HORIZON WIRELESS

BINARY INTEGER PROGRAMMING

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SCENARIO

- Horizon Wireless, a cellular telephone company, is expanding into a new city. Relay towers are necessary to provide wireless telephone coverage to the different areas of the city. A grid is superimposed on a map of the city to help determine where the towers should be located. The grid consists of 8 areas labeled A through H. Six possible tower locations (numbered L1–L6) have been identified, and each location could serve several areas. The table below indicates the areas served by each of the towers.
- Horizon wants to make sure that all areas of the city are served, while minimizing the number of towers that need to be built.

SCENARIO CONT'D.

Tower Location	Areas Served
L1	A, C, D
L2	B, D, G
L3	B, C, E, F
L4	E, F, H
L5	D, G, H
L6	A, D, F

LINEAR PROGRAMMING MODEL

	L1	L2	L3	L4	L5	L6
Variables:	1	1	0	1	0	0

Objective:	
No. of towers:	3

Constraints:	L1	L2	L3	L4	L5	L6	LHS	SIGN	RHS
A	1					1	1	>=	1
B		1	1				1	>=	1
C	1		1				1	>=	1
D	1	1			1	1	2	>=	1
E			1	1			1	>=	1
F			1	1		1	1	>=	1
G		1			1		1	>=	1
H				1	1		1	>=	1

SUMMARY

- By building the towers at locations 1, 2 and 4, the entire grid (consisting of 8 areas) would be served and that would bring the minimum number of towers to 3.
- The solver Ad-in was used to obtain this solution.


THANK YOU