```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
72
73         ********************************************************************************
74         *  TITLE :      SAS GRAIN PRICE PROJECT
75         *
76         *  DESCRIPTION: Final project for BIOS 7400 with Xiao Song, UGA, Spring 2022.
77         *               Cleaning data for grain price analysis.
78         *
79         *-------------------------------------------------------------------------------
80         *  JOB NAME:    cleaning.SAS
81         *  LANGUAGE:    SAS v9.4 (on demand for academics)
82         *
83         *  NAME:        Zane Billings
84         *  DATE:        2022-04-20
85         *
86         ********************************************************************************;
87
88         FOOTNOTE "Job run by Zane Billings on &SYSDATE at &SYSTIME";
89
90         TITLE 'Grain Price Analysis';
91
92         OPTIONS NODATE LS=95 PS=42;
93
94         LIBNAME HOME '/home/u59465388/SAS-Grain-Prices';
NOTE: Libref HOME refers to the same physical library as _TEMP1.
NOTE: Libref HOME was successfully assigned as follows:
      Engine:        V9
      Physical Name: /home/u59465388/SAS-Grain-Prices
95
96         ********************************************************************************;
97         * Macros;
98         ********************************************************************************;
99
100        * Variables for filtering the years to export in the cleaned dataset. I have
101        them set to the min/max values in the dataset, but this allows for easier
102        changing than specifying the years manually.;
103        %LET MINYEAR = 1866;
104        %LET MAXYEAR = 2021;
105
106        * Variable for controlling whether the following macro prints to the report.
107        It is easier to toggle this in one place than to add or remove the macro
108        calls later in the script.
109        1: Prints first &PRINTN observations of the dataset and the descriptor
110        portion as well.
111        Any other value (preferably 0): does not print (indeed, the macro will
112        not execute anything after the logical step).;
113        %LET VERBOSE = 1;
114        %LET PRINTN = 10;
115
116        * Macro for printing values and descriptor portion of data;
117        %MACRO DESCRIBE (DAT =, N = &PRINTN);
118        %IF %EVAL(&VERBOSE = 1) %THEN %DO;
119        PROC PRINT DATA = &DAT (OBS = &N) LABEL;
120        RUN;
121
122        PROC CONTENTS DATA = &DAT;
123        RUN;
124        %END;
125        %MEND;
126
127        ********************************************************************************;
128        * Data importing;
129        ********************************************************************************;
130
131        * Import the temperature anomaly data;
```

```
132         FILENAME NASATEMP "/home/u59465388/SAS-Grain-Prices/nasatemp.txt";
133         DATA TEMP;
134         * Read in the NASA temperature data. The data starts at line 9.;
135         INFILE NASATEMP FIRSTOBS = 9;
136
137         * Bring the next line of the INFILE into the input buffer;
138         INPUT @;
139
140         * If the first detectable word (which should be the YEAR) is not a numeric
141           digit, delete the row from the buffer, and thus do not import it.
142           This skips the blank rows and repeated header rows.
143           After DELETE is executed, return to the beginning of the data step.;
144         IF NOTDIGIT(SCAN(_INFILE_, 1)) THEN DELETE;
145
146         * If the YEAR is a number, import the current infile into the dataset;
147         ELSE DO;
148         * The data has missing values coded as '****', replace these with . so that
149           SAS interprets them as missing correctly.;
150         _INFILE_ = TRANSTRN(_INFILE_, "****", ".");
151         * Read in only the first 13 columns.;
152         INPUT YEAR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC;
153         END;
154
155         * Get the yearly average, and then divide by 100 to make the units degrees C.
156         Round to two decimal places.;
157         TEMP = ROUND(MEAN(OF JAN -- DEC) / 100, 0.01);
158         DROP JAN -- DEC;
159
160         * Give information labels to the variables;
161         LABEL
162         YEAR = "Calendar year"
163         TEMP = "Temperature diff. (deg. C)"
164         ;
165         RUN;

NOTE: The infile NASATEMP is:
      Filename=/home/u59465388/SAS-Grain-Prices/nasatemp.txt,
      Owner Name=u59465388,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=21Apr2022:19:12:22,
      File Size (bytes)=16794

NOTE: 164 records were read from the infile NASATEMP.
      The minimum record length was 0.
      The maximum record length was 104.
NOTE: The data set WORK.TEMP has 143 observations and 2 variables.
NOTE: DATA statement used (Total process time):
      real time           0.02 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              1079.31k
      OS Memory           186800.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2031  Switch Count  2
      Page Faults                       0
      Page Reclaims                     94
      Page Swaps                        0
      Voluntary Context Switches        17
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


166
167         %DESCRIBE(DAT = WORK.TEMP);

NOTE: There were 10 observations read from the data set WORK.TEMP.
```

```
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.04 seconds
      user cpu time       0.05 seconds
      system cpu time     0.01 seconds
      memory              3146.53k
      OS Memory           187676.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2032  Switch Count  0
      Page Faults                       0
      Page Reclaims                     286
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           24


NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.06 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              2475.71k
      OS Memory           188192.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2033  Switch Count  0
      Page Faults                       0
      Page Reclaims                     796
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           16


168
169         * Import the presidential party data;
170         FILENAME PRESI '/home/u59465388/SAS-Grain-Prices/presidential.csv';
171         DATA PRES;
172         * Set length of variables to ensure character vars don't get cut off;
173         LENGTH YEAR 4 PRES $ 20 PARTY $ 25;
174
175         * Import CSV file, nothing complicated like the last file;
176         INFILE PRESI DLM = ',' FIRSTOBS = 2;
177         INPUT YEAR PRES $ PARTY $;
178
179         * Abraham Lincoln and Andrew Johnson are listed as 'National Union' party
180         members, but this isn't terribly useful. Historically, Abraham Lincoln
181         was a Republican and Andrew Johnson was a Democrat, and the National Union
182         coalition was a transitionary step. So I'll recode these two for simplicity.;
183         IF PRES = "Abraham Lincoln" THEN PARTY = "Republican";
184         ELSE IF PRES = "Andrew Johnson" THEN PARTY = "Democrat";
185
186         * Add descriptive labels;
187         LABEL
188         YEAR = "Calendar year"
189         PRES = "President name"
190         PARTY = "President party"
191         ;
192         RUN;

NOTE: The infile PRESI is:
      Filename=/home/u59465388/SAS-Grain-Prices/presidential.csv,
      Owner Name=u59465388,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=21Apr2022:20:19:26,
      File Size (bytes)=7602
```

```
NOTE: 227 records were read from the infile PRESI.
      The minimum record length was 20.
      The maximum record length was 44.
NOTE: The data set WORK.PRES has 227 observations and 3 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              887.53k
      OS Memory           187056.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2034  Switch Count  2
      Page Faults                       0
      Page Reclaims                     128
      Page Swaps                        0
      Voluntary Context Switches        17
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


193
194        * The presidential data only goes through 2013, so we will have to manually
195        input the 2013 - 2022 data and append that to the end.;
196        DATA PRES_END;
197        LENGTH YEAR 4 PRES $ 20 PARTY $ 25;
198        INPUT YEAR PRES $ PARTY $;
199        LABEL
200        YEAR = "Calendar year"
201        PRES = "President name"
202        PARTY = "President party"
203        ;
204        INFILE DATALINES DSD DLM = " ";
205        DATALINES;

NOTE: The data set WORK.PRES_END has 9 observations and 3 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              790.81k
      OS Memory           187056.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2035  Switch Count  2
      Page Faults                       0
      Page Reclaims                     127
      Page Swaps                        0
      Voluntary Context Switches        13
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


215        ;
216        RUN;
217
218        * Now append the second dataset to the end of the first;
219        PROC APPEND BASE = WORK.PRES DATA = WORK.PRES_END;
220        RUN;

NOTE: Appending WORK.PRES_END to WORK.PRES.
NOTE: There were 9 observations read from the data set WORK.PRES_END.
NOTE: 9 observations added.
NOTE: The data set WORK.PRES has 236 observations and 3 variables.
NOTE: PROCEDURE APPEND used (Total process time):
      real time           0.00 seconds
```

```
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              1117.65k
      OS Memory           187576.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2036  Switch Count  0
      Page Faults                       0
      Page Reclaims                     154
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           8


221
222         %DESCRIBE(DAT = WORK.PRES);

NOTE: There were 10 observations read from the data set WORK.PRES.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.02 seconds
      user cpu time       0.03 seconds
      system cpu time     0.00 seconds
      memory              1560.37k
      OS Memory           187936.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2037  Switch Count  0
      Page Faults                       0
      Page Reclaims                     318
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           24


NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.05 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              1858.12k
      OS Memory           188200.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2038  Switch Count  0
      Page Faults                       0
      Page Reclaims                     793
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           16


223
224         * Import the inflation data;
225         FILENAME INFL '/home/u59465388/SAS-Grain-Prices/inflation_data.csv';
226         DATA INFLATION;
227         * Import CSV file, easy like the presidential data;
228         INFILE INFL DLM = ',' FIRSTOBS = 2;
229         INPUT YEAR VALUE INFL;
230
231         * Create a new column for relative 'worth': 1 / value in 1886 dollars
232           is the 'buying power' of $1 relative to an 1866 dollar.;
233         PWR = ROUND(1 / VALUE, 0.01);
234
235         * Assign descriptive lables;
```

```
236         LABEL
237         YEAR = 'Calendar year'
238         VALUE = 'Adjusted value'
239         INFL = 'Rate of inflation'
240         PWR = 'Buying power'
241         ;
242         RUN;

NOTE: The infile INFL is:
      Filename=/home/u59465388/SAS-Grain-Prices/inflation_data.csv,
      Owner Name=u59465388,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=22Apr2022:09:42:44,
      File Size (bytes)=2604

NOTE: 157 records were read from the infile INFL.
      The minimum record length was 14.
      The maximum record length was 16.
NOTE: The data set WORK.INFLATION has 157 observations and 4 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.01 seconds
      memory              883.93k
      OS Memory           187060.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2039  Switch Count  2
      Page Faults                       0
      Page Reclaims                     129
      Page Swaps                        0
      Voluntary Context Switches        15
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


243
244         %DESCRIBE(DAT = WORK.INFLATION);

NOTE: There were 10 observations read from the data set WORK.INFLATION.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.03 seconds
      user cpu time       0.03 seconds
      system cpu time     0.00 seconds
      memory              1526.21k
      OS Memory           187940.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2040  Switch Count  0
      Page Faults                       0
      Page Reclaims                     319
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           24



NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.05 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              1826.53k
      OS Memory           188200.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2041  Switch Count  0
      Page Faults                       0
```

```
Page Reclaims                     793
Page Swaps                        0
Voluntary Context Switches        0
Involuntary Context Switches      0
Block Input Operations            0
Block Output Operations           32
```

```
245
246        * Import the feed grains data. This is a complex and messy excel spreadsheet
247        that is easy to manually view but difficult to use as actual data. For
248        this project, I will only clean the first sheet.;
249        * In the current form, importing the data will be quite complicated and I think
250        impossible using PROC IMPORT. So I opened the dataset in Excel and exported
251        the sheet that I needed as a CSV file, which is what I'll import here.;
252        FILENAME FDGRN '/home/u59465388/SAS-Grain-Prices/fg-sheet1.csv';
253
254        DATA ALLGRNS;
255        * Import the CSV file;
256        INFILE FDGRN DLM = ',' DSD FIRSTOBS = 9 MISSOVER;
257
258        * SAS doesn't like the missing values being denoted by ,, even with the DSD
259        option, and has a hard time parsing the numeric values. So, I'll import
260        all of the variables as character variables with silly names. The
261        names are uninformative, but easy to use all together in SAS statements.
262          Note that I have also included the trailing @ so I can check the next line
263        for all blanks, and delete the line before being read if that is the case.;
264        INPUT GRN $ YR $ V1 $ V2 $ V3 $ V4 $ V5 $ V6 $ @;
265
266        * If the next line (@) is all missing, do not read it in;
267        IF MISSING(YR) THEN DELETE;
268
269        * The grain variable is only denoted once, and is missing for all other
270        records in the time series. This part of the code saves the most recent
271        non-missing value of GRN, and then uses it to fill in the value of
272        all missing GRN values until it finds a new non-missing value.;
273        IF NOT MISSING(GRN) THEN DO;
274        TMP = GRN;
275        RETAIN TMP;
276        END;
277        ELSE GRN = TMP;
278
279        * Create a YEAR variable as the first four digits of the YR variable, which
280        looks like ####/##. Use INPUT() to make this new variable numeric.;
281        YEAR = INPUT(SUBSTR(YR, 1, 4), 4.);
282
283        * Convert the imported character variables to numeric variables. Since SAS
284        cannot modify variable types in place, we have to create two arrays. One
285        array (_CHA) holds the placeholder character variables, and the second array
286        (_NUM) holds the newly declared numeric variables with somewhat better
287        names. Then we handle the missing character values explicitly to prevent SAS
288        from complaining about the blanks, and use INPUT to parse the remaining
289        values to numbers. We use the comma informat here since some of the
290        numeric values have commas as place value separators.;
291        ARRAY _CHA{6} $ V1 - V6;
292        ARRAY _NUM{6} ACR HVT PRD YLD PCE LNR;
293        DO I = 1 TO 6;
294        IF MISSING(_CHA{I}) THEN _NUM{I} = .;
295        ELSE _NUM{I} = INPUT(_CHA{I}, COMMA8.);
296        END;
297
298        * Compute the percent change from the previous year;
299        PCT = ROUND(DIF(PCE) / LAG(PCE) * 100, 0.01);
300
301        * Compute the log of the price;
302        LPE = LOG10(PCE);
303
```

```
304         * Drop all of the temporary and placeholder variables that we don't need in
305         the cleaned dataset;
306         DROP TMP YR V1 - V6 I;
307
308         * Assign descriptive labels to the remaining useful variables.;
309         LABEL
310         GRN = "Grain commodity"
311         YEAR = "Calendar year"
312         ACR = "Acerage (M)"
313         HVT = "Acres harvested (M)"
314         PRD = "Bushels produced (M)"
315         YLD = "Yield (bushels per acre)"
316         PCE = "Price per bushel"
317         LPE = "log10 price per bushel"
318         LNR = "Loan rate per bushel"
319         PCT = "Pct change in price"
320         ;
321         RUN;

NOTE: The infile FDGRN is:
      Filename=/home/u59465388/SAS-Grain-Prices/fg-sheet1.csv,
      Owner Name=u59465388,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=21Apr2022:20:52:21,
      File Size (bytes)=25338

NOTE: 582 records were read from the infile FDGRN.
      The minimum record length was 8.
      The maximum record length was 124.
NOTE: Missing values were generated as a result of performing an operation on missing values.
      Each place is given by: (Number of times) at (Line):(Column).
      1 at 299:8    1 at 299:23   1 at 299:34
NOTE: The data set WORK.ALLGRNS has 571 observations and 10 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              919.18k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2042  Switch Count  2
      Page Faults                       0
      Page Reclaims                     129
      Page Swaps                        0
      Voluntary Context Switches        20
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


322
323         %DESCRIBE(DAT = WORK.ALLGRNS);

NOTE: There were 10 observations read from the data set WORK.ALLGRNS.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.05 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              1602.53k
      OS Memory           187940.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2043  Switch Count  0
      Page Faults                       0
      Page Reclaims                     332
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
```

```
      Block Input Operations           0
      Block Output Operations          16


NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.06 seconds
      user cpu time       0.07 seconds
      system cpu time     0.00 seconds
      memory              1883.84k
      OS Memory           188200.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                       2044  Switch Count  0
      Page Faults                      0
      Page Reclaims                    795
      Page Swaps                       0
      Voluntary Context Switches       0
      Involuntary Context Switches     1
      Block Input Operations           0
      Block Output Operations          48


324
325         ********************************************************************************;
326         * Data merging;
327         ********************************************************************************;
328
329         * Next, we need to do a one-to-many merge of the four datasets by year. The
330         grains dataset has up to four records for each year, so the other three
331         datasets will need to be replicated.;
332
333         * First, we must sort all data sets by year. This macro will sort an arbitrary
334         number of datasets. Note that it mutates currently existing datasets rather
335         than assigning new names to the sorted datasets.;
336
337         %MACRO SORTALL (DAT = , BYVAR = );
338         %LET N = %SYSFUNC(COUNTW(&DAT));
339         %DO I = 1 %TO &N;
340         PROC SORT DATA = %SCAN(&DAT, &I);
341         BY &BYVAR;
342         RUN;
343         %END;
344         %MEND;
345
346         %SORTALL(
347         DAT = ALLGRNS INFLATION PRES TEMP,
348         BYVAR = YEAR
349         );

NOTE: There were 571 observations read from the data set WORK.ALLGRNS.
NOTE: The data set WORK.ALLGRNS has 571 observations and 10 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              816.81k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                       2045  Switch Count  2
      Page Faults                      0
      Page Reclaims                    140
      Page Swaps                       0
      Voluntary Context Switches       14
      Involuntary Context Switches     0
      Block Input Operations           0
      Block Output Operations          264
```

```
NOTE: There were 157 observations read from the data set WORK.INFLATION.
NOTE: The data set WORK.INFLATION has 157 observations and 4 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              825.09k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2046  Switch Count  2
      Page Faults                       0
      Page Reclaims                     150
      Page Swaps                        0
      Voluntary Context Switches        15
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


NOTE: There were 236 observations read from the data set WORK.PRES.
NOTE: The data set WORK.PRES has 236 observations and 3 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              929.40k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2047  Switch Count  2
      Page Faults                       0
      Page Reclaims                     148
      Page Swaps                        0
      Voluntary Context Switches        16
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


NOTE: There were 143 observations read from the data set WORK.TEMP.
NOTE: The data set WORK.TEMP has 143 observations and 2 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              834.25k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2048  Switch Count  2
      Page Faults                       0
      Page Reclaims                     151
      Page Swaps                        0
      Voluntary Context Switches        15
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


350
351        * Now we can do the actual merge. Only the records with admissible years
352        (specified by the macro variables &MINYEAR and &MAXYEAR respectively)
353        will be read in and included in the merge.;
354
355        DATA HOME.GRAINS;
```

```
356         MERGE ALLGRNS INFLATION PRES TEMP;
357         WHERE &MINYEAR <= YEAR <= &MAXYEAR;
358         BY YEAR;
359         RUN;

NOTE: MERGE statement has more than one data set with repeats of BY values.
NOTE: There were 571 observations read from the data set WORK.ALLGRNS.
      WHERE (YEAR>=1866 and YEAR<=2021);
NOTE: There were 156 observations read from the data set WORK.INFLATION.
      WHERE (YEAR>=1866 and YEAR<=2021);
NOTE: There were 157 observations read from the data set WORK.PRES.
      WHERE (YEAR>=1866 and YEAR<=2021);
NOTE: There were 142 observations read from the data set WORK.TEMP.
      WHERE (YEAR>=1866 and YEAR<=2021);
NOTE: The data set HOME.GRAINS has 571 observations and 16 variables.
NOTE: DATA statement used (Total process time):
      real time           0.02 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              2054.50k
      OS Memory           188100.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2049  Switch Count  10
      Page Faults                       0
      Page Reclaims                     281
      Page Swaps                        0
      Voluntary Context Switches        76
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


360
361         PROC SORT DATA = HOME.GRAINS;
362         BY GRN YEAR;
363         RUN;

NOTE: There were 571 observations read from the data set HOME.GRAINS.
NOTE: The data set HOME.GRAINS has 571 observations and 16 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.02 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              928.93k
      OS Memory           187320.00k
      Timestamp           04/23/2022 01:04:04 AM
      Step Count                        2050  Switch Count  3
      Page Faults                       0
      Page Reclaims                     151
      Page Swaps                        0
      Voluntary Context Switches        58
      Involuntary Context Switches      0
      Block Input Operations            288
      Block Output Operations           264


364
365         %DESCRIBE(DAT = HOME.GRAINS);

NOTE: There were 10 observations read from the data set HOME.GRAINS.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.08 seconds
      user cpu time       0.08 seconds
      system cpu time     0.00 seconds
      memory              979.37k
      OS Memory           187060.00k
      Timestamp           04/23/2022 01:04:05 AM
```

```
      Step Count                        2051  Switch Count  0
      Page Faults                       0
      Page Reclaims                     98
      Page Swaps                        0
      Voluntary Context Switches        9
      Involuntary Context Switches      0
      Block Input Operations            288
      Block Output Operations           24


NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.08 seconds
      user cpu time       0.08 seconds
      system cpu time     0.00 seconds
      memory              2065.53k
      OS Memory           188208.00k
      Timestamp           04/23/2022 01:04:05 AM
      Step Count                        2052  Switch Count  0
      Page Faults                       0
      Page Reclaims                     1017
      Page Swaps                        0
      Voluntary Context Switches        4
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           64


366
367        ********************************************************************************;
368        * END OF FILE;
369        ********************************************************************************;
370
371
372        OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
384
```