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NOTE: SAS (r) Proprietary Software 9.4 (TS1M5)  
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NOTE: This session is executing on the X64\_10PRO platform.

NOTE: Updated analytical products:

SAS/STAT 14.3  
SAS/ETS 14.3  
SAS/OR 14.3  
SAS/IML 14.3  
SAS/QC 14.3

NOTE: Additional host information:

X64\_10PRO WIN 10.0.16299 Workstation

NOTE: SAS initialization used:

real time              1.37 seconds  
cpu time               0.90 seconds

```
1  /*FINAL PROJECT*/
2  libname ds 'U:\SAS\datasets\';
NOTE: Libref DS was successfully assigned as follows:
      Engine:          V9
      Physical Name: U:\SAS\datasets
3  x 'cd U:\SAS\extdata\';
3  !
4
5
6  /*#####IMPORT THE
DATA#####*/
7
8  /*DATASET 1: FREEDOM DATASET*/
9  /*import the freedom dataset*/
10 proc import
11     out=freedom
12     datafile= 'human_freedom.csv'
13     dbms=dlm replace;
14     delimiter=', ';
15     getnames=YES;
16     guessingrows=20404042;
17 run;
```

Name pf\_ss\_women\_inheritance\_daughters truncated to  
pf\_ss\_women\_inheritance\_daughter.  
Name pf\_association\_political\_establish truncated to  
pf\_association\_political\_establi.  
Name ef\_regulation\_business\_bureaucracy truncated to  
ef\_regulation\_business\_bureaucra.  
Name ef\_regulation\_business\_compliance truncated to  
ef\_regulation\_business\_complianc.

Problems were detected with provided names. See LOG.

```
18
/*****
19      *   PRODUCT:    SAS
20      *   VERSION:    9.4
21      *   CREATOR:    External File Interface
22      *   DATE:       16APR19
23      *   DESC:       Generated SAS Datasstep Code
24      *   TEMPLATE SOURCE:  (None Specified.)
25
*****/
26      data WORK.FREEDOM      ;
27      %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
28      infile 'human_freedom.csv' delimiter = ',' MISSOVER DSD
lrecl=32767 firstobs=2 ;
29      informat year best32. ;
30      informat ISO_code $3. ;
31      informat countries $22. ;
32      informat region $29. ;
33      informat pf_rol_procedural best32. ;
34      informat pf_rol_civil best32. ;
35      informat pf_rol_criminal best32. ;
36      informat pf_rol best32. ;
37      informat pf_ss_homicide best32. ;
38      informat pf_ss_disappearances_disap best32. ;
39      informat pf_ss_disappearances_violent best32. ;
40      informat pf_ss_disappearances_organized best32. ;
41      informat pf_ss_disappearances_fatalities best32. ;
42      informat pf_ss_disappearances_injuries best32. ;
43      informat pf_ss_disappearances best32. ;
44      informat pf_ss_women_fgm best32. ;
45      informat pf_ss_women_missing best32. ;
46      informat pf_ss_women_inheritance_widows best32. ;
47      informat pf_ss_women_inheritance_daughter best32. ;
48      informat pf_ss_women_inheritance best32. ;
49      informat pf_ss_women best32. ;
50      informat pf_ss best32. ;
51      informat pf_movement_domestic best32. ;
52      informat pf_movement_foreign best32. ;
53      informat pf_movement_women best32. ;
54      informat pf_movement best32. ;
55      informat pf_religion_estop_establish best32. ;
56      informat pf_religion_estop_operate best32. ;
57      informat pf_religion_estop best32. ;
58      informat pf_religion_harassment best32. ;
59      informat pf_religion_restrictions best32. ;
60      informat pf_religion best32. ;
61      informat pf_association_association best32. ;
62      informat pf_association_assembly best32. ;
63      informat pf_association_political_establi best32. ;
64      informat pf_association_political_operate best32. ;
65      informat pf_association_political best32. ;
66      informat pf_association_prof_establish best32. ;
67      informat pf_association_prof_operate best32. ;
```

```
68 informat pf_association_prof best32. ;
69 informat pf_association_sport_establish best32. ;
70 informat pf_association_sport_operate best32. ;
71 informat pf_association_sport best32. ;
72 informat pf_association best32. ;
73 informat pf_expression_killed best32. ;
74 informat pf_expression_jailed best32. ;
75 informat pf_expression_influence best32. ;
76 informat pf_expression_control best32. ;
77 informat pf_expression_cable best32. ;
78 informat pf_expression_newspapers best32. ;
79 informat pf_expression_internet best32. ;
80 informat pf_expression best32. ;
81 informat pf_identity_legal best32. ;
82 informat pf_identity_parental_marriage best32. ;
83 informat pf_identity_parental_divorce best32. ;
84 informat pf_identity_parental best32. ;
85 informat pf_identity_sex_male best32. ;
86 informat pf_identity_sex_female best32. ;
87 informat pf_identity_sex best32. ;
88 informat pf_identity_divorce best32. ;
89 informat pf_identity best32. ;
90 informat pf_score best32. ;
91 informat pf_rank best32. ;
92 informat ef_government_consumption best32. ;
93 informat ef_government_transfers best32. ;
94 informat ef_government_enterprises best32. ;
95 informat ef_government_tax_income best32. ;
96 informat ef_government_tax_payroll best32. ;
97 informat ef_government_tax best32. ;
98 informat ef_government best32. ;
99 informat ef_legal_judicial best32. ;
100 informat ef_legal_courts best32. ;
101 informat ef_legal_protection best32. ;
102 informat ef_legal_military best32. ;
103 informat ef_legal_integrity best32. ;
104 informat ef_legal_enforcement best32. ;
105 informat ef_legal_restrictions best32. ;
106 informat ef_legal_police best32. ;
107 informat ef_legal_crime best32. ;
108 informat ef_legal_gender best32. ;
109 informat ef_legal best32. ;
110 informat ef_money_growth best32. ;
111 informat ef_money_sd best32. ;
112 informat ef_money_inflation best32. ;
113 informat ef_money_currency best32. ;
114 informat ef_money best32. ;
115 informat ef_trade_tariffs_revenue best32. ;
116 informat ef_trade_tariffs_mean best32. ;
117 informat ef_trade_tariffs_sd best32. ;
118 informat ef_trade_tariffs best32. ;
119 informat ef_trade_regulatory_nontariff best32. ;
120 informat ef_trade_regulatory_compliance best32. ;
121 informat ef_trade_regulatory best32. ;
```

```
122      informat ef_trade_black best32. ;
123      informat ef_trade_movement_foreign best32. ;
124      informat ef_trade_movement_capital best32. ;
125      informat ef_trade_movement_visit best32. ;
126      informat ef_trade_movement best32. ;
127      informat ef_trade best32. ;
128      informat ef_regulation_credit_ownership best32. ;
129      informat ef_regulation_credit_private best32. ;
130      informat ef_regulation_credit_interest best32. ;
131      informat ef_regulation_credit best32. ;
132      informat ef_regulation_labor_minwage best32. ;
133      informat ef_regulation_labor_firing best32. ;
134      informat ef_regulation_labor_bargain best32. ;
135      informat ef_regulation_labor_hours best32. ;
136      informat ef_regulation_labor_dismissal best32. ;
137      informat ef_regulation_labor_conscription best32. ;
138      informat ef_regulation_labor best32. ;
139      informat ef_regulation_business_adm best32. ;
140      informat ef_regulation_business_bureaucra best32. ;
141      informat ef_regulation_business_start best32. ;
142      informat ef_regulation_business_bribes best32. ;
143      informat ef_regulation_business_licensing best32. ;
144      informat ef_regulation_business_complianc best32. ;
145      informat ef_regulation_business best32. ;
146      informat ef_regulation best32. ;
147      informat ef_score best32. ;
148      informat ef_rank best32. ;
149      informat hf_score best32. ;
150      informat hf_rank best32. ;
151      informat hf_quartile best32. ;
152      format year best12. ;
153      format ISO_code $3. ;
154      format countries $22. ;
155      format region $29. ;
156      format pf_rol_procedural best12. ;
157      format pf_rol_civil best12. ;
158      format pf_rol_criminal best12. ;
159      format pf_rol best12. ;
160      format pf_ss_homicide best12. ;
161      format pf_ss_disappearances_disap best12. ;
162      format pf_ss_disappearances_violent best12. ;
163      format pf_ss_disappearances_organized best12. ;
164      format pf_ss_disappearances_fatalities best12. ;
165      format pf_ss_disappearances_injuries best12. ;
166      format pf_ss_disappearances best12. ;
167      format pf_ss_women_fgm best12. ;
168      format pf_ss_women_missing best12. ;
169      format pf_ss_women_inheritance_widows best12. ;
170      format pf_ss_women_inheritance_daughter best12. ;
171      format pf_ss_women_inheritance best12. ;
172      format pf_ss_women best12. ;
173      format pf_ss best12. ;
174      format pf_movement_domestic best12. ;
175      format pf_movement_foreign best12. ;
```

```
176      format pf_movement_women best12. ;
177      format pf_movement best12. ;
178      format pf_religion_estop_establish best12. ;
179      format pf_religion_estop_operate best12. ;
180      format pf_religion_estop best12. ;
181      format pf_religion_harassment best12. ;
182      format pf_religion_restrictions best12. ;
183      format pf_religion best12. ;
184      format pf_association_association best12. ;
185      format pf_association_assembly best12. ;
186      format pf_association_political_establi best12. ;
187      format pf_association_political_operate best12. ;
188      format pf_association_political best12. ;
189      format pf_association_prof_establish best12. ;
190      format pf_association_prof_operate best12. ;
191      format pf_association_prof best12. ;
192      format pf_association_sport_establish best12. ;
193      format pf_association_sport_operate best12. ;
194      format pf_association_sport best12. ;
195      format pf_association best12. ;
196      format pf_expression_killed best12. ;
197      format pf_expression_jailed best12. ;
198      format pf_expression_influence best12. ;
199      format pf_expression_control best12. ;
200      format pf_expression_cable best12. ;
201      format pf_expression_newspapers best12. ;
202      format pf_expression_internet best12. ;
203      format pf_expression best12. ;
204      format pf_identity_legal best12. ;
205      format pf_identity_parental_marriage best12. ;
206      format pf_identity_parental_divorce best12. ;
207      format pf_identity_parental best12. ;
208      format pf_identity_sex_male best12. ;
209      format pf_identity_sex_female best12. ;
210      format pf_identity_sex best12. ;
211      format pf_identity_divorce best12. ;
212      format pf_identity best12. ;
213      format pf_score best12. ;
214      format pf_rank best12. ;
215      format ef_government_consumption best12. ;
216      format ef_government_transfers best12. ;
217      format ef_government_enterprises best12. ;
218      format ef_government_tax_income best12. ;
219      format ef_government_tax_payroll best12. ;
220      format ef_government_tax best12. ;
221      format ef_government best12. ;
222      format ef_legal_judicial best12. ;
223      format ef_legal_courts best12. ;
224      format ef_legal_protection best12. ;
225      format ef_legal_military best12. ;
226      format ef_legal_integrity best12. ;
227      format ef_legal_enforcement best12. ;
228      format ef_legal_restrictions best12. ;
229      format ef_legal_police best12. ;
```

```

230     format ef_legal_crime best12. ;
231     format ef_legal_gender best12. ;
232     format ef_legal best12. ;
233     format ef_money_growth best12. ;
234     format ef_money_sd best12. ;
235     format ef_money_inflation best12. ;
236     format ef_money_currency best12. ;
237     format ef_money best12. ;
238     format ef_trade_tariffs_revenue best12. ;
239     format ef_trade_tariffs_mean best12. ;
240     format ef_trade_tariffs_sd best12. ;
241     format ef_trade_tariffs best12. ;
242     format ef_trade_regulatory_nontariff best12. ;
243     format ef_trade_regulatory_compliance best12. ;
244     format ef_trade_regulatory best12. ;
245     format ef_trade_black best12. ;
246     format ef_trade_movement_foreign best12. ;
247     format ef_trade_movement_capital best12. ;
248     format ef_trade_movement_visit best12. ;
249     format ef_trade_movement best12. ;
250     format ef_trade best12. ;
251     format ef_regulation_credit_ownership best12. ;
252     format ef_regulation_credit_private best12. ;
253     format ef_regulation_credit_interest best12. ;
254     format ef_regulation_credit best12. ;
255     format ef_regulation_labor_minwage best12. ;
256     format ef_regulation_labor_firing best12. ;
257     format ef_regulation_labor_bargain best12. ;
258     format ef_regulation_labor_hours best12. ;
259     format ef_regulation_labor_dismissal best12. ;
260     format ef_regulation_labor_conscription best12. ;
261     format ef_regulation_labor best12. ;
262     format ef_regulation_business_adm best12. ;
263     format ef_regulation_business_bureaucra best12. ;
264     format ef_regulation_business_start best12. ;
265     format ef_regulation_business_bribes best12. ;
266     format ef_regulation_business_licensing best12. ;
267     format ef_regulation_business_complianc best12. ;
268     format ef_regulation_business best12. ;
269     format ef_regulation best12. ;
270     format ef_score best12. ;
271     format ef_rank best12. ;
272     format hf_score best12. ;
273     format hf_rank best12. ;
274     format hf_quartile best12. ;
275 input
276     year
277     ISO_code $
278     countries $
279     region $
280     pf_rol_procedural
281     pf_rol_civil
282     pf_rol_criminal
283     pf_rol

```

284	pf_ss_homicide
285	pf_ss_disappearances_disap
286	pf_ss_disappearances_violent
287	pf_ss_disappearances_organized
288	pf_ss_disappearances_fatalities
289	pf_ss_disappearances_injuries
290	pf_ss_disappearances
291	pf_ss_women_fgm
292	pf_ss_women_missing
293	pf_ss_women_inheritance_widows
294	pf_ss_women_inheritance_daughter
295	pf_ss_women_inheritance
296	pf_ss_women
297	pf_ss
298	pf_movement_domestic
299	pf_movement_foreign
300	pf_movement_women
301	pf_movement
302	pf_religion_estop_establish
303	pf_religion_estop_operate
304	pf_religion_estop
305	pf_religion_harassment
306	pf_religion_restrictions
307	pf_religion
308	pf_association_association
309	pf_association_assembly
310	pf_association_political_establi
311	pf_association_political_operate
312	pf_association_political
313	pf_association_prof_establish
314	pf_association_prof_operate
315	pf_association_prof
316	pf_association_sport_establish
317	pf_association_sport_operate
318	pf_association_sport
319	pf_association
320	pf_expression_killed
321	pf_expression_jailed
322	pf_expression_influence
323	pf_expression_control
324	pf_expression_cable
325	pf_expression_newspapers
326	pf_expression_internet
327	pf_expression
328	pf_identity_legal
329	pf_identity_parental_marriage
330	pf_identity_parental_divorce
331	pf_identity_parental
332	pf_identity_sex_male
333	pf_identity_sex_female
334	pf_identity_sex
335	pf_identity_divorce
336	pf_identity
337	pf_score

338	pf_rank
339	ef_government_consumption
340	ef_government_transfers
341	ef_government_enterprises
342	ef_government_tax_income
343	ef_government_tax_payroll
344	ef_government_tax
345	ef_government
346	ef_legal_judicial
347	ef_legal_courts
348	ef_legal_protection
349	ef_legal_military
350	ef_legal_integrity
351	ef_legal_enforcement
352	ef_legal_restrictions
353	ef_legal_police
354	ef_legal_crime
355	ef_legal_gender
356	ef_legal
357	ef_money_growth
358	ef_money_sd
359	ef_money_inflation
360	ef_money_currency
361	ef_money
362	ef_trade_tariffs_revenue
363	ef_trade_tariffs_mean
364	ef_trade_tariffs_sd
365	ef_trade_tariffs
366	ef_trade_regulatory_nontariff
367	ef_trade_regulatory_compliance
368	ef_trade_regulatory
369	ef_trade_black
370	ef_trade_movement_foreign
371	ef_trade_movement_capital
372	ef_trade_movement_visit
373	ef_trade_movement
374	ef_trade
375	ef_regulation_credit_ownership
376	ef_regulation_credit_private
377	ef_regulation_credit_interest
378	ef_regulation_credit
379	ef_regulation_labor_minwage
380	ef_regulation_labor_firing
381	ef_regulation_labor_bargain
382	ef_regulation_labor_hours
383	ef_regulation_labor_dismissal
384	ef_regulation_labor_conscription
385	ef_regulation_labor
386	ef_regulation_business_adm
387	ef_regulation_business_bureaucra
388	ef_regulation_business_start
389	ef_regulation_business_bribes
390	ef_regulation_business_licensing
391	ef_regulation_business_complianc



```

392             ef_regulation_business
393             ef_regulation
394             ef_score
395             ef_rank
396             hf_score
397             hf_rank
398             hf_quartile
399         ;
400         if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
400! variable */
401         run;

```

NOTE: The infile 'human\_freedom.csv' is:  
 Filename=U:\SAS\extdata\human\_freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=1175330,  
 Last Modified=25Mar2019:14:45:25,  
 Create Time=25Mar2019:14:45:43

NOTE: 1458 records were read from the infile 'human\_freedom.csv'.  
 The minimum record length was 144.  
 The maximum record length was 1031.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: DATA statement used (Total process time):

real time	0.47 seconds
cpu time	0.40 seconds

1458 rows created in WORK.FREEDOM from human\_freedom.csv.

NOTE: WORK.FREEDOM data set was successfully created.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	3.69 seconds
cpu time	3.20 seconds

```

402
403 /*get 2016 data only*/
404 data freedom;
405     set freedom;
406     where year = 2016;
407 run;

```

NOTE: There were 162 observations read from the data set WORK.FREEDOM.  
 WHERE year=2016;

NOTE: The data set WORK.FREEDOM has 162 observations and 123 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```

408
409 /*DATASET 2: HAPPINESS DATASET*/
410 /*import the happiness dataset*/
411 proc import
412     out=happy
413     datafile= '2016_happy.csv'
414     dbms=dlm replace;
415     delimiter=',';
416     getnames=YES;
417     guessingrows=20404042;
418 run;

419
/*****
420 *   PRODUCT:    SAS
421 *   VERSION:    9.4
422 *   CREATOR:    External File Interface
423 *   DATE:       16APR19
424 *   DESC:       Generated SAS Datasheet Code
425 *   TEMPLATE SOURCE:  (None Specified.)
426
*****/
427 data WORK.HAPPY ;
428 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
429 infile '2016_happy.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
430     informat Country $23. ;
431     informat Region $31. ;
432     informat Happiness_Rank best32. ;
433     informat Happiness_Score best32. ;
434     informat Lower_Confidence_Interval best32. ;
435     informat Upper_Confidence_Interval best32. ;
436     informat Economy_gdppercapita best32. ;
437     informat Family best32. ;
438     informat health_lifeexpectancy best32. ;
439     informat Freedom best32. ;
440     informat trust_govcorruption best32. ;
441     informat Generosity best32. ;
442     informat dystopia_residual best32. ;
443     format Country $23. ;
444     format Region $31. ;
445     format Happiness_Rank best12. ;
446     format Happiness_Score best12. ;
447     format Lower_Confidence_Interval best12. ;
448     format Upper_Confidence_Interval best12. ;
449     format Economy_gdppercapita best12. ;
450     format Family best12. ;
451     format health_lifeexpectancy best12. ;
452     format Freedom best12. ;
453     format trust_govcorruption best12. ;
454     format Generosity best12. ;
455     format dystopia_residual best12. ;
456 input
457     Country $

```

```

458             Region $
459             Happiness_Rank
460             Happiness_Score
461             Lower__Confidence_Interval
462             Upper_Confidence_Interval
463             Economy_gdppercapita
464             Family
465             health_lifeexpectancy
466             Freedom
467             trust_govcorruption
468             Generosity
469             dystopia_residual
470         ;
471         if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
471! variable */
472         run;

```

NOTE: The infile '2016\_happy.csv' is:  
 Filename=U:\SAS\extdata\2016\_happy.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=17274,  
 Last Modified=25Mar2019:14:44:36,  
 Create Time=25Mar2019:14:45:43

NOTE: 157 records were read from the infile '2016\_happy.csv'.  
 The minimum record length was 92.  
 The maximum record length was 133.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: DATA statement used (Total process time):  
 real time 0.06 seconds  
 cpu time 0.06 seconds

157 rows created in WORK.HAPPY from 2016\_happy.csv.

NOTE: WORK.HAPPY data set was successfully created.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: PROCEDURE IMPORT used (Total process time):  
 real time 0.17 seconds  
 cpu time 0.14 seconds

```

473
474 /*DATASET 3: ECONOMIC DATASET*/
475 /*import the happiness dataset*/
476 proc import
477     out=economic
478     datafile= 'Economic_Freedom.csv'
479     dbms=dlm replace;
480     delimiter=',';
481     getnames=YES;
482     guessingrows=20404042;

```

```
483 run;
```

Name twog\_restrictions\_sale\_real\_property truncated to  
twog\_restrictions\_sale\_real\_prop.

Name threed\_freedom\_own\_foreign\_currency truncated to  
threed\_freedom\_own\_foreign\_curre.

Name fourd\_control\_movement\_capital\_ppl truncated to  
fourd\_control\_movement\_capital\_p.

Problems were detected with provided names. See LOG.

```
484
```

```
/******
```

```
485 *   PRODUCT:    SAS
```

```
486 *   VERSION:    9.4
```

```
487 *   CREATOR:    External File Interface
```

```
488 *   DATE:       16APR19
```

```
489 *   DESC:       Generated SAS Datasheet Code
```

```
490 *   TEMPLATE SOURCE: (None Specified.)
```

```
491
```

```
*****/
```

```
492 data WORK.ECONOMIC ;
```

```
493 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
```

```
494 infile 'Economic_Freedom.csv' delimiter = ',' MISOVER DSD
```

```
lrecl=32767 firstobs=2
```

```
494! ;
```

```
495 informat year best32. ;
```

```
496 informat ISO_code $3. ;
```

```
497 informat countries $22. ;
```

```
498 informat ECONOMIC_FREEDOM best32. ;
```

```
499 informat rank best32. ;
```

```
500 informat quartile best32. ;
```

```
501 informat onea_government_consumption best32. ;
```

```
502 informat oneb_transfers best32. ;
```

```
503 informat onec_gov_enterprises best32. ;
```

```
504 informat oned_top_marg_tax_rate best32. ;
```

```
505 informat one_size_government best32. ;
```

```
506 informat twoa_judicial_independence best32. ;
```

```
507 informat twob_impartial_courts best32. ;
```

```
508 informat twoc_protection_property_rights best32. ;
```

```
509 informat twod_military_interference best32. ;
```

```
510 informat twoe_integrity_legal_system best32. ;
```

```
511 informat twof_legal_enforcement_contracts best32. ;
```

```
512 informat twog_restrictions_sale_real_prop best32. ;
```

```
513 informat twoh_reliability_police best32. ;
```

```
514 informat twoi_business_costs_crime best32. ;
```

```
515 informat twoj_gender_adjustment best32. ;
```

```
516 informat two_property_rights best32. ;
```

```
517 informat threea_money_growth best32. ;
```

```
518 informat threeb_std_inflation best32. ;
```

```
519 informat threec_inflation best32. ;
```

```
520 informat threed_freedom_own_foreign_curre best32. ;
```

```
521 informat three_sound_money best32. ;
```

```
522 informat foura_tariffs best32. ;
```

```
523 informat fourb_regulatory_trade_barriers best32. ;
```

```
524 informat fourc_black_market best32. ;
```

```

525      informat fourd_control_movement_capital_p best32. ;
526      informat four_trade best32. ;
527      informat fivea_credit_market_reg best32. ;
528      informat fiveb_labor_market_reg best32. ;
529      informat fivec_business_reg best32. ;
530      informat five_regulation best32. ;
531      format year best12. ;
532      format ISO_code $3. ;
533      format countries $22. ;
534      format ECONOMIC_FREEDOM best12. ;
535      format rank best12. ;
536      format quartile best12. ;
537      format onea_government_consumption best12. ;
538      format oneb_transfers best12. ;
539      format onec_gov_enterprises best12. ;
540      format oned_top_marg_tax_rate best12. ;
541      format one_size_government best12. ;
542      format twoa_judicial_independence best12. ;
543      format twob_impartial_courts best12. ;
544      format twoc_protection_property_rights best12. ;
545      format twod_military_interference best12. ;
546      format twoe_integrity_legal_system best12. ;
547      format twof_legal_enforcement_contracts best12. ;
548      format twog_restrictions_sale_real_prop best12. ;
549      format twoh_reliability_police best12. ;
550      format twoi_business_costs_crime best12. ;
551      format twoj_gender_adjustment best12. ;
552      format two_property_rights best12. ;
553      format threea_money_growth best12. ;
554      format threeb_std_inflation best12. ;
555      format threec_inflation best12. ;
556      format threed_freedom_own_foreign_curre best12. ;
557      format three_sound_money best12. ;
558      format foura_tariffs best12. ;
559      format fourb_regulatory_trade_barriers best12. ;
560      format fourc_black_market best12. ;
561      format fourd_control_movement_capital_p best12. ;
562      format four_trade best12. ;
563      format fivea_credit_market_reg best12. ;
564      format fiveb_labor_market_reg best12. ;
565      format fivec_business_reg best12. ;
566      format five_regulation best12. ;
567  input
568      year
569      ISO_code $
570      countries $
571      ECONOMIC_FREEDOM
572      rank
573      quartile
574      onea_government_consumption
575      oneb_transfers
576      onec_gov_enterprises
577      oned_top_marg_tax_rate
578      one_size_government

```

```

579          twoa_judicial_independence
580          twob_impartial_courts
581          twoc_protection_property_rights
582          twod_military_interference
583          twoe_integrity_legal_system
584          twof_legal_enforcement_contracts
585          twog_restrictions_sale_real_prop
586          twoh_reliability_police
587          twoi_business_costs_crime
588          twoj_gender_adjustment
589          two_property_rights
590          threea_money_growth
591          threeb_std_inflation
592          threec_inflation
593          threed_freedom_own_foreign_curre
594          three_sound_money
595          foura_tariffs
596          fourb_regulatory_trade_barriers
597          fourc_black_market
598          fourd_control_movement_capital_p
599          four_trade
600          fivea_credit_market_reg
601          fiveb_labor_market_reg
602          fivec_business_reg
603          five_regulation
604      ;
605      if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
605! variable */
606      run;

```

NOTE: The infile 'Economic\_Freedom.csv' is:  
 Filename=U:\SAS\extdata\Economic\_Freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=928650,  
 Last Modified=25Mar2019:16:46:54,  
 Create Time=25Mar2019:14:45:43

NOTE: 3726 records were read from the infile 'Economic\_Freedom.csv'.  
 The minimum record length was 46.  
 The maximum record length was 359.

NOTE: The data set WORK.ECONOMIC has 3726 observations and 36 variables.

NOTE: DATA statement used (Total process time):

real time	0.14 seconds
cpu time	0.12 seconds

3726 rows created in WORK.ECONOMIC from Economic\_Freedom.csv.

NOTE: WORK.ECONOMIC data set was successfully created.

NOTE: The data set WORK.ECONOMIC has 3726 observations and 36 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	2.48 seconds
-----------	--------------

cpu time 2.21 seconds

```
607
608 /*get 2016 only*/
609 data economic;
610     set economic;
611     where year = 2016;
612 run;
```

NOTE: There were 162 observations read from the data set WORK.ECONOMIC.  
WHERE year=2016;

NOTE: The data set WORK.ECONOMIC has 162 observations and 36 variables.

NOTE: DATA statement used (Total process time):

real time 0.03 seconds

cpu time 0.03 seconds

```
613
614 /*MERGE THE DATASETS TO GET ONE DATASET */
615 /*to merge happiness and economic*/
616 proc sql;
617     create table merged as
618     select * from happy a left join economic b
619     on a.Country = b.Countries;
```

NOTE: Table WORK.MERGED created, with 157 rows and 49 columns.

```
620 quit;
```

NOTE: PROCEDURE SQL used (Total process time):

real time 0.18 seconds

cpu time 0.03 seconds

```
621
622 /*to merge merged dataset with freedom*/
623 /*drop repeat columns first*/
624 data freedom;
625     set freedom;
626     drop year countries region;
627 run;
```

NOTE: There were 162 observations read from the data set WORK.FREEDOM.

NOTE: The data set WORK.FREEDOM has 162 observations and 120 variables.

NOTE: DATA statement used (Total process time):

real time 0.01 seconds

cpu time 0.01 seconds

```
628
629 proc sql;
630     create table data as
631     select * from merged a left join freedom b
632     on a.ISO_code=b.ISO_code;
```

WARNING: Variable ISO\_code already exists on file WORK.DATA.

NOTE: Table WORK.DATA created, with 157 rows and 168 columns.

633 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time 0.02 seconds

cpu time 0.01 seconds

634

635

636 /\*#####REGRESSION & CORRELATION ANALYSIS#####\*/

637

638 /\*### Regression ###\*/

639 proc iml;

NOTE: Writing HTML Body file: sashtml.htm

NOTE: IML Ready

640 reset log print;

641

642 use data;

643 read all var{Happiness\_Score pf\_expression pf\_expression\_jailed

643! pf\_expression\_influence pf\_expression\_internet

pf\_expression\_control} into expression

643! ;

644 read all var{Happiness\_Score pf\_religion\_estop

pf\_religion\_harassment

644! pf\_religion\_restrictions pf\_religion} into religion;

645 read all var{Happiness\_Score ef\_legal\_integrity ef\_legal\_courts  
ef\_legal\_police}

645! into legal;

646

647 close data;

648

649

650 /\*creates a module that performs ordinary least squares\*/

651 start ols(X, Y, b, yhat, rmse);

652 design = j(nrow(X),1,1) || X;

653 b = inv(design`\*design)\*design`\*Y;

654 yhat = design\*b;

655 e = Y - yhat;

656 rmse = sqrt(e[##] / (nrow(design) - ncol(design)));

657 finish;

NOTE: Module OLS defined.

658

659

660

/\*#####  
#####

660! #####\*/

661 /\*EXPRESSION & INFORMATION\*/

662

663 /\*create a table comprised of expression variables\*/

664 create expression\_data from expression[colname =

{Happiness\_Score pf\_expression

664! pf\_expression\_jailed pf\_expression\_influence pf\_expression\_internet



```

664! pf_expression_control}}];
665     append from expression;
666     close expression_data;
NOTE: The data set WORK.EXPRESSION_DATA has 157 observations and 6
variables.
667
668     *remove missing values across all expression variables;
669     submit;
670         data nmiss_expr;
671         set expression_data;
672         if nmiss(of _numeric_) > 0 then delete;
673     run;
674     endsubmit;
675
676     use nmiss_expr;
677     read all var{Happiness_Score pf_expression pf_expression_jailed
677! pf_expression_influence pf_expression_internet
pf_expression_control} into expr;
678     close nmiss_expr;
679
680
681     X_expr = expr[,2:6];
682     Y_expr = expr[,1];
683
684     run ols(X_expr, Y_expr, b, yhat, rmse);
685     print b[format=6.2] rmse[format=6.2] yhat[format=6.2];
686
687     tot_expr_data = Y_expr || X_expr;
688     create ols_expr from tot_expr_data[colname = {Happiness_Score
pf_expression
688! pf_expression_jailed pf_expression_influence pf_expression_internet
688! pf_expression_control}}];
689     append from tot_expr_data;
690     close ols_expr;
NOTE: The data set WORK.OLS_EXPR has 125 observations and 6 variables.
691
692     submit;
693         proc reg data = ols_expr outest = expr_est;
694             model Happiness_Score = pf_expression pf_expression_jailed
694! pf_expression_influence pf_expression_internet
pf_expression_control;
695             title 'Regression: Happiness vs. Freedom of Expression';
696         run;
697     endsubmit;
698
699
/*#####
#####
699! #####*/
700
701     /*RELIGION*/
702
703     /*create a table comprised of expression variables*/

```

```

704      create religion_data from religion[colname = {Happiness_Score
pf_religion_estop
704! pf_religion_harassment pf_religion}]];
705      append from religion;
706      close religion_data;
NOTE: The data set WORK.RELIGION_DATA has 157 observations and 5
variables.
707
708      *remove missing values across all expression variables;
709      submit;
710          data nmiss_reli;
711          set religion_data;
712          if nmiss(of _numeric_) > 0 then delete;
713      run;
714      endsubmit;
715
716      use nmiss_reli;
717      read all var{Happiness_Score pf_religion_estop
pf_religion_harassment
717! pf_religion} into reli;
718      close nmiss_reli;
719
720
721      X_reli = reli[,2:4];
722      Y_reli = reli[,1];
723
724      call ols(X_reli, Y_reli, b, yhat, rmse);
725      print b[format=6.2] rmse[format=6.2] yhat[format=6.2];
726
727      tot_reli_data = Y_reli || X_reli;
728      create ols_reli from tot_reli_data[colname = {Happiness_Score
pf_religion_estop
728! pf_religion_harassment pf_religion}]];
729      append from tot_reli_data;
730      close ols_reli;
NOTE: The data set WORK.OLS_RELI has 125 observations and 4 variables.
731
732      submit;
733          proc reg data = ols_reli outest = reli_est;
734          model Happiness_Score = pf_religion_estop
pf_religion_harassment pf_religion;
735          title 'Regression: Happiness vs. Religious Freedom';
736      run;
737      endsubmit;
738
739
740
/*#####
#####
740! #####*/
741      /*LEGAL SYSTEM*/
742
743      /*create a table comprised of expression variables*/

```

```

744      create legal_data from legal[colname = {Happiness_Score
ef_legal_integrity
744! ef_legal_courts}}];
745      append from legal;
746      close legal_data;
NOTE: The data set WORK.LEGAL_DATA has 157 observations and 4 variables.
747
748      *remove missing values across all expression variables;
749      submit;
750          data nmiss_legal;
751          set legal_data;
752          if nmiss(of _numeric_) > 0 then delete;
753      run;
754      endsubmit;
755
756      use nmiss_legal;
757      read all var{Happiness_Score ef_legal_integrity ef_legal_courts}
into leg_sys;
758      close nmiss_legal;
759
760      X_legal = leg_sys[,2:3];
761      Y_legal = leg_sys[,1];
762
763      run ols(X_legal, Y_legal, b, yhat, rmse);
764      print b[format=6.2] rmse[format=6.2] yhat[format=6.2];
765
766      tot_legal_data = Y_legal || X_legal;
767      create ols_legal from tot_legal_data[colname = {Happiness_Score
767! ef_legal_integrity ef_legal_courts}}];
768      append from tot_legal_data;
769      close ols_legal;
NOTE: The data set WORK.OLS_LEGAL has 114 observations and 3 variables.
770
771      submit;
772          ods graphics on;
773          proc reg data = ols_legal outest = legal_est;
774          model Happiness_Score = ef_legal_integrity ef_legal_courts;
775          title 'Regression: Happiness vs. Legal Systems';
776          run;
777          ods graphics off;
778      endsubmit;
779
780
781      quit;
NOTE: Exiting IML.
NOTE: PROCEDURE IML used (Total process time):
      real time           5.40 seconds
      cpu time            2.07 seconds

782
783
784      /*### Correlation ###*/
785

```

```

786  /*Religious Freedom*/
787  ods graphics on;
788  title 'Happiness vs. Religious Freedom Correlation';
789  proc corr data=ols_reli nomiss plots=matrix(histogram);
790      var Happiness_Score pf_religion_estop pf_religion_harassment
pf_religion;
791  run;

```

```

NOTE: PROCEDURE CORR used (Total process time):
      real time          0.30 seconds
      cpu time           0.06 seconds

```

```

792  ods graphics off;
793
794  /*Legal System*/
795  ods graphics on;
796  title 'Happiness vs. Justice System Correlation';
797  proc corr data=ols_legal nomiss plots=matrix(histogram);
798      var Happiness_Score ef_legal_integrity ef_legal_courts;
799  run;

```

```

NOTE: PROCEDURE CORR used (Total process time):
      real time          0.22 seconds
      cpu time           0.06 seconds

```

```

800  ods graphics off;
801
802
803  /*Additional Analysis*/
804  /*remove missing values*/
805  data estop;
806  set data;
807  if nmiss(of pf_religion_estop) > 0 then delete;
808  run;

```

```

NOTE: There were 157 observations read from the data set WORK.DATA.
NOTE: The data set WORK.ESTOP has 125 observations and 168 variables.
NOTE: DATA statement used (Total process time):
      real time          0.01 seconds
      cpu time           0.00 seconds

```

```

809
810
811  /*How does the average religion estop measurement vary across
regions?*/
812  proc sgplot data=estop;
813  vbar Region /response=pf_religion_estop stat=mean
categoryorder=RESPDESC
813! fillattrs=graphdata3;
814  label pf_religion_estop="Average Religion Estop Measurement";
815  title "Average Religion Estop across Global Regions (2016)";

```

```
816 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.23 seconds
cpu time	0.06 seconds

NOTE: There were 125 observations read from the data set WORK.ESTOP.

```
817
```

```
818
```

```
819 /*#####*/
```

```
820
```

```
821 /*DATASET 1: GDP DATASET*/
```

```
822 /*import the gdp dataset using PROC IMPORT*/
```

```
823 proc import
```

```
824     out=gdp
```

```
825     datafile= 'gdp.csv'
```

```
826     dbms=dlm replace;
```

```
827     delimiter=', ';
```

```
828     getnames=YES;
```

```
829     guessingrows=20404042;
```

```
830 run;
```

```
831
```

```
/******
```

```
832 *   PRODUCT:    SAS
```

```
833 *   VERSION:    9.4
```

```
834 *   CREATOR:    External File Interface
```

```
835 *   DATE:       16APR19
```

```
836 *   DESC:       Generated SAS Datastep Code
```

```
837 *   TEMPLATE SOURCE:  (None Specified.)
```

```
838
```

```
*****/
```

```
839     data WORK.GDP      ;
```

```
840     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
```

```
841     infile 'gdp.csv' delimiter = ',' MISSOVER DSD lrecl=32767
```

```
firstobs=2 ;
```

```
842         informat Country $52. ;
```

```
843         informat ISO_Code $3. ;
```

```
844         informat gdp_2016 best32. ;
```

```
845         informat gdp_2017 best32. ;
```

```
846         format Country $52. ;
```

```
847         format ISO_Code $3. ;
```

```
848         format gdp_2016 best12. ;
```

```
849         format gdp_2017 best12. ;
```

```
850     input
```

```
851         Country $
```

```
852         ISO_Code $
```

```
853         gdp_2016
```

```
854         gdp_2017
```

```
855     ;
```

```
856     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
```

```
detection macro
```

```
856! variable */
```

```
857      run;
```

```
NOTE: The infile 'gdp.csv' is:
      Filename=U:\SAS\extdata\gdp.csv,
      RECFM=V,LRECL=32767,File Size (bytes)=10719,
      Last Modified=26Mar2019:13:59:40,
      Create Time=26Mar2019:13:59:41
```

```
NOTE: 264 records were read from the infile 'gdp.csv'.
      The minimum record length was 13.
      The maximum record length was 80.
```

```
NOTE: The data set WORK.GDP has 264 observations and 4 variables.
```

```
NOTE: DATA statement used (Total process time):
      real time           0.04 seconds
      cpu time            0.01 seconds
```

```
264 rows created in WORK.GDP from gdp.csv.
```

```
NOTE: WORK.GDP data set was successfully created.
```

```
NOTE: The data set WORK.GDP has 264 observations and 4 variables.
```

```
NOTE: PROCEDURE IMPORT used (Total process time):
      real time           0.19 seconds
      cpu time            0.14 seconds
```

```
858
859 /*DATASET 2: SUICIDE DATASET*/
860 /*import the suicide dataset using PROC IMPORT*/
861 proc import
862     out=suicide
863     datafile= 'suicide.csv'
864     dbms=dlm replace;
865     delimiter=', ';
866     getnames=YES;
867     guessingrows=20404042;
868 run;
```

```
869
870 /*****
871 *   PRODUCT:    SAS
872 *   VERSION:    9.4
873 *   CREATOR:    External File Interface
874 *   DATE:       16APR19
875 *   DESC:       Generated SAS Datastep Code
876 *   TEMPLATE SOURCE:  (None Specified.)
877 *****/
878 data WORK.SUICIDE ;
879     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
880     infile 'suicide.csv' delimiter = ',' MISSOVER DSD lrecl=32767
881     firstobs=2 ;
```

```

880      informat Country $52. ;
881      informat _2016_suicide best32. ;
882      format Country $52. ;
883      format _2016_suicide best12. ;
884      input
885          Country $
886          _2016_suicide
887      ;
888      if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
888! variable */
889      run;

```

NOTE: The infile 'suicide.csv' is:  
 Filename=U:\SAS\extdata\suicide.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=5178,  
 Last Modified=26Mar2019:14:01:20,  
 Create Time=26Mar2019:14:01:15

NOTE: 264 records were read from the infile 'suicide.csv'.  
 The minimum record length was 5.  
 The maximum record length was 63.  
 NOTE: The data set WORK.SUICIDE has 264 observations and 2 variables.  
 NOTE: DATA statement used (Total process time):  
     real time                  0.02 seconds  
     cpu time                    0.01 seconds

264 rows created in WORK.SUICIDE from suicide.csv.

NOTE: WORK.SUICIDE data set was successfully created.  
 NOTE: The data set WORK.SUICIDE has 264 observations and 2 variables.  
 NOTE: PROCEDURE IMPORT used (Total process time):  
     real time                  0.11 seconds  
     cpu time                    0.09 seconds

```

890
891
892 /*DATASET 3: HAPPINESS DATASET*/
893 /*import the happiness dataset using PROC IMPORT*/
894 proc import
895     out=happy
896     datafile= '2016_happy.csv'
897     dbms=dlm replace;
898     delimiter=',';
899     getnames=YES;
900     guessingrows=20404042;
901 run;

```

```

902
/*****

```

```

903 *   PRODUCT:    SAS
904 *   VERSION:    9.4
905 *   CREATOR:    External File Interface
906 *   DATE:       16APR19
907 *   DESC:       Generated SAS Datasheet Code
908 *   TEMPLATE SOURCE: (None Specified.)
909
*****/
910     data WORK.HAPPY      ;
911         %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
912         infile '2016_happy.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
913         informat Country $23. ;
914         informat Region $31. ;
915         informat Happiness_Rank best32. ;
916         informat Happiness_Score best32. ;
917         informat Lower__Confidence_Interval best32. ;
918         informat Upper__Confidence_Interval best32. ;
919         informat Economy_gdpperpercapita best32. ;
920         informat Family best32. ;
921         informat health_lifeexpectancy best32. ;
922         informat Freedom best32. ;
923         informat trust_govcorruption best32. ;
924         informat Generosity best32. ;
925         informat dystopia_residual best32. ;
926         format Country $23. ;
927         format Region $31. ;
928         format Happiness_Rank best12. ;
929         format Happiness_Score best12. ;
930         format Lower__Confidence_Interval best12. ;
931         format Upper__Confidence_Interval best12. ;
932         format Economy_gdpperpercapita best12. ;
933         format Family best12. ;
934         format health_lifeexpectancy best12. ;
935         format Freedom best12. ;
936         format trust_govcorruption best12. ;
937         format Generosity best12. ;
938         format dystopia_residual best12. ;
939     input
940         Country $
941         Region $
942         Happiness_Rank
943         Happiness_Score
944         Lower__Confidence_Interval
945         Upper__Confidence_Interval
946         Economy_gdpperpercapita
947         Family
948         health_lifeexpectancy
949         Freedom
950         trust_govcorruption
951         Generosity
952         dystopia_residual
953     ;

```



```

954      if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
954! variable */
955      run;

```

```

NOTE: The infile '2016_happy.csv' is:
      Filename=U:\SAS\extdata\2016_happy.csv,
      RECFM=V,LRECL=32767,File Size (bytes)=17274,
      Last Modified=25Mar2019:14:44:36,
      Create Time=25Mar2019:14:45:43

```

```

NOTE: 157 records were read from the infile '2016_happy.csv'.
      The minimum record length was 92.
      The maximum record length was 133.

```

```

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

```

```

NOTE: DATA statement used (Total process time):
      real time           0.05 seconds
      cpu time            0.06 seconds

```

```

157 rows created in WORK.HAPPY from 2016_happy.csv.

```

```

NOTE: WORK.HAPPY data set was successfully created.

```

```

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

```

```

NOTE: PROCEDURE IMPORT used (Total process time):
      real time           0.16 seconds
      cpu time            0.14 seconds

```

```

956
957 /*DATASET 4: FREEDOM DATASET*/
958 /*import the happiness dataset using PROC IMPORT*/
959 proc import
960     out=freedom
961     datafile= 'human_freedom.csv'
962     dbms=dlm replace;
963     delimiter=',';
964     getnames=YES;
965     guessingrows=20404042;
966 run;

```

```

Name pf_ss_women_inheritance_daughters truncated to
pf_ss_women_inheritance_daughter.
Name pf_association_political_establish truncated to
pf_association_political_establi.
Name ef_regulation_business_bureaucracy truncated to
ef_regulation_business_bureaucra.
Name ef_regulation_business_compliance truncated to
ef_regulation_business_complianc.
Problems were detected with provided names. See LOG.
967

```

```

/*****

```

```

968 *   PRODUCT:    SAS
969 *   VERSION:    9.4
970 *   CREATOR:    External File Interface
971 *   DATE:       16APR19
972 *   DESC:       Generated SAS Datasheet Code
973 *   TEMPLATE SOURCE: (None Specified.)
974
*****/
975     data WORK.FREEDOM      ;
976     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
977     infile 'human_freedom.csv' delimiter = ',' MISOVER DSD
lrecl=32767 firstobs=2 ;
978     informat year best32. ;
979     informat ISO_code $3. ;
980     informat countries $22. ;
981     informat region $29. ;
982     informat pf_rol_procedural best32. ;
983     informat pf_rol_civil best32. ;
984     informat pf_rol_criminal best32. ;
985     informat pf_rol best32. ;
986     informat pf_ss_homicide best32. ;
987     informat pf_ss_disappearances_disap best32. ;
988     informat pf_ss_disappearances_violent best32. ;
989     informat pf_ss_disappearances_organized best32. ;
990     informat pf_ss_disappearances_fatalities best32. ;
991     informat pf_ss_disappearances_injuries best32. ;
992     informat pf_ss_disappearances best32. ;
993     informat pf_ss_women_fgm best32. ;
994     informat pf_ss_women_missing best32. ;
995     informat pf_ss_women_inheritance_widows best32. ;
996     informat pf_ss_women_inheritance_daughter best32. ;
997     informat pf_ss_women_inheritance best32. ;
998     informat pf_ss_women best32. ;
999     informat pf_ss best32. ;
1000     informat pf_movement_domestic best32. ;
1001     informat pf_movement_foreign best32. ;
1002     informat pf_movement_women best32. ;
1003     informat pf_movement best32. ;
1004     informat pf_religion_estop_establish best32. ;
1005     informat pf_religion_estop_operate best32. ;
1006     informat pf_religion_estop best32. ;
1007     informat pf_religion_harassment best32. ;
1008     informat pf_religion_restrictions best32. ;
1009     informat pf_religion best32. ;
1010     informat pf_association_association best32. ;
1011     informat pf_association_assembly best32. ;
1012     informat pf_association_political_establi best32. ;
1013     informat pf_association_political_operate best32. ;
1014     informat pf_association_political best32. ;
1015     informat pf_association_prof_establish best32. ;
1016     informat pf_association_prof_operate best32. ;
1017     informat pf_association_prof best32. ;
1018     informat pf_association_sport_establish best32. ;
1019     informat pf_association_sport_operate best32. ;

```

```
1020 informat pf_association_sport best32. ;
1021 informat pf_association best32. ;
1022 informat pf_expression_killed best32. ;
1023 informat pf_expression_jailed best32. ;
1024 informat pf_expression_influence best32. ;
1025 informat pf_expression_control best32. ;
1026 informat pf_expression_cable best32. ;
1027 informat pf_expression_newspapers best32. ;
1028 informat pf_expression_internet best32. ;
1029 informat pf_expression best32. ;
1030 informat pf_identity_legal best32. ;
1031 informat pf_identity_parental_marriage best32. ;
1032 informat pf_identity_parental_divorce best32. ;
1033 informat pf_identity_parental best32. ;
1034 informat pf_identity_sex_male best32. ;
1035 informat pf_identity_sex_female best32. ;
1036 informat pf_identity_sex best32. ;
1037 informat pf_identity_divorce best32. ;
1038 informat pf_identity best32. ;
1039 informat pf_score best32. ;
1040 informat pf_rank best32. ;
1041 informat ef_government_consumption best32. ;
1042 informat ef_government_transfers best32. ;
1043 informat ef_government_enterprises best32. ;
1044 informat ef_government_tax_income best32. ;
1045 informat ef_government_tax_payroll best32. ;
1046 informat ef_government_tax best32. ;
1047 informat ef_government best32. ;
1048 informat ef_legal_judicial best32. ;
1049 informat ef_legal_courts best32. ;
1050 informat ef_legal_protection best32. ;
1051 informat ef_legal_military best32. ;
1052 informat ef_legal_integrity best32. ;
1053 informat ef_legal_enforcement best32. ;
1054 informat ef_legal_restrictions best32. ;
1055 informat ef_legal_police best32. ;
1056 informat ef_legal_crime best32. ;
1057 informat ef_legal_gender best32. ;
1058 informat ef_legal best32. ;
1059 informat ef_money_growth best32. ;
1060 informat ef_money_sd best32. ;
1061 informat ef_money_inflation best32. ;
1062 informat ef_money_currency best32. ;
1063 informat ef_money best32. ;
1064 informat ef_trade_tariffs_revenue best32. ;
1065 informat ef_trade_tariffs_mean best32. ;
1066 informat ef_trade_tariffs_sd best32. ;
1067 informat ef_trade_tariffs best32. ;
1068 informat ef_trade_regulatory_nontariff best32. ;
1069 informat ef_trade_regulatory_compliance best32. ;
1070 informat ef_trade_regulatory best32. ;
1071 informat ef_trade_black best32. ;
1072 informat ef_trade_movement_foreign best32. ;
1073 informat ef_trade_movement_capital best32. ;
```

```

1074      informat ef_trade_movement_visit best32. ;
1075      informat ef_trade_movement best32. ;
1076      informat ef_trade best32. ;
1077      informat ef_regulation_credit_ownership best32. ;
1078      informat ef_regulation_credit_private best32. ;
1079      informat ef_regulation_credit_interest best32. ;
1080      informat ef_regulation_credit best32. ;
1081      informat ef_regulation_labor_minwage best32. ;
1082      informat ef_regulation_labor_firing best32. ;
1083      informat ef_regulation_labor_bargain best32. ;
1084      informat ef_regulation_labor_hours best32. ;
1085      informat ef_regulation_labor_dismissal best32. ;
1086      informat ef_regulation_labor_conscription best32. ;
1087      informat ef_regulation_labor best32. ;
1088      informat ef_regulation_business_adm best32. ;
1089      informat ef_regulation_business_bureaucra best32. ;
1090      informat ef_regulation_business_start best32. ;
1091      informat ef_regulation_business_bribes best32. ;
1092      informat ef_regulation_business_licensing best32. ;
1093      informat ef_regulation_business_complianc best32. ;
1094      informat ef_regulation_business best32. ;
1095      informat ef_regulation best32. ;
1096      informat ef_score best32. ;
1097      informat ef_rank best32. ;
1098      informat hf_score best32. ;
1099      informat hf_rank best32. ;
1100      informat hf_quartile best32. ;
1101      format year best12. ;
1102      format ISO_code $3. ;
1103      format countries $22. ;
1104      format region $29. ;
1105      format pf_rol_procedural best12. ;
1106      format pf_rol_civil best12. ;
1107      format pf_rol_criminal best12. ;
1108      format pf_rol best12. ;
1109      format pf_ss_homicide best12. ;
1110      format pf_ss_disappearances_disap best12. ;
1111      format pf_ss_disappearances_violent best12. ;
1112      format pf_ss_disappearances_organized best12. ;
1113      format pf_ss_disappearances_fatalities best12. ;
1114      format pf_ss_disappearances_injuries best12. ;
1115      format pf_ss_disappearances best12. ;
1116      format pf_ss_women_fgm best12. ;
1117      format pf_ss_women_missing best12. ;
1118      format pf_ss_women_inheritance_widows best12. ;
1119      format pf_ss_women_inheritance_daughter best12. ;
1120      format pf_ss_women_inheritance best12. ;
1121      format pf_ss_women best12. ;
1122      format pf_ss best12. ;
1123      format pf_movement_domestic best12. ;
1124      format pf_movement_foreign best12. ;
1125      format pf_movement_women best12. ;
1126      format pf_movement best12. ;
1127      format pf_religion_estop_establish best12. ;

```

```
1128     format pf_religion_estop_operate best12. ;
1129     format pf_religion_estop best12. ;
1130     format pf_religion_harassment best12. ;
1131     format pf_religion_restrictions best12. ;
1132     format pf_religion best12. ;
1133     format pf_association_association best12. ;
1134     format pf_association_assembly best12. ;
1135     format pf_association_political_establi best12. ;
1136     format pf_association_political_operate best12. ;
1137     format pf_association_political best12. ;
1138     format pf_association_prof_establish best12. ;
1139     format pf_association_prof_operate best12. ;
1140     format pf_association_prof best12. ;
1141     format pf_association_sport_establish best12. ;
1142     format pf_association_sport_operate best12. ;
1143     format pf_association_sport best12. ;
1144     format pf_association best12. ;
1145     format pf_expression_killed best12. ;
1146     format pf_expression_jailed best12. ;
1147     format pf_expression_influence best12. ;
1148     format pf_expression_control best12. ;
1149     format pf_expression_cable best12. ;
1150     format pf_expression_newspapers best12. ;
1151     format pf_expression_internet best12. ;
1152     format pf_expression best12. ;
1153     format pf_identity_legal best12. ;
1154     format pf_identity_parental_marriage best12. ;
1155     format pf_identity_parental_divorce best12. ;
1156     format pf_identity_parental best12. ;
1157     format pf_identity_sex_male best12. ;
1158     format pf_identity_sex_female best12. ;
1159     format pf_identity_sex best12. ;
1160     format pf_identity_divorce best12. ;
1161     format pf_identity best12. ;
1162     format pf_score best12. ;
1163     format pf_rank best12. ;
1164     format ef_government_consumption best12. ;
1165     format ef_government_transfers best12. ;
1166     format ef_government_enterprises best12. ;
1167     format ef_government_tax_income best12. ;
1168     format ef_government_tax_payroll best12. ;
1169     format ef_government_tax best12. ;
1170     format ef_government best12. ;
1171     format ef_legal_judicial best12. ;
1172     format ef_legal_courts best12. ;
1173     format ef_legal_protection best12. ;
1174     format ef_legal_military best12. ;
1175     format ef_legal_integrity best12. ;
1176     format ef_legal_enforcement best12. ;
1177     format ef_legal_restrictions best12. ;
1178     format ef_legal_police best12. ;
1179     format ef_legal_crime best12. ;
1180     format ef_legal_gender best12. ;
1181     format ef_legal best12. ;
```

```

1182     format ef_money_growth best12. ;
1183     format ef_money_sd best12. ;
1184     format ef_money_inflation best12. ;
1185     format ef_money_currency best12. ;
1186     format ef_money best12. ;
1187     format ef_trade_tariffs_revenue best12. ;
1188     format ef_trade_tariffs_mean best12. ;
1189     format ef_trade_tariffs_sd best12. ;
1190     format ef_trade_tariffs best12. ;
1191     format ef_trade_regulatory_nontariff best12. ;
1192     format ef_trade_regulatory_compliance best12. ;
1193     format ef_trade_regulatory best12. ;
1194     format ef_trade_black best12. ;
1195     format ef_trade_movement_foreign best12. ;
1196     format ef_trade_movement_capital best12. ;
1197     format ef_trade_movement_visit best12. ;
1198     format ef_trade_movement best12. ;
1199     format ef_trade best12. ;
1200     format ef_regulation_credit_ownership best12. ;
1201     format ef_regulation_credit_private best12. ;
1202     format ef_regulation_credit_interest best12. ;
1203     format ef_regulation_credit best12. ;
1204     format ef_regulation_labor_minwage best12. ;
1205     format ef_regulation_labor_firing best12. ;
1206     format ef_regulation_labor_bargain best12. ;
1207     format ef_regulation_labor_hours best12. ;
1208     format ef_regulation_labor_dismissal best12. ;
1209     format ef_regulation_labor_conscription best12. ;
1210     format ef_regulation_labor best12. ;
1211     format ef_regulation_business_adm best12. ;
1212     format ef_regulation_business_bureaucra best12. ;
1213     format ef_regulation_business_start best12. ;
1214     format ef_regulation_business_bribes best12. ;
1215     format ef_regulation_business_licensing best12. ;
1216     format ef_regulation_business_complianc best12. ;
1217     format ef_regulation_business best12. ;
1218     format ef_regulation best12. ;
1219     format ef_score best12. ;
1220     format ef_rank best12. ;
1221     format hf_score best12. ;
1222     format hf_rank best12. ;
1223     format hf_quartile best12. ;
1224 input
1225     year
1226     ISO_code $
1227     countries $
1228     region $
1229     pf_rol_procedural
1230     pf_rol_civil
1231     pf_rol_criminal
1232     pf_rol
1233     pf_ss_homicide
1234     pf_ss_disappearances_disap
1235     pf_ss_disappearances_violent

```

1236	pf_ss_disappearances_organized
1237	pf_ss_disappearances_fatalities
1238	pf_ss_disappearances_injuries
1239	pf_ss_disappearances
1240	pf_ss_women_fgm
1241	pf_ss_women_missing
1242	pf_ss_women_inheritance_widows
1243	pf_ss_women_inheritance_daughter
1244	pf_ss_women_inheritance
1245	pf_ss_women
1246	pf_ss
1247	pf_movement_domestic
1248	pf_movement_foreign
1249	pf_movement_women
1250	pf_movement
1251	pf_religion_estop_establish
1252	pf_religion_estop_operate
1253	pf_religion_estop
1254	pf_religion_harassment
1255	pf_religion_restrictions
1256	pf_religion
1257	pf_association_association
1258	pf_association_assembly
1259	pf_association_political_establi
1260	pf_association_political_operate
1261	pf_association_political
1262	pf_association_prof_establish
1263	pf_association_prof_operate
1264	pf_association_prof
1265	pf_association_sport_establish
1266	pf_association_sport_operate
1267	pf_association_sport
1268	pf_association
1269	pf_expression_killed
1270	pf_expression_jailed
1271	pf_expression_influence
1272	pf_expression_control
1273	pf_expression_cable
1274	pf_expression_newspapers
1275	pf_expression_internet
1276	pf_expression
1277	pf_identity_legal
1278	pf_identity_parental_marriage
1279	pf_identity_parental_divorce
1280	pf_identity_parental
1281	pf_identity_sex_male
1282	pf_identity_sex_female
1283	pf_identity_sex
1284	pf_identity_divorce
1285	pf_identity
1286	pf_score
1287	pf_rank
1288	ef_government_consumption
1289	ef_government_transfers

1290	ef_government_enterprises
1291	ef_government_tax_income
1292	ef_government_tax_payroll
1293	ef_government_tax
1294	ef_government
1295	ef_legal_judicial
1296	ef_legal_courts
1297	ef_legal_protection
1298	ef_legal_military
1299	ef_legal_integrity
1300	ef_legal_enforcement
1301	ef_legal_restrictions
1302	ef_legal_police
1303	ef_legal_crime
1304	ef_legal_gender
1305	ef_legal
1306	ef_money_growth
1307	ef_money_sd
1308	ef_money_inflation
1309	ef_money_currency
1310	ef_money
1311	ef_trade_tariffs_revenue
1312	ef_trade_tariffs_mean
1313	ef_trade_tariffs_sd
1314	ef_trade_tariffs
1315	ef_trade_regulatory_nontariff
1316	ef_trade_regulatory_compliance
1317	ef_trade_regulatory
1318	ef_trade_black
1319	ef_trade_movement_foreign
1320	ef_trade_movement_capital
1321	ef_trade_movement_visit
1322	ef_trade_movement
1323	ef_trade
1324	ef_regulation_credit_ownership
1325	ef_regulation_credit_private
1326	ef_regulation_credit_interest
1327	ef_regulation_credit
1328	ef_regulation_labor_minwage
1329	ef_regulation_labor_firing
1330	ef_regulation_labor_bargain
1331	ef_regulation_labor_hours
1332	ef_regulation_labor_dismissal
1333	ef_regulation_labor_conscription
1334	ef_regulation_labor
1335	ef_regulation_business_adm
1336	ef_regulation_business_bureaucra
1337	ef_regulation_business_start
1338	ef_regulation_business_bribes
1339	ef_regulation_business_licensing
1340	ef_regulation_business_complianc
1341	ef_regulation_business
1342	ef_regulation
1343	ef_score



```

1344             ef_rank
1345             hf_score
1346             hf_rank
1347             hf_quartile
1348         ;
1349         if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
1349! variable */
1350         run;

```

NOTE: The infile 'human\_freedom.csv' is:  
 Filename=U:\SAS\extdata\human\_freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=1175330,  
 Last Modified=25Mar2019:14:45:25,  
 Create Time=25Mar2019:14:45:43

NOTE: 1458 records were read from the infile 'human\_freedom.csv'.  
 The minimum record length was 144.  
 The maximum record length was 1031.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: DATA statement used (Total process time):  
 real time 0.34 seconds  
 cpu time 0.28 seconds

1458 rows created in WORK.FREEDOM from human\_freedom.csv.

NOTE: WORK.FREEDOM data set was successfully created.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: PROCEDURE IMPORT used (Total process time):  
 real time 3.16 seconds  
 cpu time 3.07 seconds

```

1351
1352
1353 /*MERGE THE DATASETS TO GET HAPPINESS AND GDP AND SUICIDES */
1354 /*merge happiness and economic GDP datasets together using a left
join with proc
1354! sql*/
1355 proc sql;
1356     create table merged_part1 as
1357     select * from happy a left join gdp b
1358     on a.Country = b.Country;

```

WARNING: Variable Country already exists on file WORK.MERGED\_PART1.

NOTE: Table WORK.MERGED\_PART1 created, with 157 rows and 16 columns.

```

1359 quit;
NOTE: PROCEDURE SQL used (Total process time):
  real time 0.02 seconds
  cpu time 0.03 seconds

```

```
1360 /*merge the merged and suicide datasets together using a left join
with proc sql*/
```

```
1361 proc sql;
```

```
1362     create table merged as
```

```
1363     select * from merged_part1 a left join suicide b
```

```
1364     on a.Country = b.Country;
```

WARNING: Variable Country already exists on file WORK.MERGED.

NOTE: Table WORK.MERGED created, with 157 rows and 17 columns.

```
1365 quit;
```

NOTE: PROCEDURE SQL used (Total process time):

real time	0.02 seconds
-----------	--------------

cpu time	0.01 seconds
----------	--------------

```
1366
```

```
1367 /*filter the freedom dataset for only 2016 data before merging*/
```

```
1368 proc sql;
```

```
1369 create table freedom2 as
```

```
1370 select *
```

```
1371 from freedom
```

```
1372 where year = 2016;
```

NOTE: Table WORK.FREEDOM2 created, with 162 rows and 123 columns.

```
1373 quit;
```

NOTE: PROCEDURE SQL used (Total process time):

real time	0.01 seconds
-----------	--------------

cpu time	0.00 seconds
----------	--------------

```
1374
```

```
1375 /*drop repeat region column first*/
```

```
1376 data freedom2;
```

```
1377     set freedom2;
```

```
1378     drop region;
```

```
1379 run;
```

NOTE: There were 162 observations read from the data set WORK.FREEDOM2.

NOTE: The data set WORK.FREEDOM2 has 162 observations and 122 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
-----------	--------------

cpu time	0.01 seconds
----------	--------------

```
1380
```

```
1381 /*merge the merged and suicide datasets together using a left join
with proc sql*/
```

```
1382 proc sql;
```

```
1383     create table data as
```

```
1384     select * from merged a left join freedom2 b
```

```
1385     on a.Country=b.Countries;
```

WARNING: Variable ISO\_code already exists on file WORK.DATA.

NOTE: Table WORK.DATA created, with 157 rows and 138 columns.

```
1386 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time          0.02 seconds
      cpu time           0.01 seconds
```

```
1387
1388 /*#####MAKE MAPS#####*/
1389
1390 /*get country names from shape file*/
1391 data maps_to_merge;
1392 set mapsgfk.world;
NOTE: The map data sets in library MAPSGFK are based on the digital maps
from GfK
      GeoMarketing and are covered by their Copyright. For additional
information, see
      http://support.sas.com/mapsonline/gfklicense.
1393 Keep=1;
1394 drop SEGMENT LONG LAT X Y ISO ISOALPHA2 RESOLUTION DENSITY CONT
LAKE;
1395 run;
```

```
NOTE: There were 343358 observations read from the data set
MAPSGFK.WORLD.
NOTE: The data set WORK.MAPS_TO_MERGE has 343358 observations and 3
variables.
NOTE: DATA statement used (Total process time):
      real time          0.14 seconds
      cpu time           0.09 seconds
```

```
1396
1397 /*sort by country ID*/
1398 proc sort data=maps_to_merge out=maps_to_merge2 NODUPKEY;
1399 by ID;
1400 run;
```

```
NOTE: There were 343358 observations read from the data set
WORK.MAPS_TO_MERGE.
NOTE: 343105 observations with duplicate key values were deleted.
NOTE: The data set WORK.MAPS_TO_MERGE2 has 253 observations and 3
variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time          0.09 seconds
      cpu time           0.09 seconds
```

```
1401
1402 /*use proc sql to merge shape file with happiness scores*/
1403 proc sql;
1404     create table happiness_data_for_map as
1405     select * from maps_to_merge2 a left join happy b
1406     on a.IDNAME = b.Country;
```

NOTE: Table WORK.HAPPINESS\_DATA\_FOR\_MAP created, with 253 rows and 16 columns.

1407 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time	0.02 seconds
cpu time	0.00 seconds

1408

1409 /\*make map of happiness scores\*/

1410 proc gmap data=happiness\_data\_for\_map map=mapsgfk.world;

1411 id ID;

1412 choro Happiness\_Score / coutline=black;

1413 label Happiness\_Score='Happiness Score';

1414 title 'Happiness Score by Country';

1415 run;

NOTE: 43643 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary

Files\\_TD7332\_SEW-207-PC-12\_\gmap.png.

1416

1417 /\*2-suicide map\*/

1418

1419 /\*use proc sql to merge shape file with happiness scores\*/

NOTE: PROCEDURE GMAP used (Total process time):

real time	0.41 seconds
cpu time	0.26 seconds

1420 proc sql;

1421 create table suicide\_data\_for\_map as

1422 select \* from maps\_to\_merge2 a left join suicide b

1423 on a.IDNAME = b.Country;

NOTE: Table WORK.SUICIDE\_DATA\_FOR\_MAP created, with 253 rows and 5 columns.

1424 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time	0.04 seconds
cpu time	0.03 seconds

1425

1426 /\*make map of happiness scores\*/

1427 proc gmap data=suicide\_data\_for\_map map=mapsgfk.world;

1428 id ID;

1429 choro \_2016\_suicide / coutline=black;

1430 label \_2016\_suicide='Crude Suicide Rate per 100,000 Residents';

1431 title 'Crude Suicide Rate by Region';

1432 run;

NOTE: 44471 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary  
Files\\_TD7332\_SEW-207-PC-12\_\gmap1.png.

```
1433
1434 /*3-freedom of expression*/
1435
1436 /*use proc sql to merge shape file with happiness scores*/
```

NOTE: PROCEDURE GMAP used (Total process time):

real time	0.32 seconds
cpu time	0.29 seconds

```
1437 proc sql;
1438     create table freedom_data_for_map as
1439     select * from maps_to_merge2 a left join freedom2 b
1440     on a.IDNAME = b.countries;
```

NOTE: Table WORK.FREEDOM\_DATA\_FOR\_MAP created, with 253 rows and 125 columns.

```
1441 quit;
```

NOTE: PROCEDURE SQL used (Total process time):

real time	0.02 seconds
cpu time	0.03 seconds

```
1442
1443 proc gmap data=freedom_data_for_map map=mapsgfk.world;
1444 id ID;
1445 choro ef_legal_integrity / coutline=black;
1446 label ef_legal_integrity='Legal Integrity Score (1-10)';
1447 title 'Legal Integrity Score by Country';
1448 run;
```

NOTE: 43567 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary  
Files\\_TD7332\_SEW-207-PC-12\_\gmap2.png.

```
1449
1450 /*ANALYSIS #1: WHAT COUNTRIES ARE HAPPIEST ANALYSIS*/
1451 /*1-How does the average happiness level vary depending on the
region?*/
1452 /*use proc sgplot to graph the average response time by region*/
```

NOTE: PROCEDURE GMAP used (Total process time):

real time	0.30 seconds
cpu time	0.28 seconds

```
1453 proc sgplot data=merged;
1454 vbar Region /response=Happiness_score stat=mean
categoryorder=RESPDESC
1454! fillattrs=graphdata3;
1455 label Happiness_Score="Average Happiness Score";
1456 yaxis values=(0 to 10 by 1) min=0 max=10 valueshint;
```

```
1457 title "Average Happiness Scores in Global Regions (2016)";
1458 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.18 seconds
cpu time	0.06 seconds

NOTE: There were 157 observations read from the data set WORK.MERGED.

```
1459
1460 /*2-Is there a statistically significant difference between
regions?*/
1461 /*use proc anova to determine if there is a statistically
significant difference in
1461! happiness between regions*/
1462 proc anova data=happy;
1463     class Region;          * Variable with groups;
1464     model Happiness_score = Region; * Variable with experimental
results;
1465     means Region / Scheffe bon;
1466 run;

1467
1468 /*3-how do components vary across regions?*/
1469 /*create new variables to group related categories using datastep*/
```

NOTE: PROCEDURE ANOVA used (Total process time):

real time	0.09 seconds
cpu time	0.01 seconds

```
1470 data happy2;
1471 set happy;
1472 Economy=Economy_gdppercapita;
1473 Family=Family;
1474 Health=health_lifeexpectancy;
1475 Government=Freedom+trust_govcorruption;
1476 Generosity=Generosity;
1477 Dystopia=dystopia_residual;
1478 drop Happiness_Score Happiness_Rank Lower__Confidence_Interval
1478! Upper_Confidence_Interval Economy_gdppercapita
health_lifeexpectancy
1478! trust_govcorruption dystopia_residual;
1479 ID=_n_;
1480 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY.

NOTE: The data set WORK.HAPPY2 has 157 observations and 10 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```
1481
```

```

1482 /*convert the data set from wide to long using proc transpose*/
1483 proc transpose data=happy2 out=happy_long(rename=(Coll=Value))
name=Variable;
1484 by ID Country Region;
1485 var Economy Family Health Government Generosity Dystopia;
1486 run;

```

NOTE: There were 157 observations read from the data set WORK.HAPPY2.  
NOTE: The data set WORK.HAPPY\_LONG has 942 observations and 5 variables.  
NOTE: PROCEDURE TRANSPOSE used (Total process time):

real time	0.02 seconds
cpu time	0.00 seconds

```

1487
1488 /*sort the dataset using proc sort*/
1489 proc sort data=happy_long out=happy_long;
1490 by Region Country Variable;
1491 run;

```

NOTE: There were 942 observations read from the data set WORK.HAPPY\_LONG.  
NOTE: The data set WORK.HAPPY\_LONG has 942 observations and 5 variables.  
NOTE: PROCEDURE SORT used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```

1492
1493 /*plot happiness by components by region using sgplot*/
1494 proc sgplot data=happy_long;
1495 vbar Region /response=Value group=Variable stat=mean
categoryorder=RESPDESC;
1496 label Value="Average Happiness Score";
1497 title "Average Happiness Scores in Global Regions (2016)";
1498 title2 "Broken up by Components of Happiness";
1499 run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.25 seconds
cpu time	0.09 seconds

NOTE: There were 942 observations read from the data set WORK.HAPPY\_LONG.

```

1500
1501 /*4-What are the 20 happiest countries?*/
1502 /*sort countries by happiness rating using proc sort*/
1503 proc sort data=happy out=happy;
1504 by DESCENDING Happiness_Score;
1505 run;

```

NOTE: There were 157 observations read from the data set WORK.HAPPY.  
NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.  
NOTE: PROCEDURE SORT used (Total process time):

real time	0.01 seconds
-----------	--------------

cpu time 0.00 seconds

```
1506
1507 /*get dataset showing top 20 happiest using data step*/
1508 data happy_top20;
1509 set happy(obs=20);
1510 run;
```

NOTE: There were 20 observations read from the data set WORK.HAPPY.  
NOTE: The data set WORK.HAPPY\_TOP20 has 20 observations and 13 variables.  
NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.00 seconds

```
1511
1512 /*create a barplot of 20 happiest countries using proc sgplot*/
1513 proc sgplot data=happy_top20;
1514 vbar Country /response=Happiness_score categoryorder=RESPDESC
fillattrs=graphdata1;
1515 label Happiness_Score="Happiness Score";
1516 yaxis grid values=(0 to 10 by 1);
1517 title "20 Happiest Countries in the World (2016)";
1518 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.21 seconds  
cpu time 0.04 seconds

NOTE: There were 20 observations read from the data set WORK.HAPPY\_TOP20.

```
1519
1520 /*5-What are the 20 least countries?*/
1521 /*get dataset showing bottom 20 happiest using data step and where
statement*/
1522 data happy_bottom20;
1523 set happy;
1524 where Happiness_Rank>137;
1525 run;
```

NOTE: There were 20 observations read from the data set WORK.HAPPY.  
WHERE Happiness\_Rank>137;  
NOTE: The data set WORK.HAPPY\_BOTTOM20 has 20 observations and 13  
variables.  
NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.01 seconds

```
1526
1527 /*create a barplot of 20 least happy countries using proc sgplot*/
1528 proc sgplot data=happy_bottom20;
```



```
1529 vbar Country /response=Happiness_score categoryorder=RESPDESC  
fillattrs=graphdata2;  
1530 label Happiness_Score="Happiness Score";  
1531 yaxis grid values=(0 to 10 by 1);  
1532 title "20 Least Happiest Countries in the World (2016)";  
1533 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.16 seconds
cpu time	0.04 seconds

NOTE: There were 20 observations read from the data set  
WORK.HAPPY\_BOTTOM20.

```
1534  
1535 /*6- how many countries have a happyness score >5 and <5*/  
1536 /*use data step and if and then statement */  
1537 data happy_5;  
1538 set happy;  
1539 if Happiness_Score > 5 then Classification="Greater than 5";  
1540 if Happiness_Score le 5 then Classification="Less than 5";  
1541 HappinessScore=round(Happiness_Score);  
1542 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY.  
NOTE: The data set WORK.HAPPY\_5 has 157 observations and 15 variables.  
NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.00 seconds

```
1543  
1544 /*sort the dataset using proc sort*/  
1545 proc sort data=happy_5;  
1546 by Region Classification;  
1547 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.  
NOTE: The data set WORK.HAPPY\_5 has 157 observations and 15 variables.  
NOTE: PROCEDURE SORT used (Total process time):

real time	0.00 seconds
cpu time	0.00 seconds

```
1548  
1549 /*use proc freq to get frequency of each region*/  
1550 proc freq data=happy_5;  
1551 tables Region*Classification /nocol nopercent;  
1552 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.  
NOTE: PROCEDURE FREQ used (Total process time):

real time	0.04 seconds
cpu time	0.03 seconds

```

1553
1554 /*7-what is the frequency of happiness_scores among diffrent
countries/what is the
1554! distribution*/
1555 /*use proc freq to make frequency plot of regions*/
1556 proc freq data = happy_5;
1557     tables HappinessScore * Region / plots = freqplot (twoway =
grouphorizontal);
1558     title 'Distribution of Happiness Scores by Region';
1559 run;

```

WARNING: You must enable ODS graphics before requesting plots.

NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.

NOTE: PROCEDURE FREQ used (Total process time):

real time 0.05 seconds

cpu time 0.03 seconds

```

1560
1561 /*8-what is the distribution of happiness score*/
1562 /*use proc univariate to create a histogram*/
1563 proc univariate data = happy;
1564     var Happiness_Score;
1565     histogram Happiness_Score / endpoints=0 to 10 by 1 normal;
1566     label Happiness_Score="Happiness Score";
1567     title "Distribution of Happiness Scores among All Countries
(2016)";
1568 run;

```

NOTE: 23609 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary

Files\\_TD7332\_SEW-207-PC-12\\_univar.png.

NOTE: PROCEDURE UNIVARIATE used (Total process time):

real time 0.20 seconds

cpu time 0.18 seconds

```

1569
1570 /*SUICIDE/GDP ANALYSIS*/
1571 /*1-What is the relationship between happiness and gdp*/
1572 /*get logarithmic gdp using a data step*/
1573 data merged;
1574 set merged;
1575 Log_GDP=log(gdp_2016);
1576 run;

```

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).

19 at 1575:9

NOTE: There were 157 observations read from the data set WORK.MERGED.

NOTE: The data set WORK.MERGED has 157 observations and 18 variables.

NOTE: DATA statement used (Total process time):

real time 0.02 seconds

cpu time 0.00 seconds

1577

1578 /\*use proc sgplot to examine the relationship between gdp and happiness\*/

1579 proc sgplot data=merged;

1580 reg x=gdp\_2016 y=Happiness\_Score / DEGREE=2;

1581 label Happiness\_Score="Happiness Score";

1582 label gdp\_2016="2016 GDP Per Capita (USD)";

1583 yaxis values=(0 to 10 by 1);

1584 title 'Relationship between Happiness Score and GDP among Countries';

1585 title2 'Fitted with a Quadratic Regression Model (Degrees=2)';

1586 run;

NOTE: PROCEDURE SGPLOT used (Total process time):

real time 0.22 seconds

cpu time 0.07 seconds

NOTE: There were 157 observations read from the data set WORK.MERGED.

1587

1588 /\*use proc reg to examine the relationship between log gdp and happiness\*/

1589 proc reg data=merged;

1590 model Happiness\_Score=Log\_GDP;

1591 label Happiness\_Score='Happiness Score';

1592 label Log\_GDP='Logarithm of 2016 GDP Per Capita';

1593 run;

1594

1595 /\*2-What is the relationship between happiness and suicides?\*/

1596 /\*use proc sgplot to examine the relationship between suicides and happiness\*/

NOTE: PROCEDURE REG used (Total process time):

real time 0.09 seconds

cpu time 0.04 seconds

1597 proc sgplot data=merged;

1598 reg x=Happiness\_Score y=\_2016\_suicide / CLM CLI;

1599 label Happiness\_Score="Happiness Score";

1600 label \_2016\_suicide="2016 Crude Suicide Rate (per 100,000 persons)";

1601 yaxis values=(0 to 35 by 5);

1602 xaxis values=(0 to 10 by 1);

1603 title 'Relationship between Happiness Score and Suicide Rates among Countries';

1604 run;

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.18 seconds  
cpu time 0.03 seconds

NOTE: There were 157 observations read from the data set WORK.MERGED.

```
1605
1606 /*use proc reg to examine the relationship between suicides and
happiness*/
1607 proc reg data=merged;
1608 model _2016_suicide=Happiness_Score;
1609 label Happiness_Score='Happiness Score';
1610 label _2016_suicide='Crude Suicide Rate';
1611 run;

1612
1613
1614 /*3- is there a difference in relationship for men and women?*/
1615 /*import the men and women dataset*/
1616 /*import the happiness dataset using PROC IMPORT*/
```

NOTE: PROCEDURE REG used (Total process time):  
real time 0.15 seconds  
cpu time 0.09 seconds

```
1617 proc import
1618     out=menwomen
1619     datafile= 'menvwomen.csv'
1620     dbms=dlm replace;
1621     delimiter=',';
1622     getnames=YES;
1623     guessingrows=20404042;
1624 run;
```

```
1625
/*****
1626 *   PRODUCT:   SAS
1627 *   VERSION:   9.4
1628 *   CREATOR:   External File Interface
1629 *   DATE:      16APR19
1630 *   DESC:      Generated SAS Datastep Code
1631 *   TEMPLATE SOURCE:  (None Specified.)
1632
*****/
1633 data WORK.MENWOMEN ;
1634 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
1635 infile 'menvwomen.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
1636 informat Country_Name $52. ;
1637 informat ISO_Code $3. ;
1638 informat women_suicides best32. ;
1639 informat men_suicides best32. ;
```

```

1640         format Country_Name $52. ;
1641         format ISO_Code $3. ;
1642         format women_suicides best12. ;
1643         format men_suicides best12. ;
1644     input
1645         Country_Name $
1646         ISO_Code $
1647         women_suicides
1648         men_suicides
1649     ;
1650     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
1650! variable */
1651     run;

```

NOTE: The infile 'menvwomen.csv' is:  
 Filename=U:\SAS\extdata\menvwomen.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=7589,  
 Last Modified=04Apr2019:16:40:49,  
 Create Time=04Apr2019:16:37:14

NOTE: 264 records were read from the infile 'menvwomen.csv'.  
 The minimum record length was 10.  
 The maximum record length was 79.

NOTE: The data set WORK.MENWOMEN has 264 observations and 4 variables.

NOTE: DATA statement used (Total process time):  
 real time 0.03 seconds  
 cpu time 0.03 seconds

264 rows created in WORK.MENWOMEN from menvwomen.csv.

NOTE: WORK.MENWOMEN data set was successfully created.

NOTE: The data set WORK.MENWOMEN has 264 observations and 4 variables.

NOTE: PROCEDURE IMPORT used (Total process time):  
 real time 0.15 seconds  
 cpu time 0.12 seconds

```

1652
1653 proc sql;
1654     create table differenceanalysis as
1655     select * from happy a left join menwomen b
1656     on a.Country = b.Country_Name;
NOTE: Table WORK.DIFFERENCEANALYSIS created, with 157 rows and 17
columns.

```

```

1657 quit;
NOTE: PROCEDURE SQL used (Total process time):
  real time 0.02 seconds
  cpu time 0.00 seconds

```

```

1658
1659
1660 proc sgplot data=differenceanalysis;
1661   reg x=Happiness_Score y=women_suicides / legendlabel='Womens
Suicides';
1662   reg x=Happiness_Score y=men_suicides / legendlabel='Mens Suicides';
1663   label Happiness_Score="Happiness Score";
1664   label women_suicides="Women Suicide Rate";
1665   label men_suicides="Men Suicide Rate";
1666   yaxis label="2016 Crude Suicide Rate (per 100,000 persons)"
values=(0 to 35 by 5);
1667   xaxis values=(0 to 10 by 1);
1668   title 'Relationship between Happiness Score and Men and Women
Suicide Rates among
1668! Countries';
1669   run;

```

```

NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.19 seconds
      cpu time            0.03 seconds

```

```

NOTE: There were 157 observations read from the data set
WORK.DIFFERENCEANALYSIS.

```

```

1670
1671
1672
1673
1674 /*ANALYSIS OF EXPRESSION ISSUES*/
1675
1676 /*1-What expression factors are most closely correlated with
happiness*/
1677 /*use proc sql to select expression variables*/
1678 proc sql;
1679   create table expression_happy as
1680   select country, pf_expression_influence, pf_expression_jailed,
pf_expression_cable,
1680! pf_expression_newspapers, pf_expression_internet, Happiness_score
1681   from data;

```

```

NOTE: Table WORK.EXPRESSION_HAPPY created, with 157 rows and 7 columns.

```

```

1682 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time           0.01 seconds
      cpu time            0.01 seconds

```

```

1683
1684 /*use proc corr to get correlations and label variables*/
1685 proc corr data=expression_happy nosimple noprob;
1686   label pf_expression_influence='Regulation of Media Content';
1687   label pf_expression_jailed='Media Jailed';
1688   label pf_expression_cable='Access to Cable';

```

```
1689 label pf_expression_newspapers='Access to Newspapers';
1690 label pf_expression_internet='Access to Internet';
1691 label Happiness_Score='Happiness Score';
1692 run;
```

```
NOTE: PROCEDURE CORR used (Total process time):
      real time           0.02 seconds
      cpu time            0.01 seconds
```

```
1693
1694 /*2-HOW DOES FREEDOM OF EXPRESSION VARY ACROSS countries overtime
*/
1695 /*use proc sql to select only variables of interest*/
1696 proc sql;
1697 create table expression as
1698 select year, Countries, pf_expression
1699 from freedom
1700 order by year;
```

```
NOTE: Table WORK.EXPRESSION created, with 1458 rows and 3 columns.
```

```
1701 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time           0.02 seconds
      cpu time            0.01 seconds
```

```
1702
1703 /*create macro to make sgplots*/
1704 %macro show_result (country1=, country2=,country3=,country4=,
country5=);
1705 data expressiondata;
1706 set expression;
1707 where Countries=&country1 or Countries=&country2 or
Countries=&country3 or
1707! Countries=&country4 or Countries=&country5;
1708 run;
1709 proc sgplot data = expressiondata noautolegend noborder;
1710     series x = Year y = pf_expression / group=Countries
lineattrs=(thickness=2);
1710! /*Problem 8.4: plot time series and adjust line color/thickness*/
1711     xaxis label="Year" interval=year;
1712     yaxis label="Freedom of Expression Score by Country" values=(0
to 10 by 1);
1713     title 'Freedom of Expression Scores from 2008-2016';
1714     keylegend;
1715 run;
1716 %mend show_result;
1717
1718 /*use macro to make plots*/
1719 %show_result(country1="United States",
1719! country2="Denmark",country3="Burundi",country4="",country5="");
```

```
NOTE: There were 27 observations read from the data set WORK.EXPRESSION.
```

```
WHERE Countries in (' ', 'Burundi', 'Denmark', 'United States');  
NOTE: The data set WORK.EXPRESSIONDATA has 27 observations and 3  
variables.
```

```
NOTE: DATA statement used (Total process time):  
      real time          0.00 seconds  
      cpu time           0.00 seconds
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):  
      real time          0.14 seconds  
      cpu time           0.06 seconds
```

```
NOTE: There were 27 observations read from the data set  
WORK.EXPRESSIONDATA.
```

```
1720  %show_result(country1="Syria",  
1720!  country2="Ukraine",country3="Egypt",country4="",country5="");
```

```
NOTE: There were 27 observations read from the data set WORK.EXPRESSION.  
      WHERE Countries in (' ', 'Egypt', 'Syria', 'Ukraine');  
NOTE: The data set WORK.EXPRESSIONDATA has 27 observations and 3  
variables.
```

```
NOTE: DATA statement used (Total process time):  
      real time          0.01 seconds  
      cpu time           0.01 seconds
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):  
      real time          0.13 seconds  
      cpu time           0.03 seconds
```

```
NOTE: There were 27 observations read from the data set  
WORK.EXPRESSIONDATA.
```

```
1721  %show_result(country1="China", country2="India",country3="United  
1721!  States",country4="Indonesia",country5="Brazil");
```

```
NOTE: There were 45 observations read from the data set WORK.EXPRESSION.  
      WHERE Countries in ('Brazil', 'China', 'India', 'Indonesia',  
      'United States');  
NOTE: The data set WORK.EXPRESSIONDATA has 45 observations and 3  
variables.
```

```
NOTE: DATA statement used (Total process time):  
      real time          0.00 seconds  
      cpu time           0.00 seconds
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):  
      real time          0.13 seconds  
      cpu time           0.01 seconds
```



NOTE: There were 45 observations read from the data set  
WORK.EXPRESSIONDATA.

```
1722
1723 /*3-WHAT REGIONS HAVE THE HIGHEST FREEDOM OF EXPRESSION*/
1724 /*use proc means to get region */
1725 proc sort data=data;
1726 by region;
1727 run;
```

NOTE: There were 157 observations read from the data set WORK.DATA.  
NOTE: The data set WORK.DATA has 157 observations and 138 variables.  
NOTE: PROCEDURE SORT used (Total process time):  
real time 0.01 seconds  
cpu time 0.01 seconds

```
1728 proc means data=data;
1729 class region;
1730 var pf_expression;
1731 run;
```

NOTE: There were 157 observations read from the data set WORK.DATA.  
NOTE: PROCEDURE MEANS used (Total process time):  
real time 0.02 seconds  
cpu time 0.01 seconds

```
1732
1733
1734 /* ANALYSIS OF WOMEN'S RIGHTS SCORES */
1735
1736
1737 /*import the freedom dataset*/
1738 proc import
1739 out=freedom
1740 datafile= 'human_freedom.csv'
1741 dbms=dlm replace;
1742 delimiter=',';
1743 getnames=YES;
1744 guessingrows=20404042;
1745 run;
```

Name pf\_ss\_women\_inheritance\_daughters truncated to  
pf\_ss\_women\_inheritance\_daughter.  
Name pf\_association\_political\_establish truncated to  
pf\_association\_political\_establi.  
Name ef\_regulation\_business\_bureaucracy truncated to  
ef\_regulation\_business\_bureaucra.  
Name ef\_regulation\_business\_compliance truncated to  
ef\_regulation\_business\_complianc.  
Problems were detected with provided names. See LOG.  
1746

/\*\*\*\*\*

```

1747 *   PRODUCT:   SAS
1748 *   VERSION:   9.4
1749 *   CREATOR:   External File Interface
1750 *   DATE:      16APR19
1751 *   DESC:      Generated SAS Datasets Code
1752 *   TEMPLATE SOURCE: (None Specified.)
1753
*****/
1754     data WORK.FREEDOM      ;
1755     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
1756     infile 'human_freedom.csv' delimiter = ',' MISOVER DSD
lrecl=32767 firstobs=2 ;
1757     informat year best32. ;
1758     informat ISO_code $3. ;
1759     informat countries $22. ;
1760     informat region $29. ;
1761     informat pf_rol_procedural best32. ;
1762     informat pf_rol_civil best32. ;
1763     informat pf_rol_criminal best32. ;
1764     informat pf_rol best32. ;
1765     informat pf_ss_homicide best32. ;
1766     informat pf_ss_disappearances_disap best32. ;
1767     informat pf_ss_disappearances_violent best32. ;
1768     informat pf_ss_disappearances_organized best32. ;
1769     informat pf_ss_disappearances_fatalities best32. ;
1770     informat pf_ss_disappearances_injuries best32. ;
1771     informat pf_ss_disappearances best32. ;
1772     informat pf_ss_women_fgm best32. ;
1773     informat pf_ss_women_missing best32. ;
1774     informat pf_ss_women_inheritance_widows best32. ;
1775     informat pf_ss_women_inheritance_daughter best32. ;
1776     informat pf_ss_women_inheritance best32. ;
1777     informat pf_ss_women best32. ;
1778     informat pf_ss best32. ;
1779     informat pf_movement_domestic best32. ;
1780     informat pf_movement_foreign best32. ;
1781     informat pf_movement_women best32. ;
1782     informat pf_movement best32. ;
1783     informat pf_religion_estop_establish best32. ;
1784     informat pf_religion_estop_operate best32. ;
1785     informat pf_religion_estop best32. ;
1786     informat pf_religion_harassment best32. ;
1787     informat pf_religion_restrictions best32. ;
1788     informat pf_religion best32. ;
1789     informat pf_association_association best32. ;
1790     informat pf_association_assembly best32. ;
1791     informat pf_association_political_establi best32. ;
1792     informat pf_association_political_operate best32. ;
1793     informat pf_association_political best32. ;
1794     informat pf_association_prof_establish best32. ;
1795     informat pf_association_prof_operate best32. ;
1796     informat pf_association_prof best32. ;
1797     informat pf_association_sport_establish best32. ;
1798     informat pf_association_sport_operate best32. ;

```

```
1799 informat pf_association_sport best32. ;
1800 informat pf_association best32. ;
1801 informat pf_expression_killed best32. ;
1802 informat pf_expression_jailed best32. ;
1803 informat pf_expression_influence best32. ;
1804 informat pf_expression_control best32. ;
1805 informat pf_expression_cable best32. ;
1806 informat pf_expression_newspapers best32. ;
1807 informat pf_expression_internet best32. ;
1808 informat pf_expression best32. ;
1809 informat pf_identity_legal best32. ;
1810 informat pf_identity_parental_marriage best32. ;
1811 informat pf_identity_parental_divorce best32. ;
1812 informat pf_identity_parental best32. ;
1813 informat pf_identity_sex_male best32. ;
1814 informat pf_identity_sex_female best32. ;
1815 informat pf_identity_sex best32. ;
1816 informat pf_identity_divorce best32. ;
1817 informat pf_identity best32. ;
1818 informat pf_score best32. ;
1819 informat pf_rank best32. ;
1820 informat ef_government_consumption best32. ;
1821 informat ef_government_transfers best32. ;
1822 informat ef_government_enterprises best32. ;
1823 informat ef_government_tax_income best32. ;
1824 informat ef_government_tax_payroll best32. ;
1825 informat ef_government_tax best32. ;
1826 informat ef_government best32. ;
1827 informat ef_legal_judicial best32. ;
1828 informat ef_legal_courts best32. ;
1829 informat ef_legal_protection best32. ;
1830 informat ef_legal_military best32. ;
1831 informat ef_legal_integrity best32. ;
1832 informat ef_legal_enforcement best32. ;
1833 informat ef_legal_restrictions best32. ;
1834 informat ef_legal_police best32. ;
1835 informat ef_legal_crime best32. ;
1836 informat ef_legal_gender best32. ;
1837 informat ef_legal best32. ;
1838 informat ef_money_growth best32. ;
1839 informat ef_money_sd best32. ;
1840 informat ef_money_inflation best32. ;
1841 informat ef_money_currency best32. ;
1842 informat ef_money best32. ;
1843 informat ef_trade_tariffs_revenue best32. ;
1844 informat ef_trade_tariffs_mean best32. ;
1845 informat ef_trade_tariffs_sd best32. ;
1846 informat ef_trade_tariffs best32. ;
1847 informat ef_trade_regulatory_nontariff best32. ;
1848 informat ef_trade_regulatory_compliance best32. ;
1849 informat ef_trade_regulatory best32. ;
1850 informat ef_trade_black best32. ;
1851 informat ef_trade_movement_foreign best32. ;
1852 informat ef_trade_movement_capital best32. ;
```

```
1853 informat ef_trade_movement_visit best32. ;
1854 informat ef_trade_movement best32. ;
1855 informat ef_trade best32. ;
1856 informat ef_regulation_credit_ownership best32. ;
1857 informat ef_regulation_credit_private best32. ;
1858 informat ef_regulation_credit_interest best32. ;
1859 informat ef_regulation_credit best32. ;
1860 informat ef_regulation_labor_minwage best32. ;
1861 informat ef_regulation_labor_firing best32. ;
1862 informat ef_regulation_labor_bargain best32. ;
1863 informat ef_regulation_labor_hours best32. ;
1864 informat ef_regulation_labor_dismissal best32. ;
1865 informat ef_regulation_labor_conscription best32. ;
1866 informat ef_regulation_labor best32. ;
1867 informat ef_regulation_business_adm best32. ;
1868 informat ef_regulation_business_bureaucra best32. ;
1869 informat ef_regulation_business_start best32. ;
1870 informat ef_regulation_business_bribes best32. ;
1871 informat ef_regulation_business_licensing best32. ;
1872 informat ef_regulation_business_complianc best32. ;
1873 informat ef_regulation_business best32. ;
1874 informat ef_regulation best32. ;
1875 informat ef_score best32. ;
1876 informat ef_rank best32. ;
1877 informat hf_score best32. ;
1878 informat hf_rank best32. ;
1879 informat hf_quartile best32. ;
1880 format year best12. ;
1881 format ISO_code $3. ;
1882 format countries $22. ;
1883 format region $29. ;
1884 format pf_rol_procedural best12. ;
1885 format pf_rol_civil best12. ;
1886 format pf_rol_criminal best12. ;
1887 format pf_rol best12. ;
1888 format pf_ss_homicide best12. ;
1889 format pf_ss_disappearances_disap best12. ;
1890 format pf_ss_disappearances_violent best12. ;
1891 format pf_ss_disappearances_organized best12. ;
1892 format pf_ss_disappearances_fatalities best12. ;
1893 format pf_ss_disappearances_injuries best12. ;
1894 format pf_ss_disappearances best12. ;
1895 format pf_ss_women_fgm best12. ;
1896 format pf_ss_women_missing best12. ;
1897 format pf_ss_women_inheritance_widows best12. ;
1898 format pf_ss_women_inheritance_daughter best12. ;
1899 format pf_ss_women_inheritance best12. ;
1900 format pf_ss_women best12. ;
1901 format pf_ss best12. ;
1902 format pf_movement_domestic best12. ;
1903 format pf_movement_foreign best12. ;
1904 format pf_movement_women best12. ;
1905 format pf_movement best12. ;
1906 format pf_religion_estop_establish best12. ;
```

1907       format pf\_religion\_estop\_operate best12. ;  
1908       format pf\_religion\_estop best12. ;  
1909       format pf\_religion\_harassment best12. ;  
1910       format pf\_religion\_restrictions best12. ;  
1911       format pf\_religion best12. ;  
1912       format pf\_association\_association best12. ;  
1913       format pf\_association\_assembly best12. ;  
1914       format pf\_association\_political\_establi best12. ;  
1915       format pf\_association\_political\_operate best12. ;  
1916       format pf\_association\_political best12. ;  
1917       format pf\_association\_prof\_establish best12. ;  
1918       format pf\_association\_prof\_operate best12. ;  
1919       format pf\_association\_prof best12. ;  
1920       format pf\_association\_sport\_establish best12. ;  
1921       format pf\_association\_sport\_operate best12. ;  
1922       format pf\_association\_sport best12. ;  
1923       format pf\_association best12. ;  
1924       format pf\_expression\_killed best12. ;  
1925       format pf\_expression\_jailed best12. ;  
1926       format pf\_expression\_influence best12. ;  
1927       format pf\_expression\_control best12. ;  
1928       format pf\_expression\_cable best12. ;  
1929       format pf\_expression\_newspapers best12. ;  
1930       format pf\_expression\_internet best12. ;  
1931       format pf\_expression best12. ;  
1932       format pf\_identity\_legal best12. ;  
1933       format pf\_identity\_parental\_marriage best12. ;  
1934       format pf\_identity\_parental\_divorce best12. ;  
1935       format pf\_identity\_parental best12. ;  
1936       format pf\_identity\_sex\_male best12. ;  
1937       format pf\_identity\_sex\_female best12. ;  
1938       format pf\_identity\_sex best12. ;  
1939       format pf\_identity\_divorce best12. ;  
1940       format pf\_identity best12. ;  
1941       format pf\_score best12. ;  
1942       format pf\_rank best12. ;  
1943       format ef\_government\_consumption best12. ;  
1944       format ef\_government\_transfers best12. ;  
1945       format ef\_government\_enterprises best12. ;  
1946       format ef\_government\_tax\_income best12. ;  
1947       format ef\_government\_tax\_payroll best12. ;  
1948       format ef\_government\_tax best12. ;  
1949       format ef\_government best12. ;  
1950       format ef\_legal\_judicial best12. ;  
1951       format ef\_legal\_courts best12. ;  
1952       format ef\_legal\_protection best12. ;  
1953       format ef\_legal\_military best12. ;  
1954       format ef\_legal\_integrity best12. ;  
1955       format ef\_legal\_enforcement best12. ;  
1956       format ef\_legal\_restrictions best12. ;  
1957       format ef\_legal\_police best12. ;  
1958       format ef\_legal\_crime best12. ;  
1959       format ef\_legal\_gender best12. ;  
1960       format ef\_legal best12. ;

```

1961      format ef_money_growth best12. ;
1962      format ef_money_sd best12. ;
1963      format ef_money_inflation best12. ;
1964      format ef_money_currency best12. ;
1965      format ef_money best12. ;
1966      format ef_trade_tariffs_revenue best12. ;
1967      format ef_trade_tariffs_mean best12. ;
1968      format ef_trade_tariffs_sd best12. ;
1969      format ef_trade_tariffs best12. ;
1970      format ef_trade_regulatory_nontariff best12. ;
1971      format ef_trade_regulatory_compliance best12. ;
1972      format ef_trade_regulatory best12. ;
1973      format ef_trade_black best12. ;
1974      format ef_trade_movement_foreign best12. ;
1975      format ef_trade_movement_capital best12. ;
1976      format ef_trade_movement_visit best12. ;
1977      format ef_trade_movement best12. ;
1978      format ef_trade best12. ;
1979      format ef_regulation_credit_ownership best12. ;
1980      format ef_regulation_credit_private best12. ;
1981      format ef_regulation_credit_interest best12. ;
1982      format ef_regulation_credit best12. ;
1983      format ef_regulation_labor_minwage best12. ;
1984      format ef_regulation_labor_firing best12. ;
1985      format ef_regulation_labor_bargain best12. ;
1986      format ef_regulation_labor_hours best12. ;
1987      format ef_regulation_labor_dismissal best12. ;
1988      format ef_regulation_labor_conscription best12. ;
1989      format ef_regulation_labor best12. ;
1990      format ef_regulation_business_adm best12. ;
1991      format ef_regulation_business_bureaucra best12. ;
1992      format ef_regulation_business_start best12. ;
1993      format ef_regulation_business_bribes best12. ;
1994      format ef_regulation_business_licensing best12. ;
1995      format ef_regulation_business_complianc best12. ;
1996      format ef_regulation_business best12. ;
1997      format ef_regulation best12. ;
1998      format ef_score best12. ;
1999      format ef_rank best12. ;
2000      format hf_score best12. ;
2001      format hf_rank best12. ;
2002      format hf_quartile best12. ;
2003      input
2004          year
2005          ISO_code $
2006          countries $
2007          region $
2008          pf_rol_procedural
2009          pf_rol_civil
2010          pf_rol_criminal
2011          pf_rol
2012          pf_ss_homicide
2013          pf_ss_disappearances_disap
2014          pf_ss_disappearances_violent

```

2015	pf_ss_disappearances_organized
2016	pf_ss_disappearances_fatalities
2017	pf_ss_disappearances_injuries
2018	pf_ss_disappearances
2019	pf_ss_women_fgm
2020	pf_ss_women_missing
2021	pf_ss_women_inheritance_widows
2022	pf_ss_women_inheritance_daughter
2023	pf_ss_women_inheritance
2024	pf_ss_women
2025	pf_ss
2026	pf_movement_domestic
2027	pf_movement_foreign
2028	pf_movement_women
2029	pf_movement
2030	pf_religion_estop_establish
2031	pf_religion_estop_operate
2032	pf_religion_estop
2033	pf_religion_harassment
2034	pf_religion_restrictions
2035	pf_religion
2036	pf_association_association
2037	pf_association_assembly
2038	pf_association_political_establi
2039	pf_association_political_operate
2040	pf_association_political
2041	pf_association_prof_establish
2042	pf_association_prof_operate
2043	pf_association_prof
2044	pf_association_sport_establish
2045	pf_association_sport_operate
2046	pf_association_sport
2047	pf_association
2048	pf_expression_killed
2049	pf_expression_jailed
2050	pf_expression_influence
2051	pf_expression_control
2052	pf_expression_cable
2053	pf_expression_newspapers
2054	pf_expression_internet
2055	pf_expression
2056	pf_identity_legal
2057	pf_identity_parental_marriage
2058	pf_identity_parental_divorce
2059	pf_identity_parental
2060	pf_identity_sex_male
2061	pf_identity_sex_female
2062	pf_identity_sex
2063	pf_identity_divorce
2064	pf_identity
2065	pf_score
2066	pf_rank
2067	ef_government_consumption
2068	ef_government_transfers

2069	ef_government_enterprises
2070	ef_government_tax_income
2071	ef_government_tax_payroll
2072	ef_government_tax
2073	ef_government
2074	ef_legal_judicial
2075	ef_legal_courts
2076	ef_legal_protection
2077	ef_legal_military
2078	ef_legal_integrity
2079	ef_legal_enforcement
2080	ef_legal_restrictions
2081	ef_legal_police
2082	ef_legal_crime
2083	ef_legal_gender
2084	ef_legal
2085	ef_money_growth
2086	ef_money_sd
2087	ef_money_inflation
2088	ef_money_currency
2089	ef_money
2090	ef_trade_tariffs_revenue
2091	ef_trade_tariffs_mean
2092	ef_trade_tariffs_sd
2093	ef_trade_tariffs
2094	ef_trade_regulatory_nontariff
2095	ef_trade_regulatory_compliance
2096	ef_trade_regulatory
2097	ef_trade_black
2098	ef_trade_movement_foreign
2099	ef_trade_movement_capital
2100	ef_trade_movement_visit
2101	ef_trade_movement
2102	ef_trade
2103	ef_regulation_credit_ownership
2104	ef_regulation_credit_private
2105	ef_regulation_credit_interest
2106	ef_regulation_credit
2107	ef_regulation_labor_minwage
2108	ef_regulation_labor_firing
2109	ef_regulation_labor_bargain
2110	ef_regulation_labor_hours
2111	ef_regulation_labor_dismissal
2112	ef_regulation_labor_conscription
2113	ef_regulation_labor
2114	ef_regulation_business_adm
2115	ef_regulation_business_bureaucra
2116	ef_regulation_business_start
2117	ef_regulation_business_bribes
2118	ef_regulation_business_licensing
2119	ef_regulation_business_complianc
2120	ef_regulation_business
2121	ef_regulation
2122	ef_score



```

2123             ef_rank
2124             hf_score
2125             hf_rank
2126             hf_quartile
2127         ;
2128         if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2128! variable */
2129         run;

```

NOTE: The infile 'human\_freedom.csv' is:  
 Filename=U:\SAS\extdata\human\_freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=1175330,  
 Last Modified=25Mar2019:14:45:25,  
 Create Time=25Mar2019:14:45:43

NOTE: 1458 records were read from the infile 'human\_freedom.csv'.  
 The minimum record length was 144.  
 The maximum record length was 1031.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: DATA statement used (Total process time):  
     real time                  0.29 seconds  
     cpu time                  0.29 seconds

1458 rows created in WORK.FREEDOM from human\_freedom.csv.

NOTE: WORK.FREEDOM data set was successfully created.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: PROCEDURE IMPORT used (Total process time):  
     real time                  3.16 seconds  
     cpu time                  3.14 seconds

```

2130
2131 /*get 2016 data only*/
2132
2133 data freedom;
2134     set freedom;
2135     where year = 2016;
2136 run;

```

NOTE: There were 162 observations read from the data set WORK.FREEDOM.  
 WHERE year=2016;

NOTE: The data set WORK.FREEDOM has 162 observations and 123 variables.

NOTE: DATA statement used (Total process time):  
     real time                  0.01 seconds  
     cpu time                  0.01 seconds

```

2137
2138 /*import the happiness dataset*/

```

```

2139
2140 proc import
2141     out=happy
2142     datafile= '2016_happy.csv'
2143     dbms=dlm replace;
2144     delimiter=',';
2145     getnames=YES;
2146     guessingrows=20404042;
2147 run;

2148
/*****
2149 *   PRODUCT:   SAS
2150 *   VERSION:   9.4
2151 *   CREATOR:   External File Interface
2152 *   DATE:      16APR19
2153 *   DESC:      Generated SAS Dastep Code
2154 *   TEMPLATE SOURCE:  (None Specified.)
2155 *****/
2156 data WORK.HAPPY ;
2157 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
2158 infile '2016_happy.csv' delimiter = ',' MISOVER DSD
lrecl=32767 firstobs=2 ;
2159 informat Country $23. ;
2160 informat Region $31. ;
2161 informat Happiness_Rank best32. ;
2162 informat Happiness_Score best32. ;
2163 informat Lower_Confidence_Interval best32. ;
2164 informat Upper_Confidence_Interval best32. ;
2165 informat Economy_gdpper capita best32. ;
2166 informat Family best32. ;
2167 informat health_lifeexpectancy best32. ;
2168 informat Freedom best32. ;
2169 informat trust_govcorruption best32. ;
2170 informat Generosity best32. ;
2171 informat dystopia_residual best32. ;
2172 format Country $23. ;
2173 format Region $31. ;
2174 format Happiness_Rank best12. ;
2175 format Happiness_Score best12. ;
2176 format Lower_Confidence_Interval best12. ;
2177 format Upper_Confidence_Interval best12. ;
2178 format Economy_gdpper capita best12. ;
2179 format Family best12. ;
2180 format health_lifeexpectancy best12. ;
2181 format Freedom best12. ;
2182 format trust_govcorruption best12. ;
2183 format Generosity best12. ;
2184 format dystopia_residual best12. ;
2185 input
2186     Country $
2187     Region $
2188     Happiness_Rank

```

```

2189             Happiness_Score
2190             Lower__Confidence_Interval
2191             Upper_Confidence_Interval
2192             Economy_gdppercapita
2193             Family
2194             health_lifeexpectancy
2195             Freedom
2196             trust_govcorruption
2197             Generosity
2198             dystopia_residual
2199         ;
2200         if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2200! variable */
2201         run;

```

NOTE: The infile '2016\_happy.csv' is:  
 Filename=U:\SAS\extdata\2016\_happy.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=17274,  
 Last Modified=25Mar2019:14:44:36,  
 Create Time=25Mar2019:14:45:43

NOTE: 157 records were read from the infile '2016\_happy.csv'.  
 The minimum record length was 92.  
 The maximum record length was 133.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: DATA statement used (Total process time):  
 real time 0.04 seconds  
 cpu time 0.04 seconds

157 rows created in WORK.HAPPY from 2016\_happy.csv.

NOTE: WORK.HAPPY data set was successfully created.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: PROCEDURE IMPORT used (Total process time):  
 real time 0.15 seconds  
 cpu time 0.15 seconds

```

2202
2203 /*import the Freedom dataset*/
2204
2205 proc import
2206     out=economic
2207     datafile= 'Economic_Freedom.csv'
2208     dbms=dlm replace;
2209     delimiter=',';
2210     getnames=YES;
2211     guessingrows=20404042;
2212 run;

```

Name twog\_restrictions\_sale\_real\_property truncated to  
twog\_restrictions\_sale\_real\_prop.

Name threed\_freedom\_own\_foreign\_currency truncated to  
threed\_freedom\_own\_foreign\_curre.

Name fourd\_control\_movement\_capital\_ppl truncated to  
fourd\_control\_movement\_capital\_p.

Problems were detected with provided names. See LOG.

2213

/\*\*\*\*\*

2214 \* PRODUCT: SAS

2215 \* VERSION: 9.4

2216 \* CREATOR: External File Interface

2217 \* DATE: 16APR19

2218 \* DESC: Generated SAS Datastep Code

2219 \* TEMPLATE SOURCE: (None Specified.)

2220

\*\*\*\*\*/

2221 data WORK.ECONOMIC ;

2222 %let \_EFIERR\_ = 0; /\* set the ERROR detection macro variable \*/

2223 infile 'Economic\_Freedom.csv' delimiter = ',' MISSOVER DSD

lrecl=32767

2223! firstobs=2 ;

2224 informat year best32. ;

2225 informat ISO\_code \$3. ;

2226 informat countries \$22. ;

2227 informat ECONOMIC\_FREEDOM best32. ;

2228 informat rank best32. ;

2229 informat quartile best32. ;

2230 informat onea\_government\_consumption best32. ;

2231 informat oneb\_transfers best32. ;

2232 informat onec\_gov\_enterprises best32. ;

2233 informat oned\_top\_marg\_tax\_rate best32. ;

2234 informat one\_size\_government best32. ;

2235 informat twoa\_judicial\_independence best32. ;

2236 informat twob\_impartial\_courts best32. ;

2237 informat twoc\_protection\_property\_rights best32. ;

2238 informat twod\_military\_interference best32. ;

2239 informat twoe\_integrity\_legal\_system best32. ;

2240 informat twof\_legal\_enforcement\_contracts best32. ;

2241 informat twog\_restrictions\_sale\_real\_prop best32. ;

2242 informat twoh\_reliability\_police best32. ;

2243 informat twoi\_business\_costs\_crime best32. ;

2244 informat twoj\_gender\_adjustment best32. ;

2245 informat two\_property\_rights best32. ;

2246 informat threea\_money\_growth best32. ;

2247 informat threeb\_std\_inflation best32. ;

2248 informat threec\_inflation best32. ;

2249 informat threed\_freedom\_own\_foreign\_curre best32. ;

2250 informat three\_sound\_money best32. ;

2251 informat foura\_tariffs best32. ;

2252 informat fourb\_regulatory\_trade\_barriers best32. ;

2253 informat fourc\_black\_market best32. ;

2254 informat fourd\_control\_movement\_capital\_p best32. ;

2255 informat four\_trade best32. ;

```

2256      informat fivea_credit_market_reg best32. ;
2257      informat fiveb_labor_market_reg best32. ;
2258      informat fivec_business_reg best32. ;
2259      informat five_regulation best32. ;
2260      format year best12. ;
2261      format ISO_code $3. ;
2262      format countries $22. ;
2263      format ECONOMIC_FREEDOM best12. ;
2264      format rank best12. ;
2265      format quartile best12. ;
2266      format onea_government_consumption best12. ;
2267      format oneb_transfers best12. ;
2268      format onec_gov_enterprises best12. ;
2269      format oned_top_marg_tax_rate best12. ;
2270      format one_size_government best12. ;
2271      format twoa_judicial_independence best12. ;
2272      format twob_impartial_courts best12. ;
2273      format twoc_protection_property_rights best12. ;
2274      format twod_military_interference best12. ;
2275      format twoe_integrity_legal_system best12. ;
2276      format twof_legal_enforcement_contracts best12. ;
2277      format twog_restrictions_sale_real_prop best12. ;
2278      format twoh_reliability_police best12. ;
2279      format twoi_business_costs_crime best12. ;
2280      format twoj_gender_adjustment best12. ;
2281      format two_property_rights best12. ;
2282      format threea_money_growth best12. ;
2283      format threeb_std_inflation best12. ;
2284      format threec_inflation best12. ;
2285      format threed_freedom_own_foreign_curre best12. ;
2286      format three_sound_money best12. ;
2287      format foura_tariffs best12. ;
2288      format fourb_regulatory_trade_barriers best12. ;
2289      format fourc_black_market best12. ;
2290      format fourd_control_movement_capital_p best12. ;
2291      format four_trade best12. ;
2292      format fivea_credit_market_reg best12. ;
2293      format fiveb_labor_market_reg best12. ;
2294      format fivec_business_reg best12. ;
2295      format five_regulation best12. ;
2296  input
2297      year
2298      ISO_code $
2299      countries $
2300      ECONOMIC_FREEDOM
2301      rank
2302      quartile
2303      onea_government_consumption
2304      oneb_transfers
2305      onec_gov_enterprises
2306      oned_top_marg_tax_rate
2307      one_size_government
2308      twoa_judicial_independence
2309      twob_impartial_courts

```

```

2310          twoc_protection_property_rights
2311          twod_military_interference
2312          twoe_integrity_legal_system
2313          twof_legal_enforcement_contracts
2314          twog_restrictions_sale_real_prop
2315          twoh_reliability_police
2316          twoi_business_costs_crime
2317          twoj_gender_adjustment
2318          two_property_rights
2319          threea_money_growth
2320          threeb_std_inflation
2321          threec_inflation
2322          threed_freedom_own_foreign_curre
2323          three_sound_money
2324          foura_tariffs
2325          fourb_regulatory_trade_barriers
2326          fourc_black_market
2327          fourd_control_movement_capital_p
2328          four_trade
2329          fivea_credit_market_reg
2330          fiveb_labor_market_reg
2331          fivec_business_reg
2332          five_regulation
2333      ;
2334      if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2334! variable */
2335      run;

```

NOTE: The infile 'Economic\_Freedom.csv' is:  
 Filename=U:\SAS\extdata\Economic\_Freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=928650,  
 Last Modified=25Mar2019:16:46:54,  
 Create Time=25Mar2019:14:45:43

NOTE: 3726 records were read from the infile 'Economic\_Freedom.csv'.  
 The minimum record length was 46.  
 The maximum record length was 359.

NOTE: The data set WORK.ECONOMIC has 3726 observations and 36 variables.

NOTE: DATA statement used (Total process time):

real time	0.10 seconds
cpu time	0.10 seconds

3726 rows created in WORK.ECONOMIC from Economic\_Freedom.csv.

NOTE: WORK.ECONOMIC data set was successfully created.

NOTE: The data set WORK.ECONOMIC has 3726 observations and 36 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	2.30 seconds
cpu time	2.17 seconds

```
2336
2337 /*get 2016 only*/
2338
2339 data economic;
2340     set economic;
2341     where year = 2016;
2342 run;
```

NOTE: There were 162 observations read from the data set WORK.ECONOMIC.  
WHERE year=2016;

NOTE: The data set WORK.ECONOMIC has 162 observations and 36 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.00 seconds

```
2343
2344 /*to merge happiness and economic*/
2345
2346 proc sql;
2347     create table merged as
2348     select * from happy a left join economic b
2349     on a.Country = b.Countries;
```

NOTE: Table WORK.MERGED created, with 157 rows and 49 columns.

```
2350 quit;
```

NOTE: PROCEDURE SQL used (Total process time):

real time	0.02 seconds
cpu time	0.01 seconds

```
2351
2352 /*to merge merged dataset with freedom*/
2353 /*drop repeat columns first*/
2354
2355 data freedom;
2356     set freedom;
2357     drop year countries region;
2358 run;
```

NOTE: There were 162 observations read from the data set WORK.FREEDOM.

NOTE: The data set WORK.FREEDOM has 162 observations and 120 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```
2359
2360 proc sql;
2361     create table data as
2362     select * from merged a left join freedom b
2363     on a.ISO_code=b.ISO_code;
```

WARNING: Variable ISO\_code already exists on file WORK.DATA.

NOTE: Table WORK.DATA created, with 157 rows and 168 columns.

2364 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time 0.03 seconds

cpu time 0.01 seconds

2365

2366 /\* Create table womenhappiness that includes variables related to women's

2367 rights, happiness\_score, country, and region. \*/

2368

2369 proc sql;

2370 create table womenhappiness as

2371 select region, country, happiness\_score label = "Happiness  
Score",

2372 pf\_movement\_women label = "Women's  
Movement",

2373 pf\_ss\_women label = "Women's Safety" ,

2374 pf\_ss\_women\_inheritance label =

"Women's Inheritance",

2375 pf\_ss\_women\_missing label = "Missing

Women",

2376 pf\_ss\_women\_fgm label = "Female Genital  
Mutilation"

2377 from data;

NOTE: Table WORK.WOMENHAPPINESS created, with 157 rows and 8 columns.

2378 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time 0.01 seconds

cpu time 0.03 seconds

2379

2380 /\* Create a table with summary statistics for variables

pf\_movement\_women,

2381 pf\_ss\_women, pf\_ss\_women\_inheritance, pf\_ss\_women\_missing, and

pf\_ss\_women\_fgm \*/

2382

2383 proc tabulate data=womenhappiness;

2384 var pf\_movement\_women

2385 pf\_ss\_women

2386 pf\_ss\_women\_inheritance

2387 pf\_ss\_women\_missing

2388 pf\_ss\_women\_fgm;

2389 table (pf\_movement\_women pf\_ss\_women pf\_ss\_women\_inheritance  
pf\_ss\_women\_missing

2389! pf\_ss\_women\_fgm) \* (N MEAN STD MIN

2390 MAX);

2391 title "Summary Statistics for Variables Related to Women's  
Rights";

2392 run;



NOTE: There were 157 observations read from the data set  
WORK.WOMENHAPPINESS.

NOTE: PROCEDURE TABULATE used (Total process time):

real time 0.05 seconds

cpu time 0.01 seconds

2393

2394 /\* Create dataset womenhappiness2 that has one column pf that  
includes all

2395 values from pf\_movement\_women, pf\_ss\_women,  
pf\_ss\_women\_inheritance,

2395! pf\_ss\_women\_missing,

2396 pf\_ss\_women\_fgm, and averagewomenscore. \*/

2397

2398 proc sort data= womenhappiness;

2399 by region country happiness\_score;

2400 run;

NOTE: There were 157 observations read from the data set  
WORK.WOMENHAPPINESS.

NOTE: The data set WORK.WOMENHAPPINESS has 157 observations and 8  
variables.

NOTE: PROCEDURE SORT used (Total process time):

real time 0.01 seconds

cpu time 0.00 seconds

2401

2402 /\* Transpose womenhappiness data set so that women's rights

2403 variables are in the same column, under the variable women\_type  
\*/

2404

2405 proc transpose data=womenhappiness

2406 out=womenhappiness2 (rename=(coll=pf \_name\_=women\_type));

2407 var pf\_movement\_women

2408 pf\_ss\_women

2409 pf\_ss\_women\_inheritance

2410 pf\_ss\_women\_missing

2411 pf\_ss\_women\_fgm;

2412 by region country happiness\_score;

2413 run;

NOTE: There were 157 observations read from the data set  
WORK.WOMENHAPPINESS.

NOTE: The data set WORK.WOMENHAPPINESS2 has 785 observations and 6  
variables.

NOTE: PROCEDURE TRANSPOSE used (Total process time):

real time 0.02 seconds

cpu time 0.00 seconds

2414

```

2415  /* Order womenhappiness2 by women_type */
2416
2417  proc sort data = womenhappiness2;
2418      by women_type;
2419  run;

```

NOTE: There were 785 observations read from the data set  
WORK.WOMENHAPPINESS2.

NOTE: The data set WORK.WOMENHAPPINESS2 has 785 observations and 6  
variables.

NOTE: PROCEDURE SORT used (Total process time):

real time	0.01 seconds
cpu time	0.00 seconds

```

2420
2421  /* Rename women_type observations */
2422
2423  data womenhappiness2;
2424      set womenhappiness2;
2425      if women_type = "pf_movement_women" then women_type = "Women's
Movement";
2426      if women_type = "pf_ss_women" then women_type = "Women's
Safety";
2427      if women_type = "pf_ss_women_inheritance" then women_type =
"Women's
2427! Inheritance";
2428      if women_type = "pf_ss_women_missing" then women_type =
"Missing Women";
2429      if women_type = "pf_ss_women_fgm" then women_type = "FGM";
2430  run;

```

NOTE: There were 785 observations read from the data set  
WORK.WOMENHAPPINESS2.

NOTE: The data set WORK.WOMENHAPPINESS2 has 785 observations and 6  
variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.03 seconds

```

2431
2432  /* Plot side-by-side vertical boxplots for each women variable */
2433
2434  proc sgplot data = womenhappiness2;
2435      vbox pf / category = women_type fillattrs=graphdata3;
2436      title " Boxplots for Women Right's Variables";
2437      xaxis label = "Women Variables" ;
2438      yaxis label = "Score";
2439  run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.16 seconds
cpu time	0.07 seconds

NOTE: There were 785 observations read from the data set  
WORK.WOMENHAPPINESS2.

```
2440
2441  /* Correlation table */
2442
2443  proc corr data=womenhappiness nomiss nosimple ;
2444      var pf_movement_women
2445          pf_ss_women
2446          pf_ss_women_inheritance
2447          pf_ss_women_missing
2448          pf_ss_women_fgm
2449          happiness_score;
2450      title "Correlation Table for Variables Related to Women's Rights
and Happiness
2450! Score";
2451  run;
```

NOTE: PROCEDURE CORR used (Total process time):

real time	0.02 seconds
cpu time	0.01 seconds

```
2452
2453  /* Scatterplot matrix */
2454
2455  proc sgscatter data=womenhappiness;
2456      matrix happiness_score pf_movement_women pf_ss_women
pf_ss_women_inheritance
2456! pf_ss_women_missing pf_ss_women_fgm / diagonal=(histogram);
2457      title "Correlation Matrix for Variables Related to Women's Rights
and Happiness
2457! Score";
2458  run;
```

NOTE: PROCEDURE SGSCATTER used (Total process time):

real time	0.32 seconds
cpu time	0.03 seconds

NOTE: There were 157 observations read from the data set  
WORK.WOMENHAPPINESS.

```
2459
2460  /* Regression Analysis */
2461
2462  proc reg data = womenhappiness;
2463      model happiness_score = pf_movement_women
2464                              pf_ss_women
2465                              pf_ss_women_inheritance
2466                              pf_ss_women_missing;
2467      title 'Results of Regression Analysis';
2468  run;
```

```
2469
2470 /* ANALYSIS OF CRIME SCORES */
2471
```

```
NOTE: PROCEDURE REG used (Total process time):
      real time          0.06 seconds
      cpu time           0.03 seconds
```

```
2472 proc sql;
2473     create table crimehappiness as
2474     select region, country,happiness_score, pf_ss_homicide label =
"Homicides",
2475                                     pf_ss_disappearances label =
"Disappearances, Conflict,
2475! and Terrorism",
2476                                     pf_ss label = "Safety and Security",
2477                                     pf_ss_disappearances_disap label =
"Disappearances",
2478                                     pf_ss_disappearances_violent label =
"Violent Conflict",
2479                                     pf_ss_disappearances_organized label =
"Organized
2479! Conflict",
2480                                     ef_legal_police label = "Reliability of
Police",
2481                                     ef_regulation_business_bribes label =
"Bribes"
2482     from data;
```

```
NOTE: Table WORK.CRIMEHAPPINESS created, with 157 rows and 11 columns.
```

```
2483 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time          0.02 seconds
      cpu time           0.01 seconds
```

```
2484
2485 /* Plot histograms for all variables related to crime. */
2486
2487 %macro crimehist(dataset,variable);
2488     proc sgplot data=&dataset;
2489         histogram &variable / scale = count fillattrs=graphdata1;
2490         title "&variable Histogram";
2491     run;
2492 %mend crimehist;
2493
2494 %crimehist(crimehappiness,pf_ss_homicide);
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):
      real time          0.13 seconds
      cpu time           0.03 seconds
```

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2495 %crimehist(crimehappiness,pf\_ss\_disappearances);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.13 seconds  
cpu time 0.04 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2496 %crimehist(crimehappiness,pf\_ss);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.03 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2497 %crimehist(crimehappiness,pf\_ss\_disappearances\_disap);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.04 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2498 %crimehist(crimehappiness,pf\_ss\_disappearances\_violent);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.04 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2499 %crimehist(crimehappiness,pf\_ss\_disappearances\_organized);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.03 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

2500 %crimehist(crimehappiness,ef\_legal\_police);

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.06 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

```
2501 %crimehist(crimehappiness,ef_regulation_business_bribes);
```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.12 seconds
cpu time	0.01 seconds

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

```
2502
2503 /* Order crimehappiness by region, country, and happiness_score. */
2504
2505 proc sort data= crimehappiness;
2506     by region country happiness_score;
2507 run;
```

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

NOTE: The data set WORK.CRIMEHAPPINESS has 157 observations and 11  
variables.

NOTE: PROCEDURE SORT used (Total process time):

real time	0.00 seconds
cpu time	0.00 seconds

```
2508
2509 /* Transpose crimehappiness data set so that crime variables are in
the
2510     same column, under the variable crime_type */
2511
2512 proc transpose data=crimehappiness
2513     out=crimehappiness2 (rename=(coll=pf _name_=crime_type));
2514     var pf_ss_homicide
2515         pf_ss_disappearances
2516         pf_ss
2517         pf_ss_disappearances_disap
2518         pf_ss_disappearances_violent
2519         pf_ss_disappearances_organized
2520         ef_legal_police
2521         ef_regulation_business_bribes;
2522     by region country happiness_score;
2523 run;
```

NOTE: There were 157 observations read from the data set  
WORK.CRIMEHAPPINESS.

NOTE: The data set WORK.CRIMEHAPPINESS2 has 1256 observations and 6  
variables.

NOTE: PROCEDURE TRANSPOSE used (Total process time):

real time	0.02 seconds
cpu time	0.01 seconds

```

2524
2525
2526 /* order crimehappiness2 by crime_type. */
2527
2528 proc sort data = crimehappiness2;
2529     by crime_type;
2530 run;

```

NOTE: There were 1256 observations read from the data set  
WORK.CRIMEHAPPINESS2.

NOTE: The data set WORK.CRIMEHAPPINESS2 has 1256 observations and 6  
variables.

NOTE: PROCEDURE SORT used (Total process time):

real time	0.00 seconds
cpu time	0.00 seconds

```

2531
2532 /* Rename crime_type observations */
2533
2534 data crimehappiness2;
2535     set crimehappiness2;
2536     if crime_type = "pf_ss_homicide" then crime_type = "Homicides";
2537     if crime_type = "pf_ss_disappearances" then crime_type =
2537! "Disappearances,Conflict,Terrorism";
2538     if crime_type = "pf_ss" then crime_type = "Safety";
2539     if crime_type = "pf_ss_disappearances_disap" then crime_type =
"Disappearances";
2540     if crime_type = "pf_ss_disappearances_violent" then crime_type
= "Violent
2540! Conflict";
2541     if crime_type = "pf_ss_disappearances_organized" then
crime_type = "Organized
2541! Conflict";
2542     if crime_type = "ef_legal_police" then crime_type = "Police
Reliability";
2543     if crime_type = "ef_regulation_business_bribes" then crime_type
= "Bribes";
2544
2545 /* Plot side-by-side vertical boxplots for each crime variable */
2546

```

NOTE: There were 1256 observations read from the data set  
WORK.CRIMEHAPPINESS2.

NOTE: The data set WORK.CRIMEHAPPINESS2 has 1256 observations and 6  
variables.

NOTE: DATA statement used (Total process time):

real time	0.02 seconds
cpu time	0.03 seconds

```

2547 proc sgplot data = crimehappiness2;
2548     vbox pf / category = crime_type fillattrs=graphdata3;

```

```

2549     title " Boxplots for Crime Variables";
2550     xaxis label = "Crime Variables";
2551     yaxis label = "Score";
2552 run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.16 seconds
cpu time	0.04 seconds

NOTE: There were 1256 observations read from the data set  
WORK.CRIMEHAPPINESS2.

```

2553
2554 /* Correlation table for crime variables and happiness_score */
2555
2556 proc corr data = crimehappiness nosimple ;
2557     var happiness_score
2558         pf_ss_homicide
2559         pf_ss_disappearances
2560         pf_ss
2561         pf_ss_disappearances_disap
2562         pf_ss_disappearances_violent
2563         pf_ss_disappearances_organized
2564         ef_legal_police
2565         ef_regulation_business_bribes;
2566     title "Correlation Table for Crime Variables and Happiness
Score";
2567 run;

```

NOTE: PROCEDURE CORR used (Total process time):

real time	0.04 seconds
cpu time	0.04 seconds

```

2568
2569 /* Produce scatterplots with regression lines of crime variables
2570    vs. happiness_score, paneled by the type of crime variable. */
2571
2572 proc sgpanel data = crimehappiness2;
2573     panelby crime_type;
2574     reg x = pf y = happiness_score/CLM;
2575     title "Crime Variables vs. Happiness Score";
2576     label crime_type = variable;
2577 run;

```

NOTE: PROCEDURE SGPANEL used (Total process time):

real time	0.77 seconds
cpu time	0.26 seconds

NOTE: There were 1256 observations read from the data set  
WORK.CRIMEHAPPINESS2.

```

2578
2579 /* Regression Analysis */

```



```

2580
2581 proc reg data = crimehappiness;
2582     model happiness_score = pf_ss_homicide
2583                             pf_ss_disappearances
2584                             pf_ss
2585                             pf_ss_disappearances_disap
2586                             pf_ss_disappearances_violent
2587                             pf_ss_disappearances_organized
2588                             ef_legal_police
2589                             ef_regulation_business_bribes;
2590     title 'Results of Regression Analysis';
2591 run;

2592
2593
2594
2595
2596 /*FINAL PROJECT*/
2597 libname ds 'U:\SAS\datasets\';
NOTE: Libref DS was successfully assigned as follows:
      Engine:          V9
      Physical Name: U:\SAS\datasets
2598 x 'cd U:\SAS\extdata\'
2598!                               ;
2599
2600
2601 /*#####IMPORT THE
DATA#####*/
2602
2603 /*DATASET 1: GDP DATASET*/
2604 /*import the gdp dataset using PROC IMPORT*/

NOTE: PROCEDURE REG used (Total process time):
      real time          0.32 seconds
      cpu time           0.18 seconds

2605 proc import
2606     out=gdp
2607     datafile= 'gdp.csv'
2608     dbms=dlm replace;
2609     delimiter=',';
2610     getnames=YES;
2611     guessingrows=20404042;
2612 run;

2613
/*****
2614 *   PRODUCT:   SAS
2615 *   VERSION:   9.4
2616 *   CREATOR:   External File Interface
2617 *   DATE:      16APR19
2618 *   DESC:      Generated SAS Datastep Code
2619 *   TEMPLATE SOURCE:  (None Specified.)

```

```

2620
*****/
2621     data WORK.GDP      ;
2622     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
2623     infile 'gdp.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
2624         informat Country $52. ;
2625         informat ISO_Code $3. ;
2626         informat gdp_2016 best32. ;
2627         informat gdp_2017 best32. ;
2628         format Country $52. ;
2629         format ISO_Code $3. ;
2630         format gdp_2016 best12. ;
2631         format gdp_2017 best12. ;
2632     input
2633         Country $
2634         ISO_Code $
2635         gdp_2016
2636         gdp_2017
2637     ;
2638     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2638! variable */
2639     run;

```

NOTE: The infile 'gdp.csv' is:  
 Filename=U:\SAS\extdata\gdp.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=10719,  
 Last Modified=26Mar2019:13:59:40,  
 Create Time=26Mar2019:13:59:41

NOTE: 264 records were read from the infile 'gdp.csv'.  
 The minimum record length was 13.  
 The maximum record length was 80.

NOTE: The data set WORK.GDP has 264 observations and 4 variables.

NOTE: DATA statement used (Total process time):

real time	0.02 seconds
cpu time	0.03 seconds

264 rows created in WORK.GDP from gdp.csv.

NOTE: WORK.GDP data set was successfully created.

NOTE: The data set WORK.GDP has 264 observations and 4 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	0.16 seconds
cpu time	0.15 seconds

```

2640
2641 /*DATASET 2: SUICIDE DATASET*/
2642 /*import the suicide dataset using PROC IMPORT*/

```

```

2643 proc import
2644     out=suicide
2645     datafile= 'suicide.csv'
2646     dbms=dlm replace;
2647     delimiter=',';
2648     getnames=YES;
2649     guessingrows=20404042;
2650 run;

2651
/*****
2652 *   PRODUCT:   SAS
2653 *   VERSION:   9.4
2654 *   CREATOR:   External File Interface
2655 *   DATE:      16APR19
2656 *   DESC:      Generated SAS Datastep Code
2657 *   TEMPLATE SOURCE: (None Specified.)
2658 *****/
2659 data WORK.SUICIDE ;
2660 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
2661 infile 'suicide.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
2662 informat Country $52. ;
2663 informat _2016_suicide best32. ;
2664 format Country $52. ;
2665 format _2016_suicide best12. ;
2666 input
2667     Country $
2668     _2016_suicide
2669 ;
2670 if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2670! variable */
2671 run;

```

NOTE: The infile 'suicide.csv' is:  
 Filename=U:\SAS\extdata\suicide.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=5178,  
 Last Modified=26Mar2019:14:01:20,  
 Create Time=26Mar2019:14:01:15

NOTE: 264 records were read from the infile 'suicide.csv'.  
 The minimum record length was 5.  
 The maximum record length was 63.

NOTE: The data set WORK.SUICIDE has 264 observations and 2 variables.

NOTE: DATA statement used (Total process time):  
 real time 0.02 seconds  
 cpu time 0.03 seconds

264 rows created in WORK.SUICIDE from suicide.csv.

NOTE: WORK.SUICIDE data set was successfully created.  
NOTE: The data set WORK.SUICIDE has 264 observations and 2 variables.  
NOTE: PROCEDURE IMPORT used (Total process time):  
      real time                  0.11 seconds  
      cpu time                  0.10 seconds

```
2672
2673
2674 /*DATASET 3: HAPPINESS DATASET*/
2675 /*import the happiness dataset using PROC IMPORT*/
2676 proc import
2677     out=happy
2678     datafile= '2016_happy.csv'
2679     dbms=dlm replace;
2680     delimiter=',';
2681     getnames=YES;
2682     guessingrows=20404042;
2683 run;

2684
2685 /*****
2686 *   PRODUCT:   SAS
2687 *   VERSION:   9.4
2688 *   CREATOR:   External File Interface
2689 *   DATE:      16APR19
2690 *   DESC:      Generated SAS Datastep Code
2691 *   TEMPLATE SOURCE:  (None Specified.)
2692 *****/
2693 data WORK.HAPPY ;
2694 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
2695 infile '2016_happy.csv' delimiter = ',' MISSOVER DSD
2696 lrecl=32767 firstobs=2 ;
2697 informat Country $23. ;
2698 informat Region $31. ;
2699 informat Happiness_Rank best32. ;
2700 informat Happiness_Score best32. ;
2701 informat Lower_Confidence_Interval best32. ;
2702 informat Upper_Confidence_Interval best32. ;
2703 informat Economy_gdpper capita best32. ;
2704 informat Family best32. ;
2705 informat health_lifeexpectancy best32. ;
2706 informat Freedom best32. ;
2707 informat trust_govcorruption best32. ;
2708 informat Generosity best32. ;
2709 informat dystopia_residual best32. ;
2710 format Country $23. ;
2711 format Region $31. ;
2712 format Happiness_Rank best12. ;
2713 format Happiness_Score best12. ;
2714 format Lower_Confidence_Interval best12. ;
2715 format Upper_Confidence_Interval best12. ;
```

```

2714         format Economy_gdppercapita best12. ;
2715         format Family best12. ;
2716         format health_lifeexpectancy best12. ;
2717         format Freedom best12. ;
2718         format trust_govcorruption best12. ;
2719         format Generosity best12. ;
2720         format dystopia_residual best12. ;
2721     input
2722         Country $
2723         Region $
2724         Happiness_Rank
2725         Happiness_Score
2726         Lower__Confidence_Interval
2727         Upper__Confidence_Interval
2728         Economy_gdppercapita
2729         Family
2730         health_lifeexpectancy
2731         Freedom
2732         trust_govcorruption
2733         Generosity
2734         dystopia_residual
2735     ;
2736     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
2736! variable */
2737     run;

```

NOTE: The infile '2016\_happy.csv' is:  
 Filename=U:\SAS\extdata\2016\_happy.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=17274,  
 Last Modified=25Mar2019:14:44:36,  
 Create Time=25Mar2019:14:45:43

NOTE: 157 records were read from the infile '2016\_happy.csv'.  
 The minimum record length was 92.  
 The maximum record length was 133.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: DATA statement used (Total process time):

real time	0.04 seconds
cpu time	0.04 seconds

157 rows created in WORK.HAPPY from 2016\_happy.csv.

NOTE: WORK.HAPPY data set was successfully created.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	0.14 seconds
cpu time	0.14 seconds

2738

```

2739 /*DATASET 4: FREEDOM DATASET*/
2740 /*import the happiness dataset using PROC IMPORT*/
2741 proc import
2742     out=freedom
2743     datafile= 'human_freedom.csv'
2744     dbms=dlm replace;
2745     delimiter=',';
2746     getnames=YES;
2747     guessingrows=20404042;
2748 run;

```

Name pf\_ss\_women\_inheritance\_daughters truncated to  
 pf\_ss\_women\_inheritance\_daughter.  
 Name pf\_association\_political\_establish truncated to  
 pf\_association\_political\_establi.  
 Name ef\_regulation\_business\_bureaucracy truncated to  
 ef\_regulation\_business\_bureaucra.  
 Name ef\_regulation\_business\_compliance truncated to  
 ef\_regulation\_business\_complianc.  
 Problems were detected with provided names. See LOG.

```

2749
/*****
2750 *   PRODUCT:   SAS
2751 *   VERSION:   9.4
2752 *   CREATOR:   External File Interface
2753 *   DATE:      16APR19
2754 *   DESC:      Generated SAS Datastep Code
2755 *   TEMPLATE SOURCE: (None Specified.)
2756
*****/
2757 data WORK.FREEDOM ;
2758 %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
2759 infile 'human_freedom.csv' delimiter = ',' MISSOVER DSD
lrecl=32767 firstobs=2 ;
2760 informat year best32. ;
2761 informat ISO_code $3. ;
2762 informat countries $22. ;
2763 informat region $29. ;
2764 informat pf_rol_procedural best32. ;
2765 informat pf_rol_civil best32. ;
2766 informat pf_rol_criminal best32. ;
2767 informat pf_rol best32. ;
2768 informat pf_ss_homicide best32. ;
2769 informat pf_ss_disappearances_disap best32. ;
2770 informat pf_ss_disappearances_violent best32. ;
2771 informat pf_ss_disappearances_organized best32. ;
2772 informat pf_ss_disappearances_fatalities best32. ;
2773 informat pf_ss_disappearances_injuries best32. ;
2774 informat pf_ss_disappearances best32. ;
2775 informat pf_ss_women_fgm best32. ;
2776 informat pf_ss_women_missing best32. ;
2777 informat pf_ss_women_inheritance_widows best32. ;
2778 informat pf_ss_women_inheritance_daughter best32. ;
2779 informat pf_ss_women_inheritance best32. ;

```

```
2780      informat pf_ss_women best32. ;
2781      informat pf_ss best32. ;
2782      informat pf_movement_domestic best32. ;
2783      informat pf_movement_foreign best32. ;
2784      informat pf_movement_women best32. ;
2785      informat pf_movement best32. ;
2786      informat pf_religion_estop_establish best32. ;
2787      informat pf_religion_estop_operate best32. ;
2788      informat pf_religion_estop best32. ;
2789      informat pf_religion_harassment best32. ;
2790      informat pf_religion_restrictions best32. ;
2791      informat pf_religion best32. ;
2792      informat pf_association_association best32. ;
2793      informat pf_association_assembly best32. ;
2794      informat pf_association_political_establi best32. ;
2795      informat pf_association_political_operate best32. ;
2796      informat pf_association_political best32. ;
2797      informat pf_association_prof_establish best32. ;
2798      informat pf_association_prof_operate best32. ;
2799      informat pf_association_prof best32. ;
2800      informat pf_association_sport_establish best32. ;
2801      informat pf_association_sport_operate best32. ;
2802      informat pf_association_sport best32. ;
2803      informat pf_association best32. ;
2804      informat pf_expression_killed best32. ;
2805      informat pf_expression_jailed best32. ;
2806      informat pf_expression_influence best32. ;
2807      informat pf_expression_control best32. ;
2808      informat pf_expression_cable best32. ;
2809      informat pf_expression_newspapers best32. ;
2810      informat pf_expression_internet best32. ;
2811      informat pf_expression best32. ;
2812      informat pf_identity_legal best32. ;
2813      informat pf_identity_parental_marriage best32. ;
2814      informat pf_identity_parental_divorce best32. ;
2815      informat pf_identity_parental best32. ;
2816      informat pf_identity_sex_male best32. ;
2817      informat pf_identity_sex_female best32. ;
2818      informat pf_identity_sex best32. ;
2819      informat pf_identity_divorce best32. ;
2820      informat pf_identity best32. ;
2821      informat pf_score best32. ;
2822      informat pf_rank best32. ;
2823      informat ef_government_consumption best32. ;
2824      informat ef_government_transfers best32. ;
2825      informat ef_government_enterprises best32. ;
2826      informat ef_government_tax_income best32. ;
2827      informat ef_government_tax_payroll best32. ;
2828      informat ef_government_tax best32. ;
2829      informat ef_government best32. ;
2830      informat ef_legal_judicial best32. ;
2831      informat ef_legal_courts best32. ;
2832      informat ef_legal_protection best32. ;
2833      informat ef_legal_military best32. ;
```

```
2834      informat ef_legal_integrity best32. ;
2835      informat ef_legal_enforcement best32. ;
2836      informat ef_legal_restrictions best32. ;
2837      informat ef_legal_police best32. ;
2838      informat ef_legal_crime best32. ;
2839      informat ef_legal_gender best32. ;
2840      informat ef_legal best32. ;
2841      informat ef_money_growth best32. ;
2842      informat ef_money_sd best32. ;
2843      informat ef_money_inflation best32. ;
2844      informat ef_money_currency best32. ;
2845      informat ef_money best32. ;
2846      informat ef_trade_tariffs_revenue best32. ;
2847      informat ef_trade_tariffs_mean best32. ;
2848      informat ef_trade_tariffs_sd best32. ;
2849      informat ef_trade_tariffs best32. ;
2850      informat ef_trade_regulatory_nontariff best32. ;
2851      informat ef_trade_regulatory_compliance best32. ;
2852      informat ef_trade_regulatory best32. ;
2853      informat ef_trade_black best32. ;
2854      informat ef_trade_movement_foreign best32. ;
2855      informat ef_trade_movement_capital best32. ;
2856      informat ef_trade_movement_visit best32. ;
2857      informat ef_trade_movement best32. ;
2858      informat ef_trade best32. ;
2859      informat ef_regulation_credit_ownership best32. ;
2860      informat ef_regulation_credit_private best32. ;
2861      informat ef_regulation_credit_interest best32. ;
2862      informat ef_regulation_credit best32. ;
2863      informat ef_regulation_labor_minwage best32. ;
2864      informat ef_regulation_labor_firing best32. ;
2865      informat ef_regulation_labor_bargain best32. ;
2866      informat ef_regulation_labor_hours best32. ;
2867      informat ef_regulation_labor_dismissal best32. ;
2868      informat ef_regulation_labor_conscription best32. ;
2869      informat ef_regulation_labor best32. ;
2870      informat ef_regulation_business_adm best32. ;
2871      informat ef_regulation_business_bureaucra best32. ;
2872      informat ef_regulation_business_start best32. ;
2873      informat ef_regulation_business_bribes best32. ;
2874      informat ef_regulation_business_licensing best32. ;
2875      informat ef_regulation_business_complianc best32. ;
2876      informat ef_regulation_business best32. ;
2877      informat ef_regulation best32. ;
2878      informat ef_score best32. ;
2879      informat ef_rank best32. ;
2880      informat hf_score best32. ;
2881      informat hf_rank best32. ;
2882      informat hf_quartile best32. ;
2883      format year best12. ;
2884      format ISO_code $3. ;
2885      format countries $22. ;
2886      format region $29. ;
2887      format pf_rol_procedural best12. ;
```



```
2888     format pf_rol_civil best12. ;
2889     format pf_rol_criminal best12. ;
2890     format pf_rol best12. ;
2891     format pf_ss_homicide best12. ;
2892     format pf_ss_disappearances_disap best12. ;
2893     format pf_ss_disappearances_violent best12. ;
2894     format pf_ss_disappearances_organized best12. ;
2895     format pf_ss_disappearances_fatalities best12. ;
2896     format pf_ss_disappearances_injuries best12. ;
2897     format pf_ss_disappearances best12. ;
2898     format pf_ss_women_fgm best12. ;
2899     format pf_ss_women_missing best12. ;
2900     format pf_ss_women_inheritance_widows best12. ;
2901     format pf_ss_women_inheritance_daughter best12. ;
2902     format pf_ss_women_inheritance best12. ;
2903     format pf_ss_women best12. ;
2904     format pf_ss best12. ;
2905     format pf_movement_domestic best12. ;
2906     format pf_movement_foreign best12. ;
2907     format pf_movement_women best12. ;
2908     format pf_movement best12. ;
2909     format pf_religion_estop_establish best12. ;
2910     format pf_religion_estop_operate best12. ;
2911     format pf_religion_estop best12. ;
2912     format pf_religion_harassment best12. ;
2913     format pf_religion_restrictions best12. ;
2914     format pf_religion best12. ;
2915     format pf_association_association best12. ;
2916     format pf_association_assembly best12. ;
2917     format pf_association_political_establi best12. ;
2918     format pf_association_political_operate best12. ;
2919     format pf_association_political best12. ;
2920     format pf_association_prof_establish best12. ;
2921     format pf_association_prof_operate best12. ;
2922     format pf_association_prof best12. ;
2923     format pf_association_sport_establish best12. ;
2924     format pf_association_sport_operate best12. ;
2925     format pf_association_sport best12. ;
2926     format pf_association best12. ;
2927     format pf_expression_killed best12. ;
2928     format pf_expression_jailed best12. ;
2929     format pf_expression_influence best12. ;
2930     format pf_expression_control best12. ;
2931     format pf_expression_cable best12. ;
2932     format pf_expression_newspapers best12. ;
2933     format pf_expression_internet best12. ;
2934     format pf_expression best12. ;
2935     format pf_identity_legal best12. ;
2936     format pf_identity_parental_marriage best12. ;
2937     format pf_identity_parental_divorce best12. ;
2938     format pf_identity_parental best12. ;
2939     format pf_identity_sex_male best12. ;
2940     format pf_identity_sex_female best12. ;
2941     format pf_identity_sex best12. ;
```

```
2942     format pf_identity_divorce best12. ;
2943     format pf_identity best12. ;
2944     format pf_score best12. ;
2945     format pf_rank best12. ;
2946     format ef_government_consumption best12. ;
2947     format ef_government_transfers best12. ;
2948     format ef_government_enterprises best12. ;
2949     format ef_government_tax_income best12. ;
2950     format ef_government_tax_payroll best12. ;
2951     format ef_government_tax best12. ;
2952     format ef_government best12. ;
2953     format ef_legal_judicial best12. ;
2954     format ef_legal_courts best12. ;
2955     format ef_legal_protection best12. ;
2956     format ef_legal_military best12. ;
2957     format ef_legal_integrity best12. ;
2958     format ef_legal_enforcement best12. ;
2959     format ef_legal_restrictions best12. ;
2960     format ef_legal_police best12. ;
2961     format ef_legal_crime best12. ;
2962     format ef_legal_gender best12. ;
2963     format ef_legal best12. ;
2964     format ef_money_growth best12. ;
2965     format ef_money_sd best12. ;
2966     format ef_money_inflation best12. ;
2967     format ef_money_currency best12. ;
2968     format ef_money best12. ;
2969     format ef_trade_tariffs_revenue best12. ;
2970     format ef_trade_tariffs_mean best12. ;
2971     format ef_trade_tariffs_sd best12. ;
2972     format ef_trade_tariffs best12. ;
2973     format ef_trade_regulatory_nontariff best12. ;
2974     format ef_trade_regulatory_compliance best12. ;
2975     format ef_trade_regulatory best12. ;
2976     format ef_trade_black best12. ;
2977     format ef_trade_movement_foreign best12. ;
2978     format ef_trade_movement_capital best12. ;
2979     format ef_trade_movement_visit best12. ;
2980     format ef_trade_movement best12. ;
2981     format ef_trade best12. ;
2982     format ef_regulation_credit_ownership best12. ;
2983     format ef_regulation_credit_private best12. ;
2984     format ef_regulation_credit_interest best12. ;
2985     format ef_regulation_credit best12. ;
2986     format ef_regulation_labor_minwage best12. ;
2987     format ef_regulation_labor_firing best12. ;
2988     format ef_regulation_labor_bargain best12. ;
2989     format ef_regulation_labor_hours best12. ;
2990     format ef_regulation_labor_dismissal best12. ;
2991     format ef_regulation_labor_conscription best12. ;
2992     format ef_regulation_labor best12. ;
2993     format ef_regulation_business_adm best12. ;
2994     format ef_regulation_business_bureaucra best12. ;
2995     format ef_regulation_business_start best12. ;
```

```

2996         format ef_regulation_business_bribes best12. ;
2997         format ef_regulation_business_licensing best12. ;
2998         format ef_regulation_business_complianc best12. ;
2999         format ef_regulation_business best12. ;
3000         format ef_regulation best12. ;
3001         format ef_score best12. ;
3002         format ef_rank best12. ;
3003         format hf_score best12. ;
3004         format hf_rank best12. ;
3005         format hf_quartile best12. ;
3006 input
3007         year
3008         ISO_code $
3009         countries $
3010         region $
3011         pf_rol_procedural
3012         pf_rol_civil
3013         pf_rol_criminal
3014         pf_rol
3015         pf_ss_homicide
3016         pf_ss_disappearances_disap
3017         pf_ss_disappearances_violent
3018         pf_ss_disappearances_organized
3019         pf_ss_disappearances_fatalities
3020         pf_ss_disappearances_injuries
3021         pf_ss_disappearances
3022         pf_ss_women_fgm
3023         pf_ss_women_missing
3024         pf_ss_women_inheritance_widows
3025         pf_ss_women_inheritance_daughter
3026         pf_ss_women_inheritance
3027         pf_ss_women
3028         pf_ss
3029         pf_movement_domestic
3030         pf_movement_foreign
3031         pf_movement_women
3032         pf_movement
3033         pf_religion_estop_establish
3034         pf_religion_estop_operate
3035         pf_religion_estop
3036         pf_religion_harassment
3037         pf_religion_restrictions
3038         pf_religion
3039         pf_association_association
3040         pf_association_assembly
3041         pf_association_political_establi
3042         pf_association_political_operate
3043         pf_association_political
3044         pf_association_prof_establish
3045         pf_association_prof_operate
3046         pf_association_prof
3047         pf_association_sport_establish
3048         pf_association_sport_operate
3049         pf_association_sport

```

3050	pf_association
3051	pf_expression_killed
3052	pf_expression_jailed
3053	pf_expression_influence
3054	pf_expression_control
3055	pf_expression_cable
3056	pf_expression_newspapers
3057	pf_expression_internet
3058	pf_expression
3059	pf_identity_legal
3060	pf_identity_parental_marriage
3061	pf_identity_parental_divorce
3062	pf_identity_parental
3063	pf_identity_sex_male
3064	pf_identity_sex_female
3065	pf_identity_sex
3066	pf_identity_divorce
3067	pf_identity
3068	pf_score
3069	pf_rank
3070	ef_government_consumption
3071	ef_government_transfers
3072	ef_government_enterprises
3073	ef_government_tax_income
3074	ef_government_tax_payroll
3075	ef_government_tax
3076	ef_government
3077	ef_legal_judicial
3078	ef_legal_courts
3079	ef_legal_protection
3080	ef_legal_military
3081	ef_legal_integrity
3082	ef_legal_enforcement
3083	ef_legal_restrictions
3084	ef_legal_police
3085	ef_legal_crime
3086	ef_legal_gender
3087	ef_legal
3088	ef_money_growth
3089	ef_money_sd
3090	ef_money_inflation
3091	ef_money_currency
3092	ef_money
3093	ef_trade_tariffs_revenue
3094	ef_trade_tariffs_mean
3095	ef_trade_tariffs_sd
3096	ef_trade_tariffs
3097	ef_trade_regulatory_nontariff
3098	ef_trade_regulatory_compliance
3099	ef_trade_regulatory
3100	ef_trade_black
3101	ef_trade_movement_foreign
3102	ef_trade_movement_capital
3103	ef_trade_movement_visit

```

3104         ef_trade_movement
3105         ef_trade
3106         ef_regulation_credit_ownership
3107         ef_regulation_credit_private
3108         ef_regulation_credit_interest
3109         ef_regulation_credit
3110         ef_regulation_labor_minwage
3111         ef_regulation_labor_firing
3112         ef_regulation_labor_bargain
3113         ef_regulation_labor_hours
3114         ef_regulation_labor_dismissal
3115         ef_regulation_labor_conscription
3116         ef_regulation_labor
3117         ef_regulation_business_adm
3118         ef_regulation_business_bureaucra
3119         ef_regulation_business_start
3120         ef_regulation_business_bribes
3121         ef_regulation_business_licensing
3122         ef_regulation_business_complianc
3123         ef_regulation_business
3124         ef_regulation
3125         ef_score
3126         ef_rank
3127         hf_score
3128         hf_rank
3129         hf_quartile
3130     ;
3131     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
3131! variable */
3132     run;

```

NOTE: The infile 'human\_freedom.csv' is:  
 Filename=U:\SAS\extdata\human\_freedom.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=1175330,  
 Last Modified=25Mar2019:14:45:25,  
 Create Time=25Mar2019:14:45:43

NOTE: 1458 records were read from the infile 'human\_freedom.csv'.  
 The minimum record length was 144.  
 The maximum record length was 1031.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: DATA statement used (Total process time):

real time	0.27 seconds
cpu time	0.26 seconds

1458 rows created in WORK.FREEDOM from human\_freedom.csv.

NOTE: WORK.FREEDOM data set was successfully created.

NOTE: The data set WORK.FREEDOM has 1458 observations and 123 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time                3.07 seconds  
cpu time                3.03 seconds

3133  
3134  
3135 /\*MERGE THE DATASETS TO GET HAPPINESS AND GDP AND SUICIDES \*/  
3136 /\*merge happiness and economic GDP datasets together using a left  
join with proc  
3136! sql\*/

3137 proc sql;  
3138        create table merged\_part1 as  
3139        select \* from happy a left join gdp b  
3140        on a.Country = b.Country;

WARNING: Variable Country already exists on file WORK.MERGED\_PART1.  
NOTE: Table WORK.MERGED\_PART1 created, with 157 rows and 16 columns.

3141 quit;  
NOTE: PROCEDURE SQL used (Total process time):  
real time                0.02 seconds  
cpu time                0.01 seconds

3142 /\*merge the merged and suicide datasets together using a left join  
with proc sql\*/

3143 proc sql;  
3144        create table merged as  
3145        select \* from merged\_part1 a left join suicide b  
3146        on a.Country = b.Country;

WARNING: Variable Country already exists on file WORK.MERGED.  
NOTE: Table WORK.MERGED created, with 157 rows and 17 columns.

3147 quit;  
NOTE: PROCEDURE SQL used (Total process time):  
real time                0.01 seconds  
cpu time                0.03 seconds

3148  
3149 /\*filter the freedom dataset for only 2016 data before merging\*/  
3150 proc sql;  
3151 create table freedom2 as  
3152 select \*  
3153 from freedom  
3154 where year = 2016;  
NOTE: Table WORK.FREEDOM2 created, with 162 rows and 123 columns.

3155 quit;  
NOTE: PROCEDURE SQL used (Total process time):  
real time                0.01 seconds  
cpu time                0.01 seconds

3156

```
3157 /*drop repeat region column first*/
3158 data freedom2;
3159     set freedom2;
3160     drop region;
3161 run;
```

NOTE: There were 162 observations read from the data set WORK.FREEDOM2.  
NOTE: The data set WORK.FREEDOM2 has 162 observations and 122 variables.  
NOTE: DATA statement used (Total process time):  
    real time                0.01 seconds  
    cpu time                  0.01 seconds

```
3162
3163 /*merge the merged and suicide datasets together using a left join
with proc sql*/
3164 proc sql;
3165     create table data as
3166     select * from merged a left join freedom2 b
3167     on a.Country=b.Countries;
WARNING: Variable ISO_code already exists on file WORK.DATA.
NOTE: Table WORK.DATA created, with 157 rows and 138 columns.
```

```
3168 quit;
NOTE: PROCEDURE SQL used (Total process time):
    real time                0.02 seconds
    cpu time                  0.00 seconds
```

```
3169
3170 /*#####MAKE MAPS#####*/
3171
3172 /*get country names from shape file*/
3173 data maps_to_merge;
3174 set mapsgfk.world;
3175 Keep=1;
3176 drop SEGMENT LONG LAT X Y ISO ISOALPHA2 RESOLUTION DENSITY CONT
LAKE;
3177 run;
```

NOTE: There were 343358 observations read from the data set  
MAPSGFK.WORLD.  
NOTE: The data set WORK.MAPS\_TO\_MERGE has 343358 observations and 3  
variables.  
NOTE: DATA statement used (Total process time):  
    real time                0.08 seconds  
    cpu time                  0.07 seconds

```
3178
3179 /*sort by country ID*/
3180 proc sort data=maps_to_merge out=maps_to_merge2 NODUPKEY;
3181 by ID;
3182 run;
```

NOTE: There were 343358 observations read from the data set  
WORK.MAPS\_TO\_MERGE.

NOTE: 343105 observations with duplicate key values were deleted.

NOTE: The data set WORK.MAPS\_TO\_MERGE2 has 253 observations and 3  
variables.

NOTE: PROCEDURE SORT used (Total process time):

real time	0.07 seconds
cpu time	0.17 seconds

3183

3184 /\*use proc sql to merge shape file with happiness scores\*/

3185 proc sql;

3186 create table happiness\_data\_for\_map as

3187 select \* from maps\_to\_merge2 a left join happy b

3188 on a.IDNAME = b.Country;

NOTE: Table WORK.HAPPINESS\_DATA\_FOR\_MAP created, with 253 rows and 16  
columns.

3189 quit;

NOTE: PROCEDURE SQL used (Total process time):

real time	0.02 seconds
cpu time	0.03 seconds

3190

3191 /\*make map of happiness scores\*/

3192 proc gmap data=happiness\_data\_for\_map map=mapsgfk.world;

3193 id ID;

3194 choro Happiness\_Score / coutline=black;

3195 label Happiness\_Score='Happiness Score';

3196 title 'Happiness Score by Country';

3197 run;

NOTE: 43643 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary

Files\\_TD7332\_SEW-207-PC-12\_\gmap3.png.

3198

3199 /\*2-suicide map\*/

3200

3201 /\*use proc sql to merge shape file with happiness scores\*/

NOTE: PROCEDURE GMAP used (Total process time):

real time	0.30 seconds
cpu time	0.29 seconds

3202 proc sql;

3203 create table suicide\_data\_for\_map as

3204 select \* from maps\_to\_merge2 a left join suicide b

3205 on a.IDNAME = b.Country;

NOTE: Table WORK.SUICIDE\_DATA\_FOR\_MAP created, with 253 rows and 5  
columns.



```

3206 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time           0.01 seconds
      cpu time            0.03 seconds

3207
3208 /*make map of happiness scores*/
3209 proc gmap data=suicide_data_for_map map=mapsgfk.world;
3210 id ID;
3211 choro _2016_suicide / coutline=black;
3212 label _2016_suicide='Crude Suicide Rate per 100,000 Residents';
3213 title 'Crude Suicide Rate by Region';
3214 run;

```

NOTE: 44471 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary  
Files\\_TD7332\_SEW-207-PC-12\_\gmap4.png.

```

3215
3216 /*3-freedom of expression*/
3217
3218 /*use proc sql to merge shape file with happiness scores*/

```

```

NOTE: PROCEDURE GMAP used (Total process time):
      real time           0.30 seconds
      cpu time            0.25 seconds

```

```

3219 proc sql;
3220     create table freedom_data_for_map as
3221     select * from maps_to_merge2 a left join freedom2 b
3222     on a.IDNAME = b.countries;
NOTE: Table WORK.FREEDOM_DATA_FOR_MAP created, with 253 rows and 125
columns.

```

```

3223 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time           0.03 seconds
      cpu time            0.03 seconds

```

```

3224
3225 proc gmap data=freedom_data_for_map map=mapsgfk.world;
3226 id ID;
3227 choro ef_legal_integrity / coutline=black;
3228 label ef_legal_integrity='Legal Integrity Score (1-10)';
3229 title 'Legal Integrity Score by Country';
3230 run;

```

NOTE: 43567 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary  
Files\\_TD7332\_SEW-207-PC-12\_\gmap5.png.

```

3231

```

```
3232  /*ANALYSIS #1: WHAT COUNTRIES ARE HAPPIEST ANALYSIS*/
3233  /*1-How does the average happiness level vary depending on the
region?*/
3234  /*use proc sgplot to graph the average response time by region*/
```

```
NOTE: PROCEDURE GMAP used (Total process time):
      real time           0.30 seconds
      cpu time            0.28 seconds
```

```
3235  proc sgplot data=merged;
3236  vbar Region /response=Happiness_score stat=mean
categoryorder=RESPDESC
3236! fillattrs=graphdata3;
3237  label Happiness_Score="Average Happiness Score";
3238  yaxis values=(0 to 10 by 1) min=0 max=10 valueshint;
3239  title "Average Happiness Scores in Global Regions (2016)";
3240  run;
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.15 seconds
      cpu time            0.03 seconds
```

NOTE: There were 157 observations read from the data set WORK.MERGED.

```
3241
3242  /*2-Is there a statistically significant difference between
regions?*/
3243  /*use proc anova to determine if there is a statistically
significant difference in
3243! happiness between regions*/
3244  proc anova data=happy;
3245      class Region;          * Variable with groups;
3246      model Happiness_score = Region; * Variable with experimental
results;
3247      means Region / Scheffe bon;
3248  run;
```

```
3249
3250  /*3-how do components vary across regions?*/
3251  /*create new variables to group related categories using datastep*/
```

```
NOTE: PROCEDURE ANOVA used (Total process time):
      real time           0.06 seconds
      cpu time            0.03 seconds
```

```
3252  data happy2;
3253  set happy;
3254  Economy=Economy_gdpper capita;
3255  Family=Family;
3256  Health=health_lifeexpectancy;
3257  Government=Freedom+trust_govcorruption;
3258  Generosity=Generosity;
```

```

3259 dystopia=dystopia_residual;
3260 drop Happiness_Score Happiness_Rank Lower__Confidence_Interval
3260! Upper_Confidence_Interval Economy_gdppercapita
health_lifeexpectancy
3260! trust_govcorruption dystopia_residual;
3261 ID=_n_;
3262 run;

```

NOTE: There were 157 observations read from the data set WORK.HAPPY.  
NOTE: The data set WORK.HAPPY2 has 157 observations and 10 variables.  
NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```

3263
3264 /*convert the data set from wide to long using proc transpose*/
3265 proc transpose data=happy2 out=happy_long(rename=(Coll=Value))
name=Variable;
3266 by ID Country Region;
3267 var Economy Family Health Government Generosity Dystopia;
3268 run;

```

NOTE: There were 157 observations read from the data set WORK.HAPPY2.  
NOTE: The data set WORK.HAPPY\_LONG has 942 observations and 5 variables.  
NOTE: PROCEDURE TRANSPOSE used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```

3269
3270 /*sort the dataset using proc sort*/
3271 proc sort data=happy_long out=happy_long;
3272 by Region Country Variable;
3273 run;

```

NOTE: There were 942 observations read from the data set WORK.HAPPY\_LONG.  
NOTE: The data set WORK.HAPPY\_LONG has 942 observations and 5 variables.  
NOTE: PROCEDURE SORT used (Total process time):

real time	0.02 seconds
cpu time	0.01 seconds

```

3274
3275 /*plot happiness by components by region using sgplot*/
3276 proc sgplot data=happy_long;
3277 vbar Region /response=Value group=Variable stat=mean
categoryorder=RESPDESC;
3278 label Value="Average Happiness Score";
3279 title "Average Happiness Scores in Global Regions (2016)";
3280 title2 "Broken up by Components of Happiness";
3281 run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

```
real time          0.19 seconds
cpu time           0.04 seconds
```

NOTE: There were 942 observations read from the data set WORK.HAPPY\_LONG.

```
3282
3283 /*4-What are the 20 happiest countries?*/
3284 /*sort countries by happiness rating using proc sort*/
3285 proc sort data=happy out=happy;
3286     by DESCENDING Happiness_Score;
3287 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY.

NOTE: The data set WORK.HAPPY has 157 observations and 13 variables.

NOTE: PROCEDURE SORT used (Total process time):

```
real time          0.01 seconds
cpu time           0.01 seconds
```

```
3288
3289 /*get dataset showing top 20 happiest using data step*/
3290 data happy_top20;
3291 set happy(obs=20);
3292 run;
```

NOTE: There were 20 observations read from the data set WORK.HAPPY.

NOTE: The data set WORK.HAPPY\_TOP20 has 20 observations and 13 variables.

NOTE: DATA statement used (Total process time):

```
real time          0.01 seconds
cpu time           0.01 seconds
```

```
3293
3294 /*create a barplot of 20 happiest countries using proc sgplot*/
3295 proc sgplot data=happy_top20;
3296     vbar Country /response=Happiness_score categoryorder=RESPDESC
3297     fillattrs=graphdata1;
3297     label Happiness_Score="Happiness Score";
3298     yaxis grid values=(0 to 10 by 1);
3299     title "20 Happiest Countries in the World (2016)";
3300 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):

```
real time          0.15 seconds
cpu time           0.07 seconds
```

NOTE: There were 20 observations read from the data set WORK.HAPPY\_TOP20.

```
3301
3302 /*5-What are the 20 least countries?*/
3303 /*get dataset showing bottom 20 happiest using data step and where
3304 statement*/
3304 data happy_bottom20;
3305 set happy;
```

```
3306 where Happiness_Rank>137;
3307 run;
```

NOTE: There were 20 observations read from the data set WORK.HAPPY.  
WHERE Happiness\_Rank>137;

NOTE: The data set WORK.HAPPY\_BOTTOM20 has 20 observations and 13 variables.

NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.01 seconds

```
3308
3309 /*create a barplot of 20 least happy countries using proc sgplot*/
3310 proc sgplot data=happy_bottom20;
3311 vbar Country /response=Happiness_score categoryorder=RESPDESC
fillattrs=graphdata2;
3312 label Happiness_Score="Happiness Score";
3313 yaxis grid values=(0 to 10 by 1);
3314 title "20 Least Happiest Countries in the World (2016)";
3315 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.15 seconds  
cpu time 0.01 seconds

NOTE: There were 20 observations read from the data set  
WORK.HAPPY\_BOTTOM20.

```
3316
3317 /*6- how many countries have a happyness score >5 and <5*/
3318 /*use data step and if and then statement */
3319 data happy_5;
3320 set happy;
3321 if Happiness_Score > 5 then Classification="Greater than 5";
3322 if Happiness_Score le 5 then Classification="Less than 5";
3323 HappinessScore=round(Happiness_Score);
3324 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY.  
NOTE: The data set WORK.HAPPY\_5 has 157 observations and 15 variables.

NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.01 seconds

```
3325
3326 /*sort the dataset using proc sort*/
3327 proc sort data=happy_5;
3328 by Region Classification;
3329 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.  
NOTE: The data set WORK.HAPPY\_5 has 157 observations and 15 variables.

NOTE: PROCEDURE SORT used (Total process time):  
real time 0.00 seconds  
cpu time 0.00 seconds

```
3330  
3331 /*use proc freq to get frequency of each region*/  
3332 proc freq data=happy_5;  
3333 tables Region*Classification /nocol nopercent;  
3334 run;
```

NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.  
NOTE: PROCEDURE FREQ used (Total process time):  
real time 0.03 seconds  
cpu time 0.04 seconds

```
3335  
3336 /*7-what is the frequency of happiness_scores among diffrent  
countries/what is the  
3336! distribution*/  
3337 /*use proc freq to make frequency plot of regions*/  
3338 proc freq data = happy_5;  
3339     tables HappinessScore * Region / plots = freqplot (twoway =  
grouphorizontal);  
3340     title 'Distribution of Happiness Scores by Region';  
3341 run;
```

WARNING: You must enable ODS graphics before requesting plots.  
NOTE: There were 157 observations read from the data set WORK.HAPPY\_5.  
NOTE: PROCEDURE FREQ used (Total process time):  
real time 0.04 seconds  
cpu time 0.03 seconds

```
3342  
3343 /*8-what is the distribution of happiness score*/  
3344 /*use proc univariate to create a histogram*/  
3345 proc univariate data = happy;  
3346     var Happiness_Score;  
3347     histogram Happiness_Score / endpoints=0 to 10 by 1 normal;  
3348     label Happiness_Score="Happiness Score";  
3349     title "Distribution of Happiness Scores among All Countries  
(2016)";  
3350 run;
```

NOTE: 23609 bytes written to C:\Users\erkl\AppData\Local\Temp\SAS  
Temporary  
Files\TD7332\_SEW-207-PC-12\univar1.png.

NOTE: PROCEDURE UNIVARIATE used (Total process time):  
real time 0.17 seconds  
cpu time 0.17 seconds

```

3351
3352 /*SUICIDE/GDP ANALYSIS*/
3353 /*1-What is the relationship between happiness and gdp*/
3354 /*get logarithmic gdp using a data step*/
3355 data merged;
3356 set merged;
3357 Log_GDP=log(gdp_2016);
3358 run;

```

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).  
19 at 3357:9

NOTE: There were 157 observations read from the data set WORK.MERGED.

NOTE: The data set WORK.MERGED has 157 observations and 18 variables.

NOTE: DATA statement used (Total process time):

real time	0.01 seconds
cpu time	0.01 seconds

```

3359
3360 /*use proc sgplot to examine the relationship between gdp and
happiness*/
3361 proc sgplot data=merged;
3362 reg x=gdp_2016 y=Happiness_Score / DEGREE=2;
3363 label Happiness_Score="Happiness Score";
3364 label gdp_2016="2016 GDP Per Capita (USD)";
3365 yaxis values=(0 to 10 by 1);
3366 title 'Relationship between Happiness Score and GDP among
Countries';
3367 title2 'Fitted with a Quadratic Regression Model (Degrees=2)';
3368 run;

```

NOTE: PROCEDURE SGPLOT used (Total process time):

real time	0.15 seconds
cpu time	0.04 seconds

NOTE: There were 157 observations read from the data set WORK.MERGED.

```

3369
3370 /*use proc reg to examine the relationship between log gdp and
happiness*/
3371 proc reg data=merged;
3372 model Happiness_Score=Log_GDP;
3373 label Happiness_Score='Happiness Score';
3374 label Log_GDP='Logarithm of 2016 GDP Per Capita';
3375 run;

```

```

3376
3377 /*2-What is the relationship between happiness and suicides?*/
3378 /*use proc sgplot to examine the relationship between suicides and
happiness*/

```

NOTE: PROCEDURE REG used (Total process time):  
real time 0.07 seconds  
cpu time 0.04 seconds

```
3379 proc sgplot data=merged;  
3380 reg x=Happiness_Score y=_2016_suicide / CLM CLI;  
3381 label Happiness_Score="Happiness Score";  
3382 label _2016_suicide="2016 Crude Suicide Rate (per 100,000  
persons)";  
3383 yaxis values=(0 to 35 by 5);  
3384 xaxis values=(0 to 10 by 1);  
3385 title 'Relationship between Happiness Score and Suicide Rates among  
Countries';  
3386 run;
```

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.15 seconds  
cpu time 0.03 seconds

NOTE: There were 157 observations read from the data set WORK.MERGED.

```
3387  
3388 /*use proc reg to examine the relationship between suicides and  
happiness*/  
3389 proc reg data=merged;  
3390 model _2016_suicide=Happiness_Score;  
3391 label Happiness_Score='Happiness Score';  
3392 label _2016_suicide='Crude Suicide Rate';  
3393 run;  
  
3394  
3395  
3396 /*3- is there a difference in relationship for men and women?*/  
3397 /*import the men and women dataset*/  
3398 /*import the happiness dataset using PROC IMPORT*/
```

NOTE: PROCEDURE REG used (Total process time):  
real time 0.36 seconds  
cpu time 0.18 seconds

```
3399 proc import  
3400 out=menwomen  
3401 datafile= 'menvwomen.csv'  
3402 dbms=dlm replace;  
3403 delimiter=',';  
3404 getnames=YES;  
3405 guessingrows=20404042;  
3406 run;
```

```
3407  
/*****  
3408 * PRODUCT: SAS
```



```

3409 *   VERSION:    9.4
3410 *   CREATOR:    External File Interface
3411 *   DATE:       16APR19
3412 *   DESC:       Generated SAS Datastep Code
3413 *   TEMPLATE SOURCE:  (None Specified.)
3414
*****/
3415     data WORK.MENWOMEN      ;
3416     %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
3417     infile 'menvwomen.csv' delimiter = ',' MISSOVER DSD lrecl=32767
firstobs=2 ;
3418         informat Country_Name $52. ;
3419         informat ISO_Code $3. ;
3420         informat women_suicides best32. ;
3421         informat men_suicides best32. ;
3422         format Country_Name $52. ;
3423         format ISO_Code $3. ;
3424         format women_suicides best12. ;
3425         format men_suicides best12. ;
3426     input
3427         Country_Name $
3428         ISO_Code $
3429         women_suicides
3430         men_suicides
3431     ;
3432     if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR
detection macro
3432! variable */
3433     run;

```

NOTE: The infile 'menvwomen.csv' is:  
 Filename=U:\SAS\extdata\menvwomen.csv,  
 RECFM=V,LRECL=32767,File Size (bytes)=7589,  
 Last Modified=04Apr2019:16:40:49,  
 Create Time=04Apr2019:16:37:14

NOTE: 264 records were read from the infile 'menvwomen.csv'.  
 The minimum record length was 10.  
 The maximum record length was 79.

NOTE: The data set WORK.MENWOMEN has 264 observations and 4 variables.

NOTE: DATA statement used (Total process time):

real time	0.03 seconds
cpu time	0.01 seconds

264 rows created in WORK.MENWOMEN from menvwomen.csv.

NOTE: WORK.MENWOMEN data set was successfully created.

NOTE: The data set WORK.MENWOMEN has 264 observations and 4 variables.

NOTE: PROCEDURE IMPORT used (Total process time):

real time	0.15 seconds
cpu time	0.10 seconds

```
3434
3435 proc sql;
3436     create table differenceanalysis as
3437     select * from happy a left join menwomen b
3438     on a.Country = b.Country_Name;
NOTE: Table WORK.DIFFERENCEANALYSIS created, with 157 rows and 17
columns.
```

```
3439 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time           0.02 seconds
      cpu time            0.01 seconds
```

```
3440
3441
3442 proc sgplot data=differenceanalysis;
3443 reg x=Happiness_Score y=women_suicides / legendlabel='Womens
Suicides';
3444 reg x=Happiness_Score y=men_suicides / legendlabel='Mens Suicides';
3445 label Happiness_Score="Happiness Score";
3446 label women_suicides="Women Suicide Rate";
3447 label men_suicides="Men Suicide Rate";
3448 yaxis label="2016 Crude Suicide Rate (per 100,000 persons)"
values=(0 to 35 by 5);
3449 xaxis values=(0 to 10 by 1);
3450 title 'Relationship between Happiness Score and Men and Women
Suicide Rates among
3450! Countries';
3451 run;
```

```
NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.16 seconds
      cpu time            0.06 seconds
```

NOTE: There were 157 observations read from the data set  
WORK.DIFFERENCEANALYSIS.

```
3452
3453
3454
3455
3456 /*ANALYSIS OF EXPRESSION ISSUES*/
3457
3458 /*1-What expression factors are most closely correlated with
happiness*/
3459 /*use proc sql to select expression variables*/
3460 proc sql;
3461 create table expression_happy as
3462 select country, pf_expression_influence, pf_expression_jailed,
pf_expression_cable,
3462! pf_expression_newspapers, pf_expression_internet, Happiness_score
```

```
3463 from data;
NOTE: Table WORK.EXPRESSION_HAPPY created, with 157 rows and 7 columns.
```

```
3464 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time          0.01 seconds
      cpu time           0.01 seconds
```

```
3465
3466 /*use proc corr to get correlations and label variables*/
3467 proc corr data=expression_happy nosimple noprob;
3468 label pf_expression_influence='Regulation of Media Content';
3469 label pf_expression_jailed='Media Jailed';
3470 label pf_expression_cable='Access to Cable';
3471 label pf_expression_newspapers='Access to Newspapers';
3472 label pf_expression_internet='Access to Internet';
3473 label Happiness_Score='Happiness Score';
3474 run;
```

```
NOTE: PROCEDURE CORR used (Total process time):
      real time          0.02 seconds
      cpu time           0.01 seconds
```

```
3475
3476 /*2-HOW DOES FREEDOM OF EXPRESSION VARY ACROSS countries overtime
*/
3477 /*use proc sql to select only variables of interest*/
3478 proc sql;
3479 create table expression as
3480 select year, Countries, pf_expression
3481 from freedom
3482 order by year;
```

```
NOTE: Table WORK.EXPRESSION created, with 1458 rows and 3 columns.
```

```
3483 quit;
NOTE: PROCEDURE SQL used (Total process time):
      real time          0.01 seconds
      cpu time           0.01 seconds
```

```
3484
3485 /*create macro to make sgplots*/
3486 %macro show_result (country1=, country2=,country3=,country4=,
country5=);
3487 data expressiondata;
3488 set expression;
3489 where Countries=&country1 or Countries=&country2 or
Countries=&country3 or
3489! Countries=&country4 or Countries=&country5;
3490 run;
3491 proc sgplot data = expressiondata noautolegend noborder;
```

```

3492      series x = Year y = pf_expression / group=Countries
lineattrs=(thickness=2);
3492! /*Problem 8.4: plot time series and adjust line color/thickness*/
3493      xaxis label="Year" interval=year;
3494      yaxis label="Freedom of Expression Score by Country" values=(0
to 10 by 1);
3495      title 'Freedom of Expression Scores from 2008-2016';
3496      keylegend;
3497      run;
3498      %mend show_result;
3499
3500      /*use macro to make plots*/
3501      %show_result(country1="United States",
3501! country2="Denmark",country3="Burundi",country4="",country5="");

```

NOTE: There were 27 observations read from the data set WORK.EXPRESSION.  
WHERE Countries in (' ', 'Burundi', 'Denmark', 'United States');

NOTE: The data set WORK.EXPRESSIONDATA has 27 observations and 3 variables.

NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.00 seconds

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.15 seconds  
cpu time 0.04 seconds

NOTE: There were 27 observations read from the data set  
WORK.EXPRESSIONDATA.

```

3502      %show_result(country1="Syria",
3502! country2="Ukraine",country3="Egypt",country4="",country5="");

```

NOTE: There were 27 observations read from the data set WORK.EXPRESSION.  
WHERE Countries in (' ', 'Egypt', 'Syria', 'Ukraine');

NOTE: The data set WORK.EXPRESSIONDATA has 27 observations and 3 variables.

NOTE: DATA statement used (Total process time):  
real time 0.01 seconds  
cpu time 0.00 seconds

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.13 seconds  
cpu time 0.03 seconds

NOTE: There were 27 observations read from the data set  
WORK.EXPRESSIONDATA.

```

3503      %show_result(country1="China", country2="India",country3="United
3503! States",country4="Indonesia",country5="Brazil");

```

NOTE: There were 45 observations read from the data set WORK.EXPRESSION.  
WHERE Countries in ('Brazil', 'China', 'India', 'Indonesia',  
'United States');

NOTE: The data set WORK.EXPRESSIONDATA has 45 observations and 3  
variables.

NOTE: DATA statement used (Total process time):  
real time 0.00 seconds  
cpu time 0.01 seconds

NOTE: PROCEDURE SGPLOT used (Total process time):  
real time 0.12 seconds  
cpu time 0.04 seconds

NOTE: There were 45 observations read from the data set  
WORK.EXPRESSIONDATA.

```
3504
3505 /*3-WHAT REGIONS HAVE THE HIGHEST FREEDOM OF EXPRESSION*/
3506 /*use proc means to get region */
3507 proc sort data=data;
3508 by region;
3509 run;
```

NOTE: There were 157 observations read from the data set WORK.DATA.  
NOTE: The data set WORK.DATA has 157 observations and 138 variables.  
NOTE: PROCEDURE SORT used (Total process time):  
real time 0.01 seconds  
cpu time 0.01 seconds

```
3510 proc means data=data;
3511 class region;
3512 var pf_expression;
3513 run;
```

NOTE: There were 157 observations read from the data set WORK.DATA.  
NOTE: PROCEDURE MEANS used (Total process time):  
real time 0.02 seconds  
cpu time 0.04 seconds