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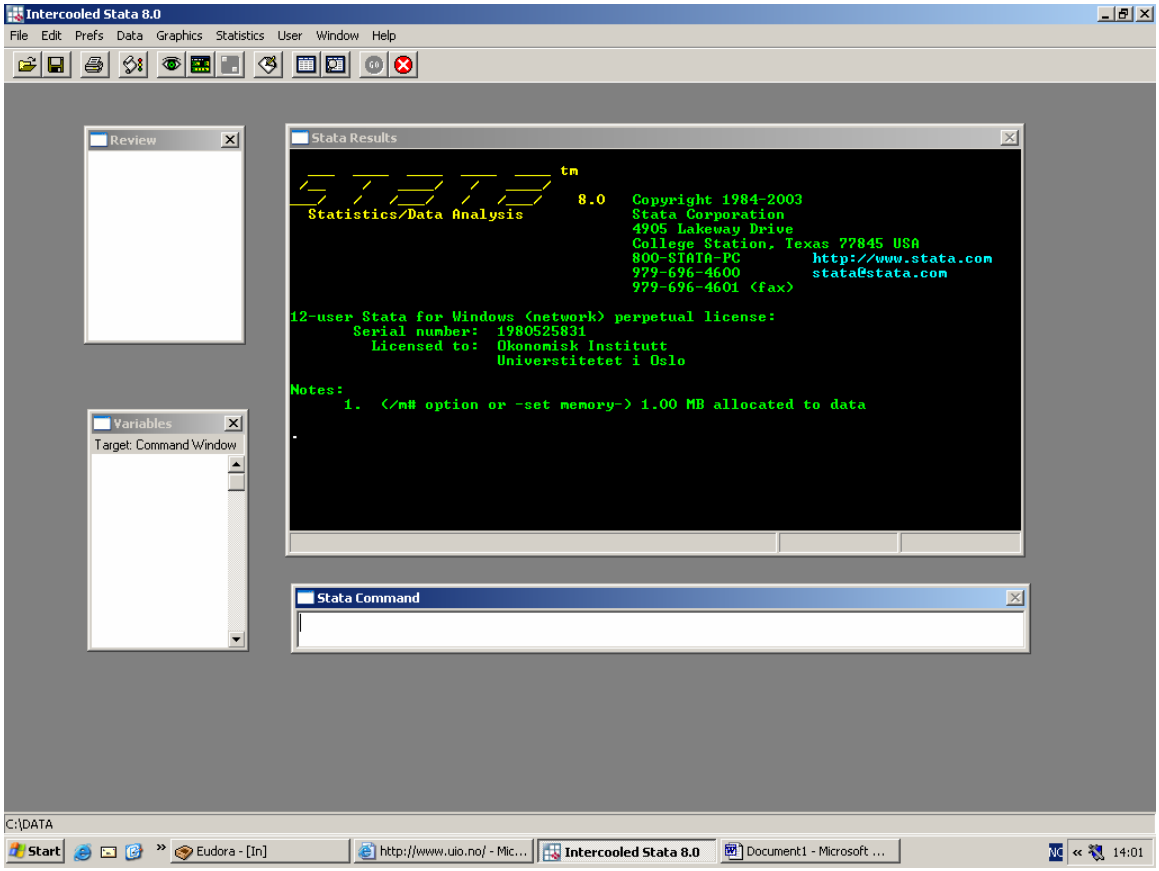
A quick introduction to STATA:

(by E. Bernhardsen and some minor additions by H. Goldstein)

The windows:

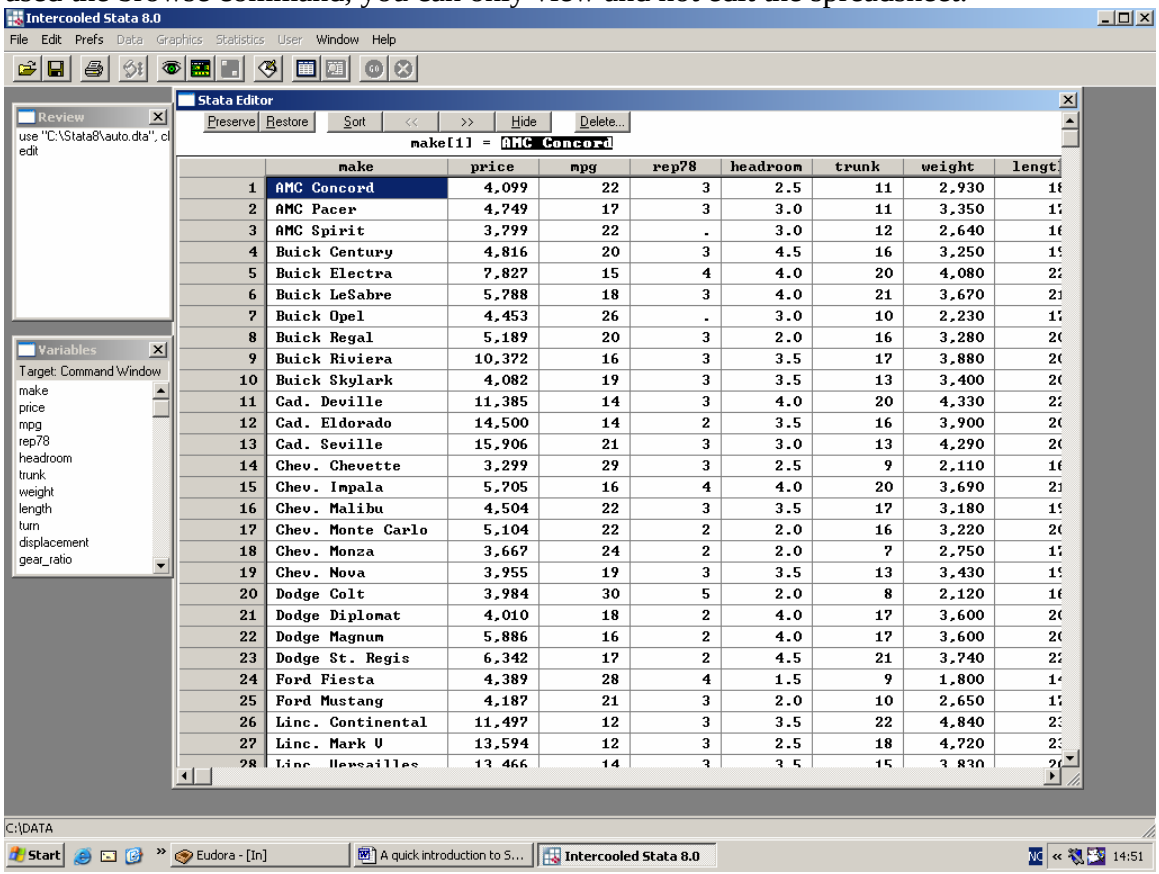
STATA has separate windows for typing in commands and for viewing results. In the review window can view (and activate) the command lines you have previously written. In the variables window all variables and labels are listed.



Excercise; Load the exercise data. Write *use C:\Stata8\auto.dta* in the command window and press enter. Alternatively, press the open file menu, navigate to C:\Stata8\auto.dta and press OK. In any case you will see that the command line enters the review window and the results window (this illustrates how the menus can be used to learn the command lines. Learning the commands facilitates greater flexibility, quicker computing, and clearly a better understanding of how the program operates).

The spreadsheet:

If you write *edit* or *browse* in the command box, you the spreadsheet window will pop up (there are also a menue and short cut buttons for opening the spreadsheet window). If you used the browse command, you can only view and not edit the spreadsheet.



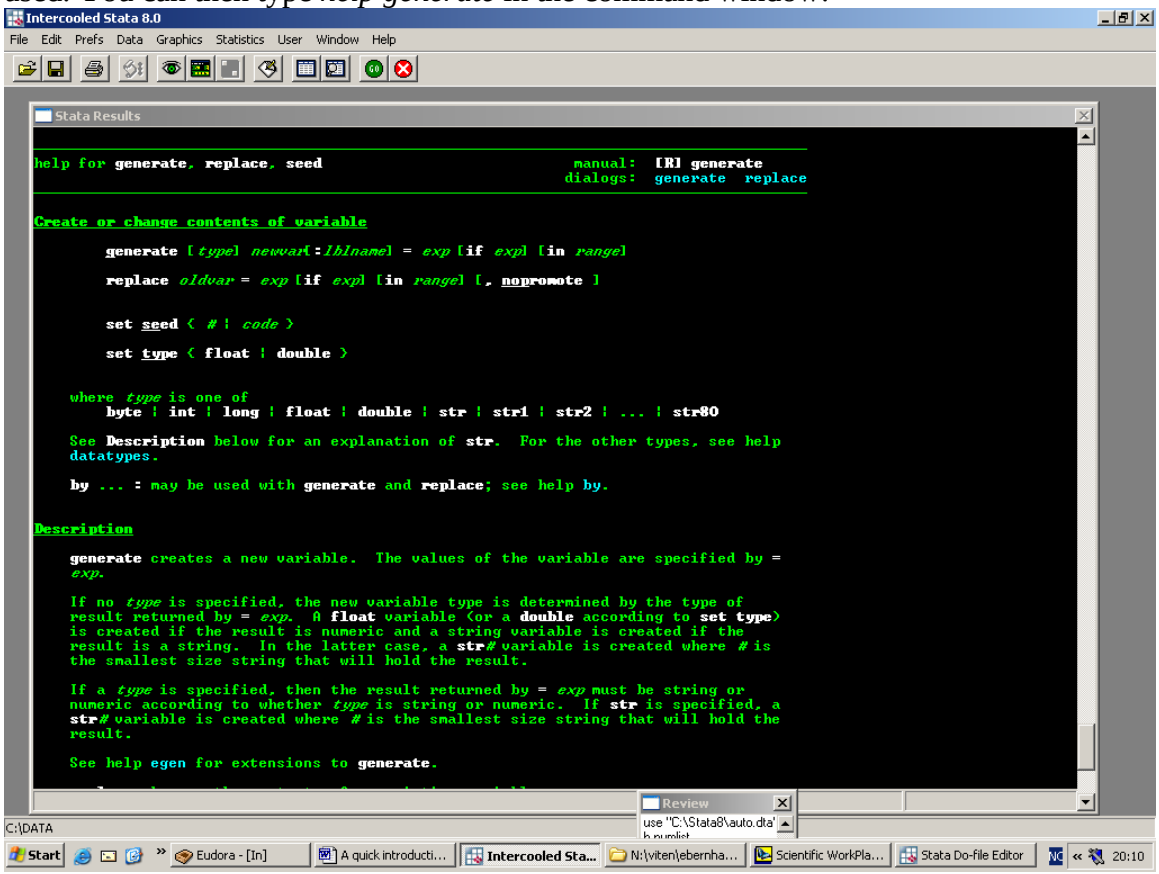
If you double click the variable names you can edit the name, or the variable labels. You are also given information on the format of the variable. In the spreadsheet you have opened, clicking on the variable name “make” tells you that the label is “Make and model” and the format is “%-18s”. The s indicates that the variable “make” is a string variable (consists of letters, not numbers), and that it will be stored using (maximum) 18 letters. The variable “price” has the different format “%8.0gc”. Here, the letter “c” indicates that a comma is used to separate at the thousands, while “g” indicates that the variable is stored as an integer. If we change the format to read “%8.1fc”, the variable is no longer stored as an integer, but as a number on the real line where one decimal place is shown. If we edit it to “%8.2fc”, two decimal places is shown etc. Writing only “%8.2f” will take away the comma separation at the thousands.

A note on formats; number variables can indeed be stored as string variables. This will often be the case when the data that is loaded is not originally in STATA format. When such data is loaded, it is therefore good practice to check whether the number variables are stored correctly.

In STATA you can refer to each variable by the variable name. You can also refer to the line number by using the reference "in". **Exercise;** Write the commands *list make in 2*, *list weight in 1/7*. What is returned in the results window?

The help facility:

Suppose you want to use the *generate* command, and cannot quite remember how it is used. You can then type *help generate* in the command window:



By clicking on –more- or just hitting the space bar, you will scroll down the windows. Alternatively you can type in *generate* in the help menu dialog box, or type *view help generate* in the command window. In any case you will se the help information in a separate window which is called the *view editor*. This window can be printed by specification on the *file* menu. The view editor can also be used to view and print contents of the results window. See "using log files", later in this document.

The command syntax:

The command syntax is almost always on the general form:

[by *varlist*:] *command* [*varlist*] [if *exp*] [in *range*] [**,***options*]

Where:
varlist refers to a list of variables, e.g. *mpg weight length price.*
exp refers to a logical expression
range refers to a range of line numbers
options, will depend on the command in question. The options must be specified at the end of the command line, after a comma separator.

The brackets indicate that specification is optional. The [by *varlist*:] formulation is optional and specifies that the command is to be repeated for each variable in the variable list. Not all commands can use this formulation.

The command syntax is best illustrated by a few simple examples:

EXAMPLE; In the tutorial dataset we may want to construct a new variable that equals mpg/weight. Writing help generate in the command window returns the following syntax from the results window.

generate [type] newvar[:lblname] = exp [if exp] [in range]

Here the command name (*generate)*, the name of the new variable to be generated (*newvar*) and the function that describes how the new variable is to be constructed (=*exp*) has to be specified. The help text explains that [type] has to be specified only if the variable that you want to create is to become a string variable, or if it is important to specify the decimal precision of the new variable. If a string variable is to be generated type can be specified to *str10* if the variable is to be stored with 10 letters. If a number variable that is generated has to have decimal precision type can be specified to *double*. The :lbname formulation is optional an allows you to specify a variable label that describes the content of the new variable.

To generate the new variable we type

generate x = mpg/weight (or shorter: gen x=mpg/weight)

If you want to change the content of an existing variable, you can use the *replace* command:

replace oldvar = exp [if exp] [in range] [, nopromote]

Exercise; Use the help function to establish what the following commands does; (these are must-to-know STATA commands). Try e.g. "list".

save	label	drop	merge
correlate	describe	keep	collapse
summarize	list	regress	test
tabulate	count	egen	predict
sort	mark	rename	clear

Num(ber)lists:

Often you will find reference to *numlist* in the STATA syntax description. *Numlist* is simply a sequence of numbers, which can be specified in various ways. As an example; the sequence 2 4 6 8 10 and the numlist 2(2)10 will be synonymous to STATA. To get an overview of different ways to specify numlists, type *help numlist*.

Logical expressions:

If you decide to use the optional [if exp] specification you must use a special syntax for logical expressions.

== equals to
~= not equal to
>= larger than or equal to, etc..
> larger than
< less than
& and
| or

EXAMPLE (do this)
tabulate make rep78 if foreign==1
tabulate make rep78 if foreign==1&price<4000
tabulate make rep78 if foreign==1|price<4000

How many different makes did you get in each of the three cases?

Note: Note (in *browse*) that the variable "foreign" has two values, 1 (with label "Foreign") and 0 (with label "Domestic"). The actual values, 1 and 0, are stored, but the labels "Foreign" and "Domestic" are displayed in the data base. If you click one value (i.e. one of the "Foreign"s), you will see the corresponding numerical value in the small window at the top of the data base window. The command, *label list*, will give a list of labels defined. You can learn how to define labels in your data set by *help label*.

Graphics

The graphics facility in STATA is quite well developed and allows numerous variations. For a start it is recommended to experiment with the graphics menu. You can then note the syntax that is automatically written in the results window. Use the auto dataset. Make a histogram over price using 10 bins (*histogram price, bin(10)*). Compare box-plots of foreign and domestic cars (*graph box price, medtype(line) over(foreign)*). Draw a scatter diagram of miles pr. gallon and weight (*twoway (scatter mpg weight*)). Try also to reproduce these three graphs by using the *graphics* – menu.

Linear regressions:

To fit simple or multiple linear regressions, use the *regress* command (or by the menu: *statistics -> linear regression* ….). Using the auto data, generate variable x=mpg/weight and type:

regress price mpg weight x foreign

Exercise; Interpret the estimated model. Check out the syntax for the *predict* command used after the *regress* command and use it to obtain the predicted price, predicted residuals and squared residuals. [e.g. *predict predy* produces a new variable in the database containing the predicted values. It is here called *predy*, or another name that you choose. *predict res , residuals* produces a variable, containing the reisduals, with name *res*, or another name of your choice.]
Can you use the *scatter* command, or the graphics-easygraph-scatterplot menu to asses whether the model specification is likely to be heteroscedastic (e.g. plot the residuals against the predicted price)? Use the help facility to list the functions library. Generate a variable that equals the natural logarithm of the price and re-estimate the model. How would you interpret the model now?

Using log-files:

This is facility allows you to print or save all commands you used for a session with STATA. It is particularly useful when you hand in written papers in class, so that the teacher can see how you obtained your results. To start logging a session, type *log using sessionname*, where sessionname is the name you decide for the session. When the session is completed, type; *log close*. In the results window you will now be told where the log file is saved. When you want to view or print the log file you type; view address\sessionname.smcl.

Make patterned/random data

Input the following lines and figure out what they do.

Command	**Notes**
`clear`	
`browse`	Close the browse window to get back to the command level.
`Set obs 100`	
`browse`	
`egen year = fill(1900 1901)`	"egen" is an extended version of "generate" that need for defining new variables, e.g. consisting of patterned data and other types.
`browse`	
`egen trend = fill(0.1(0.1)10)`	
`browse`	
`generate a = sin(trend)`	
`browse`	
`generate cycle=trend+a`	
`twoway (line trend cycle year)`	
`set seed ?`	Replace ? by an integer of your choice, e.g. your birthday like for example 100781. This starts the algorithm for generating random data. By using the same seed you can produce the same data later. If seed is not specified, stata will choose a seed by default which changes every time you draw random numbers.
`drawnorm u`	
`generate gdp = cycle+u`	
`twoway (line trend cycle gdp year)`	

Exercise; Load the auto dataset. Explain why this sequence of commands can be used to draw a random sample of 20 cars:

```
gen u = uniform()
sort u
mark sample in 1/20
```

The do-file editor

Often you will need to type a sequence of commands several times. In this case you should use the do-file editor (press the short cut with a picture of an envelope). In the do-file you can write in multiple lines and run them in a sequence. You can save the do-file for later use. Often you will want to specify loops in the do-file editor. As an example,

suppose you have variables; year1, year2, year3, … , year100, and that you want to transform these variables from string to real numbers. You can then type

```
forvalues x = 1/100 {
   generate y`x' = real(year`x')
   }
```

STATA will then perform this command successively for `x' running from 1 to 100. Note that all the definitions for *numlist* can be used with this command.

To test out a loop, try the following command (you can use the command window for this one-liner)

forvalues x = 2/20 {di "I will do `x' attempts to do my homework properly"}

Note: *di* is short for the *display* command. *display* is used for printing strings or scalar numbers. It can be used as a calculator. Try out the following (-> denotes output):

You want the value of *e*:

```
di exp(1)
```

-> 2.7182818

You want higher precision (10 decimal places):

```
di %12.10f exp(1)
```

-> 2.7182818285

You want to describe the output:

```
di  "e  =  "  exp(1)
```

You want to calculate $\sqrt{2\pi}$ (π in STATA is _pi):

```
di  sqrt(2*_pi)
```

Loading data in ASCI format:

If data is in ASCII format, you cannot use the *use* command. Try instead the *insheet* command. You can check out the syntax for *insheet* using the help facility.