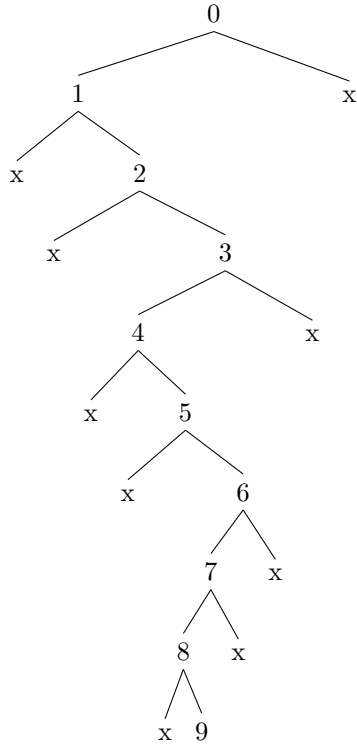
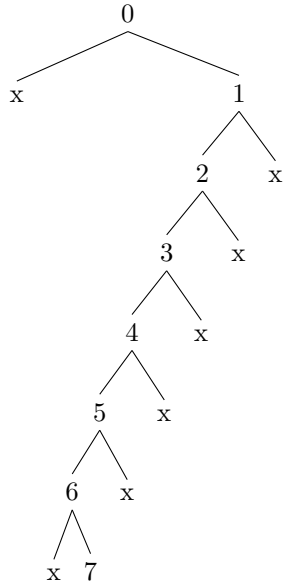


1 binary angle tree (leafmin) (N=10 R=2 theta=0.124355)



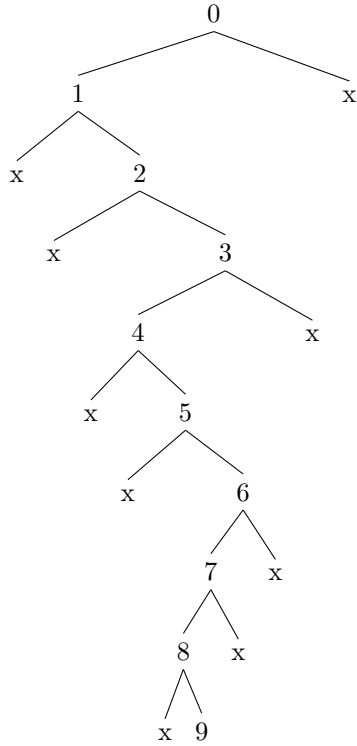
i	br	$theta$	$-u(i)$	$a(i)$	$theta'$
0	0	0.124355	-1	0.785398	-0.661043
1	1	-0.661043	1	0.463648	-0.197396
2	1	-0.197396	1	0.244979	0.047583
3	0	0.047583	-1	0.124355	-0.076772
4	1	-0.076772	1	0.062419	-0.014353
5	1	-0.014353	1	0.031240	0.016887
6	0	0.016887	-1	0.015624	0.001263
7	0	0.001263	-1	0.007812	-0.006549
8	1	-0.006549	1	0.003906	-0.002643

2 binary angle tree (globalmin) (N=10 R=2 theta=0.124355)



i	br	$theta$	$-u(i)$	$a(i)$	$theta'$
0	1	0.124355	1	0.785398	0.909753
1	0	0.909753	-1	0.463648	0.446106
2	0	0.446106	-1	0.244979	0.201127
3	0	0.201127	-1	0.124355	0.076772
4	0	0.076772	-1	0.062419	0.014353
5	0	0.014353	-1	0.031240	-0.016887
6	1	-0.016887	1	0.015624	-0.001263

3 binary angle tree (cordic) (N=10 R=2 theta=0.124355)



i	br	$theta$	$-u(i)$	$a(i)$	$theta'$
0	0	0.124355	-1	0.785398	-0.661043
1	1	-0.661043	1	0.463648	-0.197396
2	1	-0.197396	1	0.244979	0.047583
3	0	0.047583	-1	0.124355	-0.076772
4	1	-0.076772	1	0.062419	-0.014353
5	1	-0.014353	1	0.031240	0.016887
6	0	0.016887	-1	0.015624	0.001263
7	0	0.001263	-1	0.007812	-0.006549
8	1	-0.006549	1	0.003906	-0.002643

binary angle tree search (N=10)
 theta= atan(pow(2,-3)) = 0.124355

=====
 * the optimal path to a leaf
 =====

level min node : depth= 9 theta= -0.002643 minval= 0.002643 id=728

path type : leafmin

dp= 0	th=+0.124355	+1.2435499455e-01	br= 0	:	-0.785398	0.785398
dp= 1	th=-0.661043	-6.6104316885e-01	br= 1	:	-0.463648	0.463648
dp= 2	th=-0.197396	-1.9739555985e-01	br= 1	:	-0.244979	0.244979
dp= 3	th=+0.0475831	+4.7583103277e-02	br= 0	:	-0.124355	0.124355
dp= 4	th=-0.0767719	-7.6771891270e-02	br= 1	:	-0.062419	0.062419
dp= 5	th=-0.0143531	-1.4353081274e-02	br= 1	:	-0.031240	0.031240
dp= 6	th=+0.0168868	+1.6886752156e-02	br= 0	:	-0.015624	0.015624
dp= 7	th=+0.00126302	+1.2630235360e-03	br= 0	:	-0.007812	0.007812
dp= 8	th=-0.00654932	-6.5493175241e-03	br= 1	:	-0.003906	0.003906
dp= 9	th=-0.00264309	-2.6430873922e-03				

leafmin path=0 1 1 0 1 1 0 0 1

tree=[.0 [.1 x [.2 x [.3 [.4 x [.5 x [.6 [.7 [.8 x 9] x] x]]] x]]] x]

latex binary_tree_1_leafmin.tex > /dev/null

dvipdf binary_tree_1_leafmin.dvi > /dev/null

xreader -w binary_tree_1_leafmin.pdf > /dev/null

=====
 * the global optimal path to a node
 =====

level min node	: depth= 0	theta= 0.124355	minval= 0.124355	id=0
level min node	: depth= 1	theta= -0.661043	minval= 0.661043	id=1
level min node	: depth= 2	theta= -0.197396	minval= 0.197396	id=4
level min node	: depth= 3	theta= 0.047583	minval= 0.047583	id=10
level min node	: depth= 4	theta= -0.076772	minval= 0.076772	id=21
level min node	: depth= 5	theta= -0.014353	minval= 0.014353	id=44
level min node	: depth= 6	theta= -0.016887	minval= 0.016887	id=95
level min node	: depth= 7	theta= -0.001263	minval= 0.001263	id=192
level min node	: depth= 8	theta= -0.006549	minval= 0.006549	id=363
level min node	: depth= 9	theta= -0.002643	minval= 0.002643	id=728

global min node : depth= 7 theta= -0.001263 minval= 0.001263 id=192

path type : globalmin

dp= 0	th=+0.124355	+1.2435499455e-01	br= 1	:	-0.785398	0.785398
dp= 1	th=+0.909753	+9.0975315794e-01	br= 0	:	-0.463648	0.463648
dp= 2	th=+0.446106	+4.4610554894e-01	br= 0	:	-0.244979	0.244979
dp= 3	th=+0.201127	+2.0112688582e-01	br= 0	:	-0.124355	0.124355
dp= 4	th=+0.0767719	+7.6771891270e-02	br= 0	:	-0.062419	0.062419
dp= 5	th=+0.0143531	+1.4353081274e-02	br= 0	:	-0.031240	0.031240
dp= 6	th=-0.0168868	-1.6886752156e-02	br= 1	:	-0.015624	0.015624
dp= 7	th=-0.00126302	-1.2630235360e-03				

globalmin path=1 0 0 0 0 0 1

tree=[.0 x [.1 [.2 [.3 [.4 [.5 [.6 x 7] x] x] x] x] x]]

latex binary_tree_2_globalmin.tex > /dev/null

dvipdf binary_tree_2_globalmin.dvi > /dev/null

xreader -w binary_tree_2_globalmin.pdf > /dev/null

=====
 * the cordic path
 =====

cordic min node : depth= 9 theta= 0.124355 minval= 0.002643 id=0

path type : cordic

dp= 0	th=+0.124355	+1.2435499455e-01	br= 0	:	-0.785398	0.785398
dp= 1	th=-0.661043	-6.6104316885e-01	br= 1	:	-0.463648	0.463648
dp= 2	th=-0.197396	-1.9739555985e-01	br= 1	:	-0.244979	0.244979
dp= 3	th=+0.0475831	+4.7583103277e-02	br= 0	:	-0.124355	0.124355

```
dp= 4 th=-0.0767719 -7.6771891270e-02 br= 1 : -0.062419 0.062419
dp= 5 th=-0.0143531 -1.4353081274e-02 br= 1 : -0.031240 0.031240
dp= 6 th=+0.0168868 +1.6886752156e-02 br= 0 : -0.015624 0.015624
dp= 7 th=+0.00126302 +1.2630235360e-03 br= 0 : -0.007812 0.007812
dp= 8 th=-0.00654932 -6.5493175241e-03 br= 1 : -0.003906 0.003906
dp= 9 th=-0.00264309 -2.6430873922e-03
```

cordic path=0 1 1 0 1 1 0 0 1

tree=[.0 [.1 x [.2 x [.3 [.4 x [.5 x [.6 [.7 [.8 x 9] x] x]]] x]]] x]

latex binary_tree_3_cordic.tex > /dev/null

dvipdf binary_tree_3_cordic.dvi > /dev/null

xreader -w binary_tree_3_cordic.pdf > /dev/null