

```

#include <stdlib.h>
#include <stdio.h>
#include <math.h>
#include <time.h>

#include "cordic.h"

/*****/
double compute_angle ( int idx, int nIter )
/*****/
/*
  Purpose:

    Angle Array in Binary Tree Representation

  Discussion:

  Licensing:

    This code is distributed under the GNU LGPL license.

  Modified:

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  Author:

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  Parameters:
*/
{
  double angle = 0.0;
  int i, j;
  char s[32];

  for (i=0; i<nIter; i++) {
    j = 1 << i;
    if (idx & (1 << i)) {
      angle += atan( 1. / j );
      s[nIter-i-1] = '1';
    } else {
      angle -= atan( 1. / j );
      s[nIter-i-1] = '0';
    }
    printf("i=%d j=%d 1/j=%f atan(1/j)=%f \n", i, j, 1./j, atan(1./j)*180/3.1416);
  }
  s[nIter] = '\0';

  printf("%d %d %s ---> %f \n", nIter, idx, s, angle*180/3.1416);

  return angle;
}

int main (int argc, char * argv[]) {

  double pi = 3.141592653589793;
  double K = 1.646760258121;
  int nIter = 3;
  int nAngle = 1 << nIter;

```

```

int i, j, k;
double *A;
double x, y, z;
double delta = 2.*pi / nAngle;
FILE *fp;
double r;

A = (double *) malloc((1<<20) * sizeof (double));

fp = fopen("angle.dat", "w");

for (i=0; i<6; ++i) {
    nIter = i;
    nAngle = 1 << nIter;

    for (j=0; j<nAngle; ++j) {
        A[j] = compute_angle(j, nIter);
        printf("A[%d] = %f \n", j, A[j]);
        fprintf(fp, "%f %f 0.0 0.5\n", A[j]*180/pi, 0.5*i);
    }
}

fclose(fp);

fp = fopen("angle2.dat", "w");

for (i=0; i<6; ++i) {

    for (k=0; k<=i; k++) {
        nIter = k;
        nAngle = 1 << nIter;

        for (j=0; j<nAngle; ++j) {
            A[j] = compute_angle(j, nIter);
            printf("A[%d] = %f \n", j, A[j]);
            fprintf(fp, "%f %f 0.0 0.5\n", A[j]*180/pi, 0.5*i);
        }
    }
}

fclose(fp);

for (i=0; i<20; i+=4) {
    for (j=0; j<4; ++j) {
        r = atan( 1. / (1 << (i+j)) ) / atan( 1. / (1 << i) ) * 100;
        printf("index = %d --> r = %f \n", i+j, r);
    }
}

return 0;
}

```