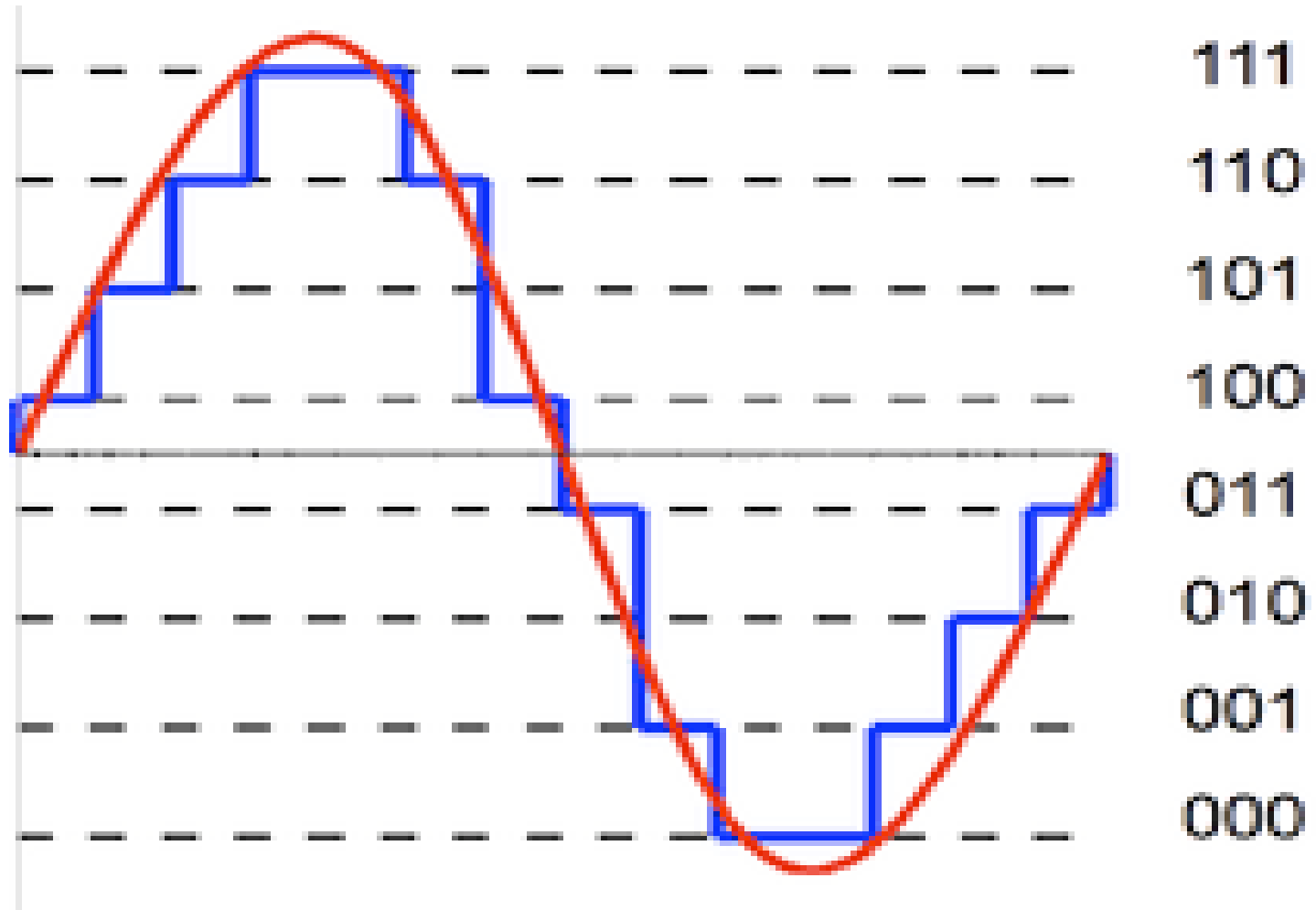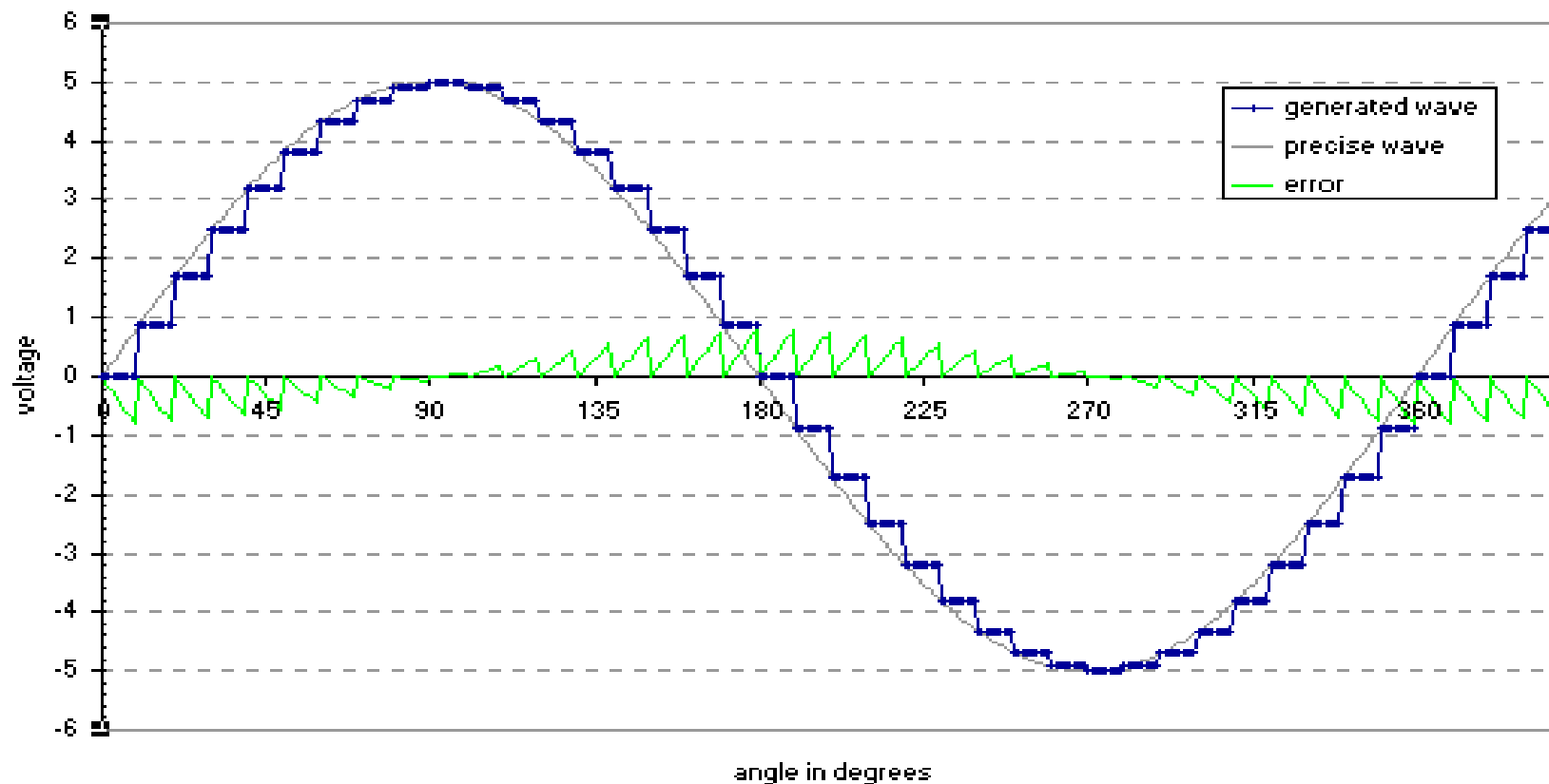# *4202 Digital Multimedia*

Lecture 2

Dr. Shaimaa Othman

Quantization

Sampling and Quantization

error in generating a sinewave from a series of values

Multimedia Data

- Sampling frequency and number of *bits per samples,* duration leads to Raw media size.

Example

Find the uncompressed CD audio file size of length 100 min?

- CD audio is sampled at 44.1 KHz
- CD audio uses 16 bit samples
- File ***bitrate*** is 44.1*16 Kbps (Kilo Bit Per Second)
- File size= 44.1*16*1000*6000=4233600000 bits

Multimedia Files

Mainly composed of

- Headers (and Tables)
  - Header is meta data i.e data about body such as :encoding method, resolution, header length, data format, data length, mapping to real, and data validation.
  - Without the header file can not be interpreted or decoded
  - Tables: some encoding schemes uses tables to encode/decode data

- Data : multimedia data organized and encoded as stated in header

Example 1

- **An analog signal has bandwidth ranges from 0 Hz to 25 Hz.**

  ❑ **Suggest a suitable sampling rate for such a signal**

  ❑ **Based on the suggested rate and the fact that the digitizer quantizes the output to 16 bits, what will be the amount of digital data delivered by the digitizer in a day of continuous operations?**

Example 2

- An input analog signal ranges from -5 volts to 5 volts quantized equal intervals by analog to digital converter, ADC, to 4 bits digital value. What will be code of sample of -3 volt and 2.5 volts. Also, the corresponding volt value for code 1101 and 0111?

-5   start S , 5 end E
Range =5-(-5)=10 volts   R
Interval=10/16=0.625   I
Code (C)   Quantizer Range (QR)
0000   (-5 to -5+0.625)
0001   (-5 +0.625 to -5+2*0.625)
.
.
.
1111   (-5+ 15* 0.625 to -5+16*0.625)

(Rule): (code of value n) its range is (start +value* interval   to start + (value+1)* interval
QR=(S+value(C)*I : S+value(C+1)*I)
I=E-S
Home Work :solve the problem due