# CPSC 4040/6040
# Computer Graphics Images

Assigned: 9/6/2021
Due: 9/15/2021 (start of class)

Quiz 2 *(Grading: 0–10 points)*

1. Please answer the following potpourri questions from lectures 4-6:

   - **[2pt]** You are given an 8-bit grayscale scanline that must be converted to a bitmap (black and white). Please describe your strategy to do so. Using your strategy, what is the bitmap version for the following scanline: 90 100 100 100 90 90 90 90

   - **[2pt]** Assume that you are using a run-length encoding scheme that encodes runs and non-repeating sequences to compress a greyscale image of 600 x 400 pixels (600 columns, 400 rows). Pixels and run lengths are stored as unsigned 8-bit numbers. Ignoring the size of the image header, and considering only lossless RLE compression per scanline, what is the smallest possible size of the RLE compressed image?

   - **[2pt]** Consider the following single scanline image: 108, 139, 135, 244, 172, 173, 56, 99. If it is quantized with 4-bit accuracy, compute the RMS error for the quantized image.

(Quiz continues in the next page)

2. Consider the following 8-bit greyscale image:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | 12 | 12 | 59 | 179 | 254 | 254 | 254 |
| 12 | 12 | 12 | 59 | 179 | 254 | 254 | 254 |
| 12 | 12 | 12 | 59 | 179 | 254 | 254 | 254 |
| 12 | 12 | 12 | 59 | 179 | 254 | 254 | 254 |

   - **[2 pt]** Compress the image using Huffman coding. *Hint: construct the Huffman table and encode the image scanlines using the table entries.*

   - **[2 pt]**What is the compression ratio and savings ratio of the Huffman encoded image?

## Extra Credits [2pt]

Use the LZW coding algorithm to encode the ASCII string AAAAAAAAAAA