Differentiate Yourself

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Abstract

Today's job, employment, contracting, and consulting marketplace is highly competitive. As a result, SAS® professionals should do everything they can to differentiate and prepare themselves for the global marketplace by acquiring and enhancing their technical and soft skills. Topics include describing how SAS professionals should assess and enhance their existing skills using an assortment of valuable, and "free", SAS-related content; become involved, volunteer, publish, and speak at in-house, local, regional and international SAS user group meetings and conferences; and publish blog posts, videos, articles, and PDF "white" papers to share knowledge and differentiate themselves from the competition.

Introduction

As technology continues to reach for newer and greater horizons, it is becoming increasingly more important for students, professionals, and anyone with a curiosity for knowledge to find ways to continue their quest for learning. In the Occupational Outlook Handbook, the Bureau of Labor Statistics projects the top eleven occupations with the highest percent change of employment between 2019 and 2029, as shown in Figure 1, below.

OCCUPATION	GROWTH RATE, 2019-29	2019 MEDIAN PAY
Wind turbine service technicians	61%	$52,910 per year
Nurse practitioners	52%	$109,820 per year
Solar photovoltaic installers	51%	$44,890 per year
Occupational therapy assistants	35%	$61,510 per year
Statisticians	35%	$91,160 per year
Home health and personal care aides	34%	$25,280 per year
Physical therapist assistants	33%	$58,790 per year
Medical and health services managers	32%	$100,980 per year
Physician assistants	31%	$112,260 per year
Information security analysts	31%	$99,730 per year
Data scientists and mathematical science occupations, all other	31%	$94,280 per year

Figure 1. U.S Bureau of Labor Statistics Fastest Growing IT Jobs (2019 – 2029)

As the world's largest privately held software company, SAS Institute continues its growth by dominating in several "key" areas including the world of big data and data analytics. SAS Institute is a top 10 software company with 14,000 employees and more than 80,000 business, government and university customer sites in 146 countries (i.e., the United States, Canada, Europe, Middle East, Africa, Asia Pacific and Latin America). SAS software is used by 90 percent of the top 100 companies on the 2019 Fortune Global 500 List. In a report by Statista (2020, Arne Holst), "SAS Institute is the leading software vendor in the global advanced and predictive analytics software market with a share of more than 25 percent." Also, as a privately held company, SAS Institute won the coveted *"Best Place to Work"* Awards two consecutive years, (2011 – 2012); 2019 Worldwide Revenue of $3.1 billion (U.S.) and an R&D Investment of 25% of Revenue.

In a 2019 survey conducted by Burtch Works Executive Recruiting the organization asks a group of college / graduate students, data science and analytics professionals whether they prefer using SAS, Python or R. Although open source software like Python and R are experiencing continued growth among college / graduate students studying data science and analytics, SAS still dominates as the tool of choice among working professionals, as shown in Figure 2, below.
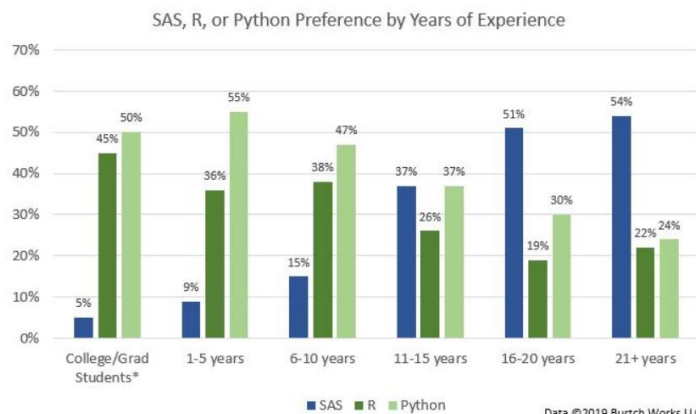
Years' Experience

Figure 2. U.S Bureau of Labor Statistics Fastest Growing IT Jobs (2019 – 2029)

Burtch Works reported the findings among respondents in the area of study for the highest degree earned and their tool preferences. Among respondents the votes were relatively close in four of the seven areas of study, Economics, Social Sciences, Mathematics/Statistics and Business; but Python is experiencing increasing growth in Engineering, Computer Science and Natural Science, as shown in Figure 3, below.
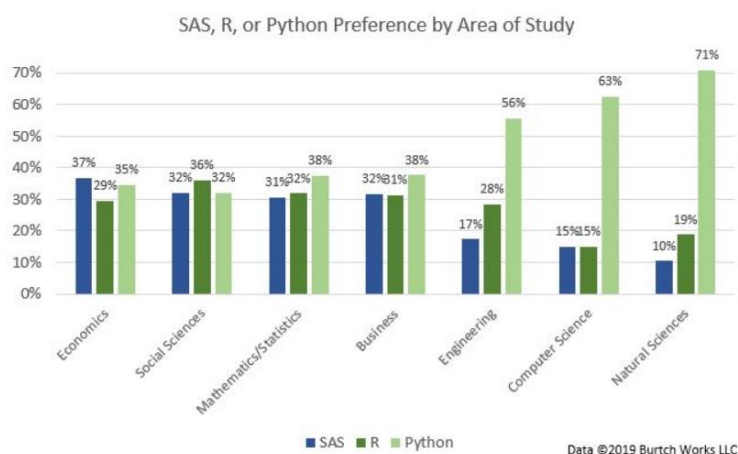
Figure 3. SAS, R or Python Preference by Area of Study

Burtch Works also reported found among respondents their preferred tool by industry, as shown in Figure 4, below.
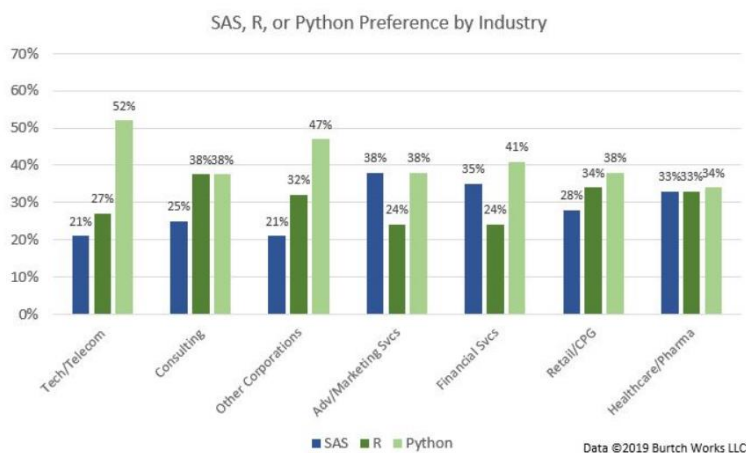
Figure 4. SAS, R or Python Preference by Industry

The Bureau of Labor Statistics mentions that the employment of software developers is projected to grow 22 percent from 2019 to 2029, much faster than the average for all occupations, as shown in Figure 5, below.
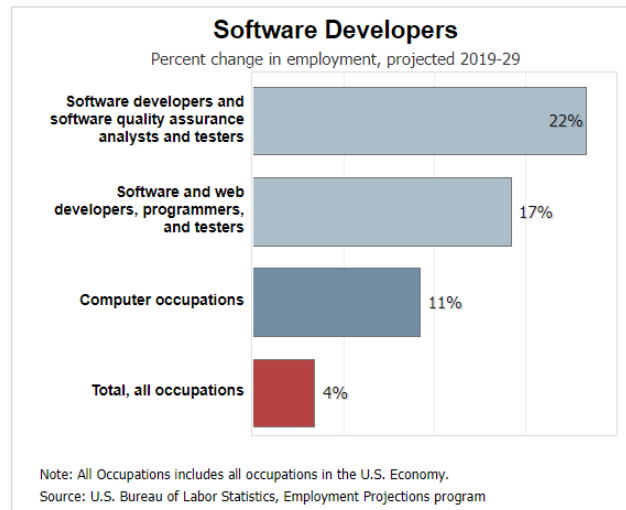
Figure 5. Employment of Software Developer Growth Projections from 2019 to 2029 (Bureau of Labor Statistics)

Differentiate Yourself

Anyone looking to stand out from the crowd and/or begin your rise to the top must learn how to differentiate themselves. But how is this accomplished? Invest in yourself. Take initiative. Pursue excellence in everything you do. Look for opportunities and, more importantly, make the most of every opportunity. Understand the impact of and, more importantly, how to leverage technology. Become involved by volunteering at your in-house, local, regional, special-interest and/or international SAS users group conferences and meetings. Become dedicated to something greater than oneself. These are just a few ways to stand out from the masses – make it happen.

Start by Taking Inventory of and/or Developing Your Skills

The Free Merriam-Webster Dictionary defines skill as, *"the ability to do something that comes from training, experience, or practice."* A skill must be developed – one isn't born possessing many desirable skills. So, how does one go about assessing what skills they already possess while seeking additional skills that may be needed? Begin by taking inventory of any skills you might already possess – simply make a list. The list of existing skills might look something like the following, as shown in Figure 6, below.

Inventory of Existing Skills
DATA/PROC Step Programming
Data Access
Data Transformation
Data Cleaning
Data Manipulation
ODS, Reporting and Specialized Output
Macro Programming
Statistical Analysis
Data-driven Application Development
User Interface Design
Database Design
Technical Writing

Figure 6. Inventory of Existing Skills

Once you've taken inventory of your skills, assign a ranking to each skill using the following values, as shown in Figure 7, below.

Ranking of Existing Skills
0 = None
1 = Heard of it, but little or no experience
2 = Some working knowledge
3 = Proficient
4 = Expert

Figure 7. Ranking of Existing Skills

After that, rank your skill level by assigning a value to your level of competence with a value, as shown in Figure 8, below.

Identify Level of Competence
0 = None
1 = Out-of-date
2 = Competitive
3 = Cutting Edge

Figure 8. Level of Competence

Finally, categorize your skills by functional discipline, as shown in Figure 9, below.

Categorize Skills by Functional Discipline
Data Access
Data Cleaning
Systems Analysis
Programming
Application Development
User Interface Design
Report, Table and Chart Design
SDLC
Statistical analysis
Data mining
Teaching
Technical Support
Debugging

Figure 9. Categorization of Skills by Functional Discipline

Develop and Improve Your Skills

There are a number of ways for SAS users to develop and/or improve their skills. The following list identifies popular methods that SAS professionals use to enhance their skills and, as a result, become more competitive, as shown in Figure 10, below.

Popular Methods of Developing and Improving Skills
1) Download, use and learn valuable techniques using the "free" SAS OnDemand for Academics software
2) Access and learn valuable techniques from the SAS Technical Support website at support.sas.com
3) Access valuable and useful tips and techniques on SAS Support Communities
4) Download and use the "free" Online SAS documentation
5) Access and learn application-oriented techniques using the published "White" papers on LexJansen.com
6) Learn from the experts by reading user-written books from SAS Press
7) Attend, Volunteer and Present at in-house, local, regional, special-interest and international SAS user groups
8) Collaborate / Network with other SAS users
9) Become certified with SAS Certification exams

Figure 10. Methods of Developing and Improving Your Skills

To better understand what skills have the greatest impact to salaries, PayScale, Inc., a Seattle-based company, shares their list of skills, along with the percentage increase to the salaries of SAS programmers, as shown in Figure 11, below.

Skill	Percentage Increase
UNIX	▲ 19%
Linux	▲ 13%
PL/SQL	▲ 12%
Oracle	▲ 11%
Windows Operating System	▲ 10%
SQL	▲ 5%
Statistical Analysis	▲ 5%
Data Analysis	▲ 2%
Microsoft Access	▲ 2%
National Average	$78,000

Figure 11. Skills List and Increase in Salary

Source: http://www.payscale.com/research/US/Job=SAS_Programmer/Salary

How to Differentiate Yourself

From time-to-time it becomes important to be able to differentiate yourself from the competition. SAS professionals should strike a balance between differentiating oneself and giving back (or sharing) learned skills with others. Giving back provides a true sense of worth through the process of mentoring others, sharing ideas and techniques, along with being open to provide information that others may benefit from. Giving back also provides an incredible way to initiate and foster potential collaborations while reinforcing your own strengths and interests by example. A list of a few popular ways to differentiate yourself is displayed in Figure 12, below.

Popular Ways to Differentiate Yourself from the Competition
1) **Earn an Advanced Degree and/or Certification**
2) **Attend, Volunteer and Present at in-house, local, regional, special-interest and international SAS user groups**
3) **Share Your Knowledge (or Mentor) Colleagues**
4) **Collaborate with others**
5) **Read, Study and Learn from the published "white" papers on LexJansen.com**
6) **Access and Learn One New Technique Each Day from the Content on support.sas.com**
7) **Become SAS Certified (Base, Advanced, Clinical Trials, Predictive Modeler, Statistical Business Analyst, BI Content Developer, Visual Business Analyst, Data Integration Developer, Data Quality Steward, Platform Administrator)**
8) **Build Social Networking Connections on LinkedIn, Blogs, etc.**

Figure 12. Popular Ways to Differentiate Yourself from the Competition

Massive Open Online Content (MOOC)

A MOOC is structured very similar to an online course. A MOOC typically is listed with a course/seminar/webinar title, abstract or description of its content, a syllabus, expected learning objectives, "live" or recorded lectures or lessons, reading assignments, hands-on assignments, and quizzes. Students tune in to the "live" or recorded lectures, perform the required reading and hands-on assignments, and take the quizzes, adhering to the required scheduled timeline. At the completion of a MOOC, students may even be able to receive a grade from the MOOC leader or instructor, just as if they had enrolled in a traditional course.

Many forward-thinking organizations, universities and degree-granting institutions use the advances that technology provides to help make some of their courses available to the masses around the world. The MOOC format offers an alternative to mainstream courses, degrees, and certificate programs that were once only available through brick-and-mortar classrooms where attendees were forced to commute to supported locations or become a resident on college campuses.

A Review of "Free" MOOC Resources

As the age of massive open online content (and courses or MOOCs) is upon us, there are many "free" MOOC resources. Numerous MOOC courses and content are now available to provide SAS users in their quest to improve their analytical, programming, statistical, and reporting skills. For content and courses that may contain a sizeable amount of material, some MOOC offerings may involve splitting larger and more involved topics into smaller, more digestible, pieces, a process known as specializing. SAS users can find "free" MOOC resources available to SAS users everywhere, as shown in Figure 13, below.

"Free" MOOC Resources for SAS Users
1) SAS OnDemand for Academics software
2) SAS Technical Support website at support.sas.com
3) Online SAS Documentation in PDF and HTML format on support.sas.com
4) Published "White" Papers on LexJansen.com
5) SAS Press and SAS Talks Webinars
6) SAS YouTube Channel Videos
7) In-house and Local SAS Users Group meetings

Figure 13. "Free" MOOC Resources

SAS® OnDemand for Academics Software

The SAS® OnDemand for Academics software is "free" for students, professionals, individual learners and instructors to use. The software suite includes Base SAS®, SAS Studio, SAS/STAT®, SAS/ACCESS® for Windows, SAS/ETS®, SAS/OR®, and SAS/IML®. It works through your Browser in the cloud to access to SAS software.

Base SAS Features

The Base SAS software contains a built in DATA step programming language, the ability to access a wide-range of data sources, comprehensive set of functions to handle data manipulation, an assortment of "canned" and ready-to-use procedures, a comprehensive SQL language, reporting and customization feature for reports and results using Output Delivery System (ODS), data display informats and output formats, comprehensive data visualization features known as ODS Statistical Graphics, data management capabilities, and much more.

SAS/STAT® Features

The SAS/STAT software supports the application of the latest statistical techniques. It supports the following statistical routines: Analysis of Variance, Bayesian Analysis, Categorical Data Analysis, Cluster Analysis, Mixed Models, Multivariate Analysis, Nonparametric Analysis, Regression Analysis, Survey Sampling and Analysis, Statistical Graphics, and much more.

SAS/IML® Features

The SAS/IML software is an interactive matrix programming language and supports the ability to conduct Exploratory Analysis, the integration with the R programming language, dynamically linked graphics, and much more.

SAS/ACCESS® Features

The SAS/ACCESS software supports the ability to read, write, and update data sources; provides a flexible query language; supports the access to a variety of data sources including text files, dat files, CSV files, Excel spreadsheets, Microsoft SQL Server, and ODBC; and much more.

SAS Studio

The SAS Studio software serves as the user interface; supports Web applications; the access to data files, libraries and programs; the ability to recover files; dynamically link graphics; and much more.

SAS OnDemand for Academics Software "In the Cloud" Website

The SAS OnDemand for Academics software website can be access at <u>SAS OnDemand for Academics Software</u>, as shown in Figure 14, below.
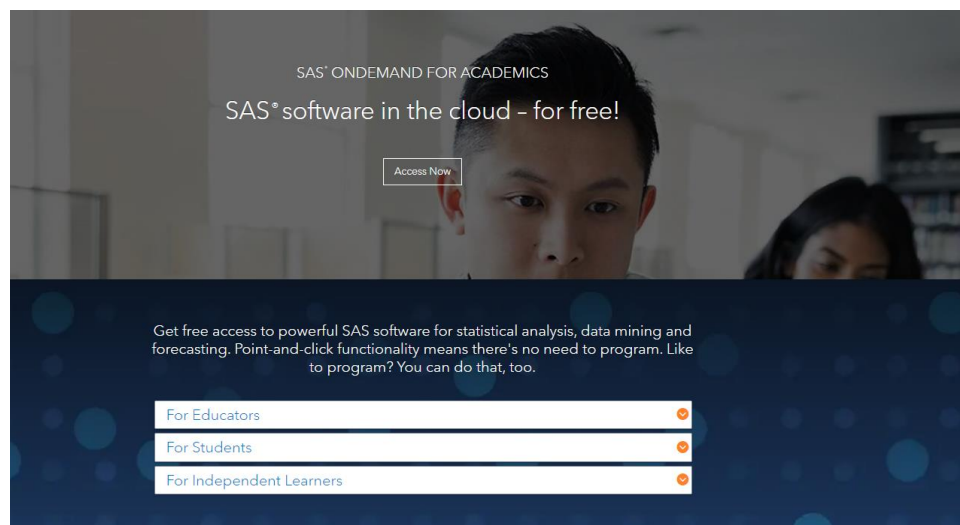
Figure 14. Snapshot from SAS OnDemand for Academics website

SAS' "World Class" Technical Support Website

SAS' technical support website, <u>support.sas.com,</u> contains a wealth of "free" SAS technical support content. Users are provided with access to timely information pertaining to: Admin, Programmer, Statistician and User content; comprehensive technical support content; training and books; what's happenings including User Group Information; access to "free" webinars and podcasts; access to code samples and comprehensive documentation; and more, as is illustrated in Figure 15, below.
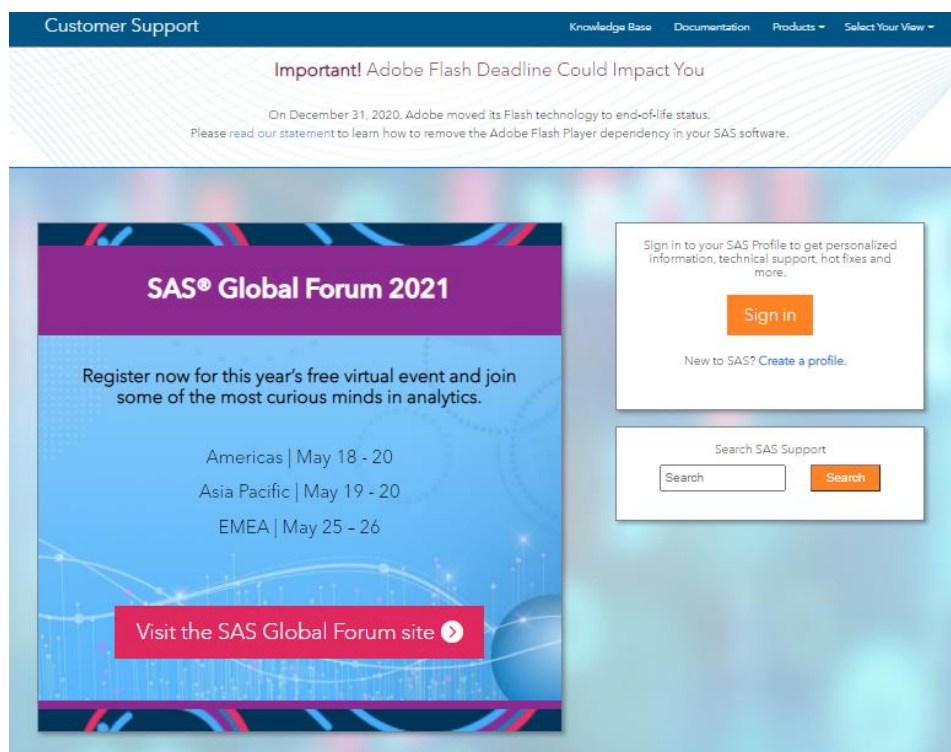
Figure 15. support.sas.com website

Knowledge Base – SAS Products and Solutions

Users can easily explore the Knowledge Base of SAS Products and Solutions, Third-Party Software Reference, Documentation, Papers, Samples & SAS Notes, and Focus Areas by accessing http://support.sas.com/software/, illustrated in Figure 16, below.

Figure 15. Knowledge Base – SAS Products and Solutions

Knowledge Base – Documentation

Users have the ability to access a comprehensive set of SAS product documentation in either HTML or PDF format and can be accessed at http://support.sas.com/documentation/index.html, as shown in Figure 16, below.
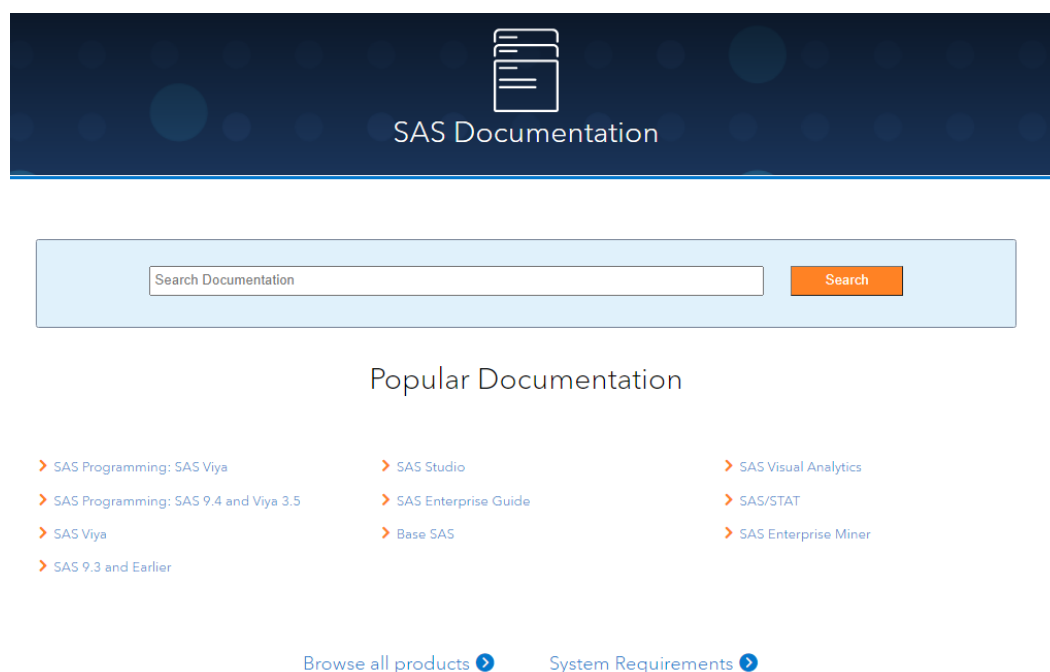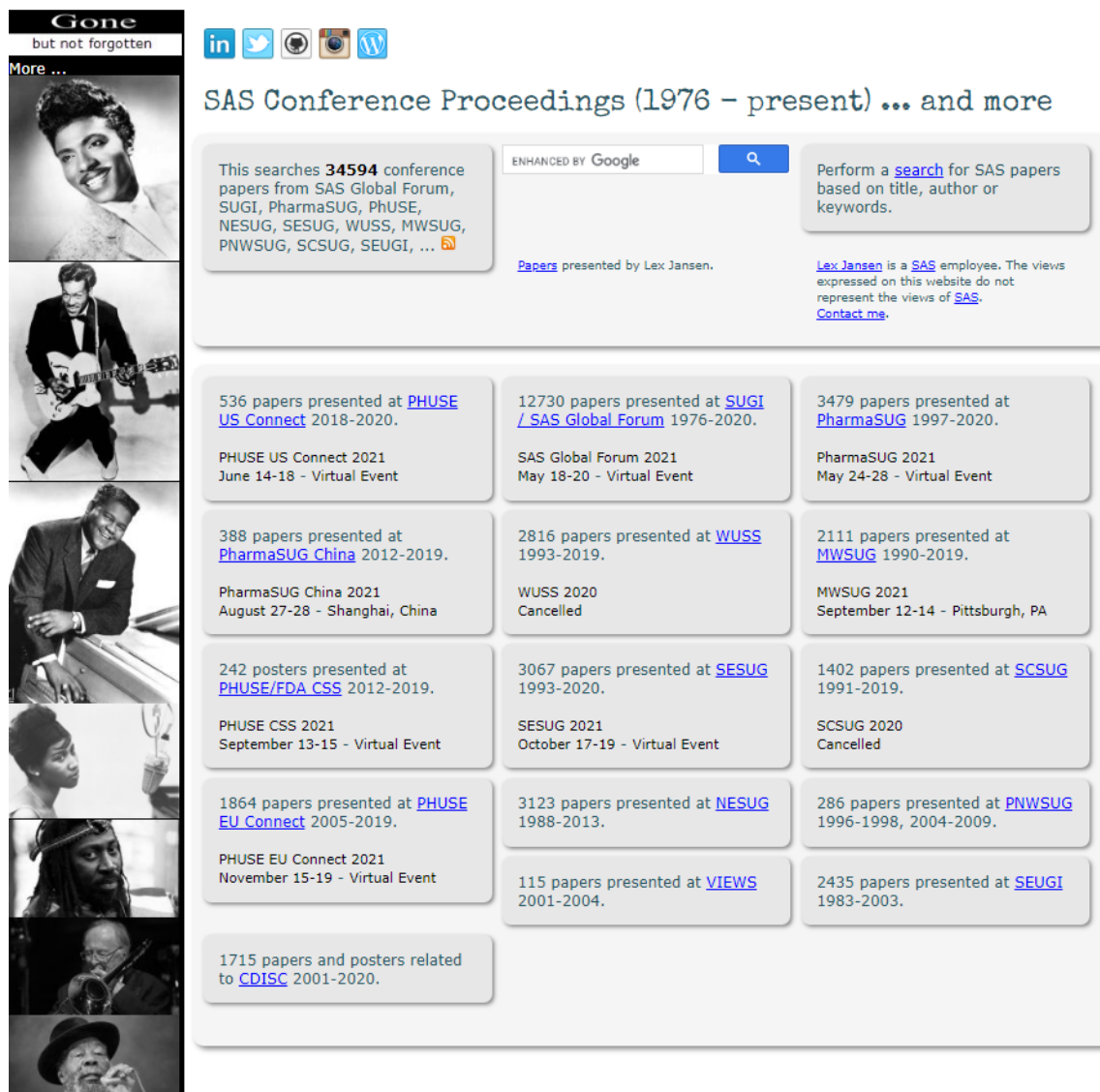
Figure 16. Knowledge Base – SAS Product Documentation

Published SAS Proceedings and "White" Papers

SAS users have access to a repository of thousands of "free" published SAS "white" papers all in the form of PDF documents. Provided with a built-in Google® search applet, users are able to search for content from 1976 to the present from SGF / SUGI, SUEGI, the various Regional conferences, PharmaSUG / PharmaSUG China, PhUSE, CDISC Forum, and other venues. Papers can be accessed using the https://www.lexjansen.com/ user interface, as shown in Figure 17, below.

Figure 17. Published SAS Proceedings on www.lexjansen.com

LexJansen.com – Search Feature

LexJansen.com provides a built-in Google search applet that can be used by users to find papers of interest, as shown in Figure 18, below.
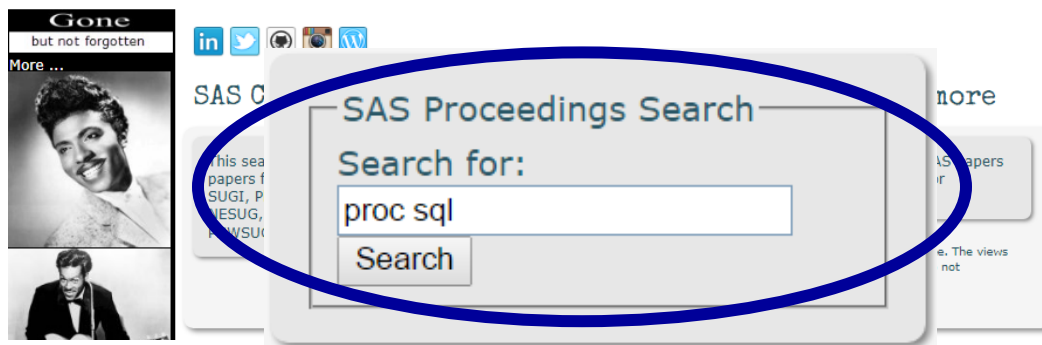
Figure 18. Built-in Google Search Applet in LexJansen.com

LexJansen.com – Search Results

LexJansen.com's search results display the most relevant results first, based on the search keyword or phrase entered in the search box, as illustrated in Figure 19, below.

Figure 19. LexJansen.com Search Results

Viewing a Paper from LexJansen.com

Any paper of interest that is found with the built-in Google search applet and/or displayed in the search results can be viewed, saved, or printed as needed. A "sample" paper from LexJansen.com is shown in Figure 20, below.

Paper BB03-2014

Five Little Known, But Highly Valuable and Widely Usable, PROC SQL Programming Techniques

Kirk Paul Lafler, Software Intelligence Corporation, Spring Valley, California

Abstract

The SQL Procedure contains a number of powerful and elegant language features for SQL users. This presentation highlights five little known, but highly valuable and widely usable, topics that will help users harness the power of the SQL procedure. Topics include using PROC SQL to perform FIRST., LAST. and Between in BY-group processing; constructing and searching the contents of a value-list macro variable for a specific value; data validation operations; data summary operations to process down rows and across columns; and using the MSGLEVEL= system option and _METHOD SQL option to capture and gain greater insight into the processes during query evaluation, the algorithm selected and used by the optimizer when processing a query, testing and debugging operations, and other processes.

Introduction

The SQL procedure is a wonderful tool for querying and subsetting data; restructuring data by constructing case expressions; constructing and using virtual tables known as a view; access information from Dictionary tables; and joining two or more tables to explore data relationships. Occasionally, an application problem comes along where the SQL procedure is either better suited or easier to use than other more conventional DATA and/or PROC step methods. As each situation presents itself, PROC SQL should be examined to see if its use is warranted for the task at hand.

Example Tables

The examples used throughout this paper utilize a database of two tables. (A relational database is a collection of tables.) The data used in all the examples in this paper consists of a selection of movies that I've viewed over the years. The Movies table consists of six columns: title, length, category, year, studio, and rating. Title, category, studio, and rating are defined as character columns with length and year being defined as numeric columns. The data stored in the Movies table is depicted below.

MOVIES Table

	Title	Length	Category	Year	Studio	Rating
1	Brave Heart	177	Action Adventure	1995	Paramount Pictures	R
2	Casablanca	103	Drama	1942	MGM / UA	PG
3	Christmas Vacation	97	Comedy	1989	Warner Brothers	PG-13
4	Coming to America	116	Comedy	1988	Paramount Pictures	R
5	Dracula	130	Horror	1993	Columbia TriStar	R
6	Dressed to Kill	105	Drama Mysteries	1980	Filmways Pictures	R
7	Forrest Gump	142	Drama	1994	Paramount Pictures	PG-13
8	Ghost	127	Drama Romance	1990	Paramount Pictures	PG-13
9	Jaws	125	Action Adventure	1975	Universal Studios	PG
10	Jurassic Park	127	Action	1993	Universal Pictures	PG-13
11	Lethal Weapon	110	Action Cops & Robber	1987	Warner Brothers	R
12	Michael	106	Drama	1997	Warner Brothers	PG-13
13	National Lampoon's Vacation	98	Comedy	1983	Warner Brothers	PG-13
14	Poltergeist	115	Horror	1982	MGM / UA	PG
15	Rocky	120	Action Adventure	1976	MGM / UA	PG
16	Scarface	170	Action Cops & Robber	1983	Universal Studios	R
17	Silence of the Lambs	118	Drama Suspense	1991	Orion	R
18	Star Wars	124	Action SciFi	1977	Lucas Film Ltd	PG
19	The Hunt for Red October	135	Action Adventure	1989	Paramount Pictures	PG
20	The Terminator	108	Action SciFi	1984	Live Entertainment	R
21	The Wizard of Oz	101	Adventure	1939	MGM / UA	G
22	Titanic	194	Drama Romance	1997	Paramount Pictures	PG-13

The data stored in the ACTORS table consists of three columns: title, actor_leading, and actor_supporting, all of which are defined as character columns. The data stored in the Actors table is illustrated below.

Page 1

Figure 20. A "Sample" Paper from LexJansen.com

SAS Press and SAS Talks Webinars

SAS Press and SAS Talks provide users with a number of effective presentations developed by SAS experts, instructors, authors, customers and students. Users also have for their viewing pleasure a SAS YouTube Channel with thousands of videos in a variety of unique categories: Analytics, Featured SAS Customer Stories, SAS Customer Stories, SAS Visual Analytics, SAS Data Management, SAS High-Performance Analytics, Popular Uploads, and Created Playlists. I always enjoy sharing a cost-effective method of upgrading staff member skills by scheduling monthly lunch-time pizza webinars where staff member view, eat and discuss the merits associated with the techniques they've learned from the webinar. This represents a winning scenario for everyone involved.

SAS Press Webinar Series

SAS Press provides users with a series of "free" informative Webinars that were developed and presented by authors. These archived webinars can be accessed at, http://support.sas.com/publishing/bbu/webinar.html, as illustrated in Figure 21, below.

Figure 21. SAS Press Webinar Series

SAS Talks Webinar Series

SAS Talks provides users with a series of "free" informative Webinars that were developed and presented by SAS experts, instructors, authors, customers, and students. These monthly webinars are archived for later viewing by users and can be accessed at, http://support.sas.com/community/events/sastalks/#s1=2, as illustrated in Figure 22, below.

Figure 22. SAS Talks Webinar Series

SAS Support Communities

SAS Support Communities enable anyone to ask questions, exchange ideas, get tips and more. SAS Support Communities can be accessed at, https://www.sas.com/en_us/connect.html, as shown in Figure 23, below.

Figure 23. SAS Support Communities

SAS Support Communities also provides access to SAS Users Groups, as shown in Figure 24, below.

Figure 24. SAS Users Groups

Access the latest SAS Blogs, as shown in Figure 25, below.

Figure 25. SAS Blogs

SAS YouTube Channel Videos

The SAS YouTube Channel is available to all users and can be accessed at, https://www.youtube.com/user/SASsoftware. Available video channels include: SAS Data for Good, SAS Life: Our Culture Code, SAS Customer Success Stories, Artificial Intelligence and Machine Learning, Internet of Things, Learn SAS – Training & Support, SAS Solutions, SAS Products & Technology, and SAS Industry Solutions. Images of featured SAS YouTube Channel presentations are shown in Figure 26, below.
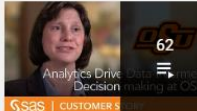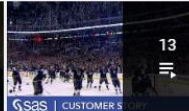
Figure 26. SAS Software YouTube Channel Video Topics

Figure 26. SAS Software YouTube Channel Video Topics (continued)

Conclusion

Technology continues to expand to newer and greater horizons, it is essential that students, professionals, and anyone with a curiosity for knowledge have a way to differentiate themselves from the crowd. The savvy SAS user accomplishes this by accessing the readily available MOOCs and videos with a computer (workstation, laptop or "smart" device), an Internet connection and a web browser, to learn techniques, tips, code examples, and other approaches from the comfort of their living room, bedroom, dorm, office, beach house, or countless other places in the world; downloading and using the "free" SAS OnDemand for Academics software to learn data access, manipulation, programming, statistical, and reporting techniques; accessing a wealth of published conference "white" papers using lexjansen.com; accessing technical content on support.sas.com, and SAS Channel YouTube videos.

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Acknowledgments

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Kirk Paul Lafler is a lecturer and adjunct professor at San Diego State University; an advisor and adjunct professor at the University of California San Diego Extension; and teaches SAS, SQL, Python, R and Excel courses, seminars, workshops, and webinars to students, professionals and users around the world. Kirk has been a SAS user since 1979 and is the author of several books including, PROC SQL: Beyond the Basics Using SAS, Third Edition (SAS Press. 2019) along with papers and articles on a variety of SAS topics. Kirk has also been selected as an Invited speaker, educator, keynote and section leader at SAS conferences; and is the recipient of 25 "Best" contributed paper, hands-on workshop (HOW), and poster awards.

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