

### Case Example 7:

#### **Sizing with Software Risk Master (SRM)**

SRM has a unique automatic sizing feature that can size any application in about 2 minutes or less. SRM sizing is based on pattern matching.

This example shows the results in terms of effort, staffing, schedules, costs, and quality for four size plateaus: 100, 1,000, 10,000, and 100,000 function points. Software risks go up with application size, as do schedules and paperwork volumes. Quality declines with application size unless very effective quality control steps are used that include static analysis and inspections.



<b>Source code size</b>		<b>5,330</b>	<b>53,300</b>	<b>550,000</b>	<b>5,700,000</b>	<b>Code volume increases with size</b>
<b>Average complexity</b>		<b>4.00</b>	<b>5.00</b>	<b>6.00</b>	<b>8.00</b>	<b>Complexity increases with size</b>
<b>Application staffing</b>		1.66	7.00	51.00	366.00	<b>Staffing increases with size</b>
<b>Application schedule</b>		7.31	16.37	29.47	70.26	<b>Schedules grow rapidly with size</b>
<b>Application effort months</b>		12.15	128.70	1,498	<b>25,716</b>	<b>Effort months grow with size</b>
<b>Application costs</b>		<b>\$121,497</b>	<b>\$1,287,000</b>	<b>\$14,984,000</b>	<b>\$257,162,000</b>	<b>Costs grow rapidly with size</b>
<b>Function points/month</b>		8.23	7.77	6.67	3.89	<b>Productivity sags as size goes up</b>
<b>Work hours/function pt</b>		16.04	16.99	19.78	33.95	
<b>\$ cost per function pt</b>		<b>\$1,214.97</b>	<b>\$1,287.00</b>	<b>\$1,498.40</b>	<b>\$2,571.62</b>	

<b>LOC per month</b>		<b>438.68</b>	<b>414.14</b>	<b>367.16</b>	<b>221.65</b>	<b>Development speed declines with size</b>
<b>\$ cost per LOC</b>		\$22.79	\$24.15	\$27.24	\$45.12	
<b>Defect potential/funct pt</b>		<b>1.85</b>	<b>3.00</b>	<b>4.25</b>	<b>6.00</b>	<b>Defect potentials increase with size</b>
<b>Defect potentials</b>		<b>185</b>	<b>3,000</b>	<b>42,500</b>	<b>600,000</b>	
<b>Defect removal efficiency</b>		<b>99.00%</b>	<b>95.00%</b>	<b>91.00%</b>	<b>87.00%</b>	<b>Defect removal efficiency (DRE) declines with size</b>
<b>Delivered defects</b>		<b>2</b>	<b>150</b>	<b>3,825</b>	<b>78,000</b>	<b>Delivered defects increase with size</b>
<b>Delivered defects/FP</b>		<b>0.02</b>	<b>0.15</b>	<b>0.38</b>	<b>0.78</b>	
<b>High-severity defects</b>		<b>0</b>	<b>15</b>	<b>383</b>	<b>7,800</b>	<b>High-severity defects increase with size</b>
<b>Security flaws</b>		<b>0</b>	<b>2</b>	<b>38</b>	<b>780</b>	<b>Security flaws increase with size</b>

			END OF EXAMPLE		
	<b>Table 1: Sizes of 100 Software Applications in Function points, SNAP, and LOC</b>				
	<b>Applications</b>	<b>Size in</b>	<b>SNAP</b>	<b>Size in</b>	
		<b>Function</b>	<b>Non-function</b>	<b>Logical</b>	
	<i>NOTE: SRM sizing takes about 1.8 minutes</i>	<b>Points</b>	<b>Points</b>	<b>Source Code</b>	
	<i>per application for sizing any application,</i>	<b>IFPUG 4.3</b>	<b>IFPUG</b>	<b>Statements</b>	
1	IBM Future System FS/1 (circa 1985 not completed)	515,323	108,218	68,022,636	
2	Star Wars missile defense	352,330	42,280	32,212,992	
3	World-wide military command and control (WWMCCS)	307,328	56,856	28,098,560	
4	U.S. Air Traffic control	306,324	59,121	65,349,222	
5	Israeli air defense system	300,655	63,137	24,052,367	

6	North Korean Border defenses	273,961	50,957	25,047,859		
7	Iran's air defense system	260,100	46,558	23,780,557		
8	SAP	253,500	32,070	18,480,000		
9	Aegis destroyer C&C	253,088	49,352	20,247,020		
10	Oracle	229,434	29,826	18,354,720		
11	Windows 10 (all features)	198,050	21,786	12,675,200		
12	Obamacare web (all features)	107,350	5,720	12,345,250		
13	Microsoft Office Professional 2010	93,498	10,285	5,983,891		
14	Airline reservation system	38,392	5,759	6,142,689		
15	North Korean Long-Range Missile controls	37,235	4,468	5,101,195		
16	NSA code decryption	35,897	3,590	3,829,056		
17	FBI Carnivore	31,111	2,800	3,318,515		
18	FBI fingerprint analysis	25,075	3,260	2,674,637		
19	NASA space shuttle	23,153	3,010	2,116,878		
20	VA Patient monitoring	23,109	3,004	4,929,910		
21	Data Warehouse	21,895	2,846	1,077,896		

22	NASA Hubble controls	21,632	2,163	1,977,754		
23	Skype	21,202	3,392	1,130,759		
24	Shipboard gun controls	21,199	4,240	1,938,227		
25	American Express billing	20,141	3,223	1,432,238		
26	M1 Abrams battle tank operations	19,569	3,131	1,789,133		
27	Apple I Phone v6 oprations	19,366	2,518	516,432		
28	IRS income tax analysis	19,013	2,472	1,352,068		
29	Cruise ship navigation	18,896	2,456	1,343,713		
30	MRI medical imaging	18,785	2,442	1,335,837		
31	Google search engine	18,640	2,423	1,192,958		
32	Amazon web site	18,080	2,350	482,126		
33	State wide child support	17,850	2,321	952,000		
34	Linux	17,505	2,276	700,205		
35	FEDEX shipping controls	17,378	2,259	926,802		
36	Tomahawk cruise missile	17,311	2,250	1,582,694		
37	Denver Airport luggage (original)	17,002	2,166	1,554,497		
38	Inventory management	16,661	2,111	1,332,869		
39	EBAY transaction controls	16,390	2,110	1,498,554		

40	Patriot missile controls	16,239	2,001	1,484,683		
41	IBM IMS data base	15,392	1,939	1,407,279		
42	Toyota robotic manufacturing	14,912	1,822	3,181,283		
43	Android operating system	14,019	1,749	690,152		
44	Quicken 2015	13,811	1,599	679,939		
45	State transportation ticketing	12,300	1,461	656,000		
46	State Motor vehicle registrations	11,240	1,421	599,467		
47	Insurance claims handling	11,033	1,354	252,191		
48	SAS statistical package	10,927	1,349	999,065		
49	Oracle CRM Features	10,491	836	745,995		
50	DNA Analysis	10,380	808	511,017		
51	EZPass vehicle controls	4,751	594	253,400		
52	Cat scan medical device	4,575	585	244,000		
53	Chinese submarine sonar	4,500	522	197,500		
54	Microsoft Excel 2007	4,429	516	404,914		
55	Citizens bank on-line	4,017	655	367,224		
56	MapQuest	3,969	493	254,006		



57	Bank ATM controls	3,917	571	208,927		
58	NVIDIA graphics card	3,793	464	151,709		
59	Lasik surgery (wave guide)	3,625	456	178,484		
60	Sun D-Trace utility	3,505	430	373,832		
61	Microsoft Outlook	3,450	416	157,714		
62	Microsoft Word 2007	3,309	388	176,501		
63	Adobe Illustrator	2,507	280	178,250		
64	SpySweeper antispyware	2,227	274	109,647		
65	Norton anti-virus software	2,151	369	152,942		
66	Microsoft Project 2007	2,108	255	192,757		
67	Microsoft Visual Basic	2,068	247	110,300		
68	All-in-one printer	1,963	231	125,631		
69	AutoCAD	1,900	230	121,631		
70	Garmin hand-held GPS	1,858	218	118,900		
71	Intel Math function library	1,768	211	141,405		
72	PBX switching system	1,658	207	132,670		
73	Motorola cell phone contact list	1,579	196	144,403		
74	Seismic analysis	1,564	194	83,393		

75	Sidewinder missile controls	1,518	188	60,730		
76	Apple I Pod	1,507	183	80,347		
77	Property tax assessments	1,492	179	136,438		
78	Mozilla Firefox (original)	1,450	174	132,564		
79	Google Gmail	1,379	170	98,037		
80	Digital camera controls	1,344	167	286,709		
81	IRA account management	1,340	167	71,463		
82	Consumer credit report	1,332	165	53,288		
83	Sun Java compiler	1,310	163	119,772		
84	All in one printer driver	1,306	163	52,232		
85	Laser printer driver	1,285	162	82,243		
86	JAVA compiler	1,281	162	91,096		
87	Smart bomb targeting	1,267	150	67,595		
88	Wikipedia	1,257	148	67,040		
89	Casio atomic watch with compass, tides	1,250	129	66,667		
90	Cochlear implant (embedded)	1,250	135	66,667		
91	APAR analysis and routing	1,248	113	159,695		
92	Computer BIOS	1,215	111	86,400		
93	Automobile fuel injection	1,202	109	85,505		

94	Anti-lock brake controls	1,185	107	63,186		
95	Ccleaner utility	1,154	103	73,864		
96	Hearing aid (multi program)	1,142	102	30,448		
97	LogiTech cordless mouse	1,134	96	90,736		
98	Instant messaging	1,093	89	77,705		
99	Twitter (original circa 2009)	1,002	77	53,455		
100	Denial of service virus	866	-	79,197		
	<b>Averages</b>	<b>42,682</b>	<b>6,801</b>	<b>4,250,002</b>		