**HW#1 Input-Output Specification**

* Input
  + 12-bit signed number (1 signed bit, 11-bit integer)
* Output
  + 16-bit signed number (1 signed bit, 15-bit integer)
  + Output is computed by using MATLAB FFT function to compute FFT result of input, and truncate the output to integer number.

MATLAB script:  
  
in=in\_real+(in\_imag)\*i;

out=fft(in);

out\_real=real(out);

out\_imag=imag(out);

out\_real\_16=floor(out\_real);

out\_imag\_16=floor(out\_imag);

* + out\_real\_16 and out\_imag\_16 are the test pattern **X[k]’** that used to calculate your SNR
* Input/Output Example Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Index | IN\_REAL | IN\_IMAG | OUT\_REAL  (MATLAB) | OUT\_IMAG  (MATLAB) | OUT\_REAL  (test pattern) | OUT\_IMAG  (test pattern) |
| 0 | 0 | -1884 | -1365 | -4063 | -1365 | -4063 |
| 1 | -1700 | 1674 | -5005.50408825214 | 978.695097267098 | -5006 | 978 |
| 2 | -1605 | 262 | 6210.17424258361 | 9398.25849879016 | 6210 | 9398 |
| 3 | 412 | 1052 | 3677.41944726843 | 66.6075318776479 | 3677 | 66 |
| 4 | 1363 | -6 | -7305.86561979584 | 3855.63762339610 | -7306 | 3855 |
| 5 | -115 | 1818 | -3350.12924504745 | 3915.89056509132 | -3351 | 3915 |
| 6 | -209 | -36 | -7291.52301697540 | 1432.70596990945 | -7292 | 1432 |
| 7 | 277 | -1932 | 1732.48986359929 | 2356.42923420797 | 1732 | 2356 |
| 8 | 381 | -203 | 12794 | -696 | 12794 | -696 |
| 9 | 736 | -1591 | 1805.83788847228 | -5619.37466204953 | 1805 | -5620 |
| 10 | -1086 | -1760 | 9432.15120079356 | -472.984587849887 | 9432 | -473 |
| 11 | 42 | 47 | -6276.04251122312 | 2992.93979074910 | -6277 | 2992 |
| 12 | 1346 | -1397 | -5413.94347134515 | 6622.15046024152 | -5414 | 6622 |
| 13 | 1889 | -145 | -1653.27244602960 | -9290.13818648131 | -1654 | -9291 |
| 14 | -978 | -24 | -2288.93621469910 | -2362.71019599559 | -2289 | -2363 |
| 15 | 96 | -743 | -811.800181844943 | -14365.7458217012 | -812 | -14366 |
| 16 | -227 | 116 | 5629 | -9067 | 5629 | -9067 |
| 17 | -1409 | 1596 | -1495.20878289579 | 994.336323056130 | -1496 | 994 |
| 18 | 1979 | -98 | 1189.57944026144 | -11112.3097230040 | 1189 | -11113 |
| 19 | -477 | -1501 | -5768.49914717731 | 434.314122250451 | -5769 | 434 |
| 20 | 299 | 681 | -6238.13438020416 | -549.637623396096 | -6239 | -550 |
| 21 | -751 | 1002 | 1193.57609601699 | 1611.73395684142 | 1193 | 1611 |
| 22 | 1563 | -1492 | 1843.43383866906 | -20539.7365455574 | 1843 | -20540 |
| 23 | -968 | -1465 | 7566.98050448653 | -1040.25023405300 | 7566 | -1041 |
| 24 | -1552 | 121 | -2446 | -4102 | -2446 | -4102 |
| 25 | -723 | 86 | 8795.58882964786 | -16517.8020627510 | 8795 | -16518 |
| 26 | -484 | 393 | 2872.09511636138 | 2351.03581206372 | 2872 | 2351 |
| 27 | -1781 | -49 | 5098.11572474812 | -1405.78164996362 | 5098 | -1406 |
| 28 | 2043 | -1910 | -6838.05652865485 | -6800.15046024152 | -6839 | -6801 |
| 29 | -527 | 621 | -1066.88825191215 | -7537.34103097416 | -1067 | -7538 |
| 30 | -701 | 672 | -4414.97460699455 | 7817.74077164355 | -4415 | 7817 |
| 31 | 1502 | 2032 | -810.663699857004 | 10425.4870266326 | -811 | 10425 |