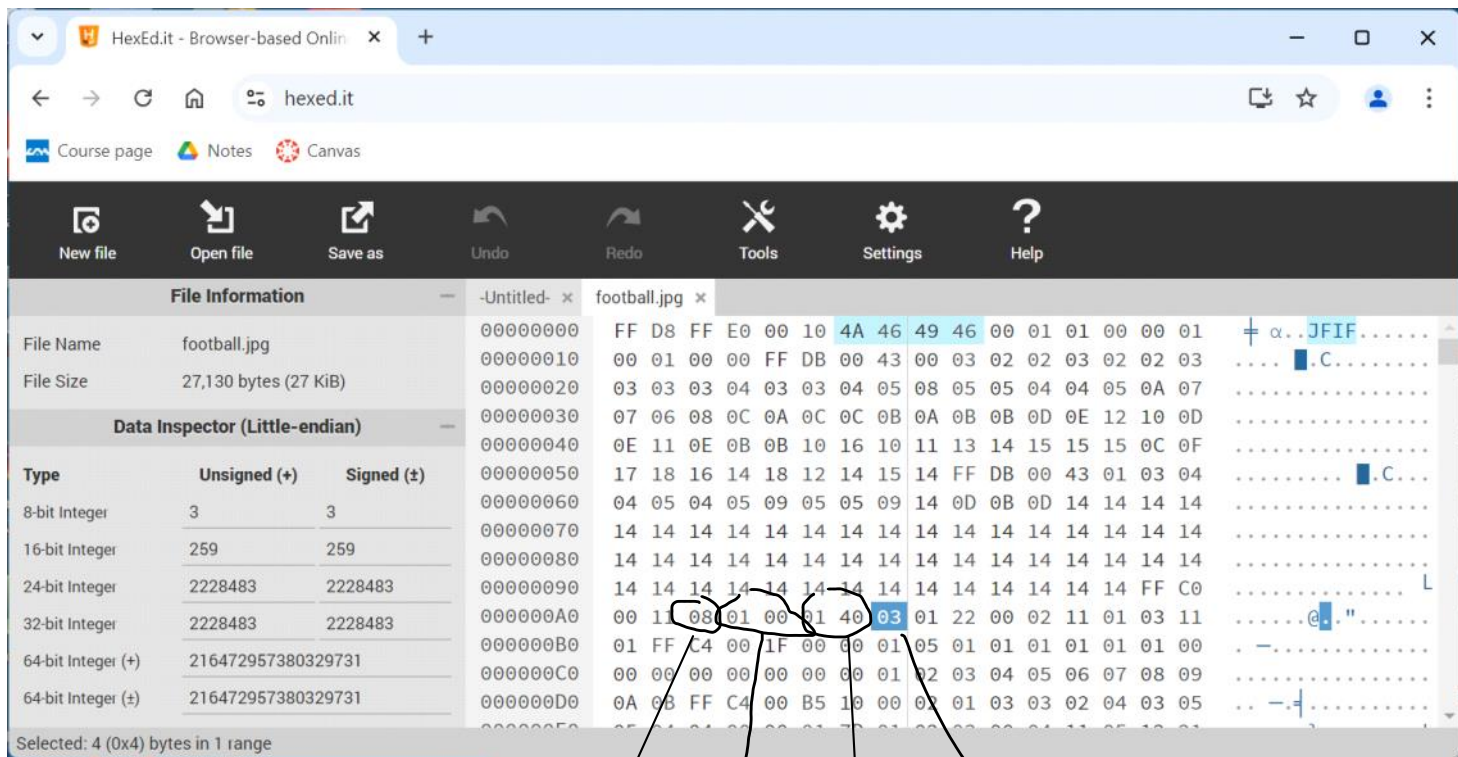


# Lecture 4

## Image Files Header Information:



8 bits/sample

$$(01\ 00)_{16} = (256)_{10}$$

Y dim

$$(01\ 40)_{16}$$

$$= 256 + 4 * 16 = 320$$

X dim

3 color components

```
>> I = imread('football.jpg');
```

```
>> whos I
```

Name	Size	Bytes	Class	Attributes
I	256x320x3	245760	uint8	

```
>> I = imread('coins.png');
```

```
>> whos I
```

Name	Size	Bytes	Class	Attributes
I	246x300	73800	uint8	

HexEd.it - Browser-based Online Hex Editor

hexed.it

Course page Notes Canvas

New file Open file Save as Undo Redo Tools Settings Help

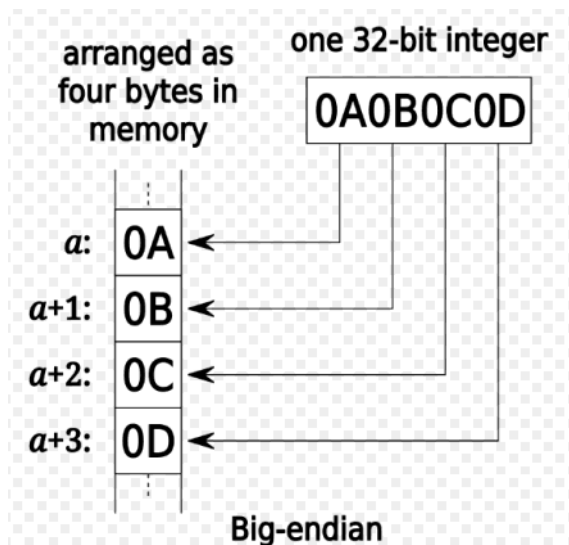
File Information		-Untitled- x	coins.png x
File Name	coins.png	00000000	89 50 4F 47 0D 0A 1A 0A 00 00 00 0D 49 48 44 52 PNG.....IHDR
File Size	37,906 bytes (38 KiB)	00000010	00 00 01 2C 00 00 00 F6 08 00 00 00 00 49 C4 E5 ... ..I
Data Inspector (Little-endian)		00000020	
Type	Unsigned (+) Signed (±)	00000030	54 00 00 00 07 74 49 4D 45 07 D2 09 13 14 1F 0C T...tIME. ....
		00000040	03 50 C4 9D 00 00 00 27 74 45 58 74 43 6F 70 79 .]-¥...'tExtCopy
		00000050	72 59 67 68 74 00 43 6F 70 79 72 69 67 68 74 20 right.Copyright
			54 68 65 20 4D 61 74 68 57 6F 72 6B 73 2C 20 49 The MathWorks, I

Most Significant  
Byte

(00 00 01 2C) Hex  
= 300 (X dim in Decimal)

(00 00 00 F6) Hex  
= 15 \* 16 + 6 = 246 (Y dim in Decimal)

## Big-Endian vs. Little-Endian format



Most Significant  
Byte  
Smallest address

(00 00 01 2C) Hex  
= 300 (X dim in Decimal)

## Summary of ways to write out (save) a raw image

### 1. Use Lossy Compression

e.g., save the image as a JPG file ('coins\_writeout\_jpg\_q25.jpg')  
`imwrite(I, 'coins_writeout_jpg_q25.jpg', 'quality', 25);`

To recover the original image:

`I_Rec = imread('coins_writeout_jpg_q25.jpg');`

I not equal to I\_Rec due to lossy compression.

### 2. Use Lossless Compression

e.g., save the image as a PNG file ('coins\_saved.png')  
`imwrite(I, 'coins_saved.png');`

To recover the original image:

`I_Rec = imread('coins_saved.png');`

`I = I_Rec`

Another way: save the original raw image into an MAT file

`>> save('coins.mat', 'I');`

Original raw image size is: 73,800 bytes.

49,166 bytes for 'coins.mat' -- compressed file with size slightly larger than  
 37,906 bytes for 'coins.png'

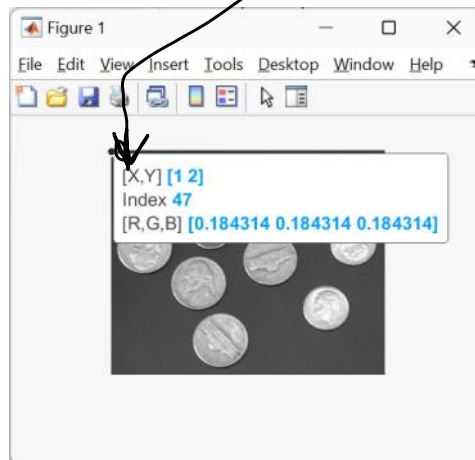
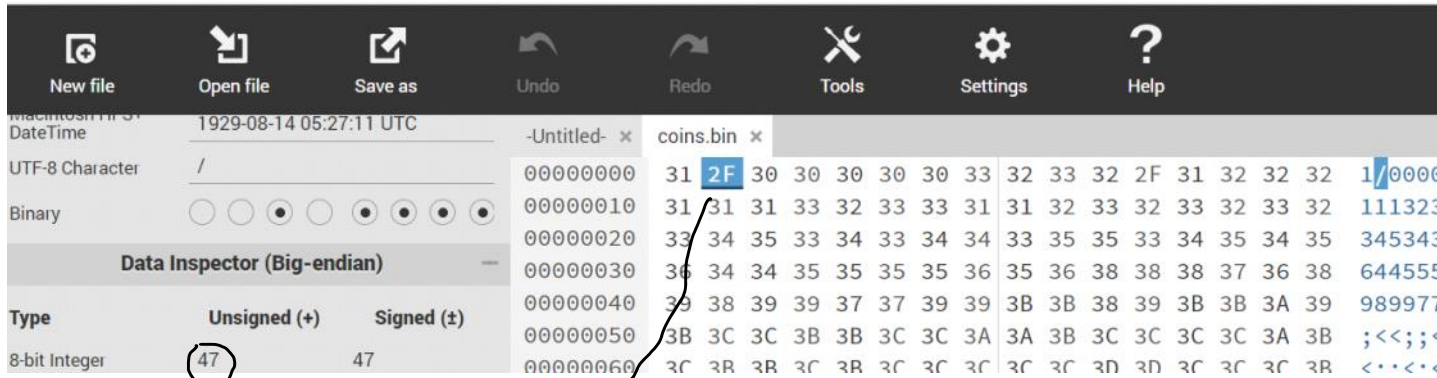
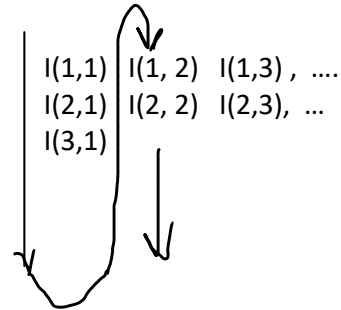
```
>> I_copy = I;
>> clear I
>> load coins.mat
>> isequal(I, I_copy)
ans =
logical
1
```

3. Save the raw image as a ('clean' -- no image file header) binary file using fwrite, fread, fopen, fclose functions.

```
>> fileid = fopen('coins.bin', 'w');
>> fwrite(fileid, I, 'uint8');
>> fclose(fileid);
```

Original raw image size is: 73,800 bytes.  
73,800 bytes for 'coins.bin'

Column-wise scan



```
>> I(2, 1)
ans =
uint8
47
```