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www.waitingforfriday.com - FHT Library automatic testing (ATmega328P Arduino Uno Board) - (c)2013 Simon Inns
FHT library version 1_2


Running automated testing:
WFF_FHT Test: Pure sine wave with frequency = 2500 Hz and amplitude of +-16383
              FHT_LEN = 32, N_DB = 64

Test 1 - Rectangular window, linear output
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from fhtDitInt():

    -1,     -1,     -1,      0,   8184,      0,     -1,     -1,     -1,      0,     -1,      0,    -24,      0,      0,     -1,
     0,      1,      1,      0,      6,      0,      1,      1,      0,      0,      1,      0,  -8168,      0,      0,      1

Output from complexToReal():

     0,      0,      0,      0,     63,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Test 2 - Rectangular window, decibel output
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from fhtDitInt():

    -1,     -1,     -1,      0,   8184,      0,     -1,     -1,     -1,      0,     -1,      0,    -24,      0,      0,     -1,
     0,      1,      1,      0,      6,      0,      1,      1,      0,      0,      1,      0,  -8168,      0,      0,      1

Output from complexToDecibel():

     0,      0,      0,      0,     63,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Test 3 - Hamming window, linear output
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from applyHammingWindow():

     0,   1035,   1920,   1881,      0,  -3437,  -6229,  -5449,      0,   7591,  12165,   9517,      0, -10915, -16038, -11558,
     0,  11339,  15435,  10298,      0,  -8602, -10736,  -6526,      0,   4404,   4859,   2583,      0,  -1359,  -1464,   -927

Output from fhtDitInt():

    -8,      1,     27,  -1722,   4298,  -2082,     47,     17,     10,      5,      3,     11,    -11,      3,      0,      0,
     1,      1,      1,      2,      4,     -2,     -1,     -3,     -5,     -9,    -33,   1707,  -4293,   2081,    -48,    -16

Output from complexToReal():

     0,      0,      0,     14,     33,     14,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Test 4 - Hamming window, decibel output with gain
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from applyHammingWindow():

     0,   1035,   1920,   1881,      0,  -3437,  -6229,  -5449,      0,   7591,  12165,   9517,      0, -10915, -16038, -11558,
     0,  11339,  15435,  10298,      0,  -8602, -10736,  -6526,      0,   4404,   4859,   2583,      0,  -1359,  -1464,   -927

Output from fhtDitInt():

    -8,      1,     27,  -1722,   4298,  -2082,     47,     17,     10,      5,      3,     11,    -11,      3,      0,      0,
     1,      1,      1,      2,      4,     -2,     -1,     -3,     -5,     -9,    -33,   1707,  -4293,   2081,    -48,    -16

Output from complexToDecibelWithGain():

     0,      0,      0,     63,     63,     63,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Test 5 - Hann window, linear output
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from applyHannWindow():

     0,    118,    662,   1038,      0,  -2728,  -5346,  -4915,      0,   7244,  11798,   9337,      0, -10857, -16008, -11555,
     0,  11318,  15353,  10187,      0,  -8343, -10245,  -6086,      0,   3780,   3857,   1800,      0,   -469,   -167,      0

Output from fhtDitInt():

    -8,      2,     29,  -1870,   3961,  -2263,     51,     19,     11,      6,      4,     13,     -9,      3,      0,      1,
     1,      2,      1,      2,      3,     -3,     -1,     -3,     -5,    -10,    -36,   1855,  -3957,   2261,    -52,    -17

Output from complexToReal():

     0,      0,      0,     16,     30,     16,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Test 6 - Hann window, decibel output with gain
Output from generateSample():

     0,  11585,  16383,  11585,      0, -11585, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585,
     0,  11584,  16383,  11585,      0, -11584, -16383, -11585,      0,  11585,  16383,  11585,      0, -11585, -16383, -11585

Output from applyHannWindow():

     0,    118,    662,   1038,      0,  -2728,  -5346,  -4915,      0,   7244,  11798,   9337,      0, -10857, -16008, -11555,
     0,  11318,  15353,  10187,      0,  -8343, -10245,  -6086,      0,   3780,   3857,   1800,      0,   -469,   -167,      0

Output from fhtDitInt():

    -8,      2,     29,  -1870,   3961,  -2263,     51,     19,     11,      6,      4,     13,     -9,      3,      0,      1,
     1,      2,      1,      2,      3,     -3,     -1,     -3,     -5,    -10,    -36,   1855,  -3957,   2261,    -52,    -17

Output from complexToDecibelWithGain():

     0,      0,      0,     63,     63,     63,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

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Tests completed...

WFF_FHT Test: Pure sine wave with frequency = 5000 Hz and amplitude of +-16383
              FHT_LEN = 32, N_DB = 64

Test 1 - Rectangular window, linear output
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from fhtDitInt():

     0,      0,      0,      0,      0,      0,      0,      0,   8191,      0,      0,      0,      0,      0,      0,      0,
     0,      0,      0,      0,      0,      0,      0,      0,  -8192,      0,      0,      0,      0,      0,      0,      0

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,      0,     63,      0,      0,      0,      0,      0,      0,      0

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Test 2 - Rectangular window, decibel output
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from fhtDitInt():

     0,      0,      0,      0,      0,      0,      0,      0,   8191,      0,      0,      0,      0,      0,      0,      0,
     0,      0,      0,      0,      0,      0,      0,      0,  -8192,      0,      0,      0,      0,      0,      0,      0

Output from complexToDecibel():

     0,      0,      0,      0,      0,      0,      0,      0,     63,      0,      0,      0,      0,      0,      0,      0

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Test 3 - Hamming window, linear output
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from applyHammingWindow():

     0,   1463,      0,  -2661,      0,   4859,      0,  -7706,      0,  10735,      0, -13460,      0,  15435,      0, -16345,
     0,  16037,      0, -14565,      0,  12165,      0,  -9229,      0,   6228,      0,  -3654,      0,   1920,      0,  -1310

Output from fhtDitInt():

    -4,     -4,     -1,      0,      3,      9,     32,  -1707,   4305,  -2069,     49,     19,     10,      6,      4,      2,
     3,      4,      1,      0,     -3,     -9,    -32,   1707,  -4305,   2069,    -49,    -19,    -10,     -6,     -4,     -2

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,     14,     33,     14,      0,      0,      0,      0,      0,      0

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Test 4 - Hamming window, decibel output with gain
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from applyHammingWindow():

     0,   1463,      0,  -2661,      0,   4859,      0,  -7706,      0,  10735,      0, -13460,      0,  15435,      0, -16345,
     0,  16037,      0, -14565,      0,  12165,      0,  -9229,      0,   6228,      0,  -3654,      0,   1920,      0,  -1310

Output from fhtDitInt():

    -4,     -4,     -1,      0,      3,      9,     32,  -1707,   4305,  -2069,     49,     19,     10,      6,      4,      2,
     3,      4,      1,      0,     -3,     -9,    -32,   1707,  -4305,   2069,    -49,    -19,    -10,     -6,     -4,     -2

Output from complexToDecibelWithGain():

     0,      0,      0,      0,      0,      0,      0,     63,     63,     63,      0,      0,      0,      0,      0,      0

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Test 5 - Hann window, linear output
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from applyHannWindow():

     0,    166,      0,  -1468,      0,   3857,      0,  -6951,      0,  10244,      0, -13206,      0,  15353,      0, -16341,
     0,  16007,      0, -14407,      0,  11798,      0,  -8606,      0,   5345,      0,  -2547,      0,    662,      0,       0

Output from fhtDitInt():

    -4,     -4,     -1,      0,      3,     10,     36,  -1854,   3967,  -2249,     53,     21,     11,      6,      4,      3,
     3,      4,      1,      0,     -3,    -10,    -36,   1854,  -3968,   2249,    -53,    -21,    -11,     -6,     -4,     -3

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,     16,     30,     16,      0,      0,      0,      0,      0,      0

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Test 6 - Hann window, decibel output with gain
Output from generateSample():

     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,
     0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383,      0,  16383,      0, -16383

Output from applyHannWindow():

     0,    166,      0,  -1468,      0,   3857,      0,  -6951,      0,  10244,      0, -13206,      0,  15353,      0, -16341,
     0,  16007,      0, -14407,      0,  11798,      0,  -8606,      0,   5345,      0,  -2547,      0,    662,      0,       0

Output from fhtDitInt():

    -4,     -4,     -1,      0,      3,     10,     36,  -1854,   3967,  -2249,     53,     21,     11,      6,      4,      3,
     3,      4,      1,      0,     -3,    -10,    -36,   1854,  -3968,   2249,    -53,    -21,    -11,     -6,     -4,     -3

Output from complexToDecibelWithGain():

     0,      0,      0,      0,      0,      0,      0,     63,     63,     63,      0,      0,      0,      0,      0,      0

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Tests completed...

WFF_FHT Test: Pure sine wave with frequency = 7500 Hz and amplitude of +-16383
              FHT_LEN = 32, N_DB = 64

Test 1 - Rectangular window, linear output
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from fhtDitInt():

    -1,     -1,      0,     -1,     -7,     -1,      0,     -1,      0,     -1,      0,     -1,   8167,     -1,      0,     -1,
     0,      1,      0,      1,  -8185,      1,      0,      1,      0,      1,      0,      1,     23,      1,      0,      1

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     63,      0,      0,      0

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Test 2 - Rectangular window, decibel output
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from fhtDitInt():

    -1,     -1,      0,     -1,     -7,     -1,      0,     -1,      0,     -1,      0,     -1,   8167,     -1,      0,     -1,
     0,      1,      0,      1,  -8185,      1,      0,      1,      0,      1,      0,      1,     23,      1,      0,      1

Output from complexToDecibel():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     63,      0,      0,      0

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Test 3 - Hamming window, linear output
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from applyHammingWindow():

     0,   1035,  -1921,   1881,      0,  -3437,   6228,  -5449,      0,   7591, -12166,   9516,      0, -10915,  16037, -11557,
     0,  11340, -15436,  10297,      0,  -8603,  10735,  -6526,      0,   4404,  -4860,   2583,      0,  -1359,   1463,   -927

Output from fhtDitInt():

    -3,     -3,     -2,     -2,     -5,      0,      0,      1,      4,     10,     33,  -1706,   4292,  -2080,     48,     17,
     6,     -3,    -28,   1720,  -4299,   2082,    -48,    -19,    -10,     -4,     -3,    -12,     10,     -2,      0,     -1

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     14,     33,     14,      0,      0

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Test 4 - Hamming window, decibel output with gain
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from applyHammingWindow():

     0,   1035,  -1921,   1881,      0,  -3437,   6228,  -5449,      0,   7591, -12166,   9516,      0, -10915,  16037, -11557,
     0,  11340, -15436,  10297,      0,  -8603,  10735,  -6526,      0,   4404,  -4860,   2583,      0,  -1359,   1463,   -927

Output from fhtDitInt():

    -3,     -3,     -2,     -2,     -5,      0,      0,      1,      4,     10,     33,  -1706,   4292,  -2080,     48,     17,
     6,     -3,    -28,   1720,  -4299,   2082,    -48,    -19,    -10,     -4,     -3,    -12,     10,     -2,      0,     -1

Output from complexToDecibelWithGain():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     63,     63,     63,      0,      0
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Test 5 - Hann window, linear output
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from applyHannWindow():

     0,    118,   -663,   1038,      0,  -2728,   5345,  -4915,      0,   7244, -11799,   9337,      0, -10857,  16007, -11554,
     0,  11319, -15354,  10186,      0,  -8343,  10244,  -6085,      0,   3780,  -3858,   1800,      0,   -469,    166,      0

Output from fhtDitInt():

    -2,     -3,     -2,     -4,     -4,      0,      0,      0,      5,     11,     36,  -1855,   3955,  -2261,     52,     18,
     7,     -3,    -30,   1870,  -3962,   2262,    -52,    -20,    -11,     -5,     -4,    -13,      9,     -3,      0,      0

Output from complexToReal():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     16,     30,     16,      0,      0
```

```
  0 |
  1 |
  2 |
  3 |
  4 |
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |***************
 12 |*****************************
 13 |***************
 14 |
 15 |
```

```
Test 6 - Hann window, decibel output with gain
Output from generateSample():

     0,  11585, -16383,  11585,      0, -11585,  16383, -11585,      0,  11585, -16383,  11584,      0, -11585,  16383, -11584,
     0,  11585, -16383,  11584,      0, -11585,  16383, -11584,      0,  11585, -16383,  11584,      0, -11584,  16383, -11585

Output from applyHannWindow():

     0,    118,   -663,   1038,      0,  -2728,   5345,  -4915,      0,   7244, -11799,   9337,      0, -10857,  16007, -11554,
     0,  11319, -15354,  10186,      0,  -8343,  10244,  -6085,      0,   3780,  -3858,   1800,      0,   -469,    166,      0

Output from fhtDitInt():

    -2,     -3,     -2,     -4,     -4,      0,      0,      0,      5,     11,     36,  -1855,   3955,  -2261,     52,     18,
     7,     -3,    -30,   1870,  -3962,   2262,    -52,    -20,    -11,     -5,     -4,    -13,      9,     -3,      0,      0

Output from complexToDecibelWithGain():

     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     63,     63,     63,      0,      0
```

```
  0 |
  1 |
  2 |
  3 |
  4 |
```

```
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |************************************************************
 12 |************************************************************
 13 |************************************************************
 14 |
 15 |
```

```
Tests completed...

WFF_FHT Test: Pure sine wave with frequency = 1990 Hz and amplitude of +-16383
              FHT_LEN = 32, N_DB = 64

Test 1 - Rectangular window, linear output
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from fhtDitInt():

   237,    558,   1344,  10394,  -2691,  -1347,   -948,   -752,   -634,   -550,   -489,   -443,   -399,   -380,   -340,   -311,
  -284,   -258,   -232,   -196,   -187,   -171,   -132,    -98,    -56,     -8,     61,    189,    497,  -2184,   -234,     25

Output from complexToReal():

     1,      3,      7,     58,     15,      7,      5,      4,      3,      3,      2,      2,      2,      2,      2,      2

  0 |*
  1 |***
  2 |*******
  3 |************************************************************
  4 |***************
  5 |*******
  6 |*****
  7 |****
  8 |***
  9 |***
 10 |**
 11 |**
 12 |**
 13 |**
 14 |**
 15 |**

Test 2 - Rectangular window, decibel output
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from fhtDitInt():

   237,    558,   1344,  10394,  -2691,  -1347,   -948,   -752,   -634,   -550,   -489,   -443,   -399,   -380,   -340,   -311,
  -284,   -258,   -232,   -196,   -187,   -171,   -132,    -98,    -56,     -8,     61,    189,    497,  -2184,   -234,     25

Output from complexToDecibel():

     7,     20,     33,     62,     43,     33,     28,     24,     22,     20,     19,     18,     16,     16,     16,     15

  0 |*******
  1 |*******************
  2 |*********************************
  3 |************************************************************
  4 |****************************************
  5 |*********************************
  6 |*************************
  7 |***********************
  8 |**********************
  9 |*******************
 10 |******************
 11 |******************
 12 |***************
 13 |***************
 14 |***************
 15 |***************

Test 3 - Hamming window, linear output
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from applyHammingWindow():

     0,    856,   1823,   2538,   2184,     76,  -3566,  -7275,  -8846,  -6554,   -383,   7530,  13671,  14862,   9987,    770,
 -8931, -14967, -14926,  -9249,   -846,   6486,   9956,   8959,   4986,    488,  -2527,  -3367,  -2594,  -1266,   -138,    663

Output from fhtDitInt():

    11,    -27,  -1809,   5749,  -3574,    194,     -8,    -34,    -38,    -37,    -36,    -35,    -27,    -35,    -25,    -25,
   -22,    -19,    -19,     -9,    -18,    -16,     -6,     -4,     -1,      5,     10,     13,    467,  -1291,    621,     33

Output from complexToReal():

     0,      0,     10,     32,     19,      1,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0

  0 |
  1 |
  2 |**********
  3 |********************************
  4 |*******************
  5 |*
```

```
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |
 15 |
```

```
Test 4 - Hamming window, decibel output with gain
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from applyHammingWindow():

     0,    856,   1823,   2538,   2184,     76,  -3566,  -7275,  -8846,  -6554,   -383,   7530,  13671,  14862,   9987,    770,
 -8931, -14967, -14926,  -9249,   -846,   6486,   9956,   8959,   4986,    488,  -2527,  -3367,  -2594,  -1266,   -138,    663

Output from fhtDitInt():

    11,    -27,  -1809,   5749,  -3574,    194,     -8,    -34,    -38,    -37,    -36,    -35,    -27,    -35,    -25,    -25,
   -22,    -19,    -19,     -9,    -18,    -16,     -6,     -4,     -1,      5,     10,     13,    467,  -1291,    621,     33

Output from complexToDecibelWithGain():

     0,      0,     62,     63,     63,     29,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0
```

```
  0 |
  1 |
  2 |************************************************************
  3 |************************************************************
  4 |************************************************************
  5 |****************************
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |
 15 |
```

```
Test 5 - Hann window, linear output
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from applyHannWindow():

     0,     97,    629,   1400,   1522,     60,  -3060,  -6562,  -8249,  -6254,   -371,   7388,  13523,  14783,   9968,    769,
 -8929, -14939, -14847,  -9148,   -830,   6290,   9500,   8354,   4497,    419,  -2006,  -2347,  -1431,   -437,    -16,      0

Output from fhtDitInt():

    -8,    -79,  -2083,   5344,  -3650,    328,     74,     28,     14,      6,      3,      0,      6,     -6,      2,      1,
     1,      1,     -1,      8,     -4,     -4,      4,      4,      4,      6,      5,     -2,    464,  -1214,    694,     33

Output from complexToReal():

     0,      0,     12,     30,     20,      1,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0
```

```
  0 |
  1 |
  2 |************
  3 |******************************
  4 |*******************
  5 |*
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |
 15 |
```

```
Test 6 - Hann window, decibel output with gain
Output from generateSample():

     0,   9588,  15549,  15628,   9795,    257,  -9378, -15466, -15703, -10001,   -515,   9166,  15379,  15775,  10203,    772,
 -8952, -15289, -15842, -10403,  -1029,   8735,  15194,  15906,  10601,   1285,  -8516, -15096, -15966, -10796,  -1542,   8295

Output from applyHannWindow():

     0,     97,    629,   1400,   1522,     60,  -3060,  -6562,  -8249,  -6254,   -371,   7388,  13523,  14783,   9968,    769,
 -8929, -14939, -14847,  -9148,   -830,   6290,   9500,   8354,   4497,    419,  -2006,  -2347,  -1431,   -437,    -16,      0

Output from fhtDitInt():

    -8,    -79,  -2083,   5344,  -3650,    328,     74,     28,     14,      6,      3,      0,      6,     -6,      2,      1,
     1,      1,     -1,      8,     -4,     -4,      4,      4,      4,      6,      5,     -2,    464,  -1214,    694,     33

Output from complexToDecibelWithGain():

     0,      0,     63,     63,     63,     37,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0
```

```
  0 |
  1 |
```

```
  2 |************************************************************
  3 |************************************************************
  4 |************************************************************
  5 |***********************************
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |
 15 |
```

Tests completed...

WFF_FHT Test: Pure sine wave with frequency = 9490 Hz and amplitude of +-16383
FHT_LEN = 32, N_DB = 64

Test 1 - Rectangular window, linear output
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from fhtDitInt():

```
  -223,   -197,   -176,   -150,   -124,    -94,    -61,    -23,     27,     83,    160,    269,    442,    752,   1561,  10697,
 -2138,  -3569,  -1266,   -914,   -738,   -626,   -549,   -489,   -447,   -401,   -370,   -341,   -316,   -290,   -265,   -241
```

Output from complexToReal():

```
     1,      1,      1,      1,      1,      1,      2,      2,      2,      2,      3,      3,      4,      6,     11,     62
```

```
  0 |*
  1 |*
  2 |*
  3 |*
  4 |*
  5 |*
  6 |**
  7 |**
  8 |**
  9 |**
 10 |***
 11 |***
 12 |****
 13 |******
 14 |***********
 15 |************************************************************
```

Test 2 - Rectangular window, decibel output
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from fhtDitInt():

```
  -223,   -197,   -176,   -150,   -124,    -94,    -61,    -23,     27,     83,    160,    269,    442,    752,   1561,  10697,
 -2138,  -3569,  -1266,   -914,   -738,   -626,   -549,   -489,   -447,   -401,   -370,   -341,   -316,   -290,   -265,   -241
```

Output from complexToDecibel():

```
     7,     11,     12,     12,     13,     13,     14,     15,     17,     19,     20,     23,     26,     31,     39,     63
```

```
  0 |*******
  1 |***********
  2 |************
  3 |************
  4 |*************
  5 |*************
  6 |**************
  7 |***************
  8 |*****************
  9 |******************
 10 |*******************
 11 |***********************
 12 |*************************
 13 |*******************************
 14 |************************************
 15 |************************************************************
```

Test 3 - Hamming window, linear output
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from applyHammingWindow():

```
     0,    233,   -606,   1230,  -2185,   3489,  -5108,   6940,  -8846,  10646, -12160,  13212, -13672,  13454, -12548,  10999,
 -8930,   6507,  -3933,   1416,    845,  -2692,   4014,  -4773,   4986,  -4737,   4151,  -3385,   2593,  -1917,   1457,  -1268
```

Output from fhtDitInt():

```
   -20,    -17,    -16,    -13,    -11,     -9,     -6,     -1,      4,      8,     14,     21,     24,     -8,  -1785,   5773,
 -3104,  -1113,    614,    -13,    -37,    -39,    -40,    -35,    -34,    -30,    -30,    -27,    -26,    -22,    -23,    -17
```

Output from complexToReal():

```
     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     10,     32
```

```
  0 |
  1 |
  2 |
```

```
  3 |
  4 |
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |**********
 15 |*******************************
```

Test 4 - Hamming window, decibel output with gain
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from applyHammingWindow():

```
     0,    233,   -606,   1230,  -2185,   3489,  -5108,   6940,  -8846,  10646, -12160,  13212, -13672,  13454, -12548,  10999,
 -8930,   6507,  -3933,   1416,    845,  -2692,   4014,  -4773,   4986,  -4737,   4151,  -3385,   2593,  -1917,   1457,  -1268
```

Output from fhtDitInt():

```
   -20,    -17,    -16,    -13,    -11,     -9,     -6,     -1,      4,      8,     14,     21,     24,     -8,  -1785,   5773,
 -3104,  -1113,    614,    -13,    -37,    -39,    -40,    -35,    -34,    -30,    -30,    -27,    -26,    -22,    -23,    -17
```

Output from complexToDecibelWithGain():

```
     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     62,     63
```

```
  0 |
  1 |
  2 |
  3 |
  4 |
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |************************************************************
 15 |************************************************************
```

Test 5 - Hann window, linear output
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from applyHannWindow():

```
     0,     26,   -209,    678,  -1523,   2770,  -4384,   6260,  -8249,  10159, -11793,  12963, -13524,  13383, -12524,  10997,
 -8928,   6495,  -3912,   1400,    829,  -2610,   3831,  -4451,   4497,  -4065,   3295,  -2360,   1430,   -662,    166,       0
```

Output from fhtDitInt():

```
    -2,     -2,     -2,     -1,      0,     -2,     -1,      0,      2,      1,      2,     -2,    -12,    -75,  -2076,   5344,
 -3187,   -900,    778,     65,     24,     12,      5,      4,      2,      3,      0,      0,      0,      1,     -2,      2
```

Output from complexToReal():

```
     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     12,     29
```

```
  0 |
  1 |
  2 |
  3 |
  4 |
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |************
 15 |*****************************
```

Test 6 - Hann window, decibel output with gain
Output from generateSample():

```
     0,   2614,  -5160,   7575,  -9795,  11765, -13433,  14757, -15703,  16247, -16375,  16083, -15379,  14281, -12818,  11026,
 -8951,   6648,  -4174,   1593,   1029,  -3624,   6127,  -8472,  10601, -12458,  13996, -15175,  15966, -16347,  16310, -15855
```

Output from applyHannWindow():

```
     0,     26,   -209,    678,  -1523,   2770,  -4384,   6260,  -8249,  10159, -11793,  12963, -13524,  13383, -12524,  10997,
 -8928,   6495,  -3912,   1400,    829,  -2610,   3831,  -4451,   4497,  -4065,   3295,  -2360,   1430,   -662,    166,       0
```

Output from fhtDitInt():

```
    -2,     -2,     -2,     -1,      0,     -2,     -1,      0,      2,      1,      2,     -2,    -12,    -75,  -2076,   5344,
 -3187,   -900,    778,     65,     24,     12,      5,      4,      2,      3,      0,      0,      0,      1,     -2,      2
```

Output from complexToDecibelWithGain():

```
     0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,      0,     63,     63
```

```
  0 |
  1 |
  2 |
  3 |
  4 |
  5 |
  6 |
  7 |
  8 |
  9 |
 10 |
 11 |
 12 |
 13 |
 14 |************************************************************
 15 |************************************************************

Tests completed...
```