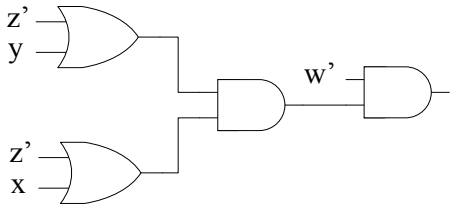
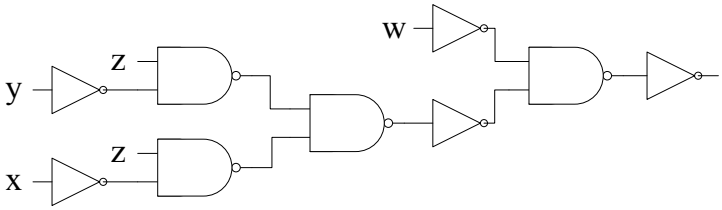
CSEE E6861y
Prof. Steven Nowick

Technology Mapping: Basic Tree-based Covering Example
(Basic Area-Oriented Method)

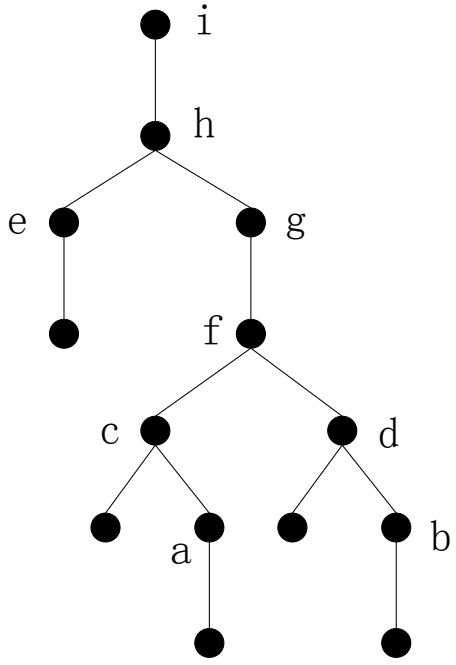
Function of sub-network to be mapped: $w'((z'+y)(z'+x))$



Represent network in terms of base functions, NAND2 and INV:



Corresponding subject graph:



Cell library (with pattern graphs): see DM book fig. 10.8, pp. 516.

Costs (new!):

INV (2), NAND2 (3), NOR2 (3), AND2 (4), OR2 (4) , AOI21 (4), AOI22 (5).

Tree Covering Using Dynamic Programming: Table

Bottom up: **1-pass traversal** of subject graph.

Vertex	Match	Gate/Cell (cost)	Children	Total Cost (√ = best cost so far at each node)
a	*t1*	INV (2)	-	2 √
b	*t1*	INV (2)	-	2 √
c	*t2*	NAND2 (3)	*a*	3 + 2 = 5 √
d	*t2*	NAND2 (3)	*b*	3 + 2 = 5 √
f	*t2*	NAND2 (3)	*c, d*	3 + 5 + 5 = 13 √
g	*t1*	INV (2)	*f*	2 + 13 = 15
	t3	AND2 (4)	*c, d*	4 + 5 + 5 = 14
	t7	AOI22 (5)	*a, b*	5 + 2 + 2 = 9 √
e	*t1*	INV (2)	-	2 √
h	*t2*	NAND2 (3)	*e, g*	3 + 9 +2 = 14 √
	t5	OR2 (4)	*f*	4 + 13 = 17
i	*t1*	INV (2)	*h*	2 + 14 = 16
	t3	AND2 (4)	*e, g*	**4 + 2 + 9 = 15 √ (final covering solution)**
	t4	NOR2 (3)	*f*	3 + 13 = 16

Final covering solution: **Min-area cost = 15**.