

## 18.310 Homework # 9

**1:** Set up a spreadsheet that does the FFT for  $N = 16$ . Make your calculations mod a prime  $p$  that possesses a primitive 16th root of 1. Make sure the cells where the input sequence is entered are clearly marked. Take the FFT of the output (using a second copy of your spreadsheet FFT, and use the output of the first as the input to the second. Make sure your spreadsheet works by multiplying the results by  $16^{-1} \pmod{p}$ . (you should get your original sequence back with the order of coefficients backwards except for the 0-power).

2. Take two numbers A and B each of which is written as a polynomial of degree seven. Take the FFT of both mod  $p$ , take the pointwise product of the two outputs as input to a third FFT, and multiply each of the coefficients of the result by  $16^{-1} \pmod{p}$ . Make sure the cells where the input sequence is entered, and where the output is found are clearly marked.