

## The Jobs and SAS® Skills Used in the United States and Europe



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### INTRODUCTION

This paper is designed to support the topics discussed in a luncheon panel on Monday, March 23, 1998 at 12:00 PM. Over the years, there has always been a great deal of interest in what SAS skills are needed to assist with gainful employment. We are using this paper, combined with its live presentation, to engage audience discussion about the SAS skill set. The panel will be made up of key individuals who will be able to shed some light as to what is needed in various industries, markets and more. We have asked Herb Kirk, Vice President of Professional Services at SAS Institute, to attend the panel and share viewpoints of what SAS clients are doing with SAS. We will discuss SAS Institute "Bootcamp" and our internal vetting program for bringing consultants up to speed with the latest SAS technologies.

To start the discussion, we decided to do some analysis on the skills we found in our own database of customers. Destiny Corporation has trained thousands of individuals in SAS over the past ten years. We decided to use a sample of this database and students' job titles to better understand the skill set that management seems to desire. This database is of U.S. customers coast to coast.

The second set of tables breaks out the skill set of several hundred SAS Consultants and Contract Programmers in Europe. SAS product and operating system information is listed within industry.

There are some important points to note about information in the following tables:

- To understand the skill set, it is important to reference class names with the outline of topics covered in the course. (Visit Web Site Address).
- The customers used in this analysis do not get trained solely by our organization.
- Just because someone attended a class, does not mean they have retained the skill set in their job. Skills are lost if they are never used after the training session. However, we feel that since management typically approves training and pays the bill, someone thinks the SAS people should have these skills for their job.
- Since everyone's job titles are slightly different, we decided to select unique, significant words found in job titles and perform a frequency analysis of the classes taken.
- The courses taken are not listed by operating system.
- The statistics listed are only information found in the database and do not necessarily reflect requirements for everyone in these job titles.

Table 1A lists an analysis of a sample of the U.S. database, without reference to words in job titles. Table 1B lists the same information broken out by significant key words found in job titles. This data is not mutually exclusive.

Table 2A lists an analysis of the entire European Consultants database, without reference to industry. Table 2B lists the same information broken out by industry expertise. This data is not mutually exclusive.

**TABLE 1A U.S. Courses Taken Entire Sample**

Topic	Percent
Fundamentals-A Programming Approach	28.4%
Programming	12.7%
Advanced Techniques and Efficiencies	6.2%
Macros	8.6%
SQL	5.4%
Report Writing with Code	7.4%
Report Writing with SAS/ASSIST	5%
SAS/ASSIST	3.2%
Proc Report	2%
SCL	4.5%
Frame	3.8%
Data Warehousing	2%
Applications Development	1%
SAS/EIS	1.7%
SAS/FSP	1.7%
SAS/GRAPH	2.4%
SAS/GIS	2%
SAS/CONNECT	3%
SAS/INSIGHT	2.0%
SAS/JMP, SpectraView	2%
SAS/ACCESS	3.4%
SQL Lists	1.2%
SAS/MDDB Server	6%
Object Oriented Programming	2%
Proc Reg	1%
SAS Under UNIX	7%
SAS/STAT	3%
SAS Under VMS	4%
SAS Under Windows	4%
JCL	9%

**TABLE 1B U.S. Courses Taken by Title Word**

Title Word	Topic	Percent
AVP	Fundamentals-A Programming Approach	37.5%
	Programming	25.0%
	Advanced Techniques and Efficiencies	12.5%
	Macros	12.5%
	JCL	12.5%
Accountant	Fundamentals-A Programming Approach	80.0%
	Programming	10.0%
	Advanced Techniques and Efficiencies	10.0%
Accounting	Fundamentals-A Programming Approach	29.1%
	Programming	16.6%
	Advanced Techniques and Efficiencies	4.1%
	Macros	4.1%
	SQL	16.6%
	Report Writing with Code	8.3%
	SCL	8.3%
	Frame	8.3%
	JCL	4.1%
Actuarial	Fundamentals-A Programming Approach	27.0%
	Programming	16.2%
	Macros	5.4%
	Report Writing with Code	18.9%
	SCL	10.8%
	Frame	10.8%
SAS/FSP		10.8%
		10.8%
Actuary	Fundamentals-A Programming Approach	36.3%
	Programming	18.1%
	Macros	9.0%

	SQL	4.5%		SCL	7%
	Report Writing with Code	22.7%		SAS/FSP	7%
	SAS/GRAPH	4.5%		SAS/GRAPH	2.8%
	SAS/ACCESS	4.5%		SAS/INSIGHT	1.4%
Administrative	Fundamentals-A Programming Approach	50.0%		SAS/ACCESS	1.4%
	Programming	25.0%		SAS/STAT	7%
	SAS/ASSIST	8.3%		JCL	7%
	SCL	8.3%	Associate	Fundamentals-A Programming Approach	36.0%
	SAS/GRAPH	8.3%		Programming	9.2%
Administrator	Fundamentals-A Programming Approach	52.6%		Advanced Techniques and Efficiencies	2.0%
	Programming	18.4%		Macros	8.2%
	Macros	2.6%		SQL	8.2%
	SQL	2.6%		Report Writing with Code	12.3%
	Report Writing with Code	2.6%		SCL	8.2%
	SCL	5.2%		Frame	5.1%
	Frame	5.2%		SAS/GRAPH	5.1%
	SAS/EIS	2.6%		SAS/ACCESS	3.0%
	SAS/ACCESS	5.2%		SCL Lists	1.0%
	JCL	2.6%	Auditor	Fundamentals-A Programming Approach	44.4%
Advisor	Fundamentals-A Programming Approach	33.3%		Programming	37.0%
	Programming	22.2%		Macros	3.7%
	Macros	22.2%		Report Writing with Code	7.4%
	SCL	11.1%		JCL	7.4%
	Frame	11.1%	Biological	Fundamentals-A Programming Approach	57.1%
Analysis	Fundamentals-A Programming Approach	17.6%		Programming	14.2%
	Programming	11.7%		SQL	14.2%
	Advanced Techniques and Efficiencies	23.5%		SAS/ACCESS	14.2%
	Macros	23.5%	Biologist	Fundamentals-A Programming Approach	52.9%
	Report Writing with Code	5.8%		Programming	29.4%
	SAS/FSP	5.8%		SCL	5.8%
	SAS/GRAPH	5.8%		Frame	5.8%
	SAS/GIS	5.8%		SCL Lists	5.8%
Analyst	Fundamentals-A Programming Approach	34.6%	Biometrician	Fundamentals-A Programming Approach	6.2%
	Programming	12.9%		Programming	30.0%
	Advanced Techniques and Efficiencies	6.8%		Advanced Techniques and Efficiencies	10.0%
	Macros	5.7%		Macros	10.0%
	SQL	6.4%		SQL	15.0%
	Report Writing with Code	7.9%		Report Writing with Code	12.5%
	Report Writing with SAS/ASSIST	1%		Proc Report	8.7%
	SAS/ASSIST	2.1%	Biostatistician	Fundamentals-A Programming Approach	12.5%
	SCL	4.9%		Programming	25.0%
	Frame	3.8%		Advanced Techniques and Efficiencies	6.2%
	Data Warehousing	1%		Macros	12.5%
	SAS/EIS	9%		SQL	6.2%
	SAS/FSP	1.0%		Report Writing with Code	6.2%
	SAS/GRAPH	2.6%		SCL	12.5%
	SAS/CONNECT	0%		Frame	12.5%
	SAS/INSIGHT	5%		SAS/GRAPH	6.2%
	SAS/JMP, Spectraview	0%	Business	Fundamentals-A Programming Approach	63.9%
	SAS/ACCESS	4.7%		Programming	19.6%
	SCL Lists	4%		Advanced Techniques and Efficiencies	1.6%
	SAS/MDDB Server	1%		Macros	1.6%
	Proc Reg	0%		SQL	11.4%
	SAS Under UNIX	2%		SAS/ACCESS	1.6%
	SAS/STAT	0%	Chief	Fundamentals-A Programming Approach	18.3%
	SAS Under VMS	0%		Programming	10.2%
	SAS Under Windows	1.1%		Advanced Techniques and Efficiencies	2.0%
	JCL	1.5%		Macros	6.1%
Applications	Fundamentals-A Programming Approach	40.8%		SQL	8.1%
	Programming	8.1%		Report Writing with Code	8.1%
	Advanced Techniques and Efficiencies	6.1%		Report Writing with SAS/ASSIST	6.1%
	Macros	6.1%		SAS/ASSIST	6.1%
	Report Writing with Code	16.3%		SCL	6.1%
	SCL	10.2%		Frame	6.1%
	Frame	4.0%		SAS/EIS	4.0%
	SAS/GRAPH	8.1%		SAS/INSIGHT	6.1%
Assistant	Fundamentals-A Programming Approach	37.5%		SAS/JMP, Spectraview	2.0%
	Programming	19.8%		SAS/ACCESS	4.0%
	Advanced Techniques and Efficiencies	5.6%		SCL Lists	2.0%
	Macros	4.2%		SAS Under UNIX	2.0%
	SQL	2.8%	Clerk	Fundamentals-A Programming Approach	48.7%
	Report Writing with Code	10.6%		Programming	7.6%
	Report Writing with SAS/ASSIST	7%			
	SAS/ASSIST	9.9%			

	Macros	2.5%		JCL	6%
	SQL	5.1%			
	Report Writing with Code	2.5%	Database	Fundamentals-A Programming Approach	57.1%
	SAS/ASSIST	33.3%		Programming	9.5%
Clinical				SQL	9.5%
	Fundamentals-A Programming Approach	34.7%		Report Writing with Code	4.7%
	Programming	10.8%		SAS/ASSIST	4.7%
	Advanced Techniques and Efficiencies	6.5%		SCL	4.7%
	Macros	10.8%		SAS/INSIGHT	4.7%
	SQL	8.6%		SAS/ACCESS	4.7%
	Report Writing with Code	8.6%	Developer		
	SCL	6.5%		Fundamentals-A Programming Approach	33.3%
	SAS/GRAPH	10.8%		Programming	34.8%
	SAS/ACCESS	2.1%		Advanced Techniques and Efficiencies	4.5%
Computer				Macros	6.0%
	Fundamentals-A Programming Approach	15.5%		Report Writing with Code	3.0%
	Programming	11.8%		SAS/ASSIST	1.5%
	Advanced Techniques and Efficiencies	8.0%		SCL	4.5%
	Macros	7.5%		Frame	10.6%
	SQL	7.5%		SCL Lists	1.5%
	Report Writing with Code	4.3%	Director		
	SAS/ASSIST	2.1%		Fundamentals-A Programming Approach	50.0%
	SCL	5.9%		Programming	8.3%
	Frame	4.8%		Advanced Techniques and Efficiencies	2.7%
	Data Warehousing	1.6%		Macros	11.1%
	SAS/EIS	3.2%		SQL	2.7%
	SAS/FSP	2.1%		Report Writing with Code	11.1%
	SAS/GRAPH	2.6%		SAS/ASSIST	4.1%
	SAS/GIS	5%		SCL	4.1%
	SAS/CONNECT	1.0%		Frame	1.3%
	SAS/INSIGHT	3.7%		SAS/GRAPH	1.3%
	SAS/ACCESS	4.8%		SAS/ACCESS	1.3%
	SCL Lists	3.7%		SAS Under Windows	1.3%
	SAS/MDDB Server	1.6%	Economist		
	Object Oriented Programming	5%		Fundamentals-A Programming Approach	36.8%
	SAS Under UNIX	2.6%		Programming	10.5%
	SAS Under VMS	1.0%		Report Writing with Code	10.5%
	JCL	2.6%		Report Writing with SAS/ASSIST	21.0%
Consultant				SAS/ASSIST	5.2%
	Fundamentals-A Programming Approach	37.5%		SAS/EIS	5.2%
	Programming	10.7%		SAS/GRAPH	5.2%
	Advanced Techniques and Efficiencies	4.7%		SAS/STAT	5.2%
	Macros	7.1%	Engineer		
	SQL	12.5%		Fundamentals-A Programming Approach	34.0%
	Report Writing with Code	3.5%		Programming	8.0%
	SAS/ASSIST	2.3%		Macros	1.0%
	SCL	7.7%		SQL	1.0%
	Frame	7.7%		Report Writing with Code	1.0%
	SAS/EIS	1.1%		SAS/ASSIST	28.0%
	SAS/GRAPH	1.1%		SCL	10.0%
	SAS/ACCESS	2.3%		Frame	10.0%
	JCL	1.1%		SAS/EIS	6.0%
Coordinator				SAS/ACCESS	1.0%
	Fundamentals-A Programming Approach	36.7%	Epidemiologist		
	Programming	20.2%		Fundamentals-A Programming Approach	23.0%
	Advanced Techniques and Efficiencies	7.5%		Programming	30.7%
	Macros	7.5%		Advanced Techniques and Efficiencies	38.4%
	SQL	5.0%		Macros	7.6%
	Report Writing with Code	5.0%	Executive		
	Proc Report	1.2%		Fundamentals-A Programming Approach	70.0%
	SCL	5.0%		Report Writing with Code	30.0%
	Frame	2.5%	Financial		
	SAS/EIS	1.2%		Fundamentals-A Programming Approach	55.5%
	SAS/GRAPH	1.2%		Programming	17.7%
	JCL	6.3%		Advanced Techniques and Efficiencies	4.4%
Data				Report Writing with Code	6.6%
	Fundamentals-A Programming Approach	33.7%		SAS/ASSIST	6.6%
	Programming	11.0%		SCL	2.2%
	Advanced Techniques and Efficiencies	2.4%		Frame	2.2%
	Macros	4.9%		SAS/GRAPH	2.2%
	SQL	18.4%		JCL	2.2%
	Report Writing with Code	4.9%	Health		
	SAS/ASSIST	1.8%		Fundamentals-A Programming Approach	35.5%
	Proc Report	6%		Programming	6.6%
	SCL	7.9%		Advanced Techniques and Efficiencies	2.4%
	Frame	3.0%		Macros	3.3%
	SAS/EIS	2.4%		SQL	14.0%
	SAS/INSIGHT	6%		Report Writing with Code	9.9%
	SAS/ACCESS	2.4%		SCL	9.0%
	Proc Reg	6%		Frame	7.4%
	SAS Under Windows	2.4%		SAS/EIS	4.1%

	SAS/GRAPH	6.6%		SAS/GRAPH	9.7%			
	SAS Under Windows	8%		SAS/INSIGHT	7.3%			
Information	Fundamentals-A Programming Approach	41.8%		SAS/JMP ,Spectraview	2.4%			
	Programming	10.8%		SAS/ACCESS	4.8%			
	Advanced Techniques and Efficiencies	2.7%		SCL Lists	4.8%			
	Macros	9.4%		SAS/MDDB Server	2.4%			
	SQL	8.1%		SAS Under UNIX	2.4%			
	Report Writing with Code	9.4%		SAS/STAT	2.4%			
	SAS/ASSIST	2.7%	Network	Fundamentals-A Programming Approach	42.8%			
	SCL	2.7%		Programming	21.4%			
	Frame	2.7%		Advanced Techniques and Efficiencies	7.1%			
	SAS/FSP	2.7%		Macros	7.1%			
	SAS/ACCESS	4.0%		SQL	14.2%			
	JCL	2.7%		SAS/ACCESS	7.1%			
	Management	Fundamentals-A Programming Approach		36.1%	Officer	Fundamentals-A Programming Approach	50.0%	
Programming		12.7%		Macros		12.5%		
Advanced Techniques and Efficiencies		2.1%		SAS/ASSIST		12.5%		
Macros		4.2%		JCL		25.0%		
SQL		12.7%		Operations		Fundamentals-A Programming Approach	53.5%	
Report Writing with Code		6.3%				Programming	17.8%	
SAS/ASSIST		12.7%				Macros	7.1%	
SCL		2.1%	SQL			3.5%		
SAS/GRAPH		6.3%	Report Writing with Code			10.7%		
SAS/ACCESS		4.2%	Report Writing with SAS/ASSIST			3.5%		
Manager	Fundamentals-A Programming Approach	33.4%	Performance		Fundamentals-A Programming Approach	22.2%		
	Programming	17.5%			Programming	44.4%		
	Advanced Techniques and Efficiencies	8.9%			Advanced Techniques and Efficiencies	11.1%		
	Macros	7.7%			Macros	11.1%		
	SQL	5.8%		Report Writing with Code	11.1%			
	Report Writing with Code	7.0%		Planner	Fundamentals-A Programming Approach	64.2%		
	SAS/ASSIST	3%			Programming	28.5%		
	Proc Report	1.5%			Advanced Techniques and Efficiencies	7.1%		
	SCL	5.0%			Planning	Fundamentals-A Programming Approach	69.2%	
	Frame	2.7%				Programming	23.0%	
	SAS/EIS	7%				Macros	7.6%	
	SAS/FSP	3%				Principal	Fundamentals-A Programming Approach	47.6%
	SAS/GRAPH	3%					Programming	4.7%
	SAS/ACCESS	3.8%					Macros	4.7%
	SAS Under VMS	3%					SAS/ASSIST	14.2%
SAS Under Windows	7%	SCL	9.5%					
JCL	1.1%	Frame	9.5%					
Manufacturing	Fundamentals-A Programming Approach	25.0%		SAS/EIS			9.5%	
	SAS/ASSIST	25.0%	Process	Fundamentals-A Programming Approach	37.5%			
	SCL	16.6%		Programming	18.7%			
	Frame	16.6%		Advanced Techniques and Efficiencies	12.5%			
	SAS/EIS	16.6%		SQL	6.2%			
				SAS/ASSIST	18.7%			
		SAS/ACCESS		6.2%				
Market	Fundamentals-A Programming Approach	42.3%	Production	Fundamentals-A Programming Approach	40.0%			
	Programming	11.5%		Programming	16.0%			
	Macros	7.6%		Advanced Techniques and Efficiencies	8.0%			
	SQL	3.8%		Macros	8.0%			
	Report Writing with Code	7.6%		Report Writing with Code	8.0%			
	SAS/ASSIST	3.8%		SAS/ASSIST	4.0%			
	SAS/GRAPH	3.8%		JCL	16.0%			
	Proc Reg	3.8%		Professor	Fundamentals-A Programming Approach	33.3%		
	SAS Under Windows	11.5%			Programming	50.0%		
	JCL	3.8%			Macros	16.6%		
Marketing	Fundamentals-A Programming Approach	42.8%	Program		Fundamentals-A Programming Approach	25.0%		
	Programming	7.1%			Programming	11.2%		
	Macros	14.2%			Advanced Techniques and Efficiencies	9.1%		
	SQL	7.1%			Macros	8.9%		
	Report Writing with Code	7.1%			SQL	5.4%		
	SAS/ASSIST	7.1%			Report Writing with Code	9.7%		
	Proc Reg	7.1%			Report Writing with SAS/ASSIST	1%		
	SAS Under Windows	7.1%		SAS/ASSIST	4%			
				Proc Report	1%			
				SCL	5.7%			
				Frame	4.4%			

	Data Warehousing	3%	Quality	Fundamentals-A Programming Approach	46.1%
	Applications Development	1%		Programming	7.6%
	SAS/EIS	1.7%		Advanced Techniques and Efficiencies	15.3%
	SAS/FSP	1.6%		Macros	15.3%
	SAS/GRAPH	2.6%		SQL	15.3%
	SAS/GIS	1%			
	SAS/CONNECT	5%	Report	Fundamentals-A Programming Approach	50.0%
	SAS/INSIGHT	1.0%		Advanced Techniques and Efficiencies	4.5%
	SAS/JMP, Spectraview	1%		Macros	4.5%
	SAS/ACCESS	4.8%		SQL	4.5%
	SCL Lists	1.4%		Report Writing with Code	27.2%
	SAS/MDDB Server	5%		SCL	4.5%
	Object Oriented Programming	4%		Frame	4.5%
	SAS Under UNIX	5%			
	SAS/STAT	2%	Representative	Fundamentals-A Programming Approach	69.2%
	SAS Under VMS	4%		Programming	23.0%
	SAS Under Windows	3%		Advanced Techniques and Efficiencies	7.6%
	JCL	2.4%			
			Research	Fundamentals-A Programming Approach	30.3%
Programmer	Fundamentals-A Programming Approach	22.6%		Programming	16.7%
	Programming	11.6%		Advanced Techniques and Efficiencies	6.3%
	Advanced Techniques and Efficiencies	9.0%		Macros	7.6%
	Macros	9.4%		SQL	2.7%
	SQL	5.8%		Report Writing with Code	14.4%
	Report Writing with Code	9.5%		SAS/ASSIST	9%
	Report Writing with SAS/ASSIST	1%		SCL	2.7%
	SAS/ASSIST	4%		Frame	1.8%
	Proc Report	1%		SAS/FSP	4%
	SCL	5.8%		SAS/GRAPH	9.0%
	Frame	4.4%		SAS/INSIGHT	2.7%
	Data Warehousing	3%		SAS/ACCESS	1.8%
	Applications Development	1%		SAS/STAT	9%
	SAS/EIS	1.6%		SAS Under Windows	9%
	SAS/FSP	1.8%		JCL	4%
	SAS/GRAPH	2.4%			
	SAS/GIS	1%	Researcher	Fundamentals-A Programming Approach	27.2%
	SAS/CONNECT	5%		Programming	45.4%
	SAS/INSIGHT	1.1%		Macros	9.0%
	SAS/JMP, Spectraview	1%		SAS/INSIGHT	18.1%
	SAS/ACCESS	5.3%			
	SCL Lists	1.5%	SAS	Fundamentals-A Programming Approach	15.0%
	SAS/MDDB Server	4%		Programming	10.0%
	Object Oriented Programming	4%		Advanced Techniques and Efficiencies	15.0%
	SAS Under UNIX	5%		Macros	20.0%
	SAS/STAT	2%		SQL	15.0%
	SAS Under VMS	4%		Report Writing with Code	5.0%
	SAS Under Windows	3%		SCL	5.0%
	JCL	2.7%		Frame	5.0%
				SAS/ACCESS	10.0%
Programming	Fundamentals-A Programming Approach	44.0%	Scientist	Fundamentals-A Programming Approach	33.3%
	Programming	8.0%		Programming	9.5%
	Advanced Techniques and Efficiencies	24.0%		Macros	23.8%
	SQL	4.0%		SQL	4.7%
	Report Writing with Code	4.0%		Report Writing with Code	19.0%
	Frame	4.0%		SCL	4.7%
	SAS/EIS	4.0%		SAS/ACCESS	4.7%
	SAS/GRAPH	4.0%			
	SAS/MDDB Server	4.0%			
			Secretary	Fundamentals-A Programming Approach	40.0%
Project	Fundamentals-A Programming Approach	41.6%		Programming	10.0%
	Programming	20.8%		Advanced Techniques and Efficiencies	10.0%
	Advanced Techniques and Efficiencies	13.8%		Report Writing with Code	10.0%
	Macros	1.3%		SAS/ASSIST	10.0%
	SQL	2.7%		SAS/GRAPH	10.0%
	Report Writing with Code	4.1%		SAS/INSIGHT	10.0%
	SAS/ASSIST	4.1%			
	SCL	1.3%	Senior	Fundamentals-A Programming Approach	31.6%
	Frame	2.7%		Programming	11.9%
	SAS Under VMS	1.3%		Advanced Techniques and Efficiencies	7.9%
	JCL	2.7%		Macros	8.8%
				SQL	7.4%
Projects	Fundamentals-A Programming Approach	42.8%		Report Writing with Code	6.3%
	Programming	14.2%		SAS/ASSIST	2.8%
	SQL	14.2%		Proc Report	4%
	Frame	14.2%		SCL	5.8%
	JCL	14.2%		Frame	4.9%
				SAS/EIS	7%
Public	Fundamentals-A Programming Approach	62.5%		SAS/FSP	4%
	Programming	25.0%		SAS/GRAPH	3.0%
	Advanced Techniques and Efficiencies	12.5%		SAS/ACCESS	3.2%
				SAS Under Windows	1.4%

	JCL	2.3%		SAS/EIS	3.0%
Sensory	Fundamentals-A Programming Approach	80.0%		SAS/FSP	3.6%
	Macros	20.0%		SAS/GRAPH	4.8%
Software				SAS/GIS	1.0%
	Fundamentals-A Programming Approach	31.7%		SAS/CONNECT	1%
	Programming	29.2%		SAS/INSIGHT	7.0%
	Advanced Techniques and Efficiencies	3.6%		SAS/JMP,Spectraview	6%
	Macros	6.0%		SAS/ACCESS	2.8%
	SQL	1.2%		SCL Lists	1.8%
	Report Writing with Code	2.4%		SAS/MDDB Server	3.3%
	SCL	7.3%		Object Oriented Programming	5%
	Frame	12.1%		SAS Under UNIX	1.8%
	SAS/EIS	4.8%		SAS/STAT	2.0%
	SAS/FSP	1.2%		SAS Under VMS	1.0%
Specialist			Student	Fundamentals-A Programming Approach	29.1%
	Fundamentals-A Programming Approach	16.7%		Programming	33.3%
	Programming	12.5%		Advanced Techniques and Efficiencies	8.3%
	Advanced Techniques and Efficiencies	8.1%		Macros	12.5%
	Macros	7.3%		SQL	4.1%
	SQL	5.9%		Report Writing with Code	8.3%
	Report Writing with Code	5.9%		SAS/INSIGHT	4.1%
	Report Writing with SAS/ASSIST	2%			
	SAS/ASSIST	7%	Supervisor	Fundamentals-A Programming Approach	19.3%
	SCL	7.6%		Programming	11.9%
	Frame	6.3%		Advanced Techniques and Efficiencies	6.2%
	Data Warehousing	9%		Macros	6.2%
	Applications Development	9%		SQL	8.5%
	SAS/EIS	2.1%		Report Writing with Code	6.8%
	SAS/FSP	3.0%		SAS/ASSIST	1.1%
	SAS/GRAPH	1.7%		SCL	3.9%
	SAS/GIS	2%		Frame	5.1%
	SAS/CONNECT	1.5%		Data Warehousing	1.7%
	SAS/INSIGHT	1.4%		SAS/EIS	3.4%
	SAS/JMP,Spectraview	2%		SAS/FSP	2.8%
SAS/ACCESS	5.9%		SAS/GRAPH	4.5%	
SCL Lists	3.4%		SAS/GIS	1.1%	
SAS/MDDB Server	1.2%		SAS/CONNECT	1.1%	
Object Oriented Programming	6%		SAS/INSIGHT	2.8%	
SAS Under UNIX	1.4%		SAS/ACCESS	5.6%	
SAS/STAT	1%		SCL Lists	2.8%	
SAS Under VMS	1.7%		SAS/MDDB Server	1.1%	
SAS Under Windows	6%		SAS Under UNIX	1.7%	
JCL	2%		SAS Under VMS	5%	
y	3%		JCL	1.1%	
Staff			Support	Fundamentals-A Programming Approach	36.8%
	Fundamentals-A Programming Approach	43.3%		Programming	15.7%
	Programming	13.3%		Advanced Techniques and Efficiencies	5.2%
	Advanced Techniques and Efficiencies	3.3%		Macros	15.7%
	Macros	16.6%		SQL	10.5%
	Report Writing with Code	6.6%		Report Writing with Code	5.2%
	SCL	6.6%		SAS/ASSIST	5.2%
Frame	6.6%		JCL	5.2%	
SAS/INSIGHT	3.3%				
Statistical			Survey	Fundamentals-A Programming Approach	12.5%
	Fundamentals-A Programming Approach	33.3%		Programming	6.5%
	Programming	15.0%		Advanced Techniques and Efficiencies	4.3%
	Advanced Techniques and Efficiencies	6.4%		Macros	8.1%
	Macros	7.5%		SQL	2.1%
	SQL	1.0%		Report Writing with Code	7.0%
	Report Writing with Code	10.7%		Report Writing with SAS/ASSIST	5.9%
	Report Writing with SAS/ASSIST	1.0%		SAS/ASSIST	12.5%
	SAS/ASSIST	12.9%		CE	5%
	SCL	1.0%		SCL	2.7%
	Frame	1.0%		Frame	3.2%
	SAS/GRAPH	2.1%		SAS/EIS	3.2%
SAS/INSIGHT	2.1%		SAS/FSP	3.2%	
SAS/ACCESS	3.2%		SAS/GRAPH	2.7%	
SCL Lists	1.0%		SAS/GIS	5%	
Statistician				SAS/INSIGHT	10.8%
	Fundamentals-A Programming Approach	9.5%		SAS/JMP,Spectraview	5%
	Programming	8.3%		SAS/ACCESS	1.0%
	Advanced Techniques and Efficiencies	8.8%		SCL Lists	1.0%
	Macros	9.0%		SAS/MDDB Server	4.8%
	SQL	4.5%		SAS Under UNIX	5%
	Report Writing with Code	8.0%		SAS/STAT	4.3%
	Report Writing with SAS/ASSIST	2.5%		SAS Under VMS	5%
	SAS/ASSIST	6.1%			
	CE	1%			
SCL	4.6%	System	Fundamentals-A Programming Approach	39.2%	
Frame	3.8%		Programming	12.2%	

	Advanced Techniques and Efficiencies	5.6%
	Macros	5.3%
	SQL	6.8%
	Report Writing with Code	6.1%
	SAS/ASSIST	1.4%
	SCL	5.3%
	Frame	5.1%
	SAS/EIS	4%
	SAS/FSP	1.4%
	SAS/GRAPH	1.7%
	SAS/INSIGHT	7%
	SAS/ACCESS	3.1%
	SCL Lists	9%
	SAS/MDDB Server	4%
	SAS Under UNIX	2%
	SAS Under VMS	2%
	SAS Under Windows	7%
	JCL	2.2%
Systems	Fundamentals-A Programming Approach	38.6%
	Programming	12.2%
	Advanced Techniques and Efficiencies	5.2%
	Macros	5.5%
	SQL	7.7%
	Report Writing with Code	5.8%
	SAS/ASSIST	1.6%
	SCL	5.0%
	Frame	5.0%
	SAS/EIS	5%
	SAS/FSP	1.6%
	SAS/GRAPH	1.9%
	SAS/INSIGHT	8%
	SAS/ACCESS	3.6%
	SCL Lists	1.1%
	SAS/MDDB Server	5%
	SAS Under UNIX	2%
SAS Under VMS	2%	
SAS Under Windows	5%	
JCL	1.6%	
Technical	Fundamentals-A Programming Approach	35.1%
	Programming	16.2%
	Advanced Techniques and Efficiencies	1.3%
	Macros	12.1%
	SQL	9.4%
	Report Writing with Code	8.1%
	SAS/ASSIST	2.7%
	SCL	1.3%
	Frame	2.7%
	SAS/ACCESS	5.4%
	SAS Under Windows	1.3%
JCL	4.0%	
Technician	Fundamentals-A Programming Approach	24.4%
	Programming	8.8%
	Advanced Techniques and Efficiencies	6.6%
	Macros	6.6%
	SQL	24.4%
	Report Writing with Code	2.2%
	SAS/ASSIST	24.4%
	SCL	2.2%

GRAPH	5.7%
IML	5%
INSIGHT	1.9%
LAB	3%
MACRO	5.6%
MDDB	3%
MICS	1.2%
MSDOS	2.2%
MVS	6.9%
MXG/CPE	2.0%
OR	8%
OS/2	1.8%
PH-CLINICAL	3%
QC	3%
REPORT	1.6%
SCL	4.4%
SHARE	1.2%
SQL	4.3%
STAT	2.6%
TOOLKIT	3%
UNIX	4.0%
VMS	3.8%
Windows	6.1%

**Table 2B European Consultant Skill Set By Industry**

Industry	Topic	Percent
Banking	ACC/DB2	1.7%
	ACC/ORACLE	2%
	ACC/PC	1.9%
	ACC/RDB	2%
	AF	7.0%
	ASSIST	2.9%
	BaseSAS	9.2%
	CALC	3%
	CMS	1%
	CONNECT	3.4%
	EIS	2.8%
	ETS	7%
	FRAME	5.0%
	FSP	6.2%
	GIS	6%
	GRAPH	5.7%
	IML	3%
	INSIGHT	1.9%
	LAB	1%
	MACRO	5.3%
	MDDB	2%
MICS	1.2%	
MSDOS	2.0%	
MVS	8.0%	
MXG/CPE	2.8%	
OR	6%	
OS/2	2.2%	
PH-CLINICAL	1%	
QC	1%	
REPORT	1.5%	
SCL	4.6%	
SHARE	1.3%	
SQL	3.9%	
STAT	1.7%	
TOOLKIT	2%	
UNIX	3.9%	
VMS	2.8%	
Windows	5.9%	
Government	ACC/DB2	1.2%
	ACC/ORACLE	1.2%
	ACC/PC	3.7%
	ACC/RDB	1.2%
	AF	3.7%
	ASSIST	3.7%
	BaseSAS	3.7%
	CALC	1.2%
	CMS	1.2%
	CONNECT	2.5%
	EIS	2.5%
ETS	1.2%	
FRAME	3.7%	
FSP	3.7%	

**TABLE 2A European Consultant Overall Skill Set**

Topic	Percent
ACC/DB2	1.2%
ACC/ORACLE	6%
ACC/PC	1.9%
ACC/RDB	3%
AF	6.4%
ASSIST	2.5%
BaseSAS	9.2%
CALC	4%
CMS	3%
CONNECT	2.8%
EIS	2.6%
ETS	1.1%
FRAME	4.6%
FSP	5.5%
GIS	6%

	GIS	2.5%		IML	6%
	GRAPH	3.7%		INSIGHT	1.4%
	IML	1.2%		LAB	1%
	INSIGHT	3.7%		MACRO	6.7%
	LAB	1.2%		MDDB	1%
	MACRO	3.7%		MICS	1.1%
	MDDB	1.2%		MSDOS	1.9%
	MICS	1.2%		MVS	7.7%
	MSDOS	3.7%		MXG/CPE	1.9%
				OR	6%
Government	MVS	3.7%		OS/2	2.2%
	MXG/CPE	1.2%		PH-CLINICAL	1%
	OR	2.5%		QC	3%
	OS/2	2.5%		REPORT	1.6%
	PH-CLINICAL	1.2%		SCL	5.1%
	QC	1.2%		SHARE	1.2%
	REPORT	3.7%		SQL	4.6%
	SCL	3.7%		STAT	2.4%
	SHARE	2.5%		TOOLKIT	1%
	SQL	3.7%		UNIX	3.6%
	STAT	3.7%		VMS	3.3%
	TOOLKIT	1.2%		Windows	6.0%
	UNIX	3.7%			
	VMS	3.7%	Manufacturing	ACC/DB2	4%
	Windows	3.7%		ACC/ORACLE	4%
				ACC/PC	1.8%
Health	ACC/DB2	1.2%		ACC/RDB	4%
	ACC/ORACLE	1.2%		AF	5.8%
	ACC/PC	3.7%		ASSIST	3.1%
	ACC/RDB	1.2%		BaseSAS	8.5%
	AF	3.7%		CALC	4%
	ASSIST	3.7%		CMS	4%
	BaseSAS	3.7%		CONNECT	3.6%
	CALC	1.2%		EIS	3.1%
	CMS	1.2%		ETS	1.8%
	CONNECT	2.5%		FRAME	4.0%
	EIS	2.5%		FSP	4.9%
	ETS	1.2%		GIS	9%
	FRAME	3.7%		GRAPH	5.8%
	FSP	3.7%		IML	4%
	GIS	2.5%		INSIGHT	2.7%
	GRAPH	3.7%		LAB	4%
	IML	1.2%		MACRO	4.5%
	INSIGHT	3.7%		MDDB	4%
	LAB	1.2%		MICS	2.2%
	MACRO	3.7%		MSDOS	2.7%
	MDDB	1.2%		MVS	7.2%
	MICS	1.2%		MXG/CPE	1.3%
	MSDOS	3.7%		OR	1.3%
	MVS	3.7%		OS/2	1.3%
	MXG/CPE	1.2%		PH-CLINICAL	4%
	OR	2.5%		QC	4%
	OS/2	2.5%		REPORT	1.8%
	PH-CLINICAL	1.2%		SCL	4.5%
	QC	1.2%		SHARE	1.3%
	REPORT	3.7%		SQL	4.0%
	SCL	3.7%		STAT	3.1%
	SHARE	2.5%		TOOLKIT	4%
	SQL	3.7%		UNIX	2.7%
	STAT	3.7%		VMS	4.5%
	TOOLKIT	1.2%		Windows	5.8%
	UNIX	3.7%	Pharmaceutical	ACC/DB2	7%
	VMS	3.7%		ACC/ORACLE	7%
	Windows	3.7%		ACC/PC	1.7%
Insurance	ACC/DB2	9%		ACC/RDB	4%
	ACC/ORACLE	6%		AF	5.9%
	ACC/PC	1.7%		ASSIST	2.2%
	ACC/RDB	1%		BaseSAS	10.5%
	AF	6.9%		CALC	2%
	ASSIST	2.4%		CMS	1%
	BaseSAS	8.9%		CONNECT	2.4%
	CALC	4%		EIS	2.2%
	CMS	1%		ETS	1.1%
	CONNECT	2.8%		FRAME	3.9%
	EIS	2.5%		FSP	5.9%
	ETS	1.1%		GIS	4%
	FRAME	5.2%		GRAPH	6.5%
	FSP	6.0%		IML	2%
	GIS	3%		INSIGHT	2.1%
	GRAPH	5.6%		LAB	1%

	MACRO	6.2%		MSDOS	3.3%
	MDDB	1%		MVS	3.3%
	MICS	9%		MXG/CPE	1.6%
	MSDOS	2.4%		OR	3.3%
	MVS	5.1%		OS/2	1.6%
	MXG/CPE	9%		PH- CLINICAL	1.6%
	OR	4%		QC	1.6%
	OS/2	1.2%		REPORT	3.3%
	PH- CLINICAL	2%		SCL	3.3%
	QC	1%		SHARE	1.6%
	REPORT	1.4%		SQL	3.3%
	SCL	3.7%		STAT	3.3%
	SHARE	7%		TOOLKIT	1.6%
	SQL	5.2%		UNIX	3.3%
	STAT	4.1%		VMS	3.3%
	TOOLKIT	4%		Windows	3.3%
	UNIX	4.9%			
	VMS	5.7%	Telecoms	ACC/DB2	2.6%
	Windows	7.2%		ACC/ORACLE	2.6%
				ACC/PC	2.6%
Retail	ACC/DB2	1.6%		ACC/RDB	2.6%
	ACC/ORACLE	4%		AF	2.6%
	ACC/PC	1.7%		ASSIST	2.6%
	ACC/RDB	1%		BaseSAS	2.6%
	AF	7.1%		CALC	2.6%
	ASSIST	1.7%		CMS	2.6%
	BaseSAS	10.9%		CONNECT	2.6%
	CALC	1%		EIS	2.6%
	CMS	1%		ETS	2.6%
	CONNECT	2.6%		FRAME	2.6%
	EIS	2.7%		FSP	2.6%
	ETS	1.1%		GIS	2.6%
	FRAME	4.8%		GRAPH	2.6%
	FSP	5.0%		IML	2.6%
	GIS	1%		INSIGHT	2.6%
	GRAPH	6.3%		LAB	2.6%
	IML	3%		MACRO	2.6%
	INSIGHT	1.1%		MDDB	2.6%
	LAB	1%		MICS	2.6%
	MACRO	5.5%		MSDOS	2.6%
	MDDB	3%		MVS	2.6%
	MICS	1.1%		MXG/CPE	2.6%
	MSDOS	1.7%		OR	2.6%
	MVS	8.6%		OS/2	2.6%
	MXG/CPE	3.0%		PH- CLINICAL	2.6%
	OR	8%		QC	2.6%
	OS/2	1.4%		REPORT	2.6%
	PH- CLINICAL	1%		SCL	2.6%
	QC	3%		SHARE	2.6%
	REPORT	8%		SQL	2.6%
	SCL	4.8%		STAT	2.6%
	SHARE	8%		TOOLKIT	2.6%
	SQL	4.4%		UNIX	2.6%
	STAT	1.9%		VMS	2.6%
	TOOLKIT	1%		Windows	2.6%
	UNIX	4.2%			
	VMS	3.7%	Utilities	ACC/DB2	2.8%
	Windows	6.6%		ACC/ORACLE	1.4%
				ACC/PC	2.8%
Service	ACC/DB2	1.6%		ACC/RDB	1.4%
	ACC/ORACLE	1.6%		AF	4.2%
	ACC/PC	3.3%		ASSIST	4.2%
	ACC/RDB	1.6%		BaseSAS	4.2%
	AF	3.3%		CALC	1.4%
	ASSIST	3.3%		CMS	1.4%
	BaseSAS	3.3%		CONNECT	2.8%
	CALC	1.6%		EIS	4.2%
	CMS	1.6%		ETS	1.4%
	CONNECT	1.6%		FRAME	2.8%
	EIS	3.3%		FSP	2.8%
	ETS	1.6%		GIS	2.8%
	FRAME	3.3%		GRAPH	2.8%
	FSP	3.3%		IML	1.4%
	GIS	3.3%		INSIGHT	2.8%
	GRAPH	3.3%		LAB	1.4%
	IML	1.6%		MACRO	4.2%
	INSIGHT	3.3%		MDDB	1.4%
	LAB	1.6%		MICS	1.4%
	MACRO	3.3%		MSDOS	2.8%
	MDDB	1.6%		MVS	4.2%
	MICS	1.6%		MXG/CPE	1.4%

OR	2.8%
OS/2	2.8%
PH- CLINICAL	1.4%
QC	1.4%
REPORT	2.8%
SCL	2.8%
SHARE	2.8%
SQL	2.8%
STAT	2.8%
TOOLKIT	1.4%
UNIX	2.8%
VMS	2.8%
Windows	4.2%

SAS, SAS/ACCESS, SAS/AF, SAS/ASSIST, Base SAS, SAS/CALC, SAS/CONNECT, SAS/EIS, SAS/ETS, FRAME, SAS/FSP, SAS/GIS, SAS/GRAPH, SAS/IML, SAS/INSIGHT, SAS/LAB, SAS/MDDB Server, SAS/CPE, SAS/OR, SAS/PH-CLINICAL, SAS/QC, SAS/SHARE, SAS/STAT, SAS/TOOLKIT are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

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