University of Texas at Arlington

EE 2347 Fall-2013

Lab Project-3 (Group of four)

Due date: 11/04/2013

PRINT YOUR NAME in CAPITAL LETTERS. ID # : XXXX-XX-	
1) Last NAME:	**First NAME:**
2) Last NAME:	**First NAME:**
3) Last NAME:	**First NAME:**
4) Last NAME:	**First NAME:**

INSTRUCTIONS:

Print this document and attach this page as a cover of your Project Report.

Prob. #	Max Points	Points Earned
Presentation	20	
Explanation	30	
Code + Report	50	
Total	100	

1. Title:

Texting with Frequency Encoding

2. Objective:

The objective of this project is to design and implement the CODEC (Encoder/Decoder) part of a communication system using frequency encoding of the binary data for texting application. The communication system consists of a transmitter and a receiver. The text-based (i.e. 95 printable ASCII characters) information is encoded at the transmitter and sent to the receiver which decodes back the original text from the encoded message. After transforming the ASCII characters to binary data, the encoder encodes '0' and '1' as two different frequency of sinusoids. The decoder has to recover the original text back from this encoded sequence of sinusoids.

2.1 Project parameters and minimum requirements

The minimum number of characters for the text message is 100. '0' should be encoded as 20 Mhz and '1' should be encoded as 10 MHz sinusoid. The bit length is 1 ms. Develop and implement algorithms in MATLAB for the CODEC part of the communication system (one at the transmitter and another one at the receiver); they include components for encoding/decoding text messages. Your program shall prompt the user for a text message (which is terminated with a return), encode the message, store the encoded message as the frequency encoded signal at transmitter end, read back the stored and encoded signal at receiver end, decode the text from the encoded message and print the message on the receiver screen.

3. Mathematical and Computational tools

Mathematical background: Correlation, Filtering.

MATLAB functions: matrix array operations (zero padding, shifting etc.). You are encouraged to study the fft(), bin2dec() , dec2bin(), xcorr(), goertzel(), int8(), char(), input(), disp().

4. Tasks

1) Develop a high level algorithm (sketch the flowchart) for this project; identify major functions for the entire program.

2) Develop and validate a computer method and codes to perform information encoding/decoding.

3) Analyze and present the results using test inputs.

4) Submit a project report (in MS Word) with at least the following sections (i.e. follow the IEEE format):

   Abstract of this study -Theory section which includes,

   a) Brief description of the concept of Convolution/Correlation

b) Brief description of your methods to compute the convolution and correlation

c) Brief description of your synthesizer design -Validation and result analysis section which include test results using the sample user input and show/plot the results. -Summary/Conclusions of this project

5) Submit the project report (printed copy) in class. Email the GTA the electronic file for the report along with the complete MATLAB program (*.m extension). [Any one member of the group can email the files and include their partners name/ID in the body of the email].

6) YOUR EMAIL MUST CONTAIN THE SUBJECT: "**EE 2347: Project #3 Fall-2013**". e-mail it to the GTA: tanmoy.bhowmik@mavs.uta.edu, mohammad.hasan@mavs.uta.edu

7) Provide an 10-minute presentation and demonstration of your project during the lab/class sessions.

NOTE:
This should be a fun and interesting project. Start working on the project as early as possible. If you have any question (or difficulty) please contact the GTA.