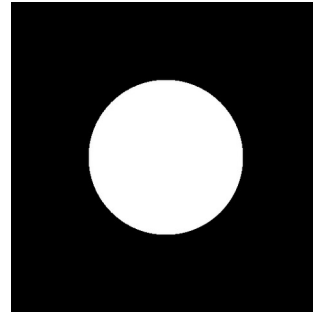


(To be done by previously assigned teams.)

Develop **your own C program** using the previously supplied library, that performs Low Pass Filtering in frequency domain. The program should work for 512x512 gray valued images. It should perform 2D DFT to create two 512x512 (type double) arrays for real and imaginary parts of complex numbers. Low frequency components should be placed at the center of the arrays so that angular frequencies are represented in range of $[-\pi, \pi]$ in both directions.

Your program should apply an ideal low pass filter which should cancel out the terms outside the specified region as illustrated below. The cut off frequency is specified using command line arguments. The cut off frequency for the example shown below is $\pi/2$. The coefficient of π (which is 0.5 in this case) should be entered in the command line. I.e:

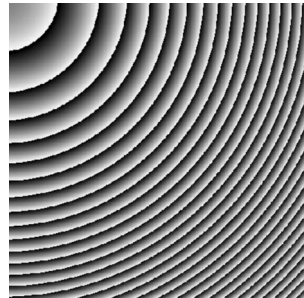
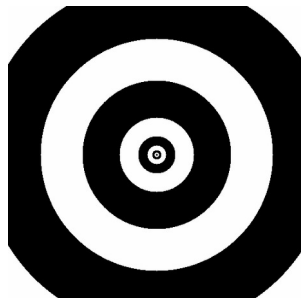
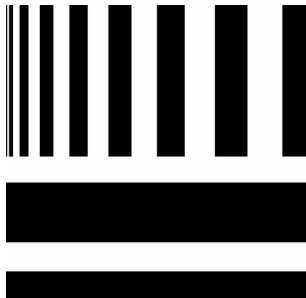
```
./hwk4.exe filtest1.pgm 0.5
```



Your program should generate an output image logDFTmag.pgm from the magnitude of the complex values. This image should be generated by taking log of each magnitude value and scaling each value so that minimum is represented by 0 and max is represented by 255.

After DFT is applied and logDFTmag.pgm is displayed, filtering should be done in frequency domain, and 2D inverse DFT should be computed. Finally the filtered result should be displayed.

The following 512x512 pgm test images will be supplied:



You should submit a C file named hwk4.c including comments on how to compile & run the program. This file should be submitted via Teams at or before due date.