

Graduate School Class Reminders

- ▶ Maintain six feet of distancing
- ▶ Please sit in the same chair each class time
- ▶ Observe entry/exit doors as marked
- ▶ Use hand sanitizer when you enter/exit the classroom
- ▶ Use a disinfectant wipe/spray to wipe down your learning space before and after class
- ▶ Media Services: 414 955-4357 option 2

Documentation on the web

- ▶ CRAN: <http://cran.r-project.org>
- ▶ R manuals: <https://cran.r-project.org/manuals.html>
- ▶ SAS: <http://support.sas.com/documentation>
- ▶ SAS 9.3: <https://support.sas.com/en/documentation/documentation-for-SAS-93-and-earlier.html>
- ▶ Step-by-Step Programming with Base SAS 9.4 (SbS):
<https://documentation.sas.com/api/docsets/basess/9.4/content/basess.pdf>
- ▶ SAS 9.4 Programmer's Guide: Essentials (PGE):
<https://documentation.sas.com/api/docsets/lepg/9.4/content/lepg.pdf>
- ▶ Wiki: <https://wiki.biostat.mcw.edu> (MCW/VPN)

Custom output with the DATASTEP

- ▶ As we have seen the put statement output appears in the .log by default
- ▶ However, if you want to create custom output, then the .log is a poor choice
- ▶ With the file statement, you can specify other locations such as .lst or others
- ▶ `file print;` specifies .lst
- ▶ `file "FILENAME";` specifies a new file
- ▶ The default is to replace the file: the mod option appends
- ▶ `file print mod;`
- ▶ `file "FILENAME" mod;`
- ▶ By default, titles defined are used: `notitles` turns them off
- ▶ By default, footnotes defined are NOT used: `footnotes` turns them on

Page size and line size

- ▶ The options statement has two options for output
- ▶ `options ps=LINES;` controls how many lines are on a page
- ▶ `options ls=CHARACTERS;` controls how many characters are in a line
- ▶ In our `~/autoexec.sas`, we have two settings for convenience
- ▶ For portrait, `options &portrait;` (which is the default)
where `%let portrait = ps=54 ls=76;`
- ▶ For landscape, `options &landscape;`
where `%let landscape= ps=49 ls=122;`

The Output Delivery System (ODS)

- ▶ With version 7 (1998), SAS introduced ODS: a more flexible output management system useful for many common tasks
- ▶ As we have seen, you can choose not to produce output with the `%_printto` macro (that relies on `proc printto;`)
- ▶ With ODS, you can do the same by `ods listing close;`
- ▶ And you can turn it back on by `ods listing;`

The Output Delivery System (ODS)

- ▶ One of the main reasons for ODS' creation is to capture SAS output in a data set for further processing
- ▶ `ods output ODSSTABLENAME=NEW;`
where NEW is the data set created
- ▶ But how do we know what ODSSTABLENAME is supposed to be?
- ▶ Prior to the PROC statement, place `ods trace on;`
- ▶ After the `run; quit;` you can turn it off `ods trace off;`
- ▶ Don't forget the `run; quit;`
`quit;` is generally optional, but it is needed for ODS
- ▶ You can selectively generate output with
`ods select ODSSTABLENAME;`
which will place ONLY the selected choices in your .lst
- ▶ And you can selectively exclude output with
`ods exclude ODSSTABLENAME;`
- ▶ see example PTB/acf.sas

The Output Delivery System (ODS)

- ▶ ODS also controls Statistical Graphics PROCs: SGPROCs
- ▶ So to capture PDF output

```
ods graphics on / imagename="&fnroot"  
outputfmt=pdf;
```
- ▶ "&fnroot" (which is created by %_fn; in ~/autoexec.sas) your SAS program is named &fnroot..sas so the **FIRST** PDF file is called &fnroot..pdf
- ▶ Subsequent PDF files are named &fnroot.n.pdf where n is a number: 1, 2, ...
- ▶ If we call the macro %_pdfjam;
then these files are combined into one PDF: &fnroot..pdf
- ▶ And pressing F12 will open the **FIRST** PDF for viewing by default: you can over-ride this in the mini-buffer
- ▶ see example PTB/acf.sas