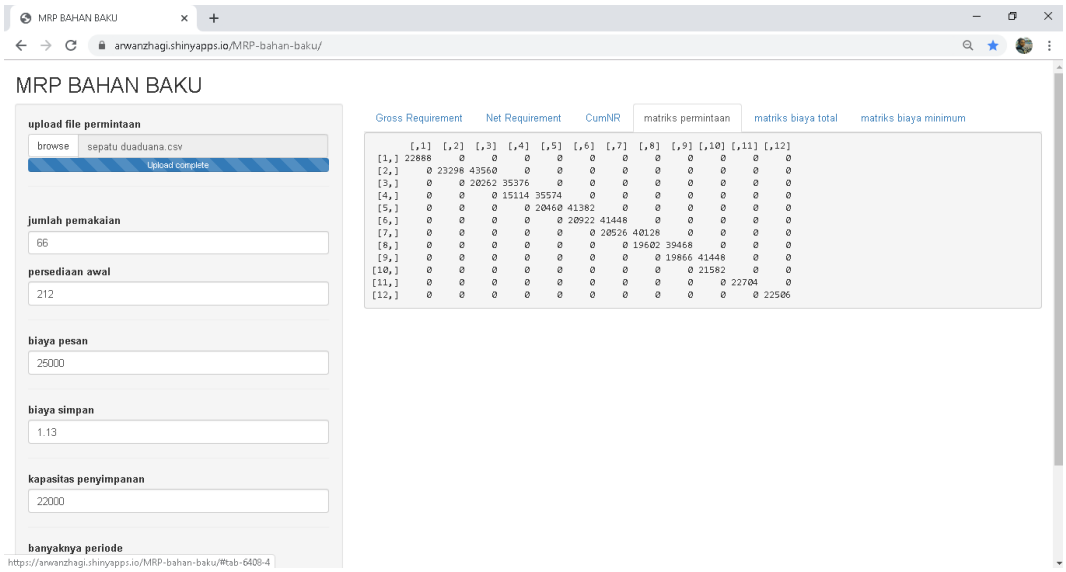

MRP BARANG JADI DAN SETENG
arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/
MRP BARANG JADI DAN SETENGAH JADI
upload file permintaan barang A
browse
sepatu kulit.csv
Upload complete
persediaan awal
0
waktu mebuat produk A
47
jumlah pemakaian
2
upload file permintaan barang B
browse
sepatu vinyl.csv
Upload complete
persediaan awal
0
waktu membuat produk B
22
jumlah pemakaian
Gross Requirement
Net Requirement
Cum. NR
Order
Cum.Order
Inventory
keterangan
[1] "waktu kerja yang dibutuhkan perwaktu(bulan) "
[,1]
[1,] 31534
[2,] 31534
[3,] 19122
[4,] 18056
[5,] 18740
[6,] 19148
[7,] 18784
[8,] 17968
[9,] 18194
[10,] 19738
[11,] 15136
[12,] 5104
[1] "banyaknya pekerja yang dibutuhkan perwaktu(bulan)"
[,1]
[1,] 3.9990707
[2,] 3.9990707
[3,] 2.4250089
[4,] 2.2898212
[5,] 2.3765645
[6,] 2.4283061
[7,] 2.3821445
[8,] 2.2786612
[9,] 2.3073220
[10,] 2.5031286
[11,] 1.9195133
[12,] 0.6472778
https://arwanzhagi.shinyapps.io/MRP_barangjadi_dan_setengahjadi/#tab-8510-7

Lampiran 8 Hasil Output Program Aplikasi Perencanaan Produksi dan Pengendalian Persediaan untuk Bahan Baku (Lem)






MRP BAHAN BAKU
arwanzhagi.shinyapps.io/MRP-bahan-baku/
MRP BAHAN BAKU
upload file permintaan
browse
sepatu duaduana.csv
Upload complete
jumlah pemakaian
66
persediaan awal
212
biaya pesan
25000
biaya simpan
1.13
kapasitas penyimpanan
22000
banyaknya periode
Gross Requirement
Net Requirement
CumNR
matriks permintaan
matriks biaya total
matriks biaya minimum
[,1]
[1,] 22888
[2,] 46186
[3,] 66448
[4,] 81562
[5,] 102022
[6,] 122944
[7,] 143470
[8,] 163072
[9,] 182938
[10,] 204520
[11,] 227224
[12,] 249730


MRP BAHAN BAKU
arwanzhagi.shinyapps.io/MRP-bahan-baku/
MRP BAHAN BAKU
upload file permintaan
browse
sepatu duaduana.csv
Upload complete
jumlah pemakaian
66
persediaan awal
212
biaya pesan
25000
biaya simpan
1.13
kapasitas penyimpanan
22000
banyaknya periode
Gross Requirement
Net Requirement
CumNR
matriks permintaan
matriks biaya total
matriks biaya minimum
[,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12]
[1,] 22888 0 0 0 0 0 0 0 0 0 0 0
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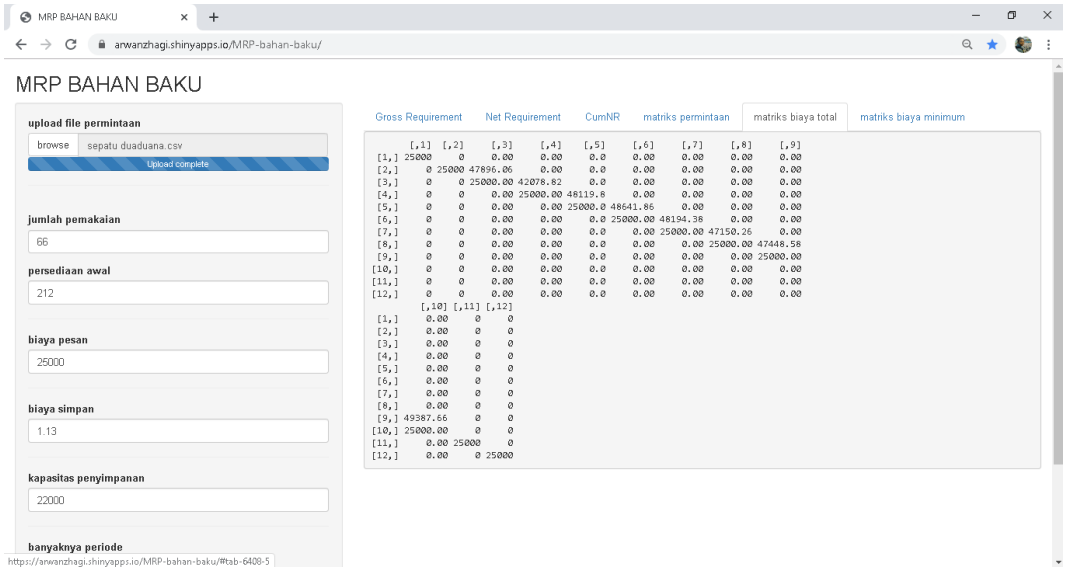
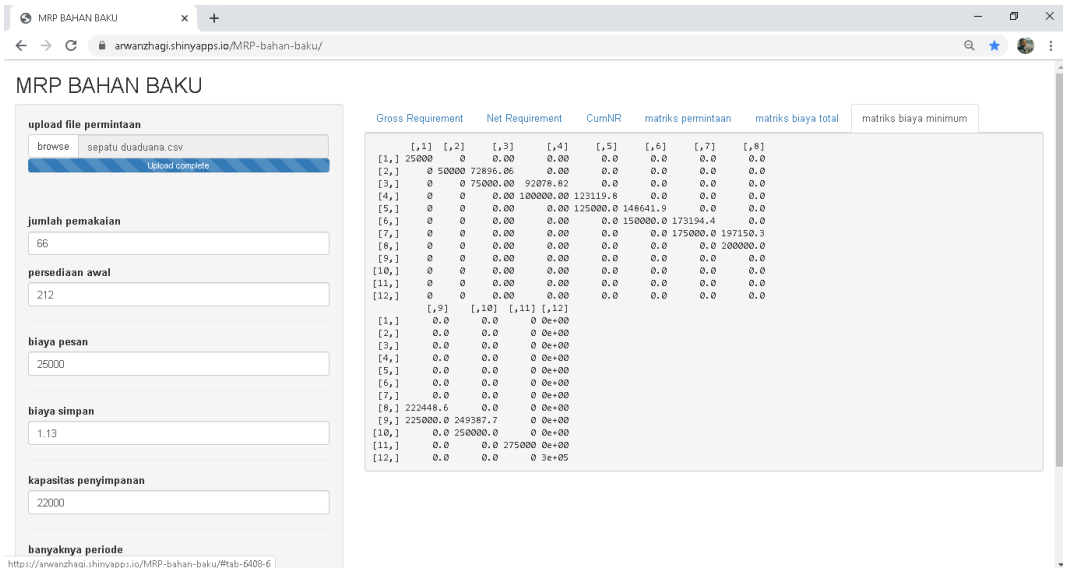
[4,] 0 0 0 15114 35574 0 0 0 0 0 0 0
[5,] 0 0 0 0 20460 41382 0 0 0 0 0 0
[6,] 0 0 0 0 0 20922 41448 0 0 0 0 0
[7,] 0 0 0 0 0 0 20526 40128 0 0 0 0
[8,] 0 0 0 0 0 0 0 19602 39468 0 0 0
[9,] 0 0 0 0 0 0 0 0 19866 41448 0 0
[10,] 0 0 0 0 0 0 0 0 0 21582 0 0
[11,] 0 0 0 0 0 0 0 0 0 0 22704 0
[12,] 0 0 0 0 0 0 0 0 0 0 0 22506


MRP BAHAN BAKU
arwanzhagi.shinyapps.io/MRP-bahan-baku/
MRP BAHAN BAKU
upload file permintaan
browse
sepatu duaduana.csv
Upload complete
jumlah pemakaian
66
persediaan awal
212
biaya pesan
25000
biaya simpan
1.13
kapasitas penyimpanan
22000
banyaknya periode
Gross Requirement
Net Requirement
CumNR
matriks permintaan
matriks biaya total
matriks biaya minimum
[,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9]
[1,] 25000 0 0.00 0.00 0.0 0.00 0.00 0.00 0.00
[2,] 0 25000 47896.06 0.00 0.0 0.00 0.00 0.00 0.00
[3,] 0 0 25000.00 42078.82 0.0 0.00 0.00 0.00 0.00
[4,] 0 0 0.00 25000.00 48119.8 0.00 0.00 0.00 0.00
[5,] 0 0 0.00 0.00 25000.0 48641.86 0.00 0.00 0.00
[6,] 0 0 0.00 0.00 0.0 25000.00 48194.38 0.00 0.00
[7,] 0 0 0.00 0.00 0.0 0.00 25000.00 47150.26 0.00
[8,] 0 0 0.00 0.00 0.0 0.00 0.00 25000.00 47448.58
[9,] 0 0 0.00 0.00 0.0 0.00 0.00 0.00 25000.00
[10,] 0 0 0.00 0.00 0.0 0.00 0.00 0.00 0.00
[11,] 0 0 0.00 0.00 0.0 0.00 0.00 0.00 0.00
[12,] 0 0 0.00 0.00 0.0 0.00 0.00 0.00 0.00
[,10] [,11] [,12]
[1,] 0.00 0 0
[2,] 0.00 0 0
[3,] 0.00 0 0
[4,] 0.00 0 0
[5,] 0.00 0 0
[6,] 0.00 0 0
[7,] 0.00 0 0
[8,] 0.00 0 0
[9,] 49387.66 0 0
[10,] 25000.00 0 0
[11,] 0.00 25000 0
[12,] 0.00 0 25000


MRP BAHAN BAKU
arwanzhagi.shinyapps.io/MRP-bahan-baku/
MRP BAHAN BAKU
upload file permintaan
browse
sepatu duaduana.csv
Upload complete
jumlah pemakaian
66
persediaan awal
212
biaya pesan
25000
biaya simpan
1.13
kapasitas penyimpanan
22000
banyaknya periode
Gross Requirement
Net Requirement
CumNR
matriks permintaan
matriks biaya total
matriks biaya minimum
[,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8]
[1,] 25000 0 0.00 0.00 0.0 0.0 0.0 0.0
[2,] 0 50000 72896.06 0.00 0.0 0.0 0.0 0.0
[3,] 0 0 75000.00 92078.82 0.0 0.0 0.0 0.0
[4,] 0 0 0.00 100000.00 123119.8 0.0 0.0 0.0
[5,] 0 0 0.00 0.00 125000.0 148641.9 0.0 0.0
[6,] 0 0 0.00 0.00 0.0 150000.0 173194.4 0.0
[7,] 0 0 0.00 0.00 0.0 0.0 175000.0 197150.3
[8,] 0 0 0.00 0.00 0.0 0.0 0.0 200000.0
[9,] 0 0 0.00 0.00 0.0 0.0 0.0 0.0
[10,] 0 0 0.00 0.00 0.0 0.0 0.0 0.0
[11,] 0 0 0.00 0.00 0.0 0.0 0.0 0.0
[12,] 0 0 0.00 0.00 0.0 0.0 0.0 0.0
[,9] [,10] [,11] [,12]
[1,] 0.0 0.0 0 0e+00
[2,] 0.0 0.0 0 0e+00
[3,] 0.0 0.0 0 0e+00
[4,] 0.0 0.0 0 0e+00
[5,] 0.0 0.0 0 0e+00
[6,] 0.0 0.0 0 0e+00
[7,] 0.0 0.0 0 0e+00
[8,] 222448.6 0.0 0 0e+00
[9,] 225000.0 249387.7 0 0e+00
[10,] 0.0 250000.0 0 0e+00
[11,] 0.0 0.0 275000 0e+00
[12,] 0.0 0.0 0 3e+05

Lampiran 9 MRP Barang Jadi

.Tabel MRP Sepatu Kulit

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	115	116	101	98	102	104	102	98
NR	115	116	101	98	102	104	102	98
CumNR	115	231	332	430	532	636	738	836
Order	197	184	101	98	102	104	102	98
CumOrder	197	381	482	580	682	786	888	986
Final Inventori	82	150	150	150	150	150	150	150

Bulan	Periode 3			
	Jul	Agust	Sep	Okt
GR	99	107	113	112
NR	99	107	113	112
CumNR	935	1042	1155	1267
Order	99	107	75	0
CumOrder	1085	1192	1267	1267
Final Inventori	150	150	112	0

Tabel MRP Sepatu Vinyl

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	235	237	206	201	208	213	209	199
NR	235	237	206	201	208	213	209	199
CumNR	235	472	678	879	1087	1300	1509	1708
Order	235	237	206	201	208	213	209	199
CumOrder	235	472	678	879	1087	1300	1509	1708
Final Inventori	0	0	0	0	0	0	0	0

Bulan	Periode 3			
	Jul	Agust	Sep	Okt
GR	202	220	231	229
NR	202	220	231	229
CumNR	1910	2130	2361	2590
Order	202	220	269	191
CumOrder	1910	2130	2399	2590
Final Inventori	0	0	38	0

Lampiran 10 MRP Barang Setengah Jadi

Tabel *MRP Body* Sepatu Kulit

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	394	368	202	196	204	208	204	196
NR	394	368	202	196	204	208	204	196
CumNR	394	762	964	1160	1364	1572	1776	1972
Order	450	450	214	196	204	208	204	196
CumOrder	450	900	1114	1310	1514	1722	1926	2122
Final Inventori	56	138	150	150	150	150	150	150

Bulan	Periode 3			
	Jul	Agust	Sep	Okt
GR	198	214	150	0
NR	198	214	150	0
CumNR	2170	2384	2534	2534
Order	198	214	0	0
CumOrder	2320	2534	2534	2534
Final Inventori	150	150	0	0

Tabel *MRP Body* Sepatu Vinyl

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	470	474	412	402	416	426	418	398
NR	470	474	412	402	416	426	418	398
CumNR	470	944	1356	1758	2174	2600	3018	3416
Order	472	472	412	402	416	426	418	398
CumOrder	472	944	1356	1758	2174	2600	3018	3416
Final Inventori	2	0	0	0	0	0	0	0

Bulan	Periode 3			
	Jul	Agust	Sep	Okt
GR	404	440	538	382
NR	404	440	538	382
CumNR	3820	4260	4798	5180
Order	404	440	688	232
CumOrder	3820	4260	4948	5180
Final Inventori	0	0	150	0

Tabel *MRP* alas Sepatu Kulit

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	394	368	202	196	204	208	204	196
NR	394	368	202	196	204	208	204	196
CumNR	394	762	964	1160	1364	1572	1776	1872
Order	544	368	202	196	204	208	204	196
CumOrder	544	912	1114	1310	1514	1722	1926	2122

Final Inventori	150	150	150	150	150	150	150	150
Bulan	Periode 3							
	Jul	Agust	Sep	Okt				
GR	198	214	150	0				
NR	198	214	150	0				
CumNR	2170	2384	2534	2534				
Order	198	214	0	0				
CumOrder	2320	2534	2534	2534				
Final Inventori	150	150	0	0				

Tabel *MRP* alas Sepatu Vinyl

Bulan	Periode 3							
	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun
GR	470	474	412	402	416	426	418	398
NR	470	474	412	402	416	426	418	398
CumNR	470	944	1356	1758	2174	2600	3018	3416
Order	470	474	412	402	416	426	418	398
CumOrder	470	944	1356	1758	2174	2600	3018	3416
Final Inventori	0	0	0	0	0	0	0	0
Bulan	Periode 3							
	Jul	Agust	Sep	Okt				
GR	404	440	538	382				
NR	404	440	538	382				
CumNR	3820	4260	4798	5180				
Order	404	440	688	232				
CumOrder	3820	4260	4948	5180				
Final Inventori	0	0	150	0				

Lampiran 11 MRP Bahan Baku

Tabel MRP Lem

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	23100	23298	20262	15114	20460	20922	20526
NR	22888	23298	20262	15114	20460	20922	20526
CumNR	22888	46186	66448	81562	102022	122944	143470
Order	22888	23298	35376	0	41382	0	40128
Final Inventori	0	0	15114	0	20922	0	19602

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	19602	19866	21582	22704	22506
NR	19602	19866	21582	22704	22506
CumNR	163072	182938	204520	227224	249730
Order	0	41448	0	22704	22506
Final Inventori	0	21582	0	22506	0

Tabel *MRP* Benang

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	350	353	307	229	310	317	311
NR	238	353	307	229	310	317	311
CumNR	238	591	898	1127	1437	1754	2065
Order	3675	0	0	0	0	0	0
Final Inventori	3437	3084	2777	2548	2238	1921	1610

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	297	301	327	344	341
NR	297	301	327	344	341
CumNR	2362	2663	2990	3334	3675
Order	0	0	0	0	0
Final Inventori	1313	1012	685	341	0

Tabel *MRP* Kain Keras

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	350	353	307	229	310	317	311
NR	294	353	307	229	310	317	311
CumNR	294	647	954	1183	1493	1810	2121
Order	1010	0	0	856	0	0	909
Final Inventori	660	307	0	627	317	0	598

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	297	301	327	344	341
NR	297	301	327	344	341
CumNR	2418	2719	3046	3390	3731
Order	0	0	1012	0	0
Final Inventori	301	0	685	341	0

Tabel *MRP* Sol

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	700	706	614	458	620	634	622
NR	587	706	614	458	620	634	622
CumNR	587	1293	1907	2365	2985	3619	4241
Order	700	706	1072	0	620	634	622
Final Inventori	0	0	458	0	0	0	0

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	594	602	654	688	682
NR	594	602	654	688	682
CumNR	4835	5437	6091	6779	7461
Order	594	602	654	688	682
Final Inventori	0	0	0	0	0

Tabel *MRP* Kulit

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	591	552	303	294	306	312	306
NR	556	552	303	294	306	312	306
CumNR	556	1108	1411	1705	2011	2323	2629
Order	591	552	597	0	306	312	306
Final Inventori	0	0	294	0	0	0	0

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	294	297	321	225	0

NR	294	297	321	225	0
CumNR	2923	3220	3541	3766	3766
Order	591	0	546	0	0
Final Inventori	297	0	225	0	0

Tabel *MRP* Vinyl

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	940	948	824	804	832	852	836
NR	728	948	824	804	832	852	836
CumNR	728	1676	2500	3304	4136	4988	5824
Order	940	948	824	804	832	852	836
Final Inventori	0	0	0	0	0	0	0

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	796	808	880	1076	764
NR	796	808	880	1076	764
CumNR	6620	7428	8308	9384	10148
Order	796	808	880	1076	764
Final Inventori	0	0	0	0	0

Tabel *MRP* Lubang Tali

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	1410	1422	1236	1206	1248	1278	1254
NR	0	0	738	1206	1248	1278	1254
CumNR	0	0	734	1940	3188	4466	5720
Order	0	0	1944	0	2526	0	2448

Final Inventori	0	0	1206	0	1278	0	1194
Bulan	Periode 3						
	Jun	Jul	Agust	Sep	Okt		
GR	1194	1212	1320	1614	1146		
NR	1194	1212	1320	1614	1146		
CumNR	6914	8126	9446	11060	12206		
Order	0	2532	0	2760	0		
Final Inventori	0	1320	0	1146	0		

Tabel *MRP* Tali

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	235	237	206	201	208	213	209
NR	124	237	206	201	208	213	209
CumNR	124	361	567	768	976	1189	1398
Order	678	0	0	622	0	0	610
Final Inventori	443	206	0	421	213	0	401
Bulan	Periode 3						
	Jun	Jul	Agust	Sep	Okt		
GR	199	202	220	269	191		
NR	199	202	220	269	191		
CumNR	1597	1799	2019	2288	2479		
Order	0	0	680	0	0		
Final Inventori	202	0	460	191	0		

Tabel *MRP* Laken

Bulan	Periode 3						
	Nov	Des	Jan	Feb	Mar	Apr	Mei
GR	1531	1500	1127	1098	1138	1164	1142
NR	1136	1500	1127	1098	1138	1164	1142
CumNR	1136	2636	3763	4861	5999	7163	8305
Order	1688	948	1421	804	1450	852	1436
Final Inventori	552	0	294	0	312	0	294

Bulan	Periode 3				
	Jun	Jul	Agust	Sep	Okt
GR	1090	1105	1201	1301	764
NR	1090	1105	1201	1301	764
CumNR	9395	10500	11701	13002	13766
Order	796	1651	880	1076	764
Final Inventori	0	546	225	0	0

Lampiran 12 Teks Coding untuk Pemprograman Peramalan

UI

```
library(shiny)
shinyUI(fluidPage(
  titlePanel("Forecast"),
  sidebarLayout(
    sidebarPanel(
      fileInput("file","upload the file",buttonLabel = "browse"),
      helpText("defaultmax 5mb"),
      tags$hr(),
      br(),
      selectInput(inputId = "exsmo",label = "pilih metode peramalan",choices =
c("exponential smoothing 1"="ses","exponential smoothing
2"="holt","exponential smoothing 3"="winter"),selected = FALSE)),
    mainPanel(
      uiOutput("tb"),
      uiOutput("tb1"))  )))
```

Server

```
library(shiny)
shinyServer(function(input,output){
   ######## upload data#########
  data<-reactive({
    file1<-input$file
    if(is.null(file1)){return()}
    read.table(file = file1$datapath,
               header = TRUE,
               sep = ';',
               stringsAsFactors = FALSE)})

  ####output file1#####
  output$file1<-renderPrint({
```

```
  if(is.null(data())){return()}
  input$file})

 ####output sum####
 output$sum<-renderPrint({
  if(is.null(data())){return()}
  summary(data())  })

 ####output data ####
 output$table<-renderPrint({
  if(is.null(data())){return()}
  data()})

 ####output time series####
 output$ts<-renderPrint({
  if(is.null(data())){return()}
  b<-as.matrix(data())
  a<-ts(b,frequency = 12)
  print(a)})

 ####output plot####
 output$plot<-renderPlot({
  c<-ts(data = a,frequency = 12)
  plot.ts(c, ylab="demand",
          xlim=c(1,5),
          ylim=c(15000,30000))})

 ####output holt winter #####
 output$exsmohw<-renderPrint({
  if(is.null(data())){return()}
  c<-ts(data = a,frequency = 12)
  if(input$exsmo=="ses"){
```

```
    HW1<-HoltWinters(x =c,beta=FALSE,gamma = FALSE)
    HW1.pred<- predict(HW1,12,prediction.interval = TRUE)
    print(HW1)
    print(HW1.pred)}
  else if(input$exsmo=="holt"){
    HW2<-HoltWinters(x =c,gamma = FALSE)
    HW2.pred<- predict(HW2,12,prediction.interval = TRUE)
    print(HW2)
    print(HW2.pred)}
  else if(input$exsmo=="winter"){
    HW3<-HoltWinters(x =c)
    HW3.pred<- predict(HW3,12,prediction.interval = TRUE)
    print(HW3)
    print(HW3.pred)}})

 ####output plot pred####
 output$plots<-renderPlot({
  if(is.null(data())){return()}
  c<-ts(data = a,frequency = 12)
  if(input$exsmo=="ses"){
    plot.ts(c, ylab="demand",
         xlim=c(1,5),
         ylim=c(15000,30000))
    lines(HW1$fitted[,1], lty=2, col="red") #fitted values
    lines(HW1.pred[,1], col="blue") #forecast value
    lines(HW1.pred[,2], col="seagreen",lty=2)
    lines(HW1.pred[,3], col="seagreen",lty=2)
    }
  else if(input$exsmo=="holt"){
    plot.ts(c, ylab="demand",
          xlim=c(1,5),
          ylim=c(15000,30000))
```

```
    lines(HW2$fitted[,1], lty=2, col="red") #fitted values
    lines(HW2.pred[,1], col="blue") #forecast value
    lines(HW2.pred[,2], col="seagreen",lty=2)
    lines(HW2.pred[,3], col="seagreen",lty=2)
    }
  else if(input$exsmo=="winter"){
    plot.ts(c, ylab="demand",
            xlim=c(1,5),
            ylim=c(15000,30000))
    lines(HW3$fitted[,1], lty=2, col="red") #fitted values
    lines(HW3.pred[,1], col="blue") #forecast value
    lines(HW3.pred[,2], col="seagreen",lty=2)
    lines(HW3.pred[,3], col="seagreen",lty=2) }    })

 ####output UI####
 output$tb<-renderUI({
    tabsetPanel(tabPanel("about file",verbatimTextOutput("file1")),
                tabPanel("summary",verbatimTextOutput("sum")),
                tabPanel("data",verbatimTextOutput("table")),
                tabPanel("data time series",verbatimTextOutput("ts")),
                tabPanel("plot time series",plotOutput("plot")),
                tabPanel("peramalan",verbatimTextOutput("exsmohw")),
                tabPanel("plots",plotOutput("plots"))) })    }  )
```

Lampiran 13 Teks Coding untuk Pemprograman Perencanan Produksi dan Pengendalian Persediaan untuk Barang Jadi dan Barang Setengah Jadi

UI

```
library(shiny)
shinyUI(fluidPage(
  titlePanel("MRP BARANG JADI DAN SETENGAH JADI"),
  sidebarLayout(
    sidebarPanel(
      fileInput("file","upload file permintaan barang A",multiple =
TRUE,buttonLabel = "browse"),
      numericInput("no1","persediaan awal",value = 0, min=0),
      numericInput("no2","waktu mebuat produk A",value = 105, min=0),
      numericInput("no5","jumlah pemakaian",value = 1, min=0),
      tags$hr(),
      fileInput("files","upload file permintaan barang B",multiple =
TRUE,buttonLabel = "browse"),
      numericInput("no8","persediaan awal",value = 0, min=0),
      numericInput("no3","waktu membuat produk B",value = 46, min=0),
      numericInput("no6","jumlah pemakaian",value = 1, min=0),
      tags$hr(),
      numericInput("no4","periode",value = 12,min = 2,max = 12),
      numericInput("no7","kapasitas produksi",value = 31542, min=0),
      numericInput("no9","kapasitas penyimpanan",value = 150, min=0) ),
    mainPanel(
     uiOutput("tb1")    ) ) ))
```

Server

```
library(shiny)
library(lpSolve)
library(rsconnect)
shinyServer(function(input,output){
```

```
  #### upload data Gross Requirement####
  data1<-reactive({
    file1<-input$file
    if(is.null(file1)){return()}
    read.table(file = file1$datapath,header = TRUE,sep = ';',stringsAsFactors =
FALSE) })
  data2<-reactive({
    file2<-input$files
    if(is.null(file2)){return()}
    read.table(file = file2$datapath,header = TRUE,sep = ';',stringsAsFactors =
FALSE)})

  ####output Gross Requirement####
  output$GR<-renderPrint({
    if(is.null(data1())){return()}
    if(is.null(data2())){return()}
    a<-data1()
    u2_kulit<-as.numeric(input$no5)
    u1_kulit<-as.numeric(input$no4)
    cum_kulit<-matrix(c(0),nrow = u1_kulit,ncol = 1)
    for(i in 1:u1_kulit){
      hasil1_kulit<-a[i,"permintaan"]*u2_kulit;
      cum_kulit[i,1]<-hasil1_kulit;}
    print("Produk A")
    print(cum_kulit)

  ####output Matriks Kumulatif Order####
  output$AV<-renderPrint({
    if(is.null(data1())){return()}
    if(is.null(data2())){return()}
    b<-data2()
    a<-data1()
```

```
   orderan<-matrix(lp ("min", f.obj, f.con, f.dir, f.rhs,all.int =
TRUE)$solution,ncol = 2 )
   cumorder<-matrix(c(0),u1,2)
   cumorder[1,1]<-orderan[1,1]
   cumorder[1,2]<-orderan[1,2]
   for (i in 2:u1) {
     cumorder[i,1]<- orderan[i,1] + cumorder[i-1,1] ;
     cumorder[i,2]<- orderan[i,2] + cumorder[i-1,2]}
   invent<-matrix(c(0),nrow = u1,ncol = 2,byrow = T)
   for (i in 1:u1) {
     invent[i,1]<-cumorder[i,1] - cumu[i,1];
     invent[i,2]<-cumorder[i,2] - cumub[i,1]
   }
   print(cumorder)  })

 ####output Net Requirement####
 output$NR<-renderPrint({
   if(is.null(data1())){return()}
   if(is.null(data2())){return()}
   a<-data1()
   u2_kulit<-as.numeric(input$no5)
   u<-input$no1
   u1<-as.numeric(input$no4)
   hasil2_kulit<-max(0,u)
   cum_kulit<-matrix(c(0),nrow = u1,ncol = 1)
   for(i in 1:u1){
     hasil1_kulit<-a[i,"permintaan"]*u2_kulit;
     hasil3_kulit<-max(0,hasil1_kulit-hasil2_kulit);
     hasil2_kulit<-max(0,hasil2_kulit-hasil1_kulit);
     cum_kulit[i,1]<-hasil3_kulit;}
   print("Produk A")
   print(cum_kulit)
```

```
####output cumulatif Net Requirement####
output$CumNR<-renderPrint({
 if(is.null(data1())){return()}
 if(is.null(data2())){return()}
 a<-data1()
 u2_kulit<-as.numeric(input$no5)
 u<-input$no1
 for(i in 1:u1){
  hasil1_kulit<-a[i,"permintaan"]*u2_kulit;
  hasil3_kulit<-max(0,hasil1_kulit - hasil2_kulit);
  hasil2_kulit<-max(0,hasil2_kulit - hasil1_kulit);
  cum_kulit[i,1]<-hasil3_kulit;}
 cumu_kulit<-matrix(cum_kulit,nrow=u1,ncol=1)
 for (i in 2:u1) {
  cumu_kulit[1,1]<-cum_kulit[1,1];
  cumu_kulit[i,1]<-cumu_kulit[i-1,1]+cum_kulit[i,1]}
 print("Produk A")
 print(cumu_kulit)

####output order####
output$Order<-renderPrint({
 if(is.null(data1())){return()}
 if(is.null(data2())){return()}
 b<-data2()
 a<-data1()
 u<-input$no1
 lipro<-matrix(c(0),(4*u1)+2,2*u1,byrow = TRUE)
 q1<-2*u1
 q2<-3*u1
 q3<-4*u1
```

```
  for (i in 1:u1) {lipro[i,i]=u6}
  for (i in 1:u1) {
    for (j in u1+1:q1) {
      if (i+u1==j){lipro[i,j]=u7} } }
  for (i in u1+1:q1) {
    for (j in 1:u1) {
      if (i>=j+u1 & i<=q1){lipro[i,j]=1} } }
  for (i in q1+1:q2) {
    for (j in u1+1:q1) {
      if (i>=j+u1 &i<=q2){lipro[i,j]=1} } }
  for (i in q2+3:q3) {
    for (j in u1+1:q1) {
      if (i>=j+q1+2 &i<=q3+2){lipro[i,j]=1} } }
  for (i in q2+3:q3) {
    for (j in 1:u1) {
      if (i>=j+q2+2 & i<=q3+2){lipro[i,j]=1} } }
  lipro[q2+1,1]=1
  lipro[q2+2,u1+1]=1
  f.obj<-matrix(c(1),1,2*u1)
  f.con<-lipro
  f.dir<-matrix(c(rep("<=",u1),rep(">=",(2*u1)+2), rep("<=",u1)),1,(4*u1)+2)
  f.rhs<-matrix(c(rep(kapasitaskerja,u1),cumu,cumub,cum[1,1],cumb[1,1],cumu
+cumub + u8),1)
  orderan<-matrix(lp ("min", f.obj, f.con, f.dir, f.rhs,all.int =
TRUE)$solution,ncol = 2 )
  cumorder<-matrix(c(0),u1,2)
  cumorder[1,1]<-orderan[1,1]
  cumorder[1,2]<-orderan[1,2]
  for (i in 2:u1) {
    cumorder[i,1]<- orderan[i,1] + cumorder[i-1,1] ;
    cumorder[i,2]<- orderan[i,2] + cumorder[i-1,2]}
  invent<-matrix(c(0),nrow = u1,ncol = 2,byrow = T)
```

```
    for (i in 1:u1) {
      invent[i,1]<-cumorder[i,1] - cumu[i,1];
      invent[i,2]<-cumorder[i,2] - cumub[i,1] }
    print(orderan)    })

#### output Inventory#####
  output$invent<-renderPrint({
    if(is.null(data1())){return()}
    if(is.null(data2())){return()}
    b<-data2()
    a<-data1()
    orderan<-matrix(lp ("min", f.obj, f.con, f.dir, f.rhs,all.int =
TRUE)$solution,ncol = 2 )
    cumorder<-matrix(c(0),u1,2)
    cumorder[1,1]<-orderan[1,1]
    cumorder[1,2]<-orderan[1,2]
    for (i in 2:u1) {
      cumorder[i,1]<- orderan[i,1] + cumorder[i-1,1] ;
      cumorder[i,2]<- orderan[i,2] + cumorder[i-1,2]}
    invent<-matrix(c(0),nrow = u1,ncol = 2,byrow = T)
    for (i in 1:u1) {
      invent[i,1]<-cumorder[i,1] - cumu[i,1];
      invent[i,2]<-cumorder[i,2] - cumub[i,1] }
    print(invent)  })

#### Output Keterangan#####
  output$waktu<-renderPrint({
    if(is.null(data1())){return()}
    if(is.null(data2())){return()}
    b<-data2()
    a<-data1()
```

```
   orderan<-matrix(lp ("min", f.obj, f.con, f.dir, f.rhs,all.int =
TRUE)$solution,ncol = 2 )
   waktu<-matrix(c(0),nrow = u1, ncol = 2, byrow = T)
   for (i in 1:u1) {
     waktu[i,1]=orderan[i,1]*u6
     waktu[i,2]=orderan[i,2]*u7
   }
   waktu1<-matrix(c(0),12,1)
   for (i in 1:12) {
     waktu1[i,1]=waktu[i,1]+waktu[i,2]
   }
   print("waktu kerja yang dibutuhkan perwaktu(bulan) ")
   print(waktu1)
   print("banyaknya pekerja yang dibutuhkan perwaktu(bulan)")
   print(waktu1/(60*26*7*0.87*0.83))  })

 output$tb1<-renderUI({
   tabsetPanel(tabPanel("Gross Requirement",verbatimTextOutput("GR")),
               tabPanel("Net Requirement",verbatimTextOutput("NR")),
               tabPanel("Cum. NR",verbatimTextOutput("CumNR")),
               tabPanel("Order",verbatimTextOutput("Order")),
               tabPanel("Cum.Order",verbatimTextOutput("AV")),
               tabPanel("Inventory",verbatimTextOutput("invent")),
               tabPanel("keterangan",verbatimTextOutput("waktu"))    ) }) } )
```

Lampiran 14 Teks Coding untuk Pemprograman Perencanan Produksi dan Pengendalian Persediaan untuk Bahan Baku

UI

```
library(shiny)
shinyUI(fluidPage(
  titlePanel("MRP BAHAN BAKU"),
  sidebarLayout(
    sidebarPanel(
      fileInput("file","upload file permintaan",multiple = TRUE,buttonLabel =
"browse"),
      tags$hr(),
      br(),
      numericInput("no6","jumlah pemakaian",value = 1, min=0),
      numericInput("no1","persediaan awal",value = 1000, min = 0),
      numericInput("no2","biaya pesan",value = 1200, min = 0),
      numericInput("no3","biaya simpan",value = 2, min = 0),
      numericInput("no4","kapasitas penyimpanan",value = 7000, min=0),
      tags$hr(),
      radioButtons("no5","banyaknya periode",choices =
c("mingguan"=4,"harian"=7,"bulanan"=12),selected = 12),
      tags$hr(),
      br(),
      br() ),
    mainPanel(
      uiOutput("tb1"),
      br(),
      br(),
      br(),
      br(),
      uiOutput("tb2")))))
```

Server

```
library(shiny)
shinyServer(function(input,output){
  data1<-reactive({
    file1<-input$file
    if(is.null(file1)){return()}
    read.table(file = file1$datapath,header = TRUE,sep = ';',stringsAsFactors =
FALSE)  })

  ####output Gross Requirement####
  output$GR<-renderPrint({
    if(is.null(data1())){return()}
    a<-data1()
    u_barang<-input$no6
    for(i in 1:12){
      hasil1<-a[i,"permintaan"]*u_barang
      print(hasil1)}  })

    ####output kumulatif NR####
  output$AV<-renderPrint({
    if(is.null(data1())){return()}
    a<-data1()
    cumu<-matrix(cum,nrow=u1,ncol=1)
    for (i in 2:u1) {
      cumu[1,1]<-cum[1,1];
      cumu[i,1]<-cumu[i-1,1]+cum[i,1]}
    cumu
    })

  ####output Net Requirement####
  output$NR<-renderPrint({
    if(is.null(data1())){return()}
```

```
  a<-data1()
  u_barang<-input$no6
  u<-input$no1
  hasil2<-max(0,u)
  for(i in 1:12){
    hasil1<-a[i,"permintaan"]*u_barang
    hasil3<-max(0,hasil1-hasil2)
    hasil2<-max(0,hasil2-hasil1)
    print(hasil3)    }  })

####output Matriks permintaan####
output$Mper<-renderPrint({
  if(is.null(data1())){return()}
  a<-data1()
  u_barang<-input$no6
  permintaan<-matrix(c(0),nrow = u1,ncol = u1)
   for (i in 1:u1) {
     permintaan[i,i]=cum[i,1]}
   for (i in 2:u1) {
     permintaan[1,i]=cumu[i,1]}
   if (u1==12){
     for (i in 2:11) {
       for (j in 3:12) { if (j>i)
         permintaan[i,j]=cumu[j,1] - cumu[i-1,1]}}}
   else if (u1==7){
     for (i in 2:6) {
       for (j in 3:7) { if (j>i)
         permintaan[i,j]=cumu[j,1] - cumu[i-1,1]}}}
   else if (u1==4){
     for (i in 2:3) {
       for (j in 3:4) { if (j>i)
         permintaan[i,j]=cumu[j,1] - cumu[i-1,1]}}}
```

```
   for (i in 1:u1) {
    for (j in 2:u1)
    {if (permintaan[i,j] - permintaan[i,i] > u2 & j>i)
     {permintaan[i,j]=0}}}
permintaan})

####output matriks biaya total####
output$Mtot<-renderPrint({
 if(is.null(data1())){return()}
 a<-data1()
 biayatotal<-permintaan
 else if (u1==4){
  for (i in 1:u1) {
   biayatotal[i,i]=u3}
  for (i in 1:u1) {
   for (j in 2:u1) {
    if (j>i & j==i+1){
     permi<-permintaan[i,j]-cum[i,1]
     biayatotal[i,j]=u3+(u4*permi)}
    }}
  for (i in 1:u1) {
   for (j in 3:u1) {
    if(j>i & j==i+2){
     sel<-permintaan[i,j]-cum[i,1]
     permi<-2*sel-cum[i+1,1]
     biayatotal[i,j]=u3+(u4*permi)}}}
  for (i in 1:u1) {
   for (j in 4:u1) {
    if(j>i & j==i+3){
     sel<-permintaan[i,j]-cum[i,1]
     sel1<-sel -cum[i+1,1]
     permi<-sel + (2*sel1) -cum[i+2,1]
```

```
        biayatotal[i,j]=u3+(u4*permi)}}}
    for (i in 1:u1) {
     for (j in 1:u1) {
      if (biayatotal[i,j]<u3){biayatotal[i,j]=0}
      if (permintaan[i,j]==0){biayatotal[i,j]=0}
     }}}
  biayatotal
  })

####output matriks biaya minimal####
output$Mmin<-renderPrint({
  if(is.null(data1())){return()}
  a<-data1()
  u<-input$no1
  biayaminimum<-matrix(biayatotal,u1,u1)
  for (i in 2:u1) {
   for (j in 3:u1) {
    if(j>i & biayaminimum[i,j]!=0){
     biayaminimum[i,j]=biayatotal[i,j]+((i-1)*u3)}}}
  biayaminimum  })

output$tb1<-renderUI({
  tabsetPanel(tabPanel("Gross Requirement",verbatimTextOutput("GR")),
              tabPanel("Net Requirement",verbatimTextOutput("NR")),
              tabPanel("CumNR",verbatimTextOutput("AV")),
              tabPanel("matriks permintaan",verbatimTextOutput("Mper")),
              tabPanel("matriks biaya total",verbatimTextOutput("Mtot")),
              tabPanel("matriks biaya minimum",verbatimTextOutput("Mmin"))))})})
```

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