Software System Testing and Quality Assurance
Boris Beizer, Van Nostrand Reinhold Electrical/Computer Science and Engineering Series, 1984.

Testing VS Debugging

- testing starts with known conditions, uses predefined procedures, and has predictable outcomes. Debugging starts from possibly unknown initial conditions and the end cannot be predicted, except statistically.
- testing should be designed and scheduled beforehand. The procedures for, and duration of debugging, cannot be constrained.
- testing is a demonstration of error or apparent correctness. Debugging is a deductive process.
- testing proves programmer's failure. Debugging is the programmer's vindication.
- testing should strive to be predictable, dull, constrained, rigid, and inhuman. Debugging demands intuitive leaps, conjectures, experimentation, intelligence, and freedom.
- testing can be done by an outsider; debugging must be done by an insider.
- testing, to a large extent, can be designed and accomplished in ignorance of the design. Debugging is impossible without detailed design knowledge.

Decision table (SE—Theory and Practice, Pfleeger, Prentice-Hall, 2001)

Variables				Actions					
w	x	y	z	A_1	A_2	A_3	A_4	A_5	A_6
0	0	0	0						X
0	0	0	1					X	X
0	0	1	0				X	X	
0	0	1	1				X		
0	1	0	0				X		
0	1	0	1		X		X		
0	1	1	0		X		X		
0	1	1	1		X		X		
1	0	0	0		X		X		
1	0	0	1		X		X		
1	0	1	0		X		X		
1	0	1	1		X		X		
1	1	0	0		X	X			
1	1	0	1		X	X			
1	1	1	0	X		X			
1	1	1	1	X		X			

$A_1 = wxy\underline{z} + wxyz$

$A_2 = \underline{w}x\underline{y}\,\underline{z} + \underline{w}x\underline{y}z + \underline{w}xy\underline{z} + \underline{w}xyz + w\underline{x}\,\underline{y}\,\underline{z} + w\underline{x}\,\underline{y}z + w\underline{x}y\underline{z} + w\underline{x}yz + wx\underline{y}\,\underline{z} + wx\underline{y}z$

$A_3 = \mathit{wx}\underline{y}\,\underline{z} + wx\underline{y}z + wxy\underline{z} + wxyz$

$A_4 = \underline{w}\,\underline{x}y\underline{z} + \underline{w}\,\underline{x}yz + \underline{w}x\underline{y}\,\underline{z} + \underline{w}x\underline{y}z + \underline{w}xy\underline{z} + \underline{w}xyz + w\underline{x}\,\underline{y}\,\underline{z} + w\underline{x}\,\underline{y}z + w\underline{x}y\underline{z} + w\underline{x}yz$

$A_5 = \underline{w}\,\underline{x}y\underline{z} + \underline{w}\,\underline{x}yz$

$A_6 = \underline{w}\,\underline{x}\,\underline{y}\,\underline{z} + \underline{w}\,\underline{x}\,\underline{y}z$

To reduce A_1

$$
\begin{aligned}
A_1 &= wxy\underline{z} + wxyz \\
&= wxy\,(z + \underline{z}) \\
&= wxy
\end{aligned}
$$

Similarly,

$A_2 = x\underline{y} + \underline{w}xy + w\underline{x}$

$A_3 = wx$

$A_4 = \underline{x}y + \underline{w}x + w\underline{x}y$

$A_5 = \underline{w}\,\underline{x}y$

$A_6 = \underline{w}\,\underline{x}\,\underline{y}$