ATLAS -- SAS Exercises: Solution Code & Answers

1.
\begin{verbatim}
title1 'ATLAS SAS Exercises';
title2 ' W.W. Howells world cranial measurements dataset '
libname heads 'C:\--path--to--downloaded----file';
proc print data=heads.howells;
run;
proc contents data=heads.howells;
run;
proc means data=heads.howells mean median skew kurt std n;
  var zyb;
run;
\end{verbatim}

2.
\begin{verbatim}
title3 ' comparison of sexes raw values for face and eye width '
proc ttest data=heads.howells;
  class sex;
  var zyb;
run;
proc ttest data=heads.howells;
  class sex;
  var obb;
run;
data ratio;
  set heads.howells;
  OrbitFaceRatio=(obb/zyb);
  keep sex obb zyb OrbitFaceRatio;
run;
title3 ' comparison of sexes relative eye widths (size-adjusted) '
proc ttest data=ratio;
  class sex;
  var OrbitFaceRatio;
run;
\end{verbatim}

Men have both significantly wider faces (ZYB) and eyes (OBB), but women have significantly wider eyes relative to their facial widths (OrbitFaceRatio). One could say women have relatively larger eyes than men.

3.
\begin{verbatim}
title1 'ATLAS SAS Exercises';
title2 ' "The Economist" Big Mac Index for Jan. 15, 2003 ';
title3;
\end{verbatim}
```sas
data BigMacs;
  input country $1-13 currency $ LocBigMac ExchRate; /*1-13" required to capture country names with spaces;
  datalines;
  ------ pasted lines of data ------
;
run;

/*Check data correctly entered*/
proc print;
run;

data PPP;
  set BigMacs;
  PPP=(LocBigMac/2.65); /*US$ Big Mac price=2.65;
  Over_Under=((PPP-ExchRate)/ExchRate)*100;
  PredLocBigMac=LocBigMac/ExchRate; /*This statement is not necessary to solve the problem;
run;

proc print;
run;

Switzerland has the most overvalued currency; China the most undervalued. Turning the logic of purchasing price parity around, Big Macs in China cost too much, and they’re too cheap in Switzerland.

4.
data PPP;
  set PPP;
  if Over_under<0 then overvalued=0;
  if Over_under>0 then overvalued=1; /*leave out US$: it’s the base currency;
run;

proc print;
run;

data NationWealth;
  input wealth @@;
datalines;
1 2 1 2 1 1 2 1 1 1 2 1 2 2 1 1 1 2 2 2 1 1 2 2 ;
run;

proc print;
run;

data merged;
  merge NationWealth PPP;
run;

proc print;
```
Because we did not have a prior belief about the direction of any relationship between wealth and overvaluation of currency, this is a two-sided test. The two-sided \( p \)-value is 0.1550. Thus, we cannot reject the null hypothesis that there is no relationship between these variables.

5.

a.  

b.  

c.  

The global correlation is significant, and all of the regional correlations are significant and positive except for Europe.

d. 

```
run;
title2 'scatterplot of population density and year';

proc gplot data=worldpopS(where=(var='popdens'));
   plot value*year;
run;
```

```
proc gplot data=worldpopS(where=(var='popdens'));
   plot value*year;
   by region;
run;
```

You should see an increasing and fairly linear relationship everywhere but Europe, where population density peaks around the year 2000 and declines thereafter. Correlations only identify linear (straight-line) relationships. Note that the correlation for Europe is not significant, but there is an identifiable (but curvilinear) trend.