```
1067  0  OUTPUT ACTIVATE SeasonalDecompositionOutput.
1067  0 M>  OUTPUT ACTIVATE SeasonalDecompositionOutput.
1068  0  TITLE 'Seasonal Decomposition'.
1068  0 M>  TITLE 'Seasonal Decomposition'.
```

```
1069  0  GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and Fo
recasting\Seasonal Decomposition\dataset.csv' /ENCODIN
            G='UTF8' /DELCASE=LINE /DELIMITERS=',' /QUALIFIER='"' /ARRANGEMENT
=DELIMITED /FIRSTCASE=2
1069  0 M>  GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and
 Forecasting\Seasonal Decomposition\dataset.csv' /ENCO
              DING='UTF8' /DELCASE=LINE /DELIMITERS=',' /QUALIFIER='"' /ARRAN
GEMENT=DELIMITED /FIRSTCASE=2
1070  0   /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A
8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16 gua
            rdian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoolsup A
8 famsup A8 paid A8 activities A8 nursery A8 higher A8
             internet A8 romantic A8 famrel F8.0 freetime F8.0 goout F8.0 Dalc
 F8.0 Walc F8.0 health F8.0 absences F8.0 G1 F8.0 G2 F
            8.0 G3 F8.0.
1070  0 M>   /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatu
s A8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16
              guardian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoo
lsup A8 famsup A8 paid A8 activities A8 nursery A8 hig
              her A8 internet A8 romantic A8 famrel F8.0 freetime F8.0 goout
F8.0 Dalc F8.0 Walc F8.0 health F8.0 absences F8.0 G1
              F8.0 G2 F8.0 G3 F8.0.
1071  0  DATASET NAME SeasonalDecompositionData.
1071  0 M>  DATASET NAME SeasonalDecompositionData.
1072  0  COMPUTE time_index=$CASENUM.
1072  0 M>  COMPUTE time_index=$CASENUM.
1073  0  EXECUTE.
1073  0 M>  EXECUTE.
1074  0  * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1074  0 M>  * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
1075  0  COMPUTE trend12=(G3+LAG(G3)+LAG(G3,2)+LAG(G3,3)+LAG(G3,4)+LAG(G3,5)+L
AG(G3,6)+LAG(G3,7)+LAG(G3,8)+LAG(G3,9)+LAG(G3,10)+LAG(
            G3,11))/12.
1075  0 M>  COMPUTE trend12=(G3+LAG(G3)+LAG(G3,2)+LAG(G3,3)+LAG(G3,4)+LAG(G3,5
)+LAG(G3,6)+LAG(G3,7)+LAG(G3,8)+LAG(G3,9)+LAG(G3,10)+L
              AG(G3,11))/12.
1076  0  COMPUTE detrended=G3-trend12.
1076  0 M>  COMPUTE detrended=G3-trend12.
1077  0  COMPUTE season_index=MOD(time_index-1,12)+1.
```

```
1077  0 M>  COMPUTE season_index=MOD(time_index-1,12)+1.
1078  0  MEANS TABLES=detrended BY season_index /CELLS=COUNT MEAN STDDEV.
1078  0 M>  MEANS TABLES=detrended BY season_index /CELLS=COUNT MEAN STDDEV.
```

Means

Notes

Output Created		18-JUL-2026 15:53:53
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Seasonal Decomposition\dataset.csv
	Active Dataset	SeasonalDecompositionData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	For each dependent variable in a table, user-defined missing values for the dependent and all grouping variables are treated as missing.
	Cases Used	Cases used for each table have no missing values in any independent variable, and not all dependent variables have missing values.
Syntax		MEANS TABLES=detrended BY season_index /CELLS=COUNT MEAN STDDEV.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.04

[SeasonalDecompositionData]

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
detrended * season_index	638	98.3%	11	1.7%	649	100.0%

Report

detrended

season_index	N	Mean	Std. Deviation
1.00	54	.5370	2.25368
2.00	53	.0550	2.85325
3.00	53	-.0833	2.56283
4.00	53	-.3632	3.99258
5.00	53	-.4371	2.85203
6.00	53	.3145	3.12800
7.00	53	.6195	2.88270
8.00	53	-.0362	2.69519
9.00	53	.1635	2.86749
10.00	53	.2343	2.87075
11.00	53	-.5314	2.77534
12.00	54	-.7963	2.73453
Total	638	-.0273	2.90333

```
1079  0  DESCRIPTIVES VARIABLES=trend12 detrended /STATISTICS=MEAN STDDEV MIN
MAX.
1079  0 M>  DESCRIPTIVES VARIABLES=trend12 detrended /STATISTICS=MEAN STDDEV M
IN MAX.
```

Descriptives

Notes

Output Created		18-JUL-2026 15:53:53
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Seasonal Decomposition\dataset.csv
	Active Dataset	SeasonalDecompositionData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=trend12 detrended /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.06

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
trend12	638	7.25	15.92	11.9129	1.59191
detrended	638	-12.25	8.67	-.0273	2.90333
Valid N (listwise)	638				

```
1080  0  * END METHOD-SPECIFIC SPSS WORKFLOW.
1080  0 M>  * END METHOD-SPECIFIC SPSS WORKFLOW.
1081  0  SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Se
asonal Decomposition\SPSS_Output\sav\seasonal-decompos
           ition_spss_ready_data.sav' /COMPRESSED.
```

```
1081  0 M>  SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting
\Seasonal Decomposition\SPSS_Output\sav\seasonal-decom
              position_spss_ready_data.sav' /COMPRESSED.
1082  0  ECHO 'Seasonal Decomposition'.
1082  0 M>  ECHO 'Seasonal Decomposition'.
Seasonal Decomposition
1083  0  ECHO 'Method type: decomposition_method'.
1083  0 M>  ECHO 'Method type: decomposition_method'.
Method type: decomposition_method
1084  0  ECHO 'Design: Additive classical decomposition of ordered G3 with ass
umed period 12.'.
1084  0 M>  ECHO 'Design: Additive classical decomposition of ordered G3 with
assumed period 12.'.
Design: Additive classical decomposition of ordered G3 with assumed period 12.
1085  0  ECHO 'Formula: y_t=Trend_t+Seasonal_t+Remainder_t'.
1085  0 M>  ECHO 'Formula: y_t=Trend_t+Seasonal_t+Remainder_t'.
Formula: y_t=Trend_t+Seasonal_t+Remainder_t
1086  0  ECHO 'Series order: source-row order'.
1086  0 M>  ECHO 'Series order: source-row order'.
Series order: source-row order
1087  0  ECHO 'seasonal_period = 12'.
1087  0 M>  ECHO 'seasonal_period = 12'.
seasonal_period = 12
1088  0  ECHO 'trend_variance = 2.5587455987978207'.
1088  0 M>  ECHO 'trend_variance = 2.5587455987978207'.
trend_variance = 2.5587455987978207
1089  0  ECHO 'seasonal_variance = 0.1635672377372171'.
1089  0 M>  ECHO 'seasonal_variance = 0.1635672377372171'.
seasonal_variance = 0.1635672377372171
1090  0  ECHO 'remainder_variance = 7.4411841962045235'.
1090  0 M>  ECHO 'remainder_variance = 7.4411841962045235'.
remainder_variance = 7.4411841962045235
1091  0  ECHO 'seasonal_amplitude = 1.3701446444502001'.
1091  0 M>  ECHO 'seasonal_amplitude = 1.3701446444502001'.
seasonal_amplitude = 1.3701446444502001
1092  0  ECHO 'reconstruction_max_error = 8.881784197001252e-16'.
1092  0 M>  ECHO 'reconstruction_max_error = 8.881784197001252e-16'.
reconstruction_max_error = 8.881784197001252e-16
1093  0  ECHO 'Cross-check status: pass'.
```

```
1093  0 M>  ECHO 'Cross-check status: pass'.
Cross-check status: pass
1094  0  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecas
ting\Seasonal Decomposition\SPSS_Output\spv\seasonal-d
            ecomposition_spss_output.spv'.
1094  0 M>  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Fore
casting\Seasonal Decomposition\SPSS_Output\spv\seasona
               l-decomposition_spss_output.spv'.
1095  0  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Time S
            eries Tests and Forecasting\Seasonal Decomposition\SPSS_Output\pdf
\seasonal-decomposition_spss_output.pdf'.
1095  0 M>  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Tim
               e Series Tests and Forecasting\Seasonal Decomposition\SPSS_Outp
ut\pdf\seasonal-decomposition_spss_output.pdf'.
```