

# **STA 311 Statistical Computing and Data Management**

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## Topics to Be Covered

- ☐ What is ODS?
- ☐ Benefit of ODS
- ☐ ODS terminology
- ☐ ODS Syntax
- ☐ ODS parameter specification
- ☐ ODS destinations
- ☐ Multiple ODS destinations
- ☐ ODS RTF enhancements: Styles

## What is SAS ODS?

- SAS Output Delivery System (ODS) is designed to overcome the limitations of traditional SAS output that is designed for line-printer.
- ODS provides a method of delivering output in a variety of formats such as HTML, RTF and PDF.

## Benefits of ODS

Through ODS, we can do the following:

1. Create HTML, RTF, PostScript, and PDF files.
2. Select SAS-supplied styles to enhance reports.
3. Create output objects from almost all SAS procedures.
4. Create SAS datasets from output objects.
5. Provide support for website navigation and management of HTML files.

# ODS Basics

1. ODS creates your output in the form of output objects. Each output object is comprised of two components. The data component contains the results - think numbers - of a procedure or a DATA step. The table definition tells SAS how to render the results - think structure.
2. Once SAS creates all the output objects from an executed program, it then just needs to figure out where to send the objects.

SAS ODS destinations (i.e., file format)

- (0). LISTING (SAS default ODS destination)
- (1). HTML
- (2). OUTPUT
- (3). Printer Family format: PDF or PS
- (4). RTF

## Default ODS Destination: LISTING

1. The default ODS destination is LISTING. This is where SAS sends the output. This ODS destination is the standard output window.
2. If we choose a specific ODS destination other than LISTING and don't want to print out anything in the output window. We should close this ODS destination using command **ODS LISTING CLOSE** before open other ODS destinations.
3. It is a good practice to keep LISTING open.

## ODS Syntax

```
ODS output-type  
  PATH path-name  
  FILE = Filename-and-Path  
  STYLE = Style-Name;  
  
PROC some proc;  
  
ODS output type CLOSE;
```

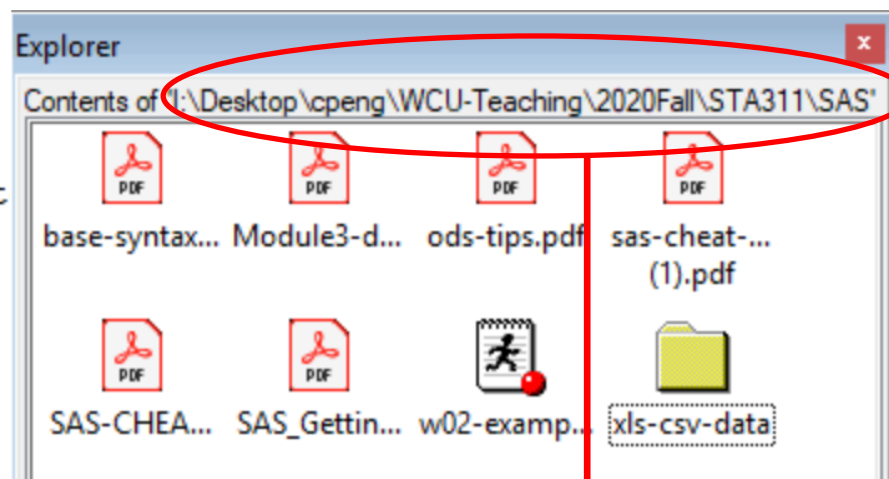
**PATH** represents the statement used in case of HTML output. In other types of output we include the path in the filename.

**Style** represents one of the in-built styles available in the SAS environment.

# A Simple Example

```
/* column input */
```

```
DATA Orange;
INPUT state $ 1-10 early 12-14 lat
DATALINES;
Florida      130    90
California   37     26
Texas        1.3    .15
Arizona      .65    .85
;
RUN;
```



```
ODS RTF FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange.rtf";
```

```
PROC PRINT DATA = Orange;
    TITLE "Output of theTesting Data";
RUN;
ODS RTF CLOSE;
```

Make sure SAS can access this folder and write output file with specified format to this folder.



# A Simple Example: File location

Chester University of PA > Desktop > cpeng > WCU-Teaching > 2020Fall > STA311 > SAS

☐ Name

- xls-csv-data
- base-syntax-ref-cheat-sheet
- Module3-data-step-statements-options
- myOrange
- ods-tips

Output of theTesting Data

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

01:10 Thursday, August 27, 2020 1

8/27/2020 12:07 AM

```
ODS RTF FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange.rtf";
PROC PRINT DATA = Orange;
    TITLE "Output of theTesting Data";
RUN;
ODS RTF CLOSE;
```

Results

- Results
  - Print: Output of theTesting Data
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Print: Output of theTesting Data
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE

# A Simple Example: file location

Chester University of PA > Desktop > cpeng > WCU-Teaching > 2020Fall > STA311 > SAS

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Output of theTesting Data

Obs	state	early	late
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01:10 Thursday, August 27, 2020 1

8/27/2020 12:07 AM

```
ODS RTF FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange.rtf";
PROC PRINT DATA = Orange;
    TITLE "Output of theTesting Data";
RUN;
ODS RTF CLOSE;
```

Results

- Results
  - Print: Output of theTesting Data
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Print: Output of theTesting Data
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE
  - Data Set WORK.ORANGE

# ODS HTML

## ODS HTML with and without PATH

```

/* Parameter PATH is used in the ODS HTML destination */
ODS HTML
    PATH = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS"
    FILE ="myOrange.HTML";
PROC PRINT DATA = Orange;
    TITLE "Output in PDF Format";
RUN;
ODS HTML CLOSE;    /* ODS must be cloased! */
|
/* ODS HTML destination - combine PATH and file name */
ODS HTML
    FILE ="I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrangenPATH.HTML";
PROC PRINT DATA = Orange;
    TITLE "Output in PDF Format";
RUN;
ODS HTML CLOSE;    /* ODS must be cloased! */

```

## Multiple ODS Destinations In A Single Step
















```

/*****
Multiple ODS Destinations in a single step
*****/
ODS LISTING CLOSE;    /* close listing and open other ODS destinations */
ODS RTF
    FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange0.RTF";
ODS PDF
    FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange0.PDF";
ODS HTML
    FILE = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrange0.HTML";
PROC PRINT DATA = Orange;
    TITLE "Output in PDF Format";
RUN;
ODS HTML CLOSE;    /* ODS must be closed! */
ODS PDF CLOSE;
ODS RTF CLOSE;
ODS LISTING;        /* open ODS LISTING for printing future outputs */

```

# Multiple ODS Destinations: OUTPUT

Chester University of PA > Desktop > cpeng > WCU-Teaching > 2020Fall > STA311 > SAS

<input type="checkbox"/> Name	Status	Date modified	Type
 xls-csv-data	✓	8/23/2020 2:00 AM	File folder
 base-syntax-ref-cheat-sheet	✓	8/24/2020 11:52 PM	Adobe Acrobat Docu...
 Module3-data-step-statements-options	✓	8/24/2020 11:49 PM	Adobe Acrobat Docu...
 myOrange	☁	8/27/2020 3:46 AM	Chrome HTML Docu...
 myOrange	☁	8/27/2020 12:55 AM	Rich Text Format
 myOrange0	☁	8/27/2020 4:12 AM	Chrome HTML Docu...
 myOrange0	✓	8/27/2020 4:12 AM	Adobe Acrobat Docu...
 myOrange0	☁	8/27/2020 4:12 AM	Rich Text Format
 myOrangenopath	☁	8/27/2020 3:51 AM	Chrome HTML Docu...
 ods-tips	✓	8/27/2020 12:07 AM	Adobe Acrobat Docu...
 SAS_GettingStarted	✓	8/24/2020 11:51 PM	Adobe Acrobat Docu...
 sas-cheat-sheet (1)	✓	8/25/2020 12:10 AM	Adobe Acrobat Docu...
 SAS-CHEAT-SHEET	✓	8/25/2020 12:06 AM	Adobe Acrobat Docu...
 To-ODS-RTF-and-Beyond	✓	8/27/2020 2:23 AM	Adobe Acrobat Docu...
 w02-example-code	✓	8/26/2020 3:17 AM	SAS Program

## ODS Styles

When we output information to a SAS ODS format, the tables, graphs and text are defined with default colors and fonts. There are several built-in ODS styles that we can select. Each style is based on some theme or purpose.

### Built-in Styles(partial list):

EGDefault	Electronics	Journal3	Rsvp	Watercolor
Analysis	Default	Listing	Rtf	blockPrint
Astronomy	D3d	Magnify	Sasweb	fancyPrinter
Banker	Education	Meadow	Science	grayscalePrinter
BarrettsBlue	Electronics	MeadowPrinter	Seaside	monochromePrinter
Beige	Festival	Minimal	SeasidePrinter	sansPrinter
Brick	FestivalPrinter	Money	Sketch	sasdocPrinter
Brown	Gears	NoFontDefault	Solutions	serifPrinter
Curve	Harvest	Normal	Statdoc	PowerPointDark
Default	HighContrast	NormalPrinter	Statistical	PowerPointLight
D3d	Journal	Ocean	Theme	Excel
Education	Journal2	Printer	Torn	Raven

## Example: Raven Style

```

/* Style = Raven */
ODS HTML
  PATH = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS"
  FILE = "myOrangeRaven.HTML"
  STYLE = Raven;
PROC PRINT DATA = Orange;
  TITLE "Output in PDF Format";
RUN;
ODS HTML CLOSE; /* ODS must be closed! */

```

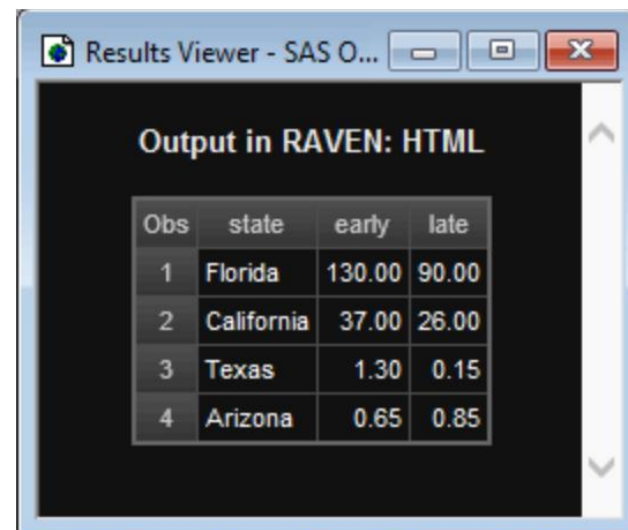
```

12 /* Style = Raven */
13 ODS HTML
14   PATH = "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS"
15   FILE = "myOrangeRaven.HTML"
16   STYLE = Raven;
NOTE: Writing HTML Body file: myOrangeRaven.HTML
17 PROC PRINT DATA = Orange;
18   TITLE "Output in PDF Format";
19 RUN;

NOTE: There were 4 observations read from the data set WORK.ORANGE.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.36 seconds
      cpu time            0.00 seconds

50 ODS HTML CLOSE; /* ODS must be closed! */

```



Output in RAVEN: HTML

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85



## Example: Raven Style (PDF)

```

/* PDF - Should not PATH option in PDF and RFT
Note that I did close LISTING, the data set will
be printed in the output window. */
/* Style = Raven */
ODS PDF
FILE ="I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrangeRaven.PDF"
STYLE = Raven;
PROC PRINT DATA = Orange;
TITLE "Output in RAVEN Format";
RUN;
ODS PDF CLOSE; /* ODS must be closed! */

```

```

60 ODS PDF CLOSE; /* ODS must be closed! */
61 /* PDF - Should not */
62 /* Style = Raven */
63 ODS PDF
64 FILE ="I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrangeRaven
65 STYLE = Raven;
NOTE: Writing ODS PDF output to DISK destination
      "I:\Desktop\cpeng\WCU-Teaching\2020Fall\STA311\SAS\myOrangeRaven.PDF", pr
66 PROC PRINT DATA = Orange;
67 TITLE "Output in RAVEN Format";
68 RUN;

NOTE: There were 4 observations read from the data set WORK.ORANGE.
NOTE: PROCEDURE PRINT used (Total process time):
      real time          0.06 seconds
      cpu time           0.03 seconds

69 ODS PDF CLOSE; /* ODS must be closed! */

```

myOrangeRaven.PDF - Adobe Acrobat Reader DC

File Edit View Sign Window Help

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Output in RAVEN Format 09:34 Thursday, August 27, 2020 1

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85



# Some Sample Styles: HTML Format

Results Viewer - myOrangeRaven

**Output Style HARVEST: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOrangeRaven

**Output Style Ocean: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOrangeRaven

**Output Style PowerPointDark: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOrangeRa...

**Output Style BarrettsBlue: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOr...

**Output Style Excel: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - m...

**Output Style MeadowPrinter: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOrangeRaven

**Output Style BlockPrint: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85

Results Viewer - myOrangeRaven

**Output Style EGDefault: HTML**

Obs	state	early	late
1	Florida	130.00	90.00
2	California	37.00	26.00
3	Texas	1.30	0.15
4	Arizona	0.65	0.85