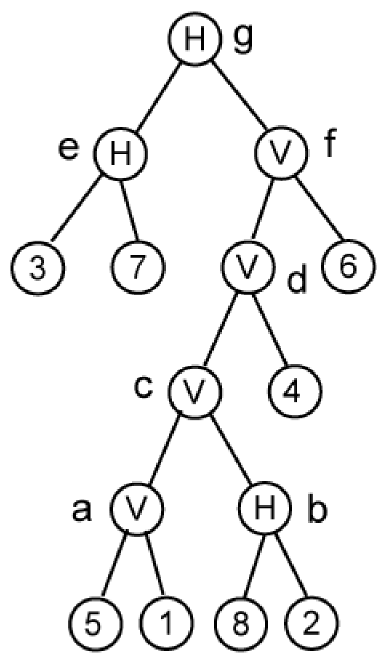
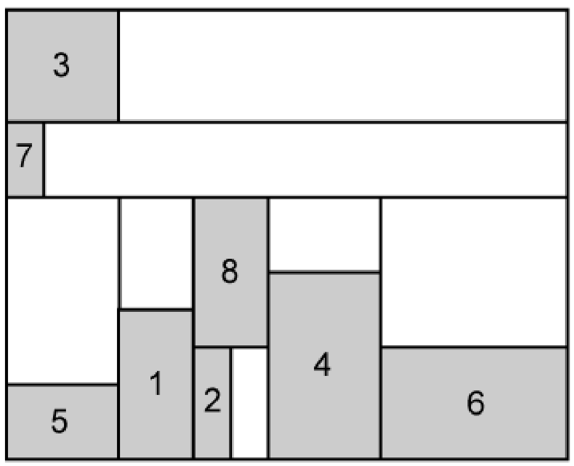
Stockmeyer Algorithm

- Determine optimal orientation of the blocks
  - Internal nodes in the slicing tree: top-H-bottom, left-V-right
  - lower-left corner of the block → lower-left corner of its room
  - Block dimension: (2,4), (1,3), (3,3), (3,5), (3,2), (5,3), (1,2), (2,4)





Bottom-up Tree Traversal

visit node a: Since the cut orientation is vertical;

$$L = \{(2,3),(3,2)\}$$
$$R = \{(2,4),(4,2)\}$$

i join $l_1 = (2,3)$ and $r_1 = (2,4)$: we get $(2+2, \max\{3,4\}) = (4,4)$. Since the maximum is from R, we join l_1 and r_2 next.

ii join $l_1 = (2,3)$ and $r_2 = (4,2)$: we get $(2+4, \max\{3,2\}) = (6,3)$. Since the maximum is from L, we join l_2 and r_2 next.

iii join $l_2 = (3,2)$ and $r_2 = (4,2)$: we get $(3+4, \max\{2,2\}) = (7,2)$.

Thus, the resulting dimensions are $\{(4,4),(6,3),(7,2)\}$.

Bottom-up Tree Traversal (cont)

visit node b: Since the cut orientation is horizontal;

$$L = \{(4,2),(2,4)\}$$
$$R = \{(3,1),(1,3)\}$$

i join $l_1 = (4,2)$ and $r_1 = (3,1)$: we get $(\max\{4,3\}, 2+1) = (4,3)$. Since the maximum is from L, we join l_2 and r_1 next.

ii join $l_2 = (2,4)$ and $r_1 = (3,1)$: we get $(\max\{2,3\}, 4+1) = (3,5)$. Since the maximum is from R, we join l_2 and r_2 next.

iii join $l_2 = (2,4)$ and $r_2 = (1,3)$: we get $(\max\{2,1\}, 4+3) = (2,7)$.

Thus, the resulting dimensions are $\{(4,3),(3,5),(2,7)\}$.

Top Node

visit node g: Since the cut orientation is horizontal;

$$L = \{(3,4)\}$$
$$R = \{(20,3),(18,4),(13,5),(12,7)\}$$

i join $l_1 = (3,4)$ and $r_1 = (20,3)$: we get $(\max\{3,20\}, 4+3) = (20,7)$. Since the maximum is from R, we join l_1 and r_2 next.

ii join $l_1 = (3,4)$ and $r_2 = (18,4)$: we get $(\max\{3,18\}, 4+4) = (18,8)$. Since the maximum is from R, we join l_1 and r_3 next.

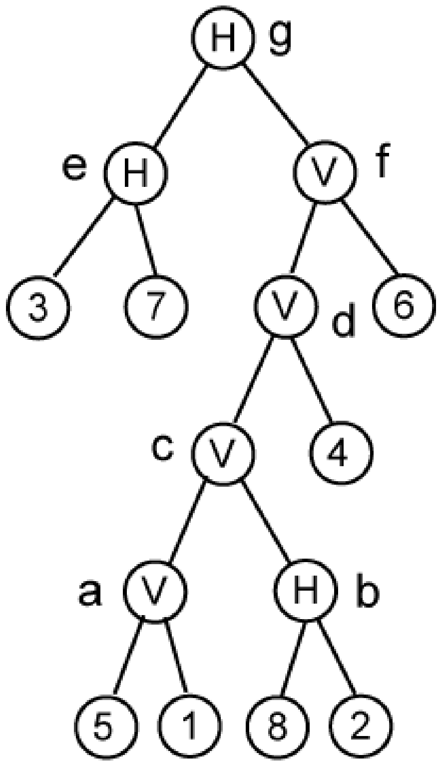
iii join $l_1 = (3,4)$ and $r_3 = (13,5)$: we get $(\max\{3,13\}, 4+5) = (13,9)$. Since the maximum is from R, we join l_1 and r_4 next.

iv join $l_1 = (3,4)$ and $r_4 = (12,7)$: we get $(\max\{3,12\}, 4+7) = (12,11)$.

Thus, the resulting dimensions are $\{(20,7),(18,8),(13,9),(12,11)\}$. The minimum area floorplan is $13 \times 9 = 117$.

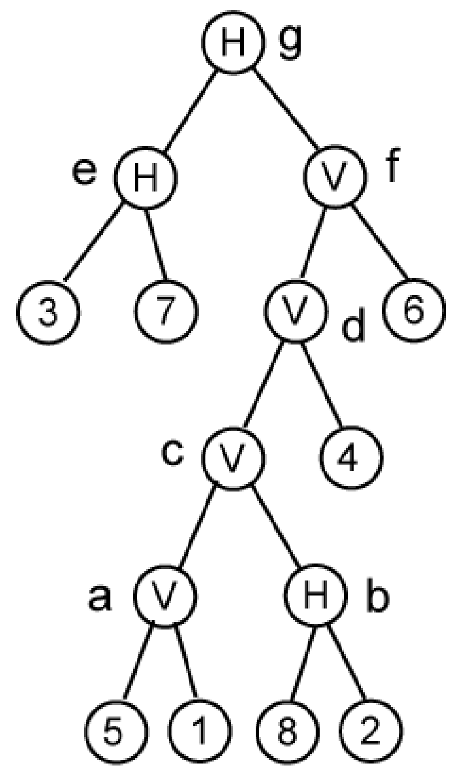
Top-down Tree Traversal

node	dir	dimensions
g	hor	$L = \{(\mathbf{3}, \mathbf{4})\}$
		$R = \{(20, 3), (18, 4), (\mathbf{13}, \mathbf{5}), (12, 7)\}$
		$D = \{(20, 7), (18, 8), (\mathbf{13}, \mathbf{9}), (12, 11)\}$
e	hor	$L = \{(\mathbf{3}, \mathbf{3})\}$
		$R = \{(\mathbf{2}, \mathbf{1}), (1, 2)\}$
		$D = \{(\mathbf{3}, \mathbf{4})\}$
f	ver	$L = \{(9, 7), (\mathbf{10}, \mathbf{5}), (13, 4), (15, 3)\}$
		$R = \{(\mathbf{3}, \mathbf{5}), (5, 3)\}$
		$D = \{(12, 7), (\mathbf{13}, \mathbf{5}), (18, 4), (20, 3)\}$
d	ver	$L = \{(6, 7), (\mathbf{7}, \mathbf{5}), (8, 4), (10, 3)\}$
		$R = \{(\mathbf{3}, \mathbf{5}), (5, 3)\}$
		$D = \{(9, 7), (\mathbf{10}, \mathbf{5}), (13, 4), (15, 3)\}$



Top-down Tree Traversal (cont)

node	dir	dimensions
c	ver	$L = \{(\mathbf{4}, \mathbf{4}), (6, 3), (7, 2)\}$
		$R = \{(2, 7), (\mathbf{3}, \mathbf{5}), (4, 3)\}$
		$D = \{(6, 7), (\mathbf{7}, \mathbf{5}), (8, 4), (10, 3)\}$
b	hor	$L = \{(4, 2), (\mathbf{2}, \mathbf{4})\}$
		$R = \{(\mathbf{3}, \mathbf{1}), (1, 3)\}$
		$D = \{(4, 3), (\mathbf{3}, \mathbf{5}), (2, 7)\}$
a	ver	$L = \{(\mathbf{2}, \mathbf{3}), (3, 2)\}$
		$R = \{(\mathbf{2}, \mathbf{4}), (4, 2)\}$
		$D = \{(\mathbf{4}, \mathbf{4}), (6, 3), (7, 2)\}$



Final Floorplan

- 4 blocks are rotated
  - Area reduced from 15 × 12 to 13 × 9