**Project #4 –Wavelets and Multi-resolution Processing**

**Due date: 2016/01/03**

**Requirements**

1. Write a computer program capable of doing 2-level discrete wavelet transform using Haar H2 basis functions.  
   Sample Input:   
   (1) Fig. 8.9(a).  
   Sample Output:   
   (1) Fig. 8.46(a)  
   (2) a txt file consists of all 2-level wavelet coefficients.
2. Write another program capable of taking user’s level parameter and doing inverse discrete wavelet transform using Haar H2 basis functions.  
   Sample Input:   
   (1) a txt file consists of all 2-level wavelet coefficients.  
   (2) assume level parameter = 2  
   Sample Output:   
   (1) Fig. 8.9(a)
3. Upload your project results to E3 before the due time with one single zipped file named “IP\_Project4\_[StudentID].rar”. The file should include: (1) source code with proper comments and (2) project report.   
   Some sample images are provided for you to verify each of your functions. You can optionally download images from the textbook official website to testify your program. Keep your project reports short, and organized in a uniform manner to simplify grading:  
   1. Information including: project title, project number, course name, student's id, student's name, date due, date handed in.   
   2. Technical discussion. Techniques used and the principal equations (if any) implemented. Some best practices or implementation issues are encouraged to present here.   
   3. Experimental results discussion. Major findings in terms of the project objectives, and make clear reference to any images generated.   
   4. Appendix (optional). Some special designs of your partial program could be listed here. Do not list all your source code here.