Oh, There's No Place Like SAS® ODS Graphics for the Holidays!

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ABSTRACT

Already a SAS ODS Graphics user at work, the author used the (*free!*) SAS University Edition software he'd recently downloaded and installed on his home laptop to knock out a connect-the-dots Tom Turkey with PROC SGPLOT to commemorate Thanksgiving 2015. And so began an ongoing series of "Fun with SAS ODS Graphics" posts on the SAS Support Communities and Twitter that celebrated major holidays and other events. While creating these admittedly frivolous charts from the comfort of his easy chair, the author learned some useful techniques for creating serious data vizzes, which will be shared in this e-poster and the accompanying paper.

INTRODUCTION

Don't ask me why, but some people – myself included – have felt compelled to write silly little computer programs to create holiday-themed images for the better part of a half-century. So, I suppose it's not too surprising that I opted to test out my newly-downloaded SAS University Edition software by using ODS Graphics to knock out a line drawing of a Tom Turkey. After all, it was Thanksgiving (2015) and I'd stumbled across a site for Math Teachers that included x and y coordinate pairs for holiday characters (for kids to create connect-the-dots puzzles). Hey, what else was I supposed to do?

PLATO, Nov 22, 1973 (Source: PLATO History)   **Twitter, Nov 26, 2015**
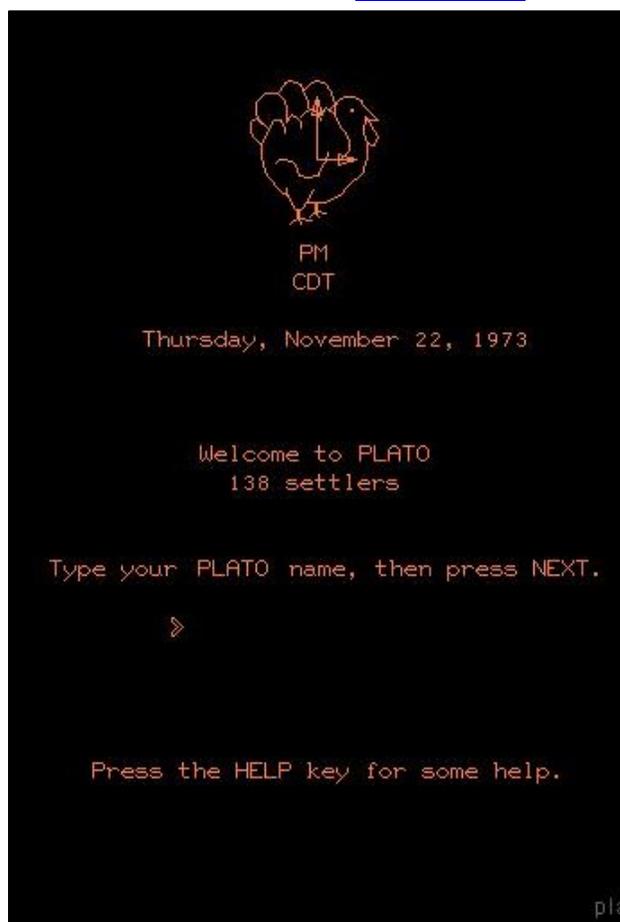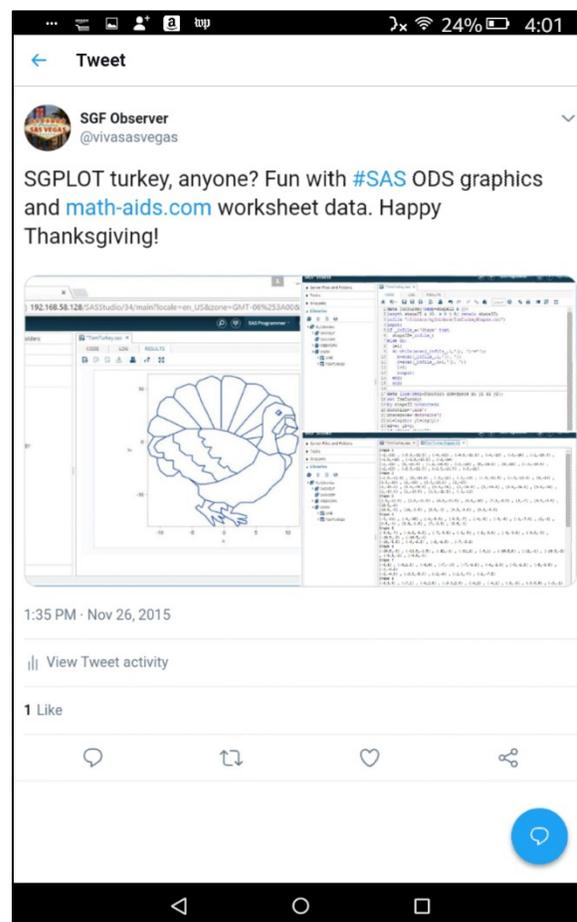
After posting my "Happy Thanksgiving!" greeting on Twitter and SAS-L, Chris Hemedinger spotted it and also suggested sharing any future holiday programming doodles on SAS Support Communities (Chris also provided a model post showing how to document SAS code, input, and output!). And that, kids, was all the encouragement I needed to begin a series of "Fun with SAS ODS Graphics" posts!

A "FUN WITH SAS ODS GRAPHICS" GALLERY
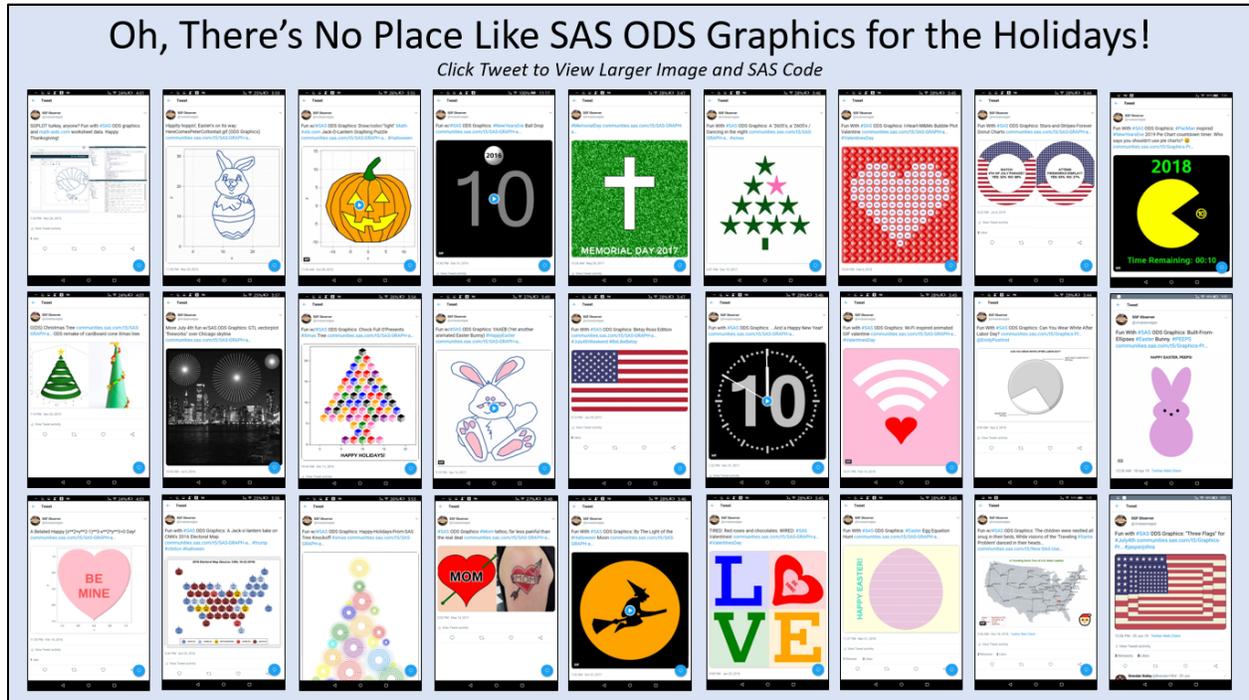
"Fun with SAS ODS Graphics" Gallery (Reduced From 41" x 23")

The Appendix contains larger versions of the Twitter screenshot thumbnails shown above together with links to the underlying SAS ODS Graphics code, typically part of a SAS Support Communities post that also includes any input data and output images (including some animated GIFs!).

Nearly four years later, there are still some holidays left on my Fun with SAS ODS Graphics to-do list, but New Year's Eve, Valentine's Day, Easter, Mother's Day, Memorial Day, Fourth of July, Labor Day, Halloween, Thanksgiving, and Christmas have all been tackled at least once.

In addition to the holiday-themed posts, events covered in the Fun with SAS ODS Graphics series have included SAS Conferences, the Summer Olympics, the recent Total Solar Eclipse, March Madness, the World Series (Cubs Win!), and Super Bowl LI. Other subjects that caught my attention and got the SAS ODS Graphics treatment include K-12 Education Funding, Sort Algorithms (Bubble), Public Employee Salary/Overtime Pay Distributions, iPhone Fitness Data (Steps), MLB Batting Statistics, U.S. Presidents' Ages and Heights, U.S. Presidential Election Results/Headlines, AP Exam Score Distributions, Flag Designs, U.S. Refugee Admissions, Misleading Descriptive Statistics, Weather Forecast Data, Apollo 11 Moon Landing 50th Anniversary, and Cancer Survival Rates. The Appendix also contains screenshots of the Tweets I sent out for these additional charts, again with links to accompanying SAS Support Communities posts containing SAS ODS Graphics code, input data and (sometimes animated!) output images.

In the next section, we'll take a quick look at one of the "Fun with SAS ODS Graphics" SAS Support Communities posts, so you can see what kind of content you can expect to find there.

By the way, if SAS ODS Graphics is new to you (or if you'd like a quick refresher!), a short three-page 'elevator pitch' for why you should consider adding it to your bag of SAS tricks can be found at the end of this paper, together with a few introductory examples that illustrate several ODS Graphics takes on a bar chart presentation of data (sashelp.prdsale).

FUN WITH SAS ODS GRAPHICS: I HEART M&MS VALENTINE

The image to the right was created using the code below for the [Challenge for SAS Nerds: Build a SAS Valentine](#).

Because ODS Graphics supports a layered approach to chart-building (a la R's ggplot2 or Python's matplotlib), this could be easily accomplished by combining:

1. A rose-colored **background**

2. A **bubble chart** of red M&M's, using the option dataskin=sheen to get a 3D, candy-like look

3. A **text chart** of white "m" labels for the red M&M's

4. A **bubble chart** of white M&M's

5. A **text chart** of red "m" labels for the white M&M's

Just click Run and – voila! – you have a neat, if not quite Hallmark-quality, valentine!
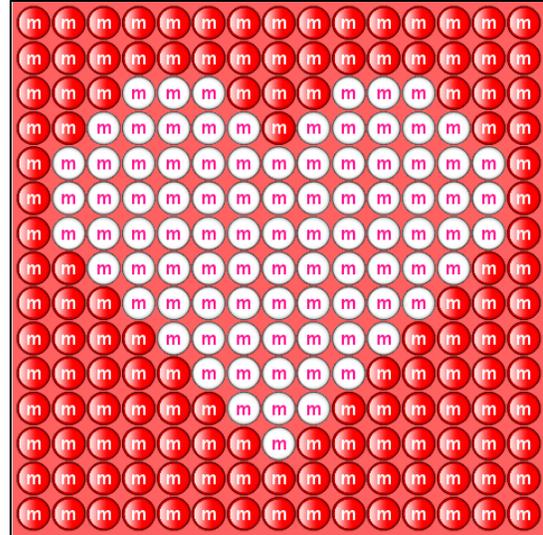

```sas
* Fun w/SAS ODS Graphics: I Heart M&Ms Valentine;

data red(keep=x y m s rename=(x=x1 y=y1)) white(keep=x y m s rename=(x=x2 y=y2));
retain m "m" s 1;                 * M&M letter ("m"), M&M size (1);
do y=15 to 1 by -1;              * Read in 15x15 M&M valentine layout template from inline data;
  input mms $15.;                * X=Background M&M (red), *=Heart M&M (white);
  do x=1 to 15;                  * Output points for plot;
    if substr(mms,x,1)="X" then output red;
    else output white;
  end;
end;
cards;
XXXXXXXXXXXXXXX
XXXXXXXXXXXXXXX
XXX***XXX***XXX
XX*****X*****XX
X*************X
X*************X
X*************X
XX***********XX
XXX*********XXX
XXXX*******XXXX
XXXXX*****XXXXX
XXXXXX***XXXXXX
XXXXXXX*XXXXXXX
XXXXXXXXXXXXXXX
XXXXXXXXXXXXXXX
;
data mms;                         * Put M&Ms all together;
set red white;
                                  * Plot M&Ms valentine!;
ods graphics on / reset=index imagefmt=png antialias=on height=5in width=5in dataskinmax=500;
proc sgplot data=mms noautolegend noborder pad=0 aspect=1 nowall subpixel;
styleattrs backcolor=rose;
* 1. Background M&Ms (red);
bubble x=x1 y=y1 size=s / dataskin=gloss bradiusmin=15 fill fillattrs=(color=red);
text x=x1 y=y1 text=m / textattrs=(family="Albany AMT Bold" size=12pt color=white weight=bold)
position=center vcenter=bbox contributeoffsets=none strip;
* 2. Heart M&Ms (white);
bubble x=x2 y=y2 size=s / dataskin=gloss bradiusmin=15 fill fillattrs=(color=white);
text x=x2 y=y2 text=m / textattrs=(family="Albany AMT Bold" size=12pt color=deeppink weight=bold)
position=center vcenter=bbox contributeoffsets=none strip;
xaxis display=none offsetmin=0 offsetmax=0 min=.4 max=15.6 values=(.4 15.6); * Suppress labels/ticks on
axes, set bounds;
yaxis display=none offsetmin=0 offsetmax=0 min=.4 max=15.6 values=(.4 15.6);
```

3

WHAT I'VE LEARNED

There are, of course, always lessons to be learned from play. Indeed, some of the techniques I've picked up knocking out these "doodles" while watching TV have proven to be very useful in my day job. And having the programs available on SAS Support Communities gives me access to a wealth of code snippets at work that are just a Google search away!

Borrowing the random thoughts format of the old *What I've Learned* interviews in Esquire and Larry King's *It's My Two Cents* columns in USA Today, here's some of what I've learned from my Fun with SAS ODS Graphics posts:

- The first rule of Fun with SAS ODS Graphics club is to **always use SGPLOT** (it keeps things simple!). The second is to use GTL (PROC TEMPLATE, PROC SGRENDER) when you can't use SGPLOT!

- Don't be afraid to **"stack up" your charts and chart types in layers** – SAS ODS Graphics doesn't limit you to a simple line-bar combo. Remember, order counts, so use statements so they produce output in the desired "z-order" and use transparency when helpful.

- Surprisingly, people seem to be **more engaged than annoyed by animated GIFs**. The same technique you use to draw an animated Easter bunny can also be used to effectively show cumulative sales growth over time following a product launch, calls arriving in a contact center, etc.

- You can often **get away with using the STYLEATTRS option** to specify colors and other attributes, but Attribute Maps (discrete and range) eliminate any doubt and offer the utmost in flexibility.

- If you like Excel's data tables, **you'll love ODS Graphics' XAXISTABLEs**. There are also YAXISTABLEs, too, and both have position options (inside or outside) that allow you to augment your charts with lots of statistics for viewers.

- I don't always need to worry about **aspect ratios** to get consistent x and y axis scales, but when I do, ASPECT = 1 (SGPLOT) or LAYOUT OVERLAYEQUATED / EQUATETYPE=SQUARE (GTL) are life-savers. Without them, your image will look like a bad photo that's been stretched in just one direction!

- You can **share some photos or other images** in your charts using an annotate dataset (with function="IMAGE") or the SYMBOLIMAGE statement.

- When specifying color values, in addition to the SAS-defined names, you can also specify **16,777,216 RGB combinations in CXrrggbb notation**. Also, check out sites like ColorBrewer to get values to use in your COLORMODEL options.

- Macros, PROC SQL, and BY statements are all surprisingly useful tools for **building a series of incremental images** for an animation (PRINTERPATH=GIF).

- Don't forget to use the numerous options to **format your data**!

- Line, bar, scatter, and pie charts are all fine, but don't forget to **try less often-used chart types** – dot plots, box plots, step plots, vector plots (with/without arrows!), bubble charts, waterfall charts, high-low charts, maps, needle plots, polygon plots.

- If you can get away with it, **let SAS choose your defaults**. Otherwise, your bread-and-butter options for fonts and other items are likely to be SIZE=, COLOR=, SYMBOL=, WEIGHT=, FAMILY=, PATTERN=, THICKNESS=.

- You can **cobble together cartograms** easily as a neat alternative to traditional U.S. maps and convey state-level information without having to worry about those tiny eastern seaboard states!

- You'll want to **override axis defaults** more than you'd expect – e.g., change or eliminate labels, modify attributes, change ticks, specify MAX/MIN values, use RANGES for "broken" axes.

- SAS usually figures things out, but you can specify **DISCRETE, TIME, or LINEAR** for your axes.

- Defaults are often OK, but you may need to **specify image resolution** (IMAGE_DPI=) and size (HEIGHT=, WIDTH=), as well as an output image file name/location (NAME=, GPATH=).

- When things like text, markers, and lines collide or overlap, **try using TRANSPARENCY options**.

WHAT I'VE LEARNED (CONT.)

- Remember, **a circle is merely an ellipse** where SEMIMAJOR=SEMIMINOR.

- If x/y axis options aren't getting you the labels and gridlines you need, **try using REFERENCELINEs**.

- Looking at things from different angles? Try **SGPANEL/SGSCATTER, GTL, and BY statements**!

- Does your TEXT look off-center? Don't forget to **specify STRIP=TRUE** to get rid of trailing spaces!

- For better or worse, we live in an emoji world ☺. Remember that **Unicode is an option for text and markers** (e.g., SYMBOLCHAR). Check out sites like Unicode.org to see what's available!

- **To save real estate,** suppress axis labels and color legends when things are obvious without them (e.g., green=good red=bad). You can also save real estate by creating custom legends and/or repositioning legends to take advantage of free space in charts.

- TITLEs and FOOTNOTEs are convenient, but also eat up real estate. Consider the use of ENTRY, DRAWTEXT, and INSET to **put this info in otherwise blank areas of your charts**.

- Don't overuse it, but sometimes **the BACKLIGHT option has a nice effect** in TEXT plots, rendering text more readable by making it pop, especially in color-on-color scenarios!

- Need a Gantt chart, but don't have SAS/OR? Try an ODS Graphics **High-Low Chart** (w/TYPE=BAR).

- When input data is neat (think Excel or .csv), **PROC IMPORT is your friend**; when it's messy, INPUT, _INFILE_, and SCAN can save the day!

- If you need to create plots that don't exist, you can **roll-your-own** – e.g., Ellipseparm + Vector + Text plots = Donut chart – until ODS Graphics is enhanced (SAS 9.4M6 introduces **donut** charts!)

- PROC FCMP **supports recursive programming**. Who knew?

- **DATASKINs can be cheesy**, but sometimes they're just what the Doctor ordered.

- SCATTER charts and the CURVELABEL option do a pretty amazing job of **avoiding label collision**, and you can always turn to PROC TEXT if you need even finer control over label placement/content.

- If they don't get in the way, **GRIDs are helpful to group data**, as are BANDs & REFLINEs.

- It deviates a bit from the rest of the ODS Graphics model, but **if local geographic info is desired** (e.g., streets, street names), give the new SGMAP option a try!

- **GTL is intimidating**, but only until you have your first working example!

- Specify **INCLUDEMISSINGGROUP=FALSE** if your dataset has points you want to exclude from certain drawing statements.

- **Use SPLITCHAR=* to split strings into multiple lines** in TEXT plots (much like you use SPLIT='*' in PROC PRINT!).

- Microsoft Paintbrush can be used to **get x and y coordinates of points** in images you're trying to reproduce with SAS ODS Graphics.

- **3-D is cool** (SURFACEPLOTPARM), but a challenge for my apparently 2-D mind!

- A stacked bar chart can be **indistinguishable from a stacked area chart**.

- If the basic charts don't do what you want, you can **use your high school algebra/trig** (e.g., cosines, sines) to plot equations (remember that SAS tends to prefer radians to degrees for angles!). When plotted equations aren't smooth enough, try more points, a thicker line (THICKNESS=), or SPLINE

- You can use the **REVERSE axis option** to display top-ranked (#1) items at the top of the y-axis.

- There's **no SGPLOT for pie charts**. Not sure if that's because SAS wanted to discourage its (mis)use, but it's available via GTL when you need it (note: SAS 9.4M6 brings **PROC SGPIE**!).

- Use **SAS Support Communities** to find answers, share work, and get/give feedback!

CONCLUSION

Whether you're writing silly little programs to create holiday-themed images at home or doing serious data visualization at work, the SAS ODS Graphics procedures and statements provide an easy-to-use, flexible, rich feature set for data visualization that promotes reproducibility and scalability.

So, if you're seeking a better way of producing better charts and graphs – and who isn't these days? – make sure that SAS ODS Graphics is in your bag of dataviz tricks!

REFERENCES

Allison, Robert. "A periodic table to help you with your SAS ODS graphics!" Available at https://blogs.sas.com/content/sastraining/2018/.../a-periodic-table-of-sas-ods-graphics/

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SAS. "Graphically Speaking. Data Visualization with a focus on SAS ODS Graphics." Available at https://blogs.sas.com/content/graphicallyspeaking/

SAS. "SAS Product Documentation." Available at http://support.sas.com/documentation/index.html

SAS. "SAS Support Communities." Available at https://communities.sas.com/

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HOLIDAY-THEMED CHARTS

Note: Click on links to view underlying SAS code, typically in a [SAS Support Communities](#) post.

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THANKSGIVING – NOV 26, 2015

SGF Observer
@vivasasvegas

SGPLOT turkey, anyone? Fun with #SAS ODS graphics and math-aids.com worksheet data. Happy Thanksgiving!
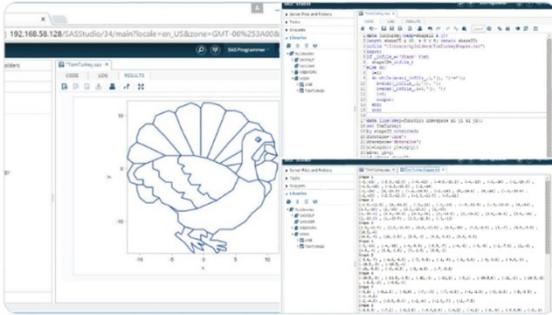
1:35 PM · Nov 26, 2015

View Tweet activity

1 Like

VALENTINE'S DAY – FEB 14, 2016

SGF Observer
@vivasasvegas

A Belated Happy (x**2+y**2-1)**3-x**2*y**3=0 Day! communities.sas.com/t5/SAS-GRAPH-a…
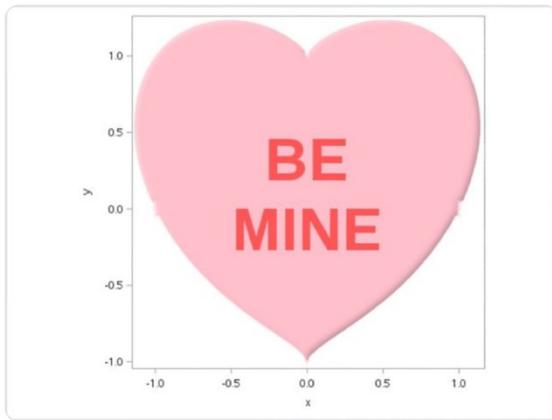
11:30 PM · Feb 14, 2016

View Tweet activity

1 Like

CHRISTMAS – DEC 25, 2015

SGF Observer
@vivasasvegas

O(DS) Christmas Tree communities.sas.com/t5/SAS-GRAPH-a… ODS remake of cardboard cone Xmas tree
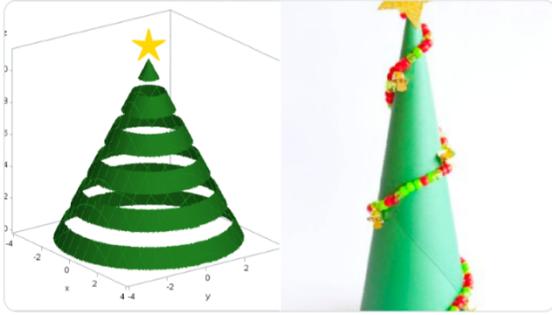
7:10 PM · Dec 20, 2015

View Tweet activity

EASTER – MAR 27, 2016

SGF Observer
@vivasasvegas

Hippity hoppin', Easter's on its way: HereComesPeterCottontail.gif (ODS Graphics) communities.sas.com/t5/SAS-GRAPH-a…
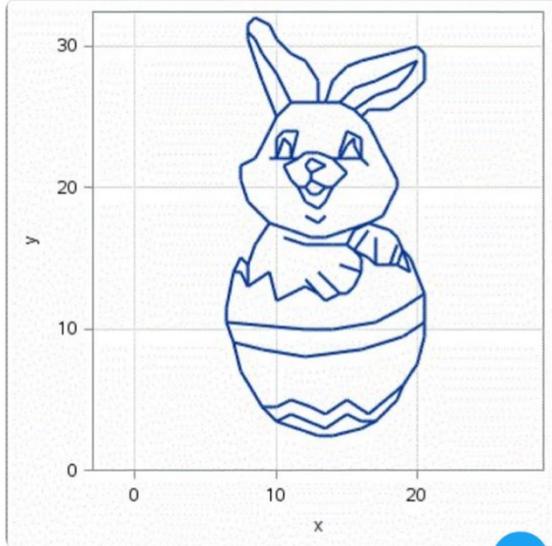
11:38 PM · Mar 20, 2016

INDEPENDENCE DAY – JUL 4, 2016

HALLOWEEN – OCT 31, 2016

INDEPENDENCE DAY – JUL 4, 2016

HALLOWEEN – OCT 31, 2016

CHRISTMAS – DEC 25, 2016

NEW YEAR'S EVE – JAN 1, 2017

CHRISTMAS – DEC 25, 2016

EASTER – APR 16, 2017

MOTHER'S DAY – MAY 14, 2017

MEMORIAL DAY – MAY 29, 2017

INDEPENDENCE DAY – JUL 4, 2017

HALLOWEEN – OCT 31, 2017

CHRISTMAS – DEC 25, 2017

NEW YEAR'S EVE – JAN 1, 2018

VALENTINE'S DAY – FEB 14, 2018

VALENTINE'S DAY – FEB 14, 2018
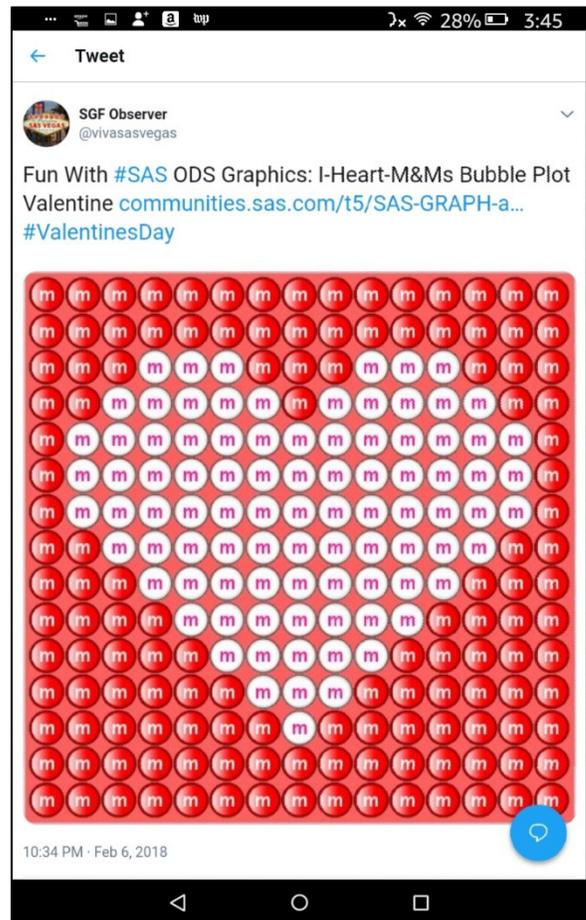
VALENTINE'S DAY – FEB 14, 2018

SGF Observer
@vivasasvegas

Fun with #SAS ODS Graphics: Wi-Fi inspired animated GIF valentine communities.sas.com/t5/SAS-GRAPH-a...
#ValentinesDay

10:31 PM · Feb 12, 2018

INDEPENDENCE DAY – JUL 4, 2018

SGF Observer
@vivasasvegas

Fun With #SAS ODS Graphics: Stars-and-Stripes-Forever Donut Charts communities.sas.com/t5/SAS-GRAPH-a...

WATCH 4TH OF JULY PARADE? YES: 32% NO: 68%

ATTEND FIREWORKS DISPLAY? YES: 63% NO: 37%

6:22 PM · Jul 4, 2018

View Tweet activity

2 Likes

EASTER – APR 1, 2018

SGF Observer
@vivasasvegas

Fun With #SAS ODS Graphics: #Easter Egg Equation Hunt communities.sas.com/t5/SAS-GRAPH-a...

HAPPY EASTER!
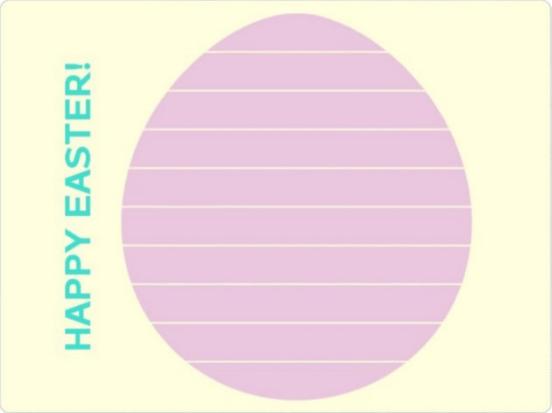
11:27 PM · Mar 31, 2018

View Tweet activity

1 Retweet   3 Likes

LABOR DAY – SEP 3, 2018

SGF Observer
@vivasasvegas

Fun With #SAS ODS Graphics: Can You Wear White After Labor Day? communities.sas.com/t5/Graphics-Pr...
@EmilyPostInst

CAN YOU WEAR WHITE AFTER LABOR DAY?

Jan01-May27,Sep04-Dec31 ?
266 Days

May28-Sep03
99 Days
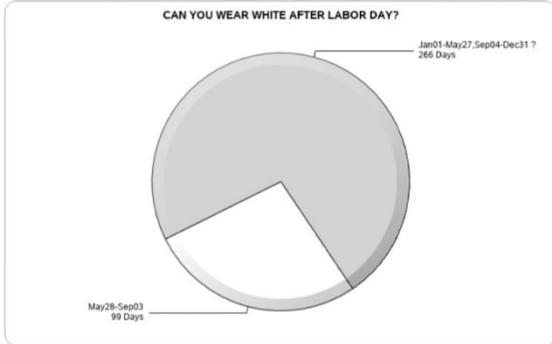
2:49 AM · Sep 3, 2018

View Tweet activity

CHRISTMAS – DEC 25, 2018

NEW YEAR'S EVE – JAN 1, 2019

EASTER – APR 21, 2019

INDEPENDENCE DAY – JUL 4, 2019

ADDITIONAL CHARTS

Note: Click on links to view underlying SAS code, typically in a [SAS Support Communities](#) post.

SAS GLOBAL FORUM 2015 – APR 11, 2015

← Tweet

SGF Observer
@vivasasvegas

Mama, let your babies grow up to be #sasgf15 cowboys. SAS University Edition + GTL version of proc g3d cowboy hat.
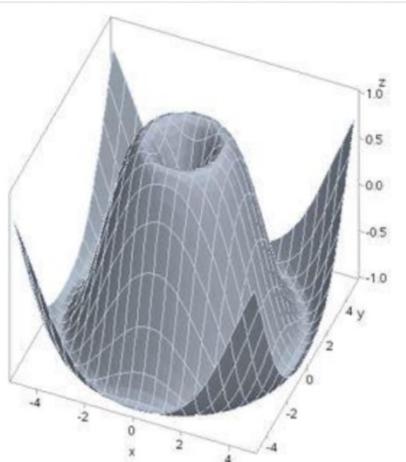
```
1 data hat;
2 do x=-5 to 5 by .25;
3    do y=-5 to 5 by .25;
4       z=sin(sqrt(x*x+y*y));
5       output;
6    end;
7 end;
```

BUB[B]LÉ SORT – JUL 24, 2016

← Tweet

SGF Observer
@vivasasvegas

Intro to Computer Science Algorithms: "Bublé Sort" @michaelbuble communities.sas.com/t5/SAS-GRAPH-a...

Translate Tweet

"Bublé Sort"
Bubble Sorting Tracks From Michael Bublé's *Let It Snow*

K-12 SPENDING CARTOGRAM – APR 9, 2016

← Tweet

SGF Observer
@vivasasvegas

Fun With #SAS ODS Graphics: The United Polygons of America communities.sas.com/t5/SAS-GRAPH-a... #SASGF
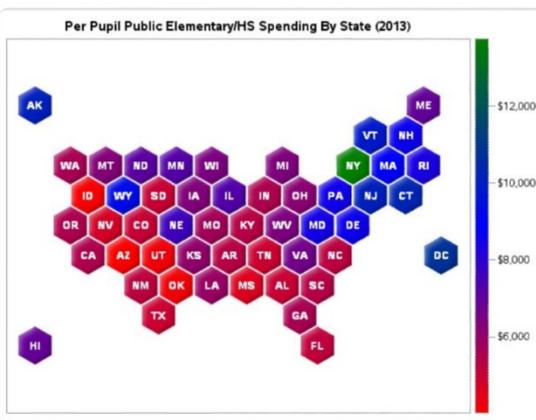
Per Pupil Public Elementary/HS Spending By State (2013)

2:01 PM · Apr 9, 2016

View Tweet activity

4 Retweets   1 Like

CITY OF CHICAGO SALARIES – JUL 29, 2016

← Tweet

SGF Observer
@vivasasvegas

Which City of Chicago Dept. offers a $300K salary? $137K in OT? The best avg. salary ($97K)? communities.sas.com/t5/SAS-GRAPH-a...

11:17 AM · Aug 1, 2016

View Tweet activity

SUMMER OLYMPICS – AUG 9, 2016

SGF Observer
@vivasasvegas

Q. How many Aussie swimmers does it take to beat otherwise-golden Katie Ledecky? A. 4.
communities.sas.com/t5/SAS-GRAPH-a...

9:31 PM · Aug 9, 2016

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SUMMER OLYMPICS – AUG 21, 2016

SGF Observer
@vivasasvegas

Fun w/ODS Graphics Dot Plots: Average speeds of Men's Track & Field event winners
communities.sas.com/t5/SAS-GRAPH-a...

4:37 PM · Aug 21, 2016

View Tweet activity

1 Retweet

SUMMER OLYMPICS – AUG 14, 2016

SGF Observer
@vivasasvegas

A vector plot look at @katieledecky's dominance of the Women's 800m Freestyle communities.sas.com/t5/SAS-GRAPH-a...

7:29 PM · Aug 14, 2016

View Tweet activity

STEPS TAKEN AT SGF 2016 – SEP 5, 2016

SGF Observer
@vivasasvegas

These SGF boots were made for walking: Step plot of 73K steps taken at SAS Global Forum 2016
communities.sas.com/t5/SAS-GRAPH-a...

9:14 AM · Sep 5, 2016

View Tweet activity

TOP 50 MLB HOME RUN HITTERS – OCT 1, 2016

US PRESIDENTS' AGES IN OFFICE – NOV 16, 2016

WORLD SERIES: CUBS WIN! – NOV 5, 2016

ELECTION HEADLINES – NOV 20, 2016

SAS GLOBAL FORUM 2017 – JAN 28, 2017

NCAA BASKETBALL TOURNAMENT – MAR 9, 2017

SUPER BOWL LI – FEB 7, 2017

SAS GLOBAL FORUM 2017 – MAR 26, 2017

SAS GLOBAL FORUM 2017 – APR 7, 2017

U.S. PRESIDENTS' HEIGHTS – APR 30, 2017

BASEBALL STAT DONUT CHARTS – APR 12, 2017

MLB 2016 HOMER RUN LEADERS – JUN 4, 2017

2017 AP EXAM SCORES – JUN 29, 2017

TOTAL SOLAR ECLIPSE – AUG 19, 2017

FLAG OF SWEDEN – JUL 10, 2017

U.S. REFUGEE ADMISSIONS – OCT 6, 2017

"THE DATASAURUS DOZEN" – MAY 1, 2018

CPS SALARY DISTRIBUTION – JUN 8, 2018

CANCER SURVIVAL SLOPEGRAPH – MAY 29, 2018

WI-IL SAS USERS CONFERENCE – SEP 3, 2018

TIME & TEMP "WATCH FACES" – NOV 12, 2018

APOLLO 11: 50th ANNIVERSARY – JUL 20, 2019

WHY
SAS ODS GRAPHICS?

WHY SHOULD I LEARN SAS ODS GRAPHICS?

So, why learn SAS ODS Graphics – aren't your current methods of producing charts good enough?

Well, among other things, SAS ODS Graphics:

- Provides an easy-to-use, flexible, and rich feature set for data visualization

- Facilitates the automation of chart creation, promoting reproducible and repeatable results

- Scales, allowing you to produce dozens, hundreds, or even thousands of charts with a consistent look

- Enables you to create precisely-sized and formatted charts when needed

- Is fully-integrated with SAS, giving you access to all the powerful analytic and data transformation features of SAS software, so you can get your data chart-ready in no time!

The procedures and statements support the creation of a wealth of single and multiple panel charts.

- PROCs **SGPLOT**, **SGPANEL**, **SGSCATTER, SGMAP** (*new!*) are used to produce "standard" graphs.

- **GTL** (Graph Template Language) can be used with PROC **SGRENDER** to make custom graphs.

- The **SGDESIGN** PROC produces charts from SAS data sets and user-defined ODS Graphics Designer (SGD) files, which are created with the **SAS ODS Graphics Designer** GUI application.

Chart types that can be produced using SAS ODS Graphics include the following:

✓ Bar Charts (Vertical, Horizontal, Grouped, Stacked)	✓ Multi-Panel Charts (SGPANEL, SGSCATTER)	✓ Mosaic Charts
✓ Scatter Plots (Including Grouped)	✓ High-low Plots	✓ Pie Charts
✓ Histograms	✓ Needle Charts	✓ Surface Plots
✓ Line Charts (Including Series)	✓ Vector Charts	✓ Text Plots
✓ Step Charts	✓ Basic REG Plots	✓ Band Plots
✓ Bubble Charts	✓ Dot Plots	✓ Fringe Plots
✓ Waterfall Charts	✓ Box Pots (Vertical, Horizontal)	✓ Maps (SGMAP, Polygon)
	✓ Heat maps	✓ GTL-Based Chart Composites

Other statements and options that enhance the appearance of charts – e.g., labels, axis options (including data tables), reference lines, colors, legends, font family/size/weight, transparency, bands, annotation, markers, insets, symbols, attribute maps, drawtext – are also available.

HELLO, BAR CHART!

So, where can you find examples of SAS ODS Graphics? Well, the SAS 9.4 ODS Graphics: Procedures Guide is a great resource, but weighs in at 1,652 pages, so let's start with a simple SAS ODS Graphics take on a "Hello, World!" Program to illustrate just how easy it can be to create a chart from your data.

```
proc sgplot data=sashelp.prdsale;
vbar month / response=actual;
where year(month)=1994;
```
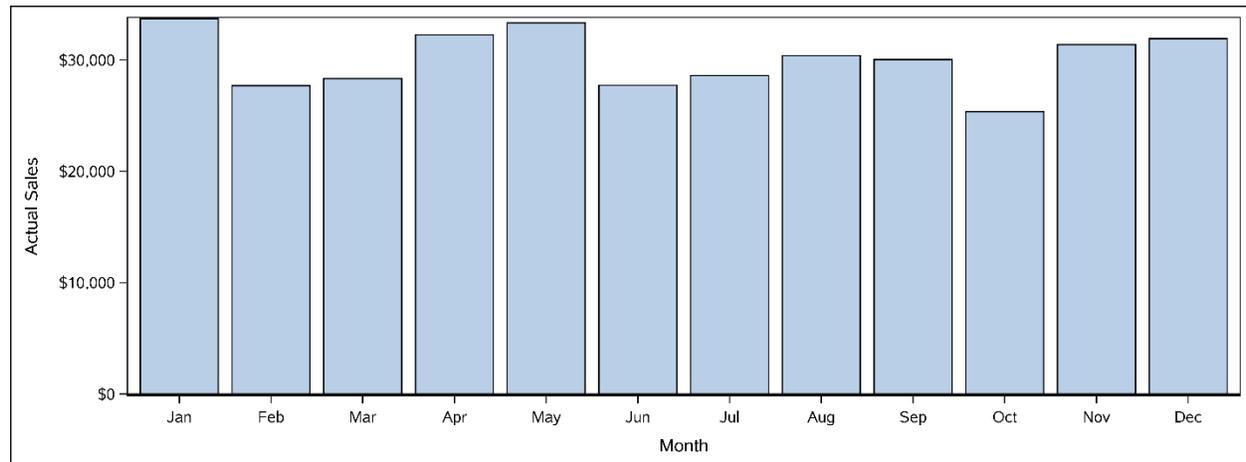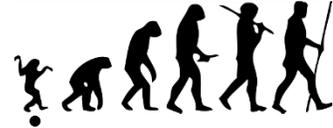

SASHELP.PRDSALE – 1994 Actual Sales by Month – Ungrouped Bar Chart

Want to go beyond the default? No problem! Luckily, SAS took Alan Kay's famous credo – "*Simple things should be simple, complex things should be possible.*" – to heart, so you can "evolve" the look-and-feel of charts to your heart's content – here are two different takes on the same data as our last example.

```
proc sgplot data=sashelp.prdsale;
vbar month / response=actual group=division groupdisplay=cluster;
where year(month)=1994;
format month monyy5.;
```
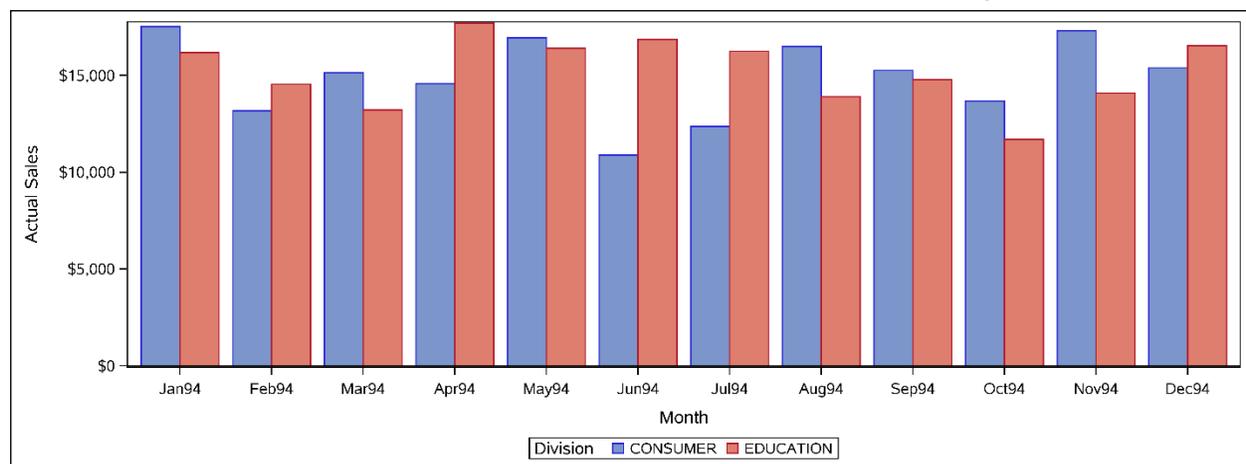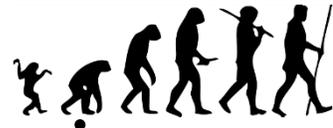

SASHELP.PRDSALE – 1994 Actual Sales by Month – Clustered Group Bar Chart
Illustration Credit: José-Manuel Benitos

Below, we've opted for a stacked bar chart presentation, and used various SAS ODS Graphics options to not only enhance the default appearance, but also to increase the amount of information presented to the viewer.

```
proc sgplot data=sashelp.prdsale(where=(year(month)=1994));
styleattrs datacolors=(palegreen lightblue);
title height=12pt "1994 MONTHLY SALES";
vbar month /  response=actual group=division
              datalabel datalabelattrs=(size=8.5pt)
              seglabel seglabelformat=dollar9. seglabelattrs=(size=8.5pt);
xaxis display=(nolabel);
yaxis display=(nolabel) grid;
keylegend / title="" noborder;
format actual dollar9. month monname3.;
```
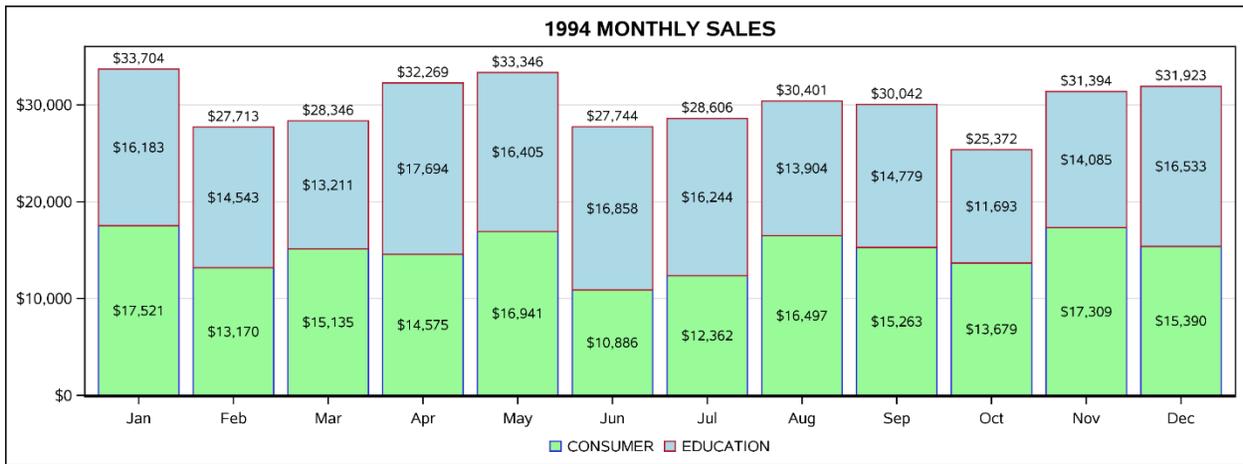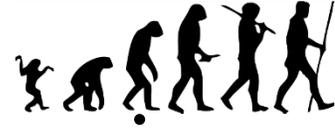

SASHELP.PRDSALE – 1994 Actual Sales by Month – Stacked Group Bar Chart