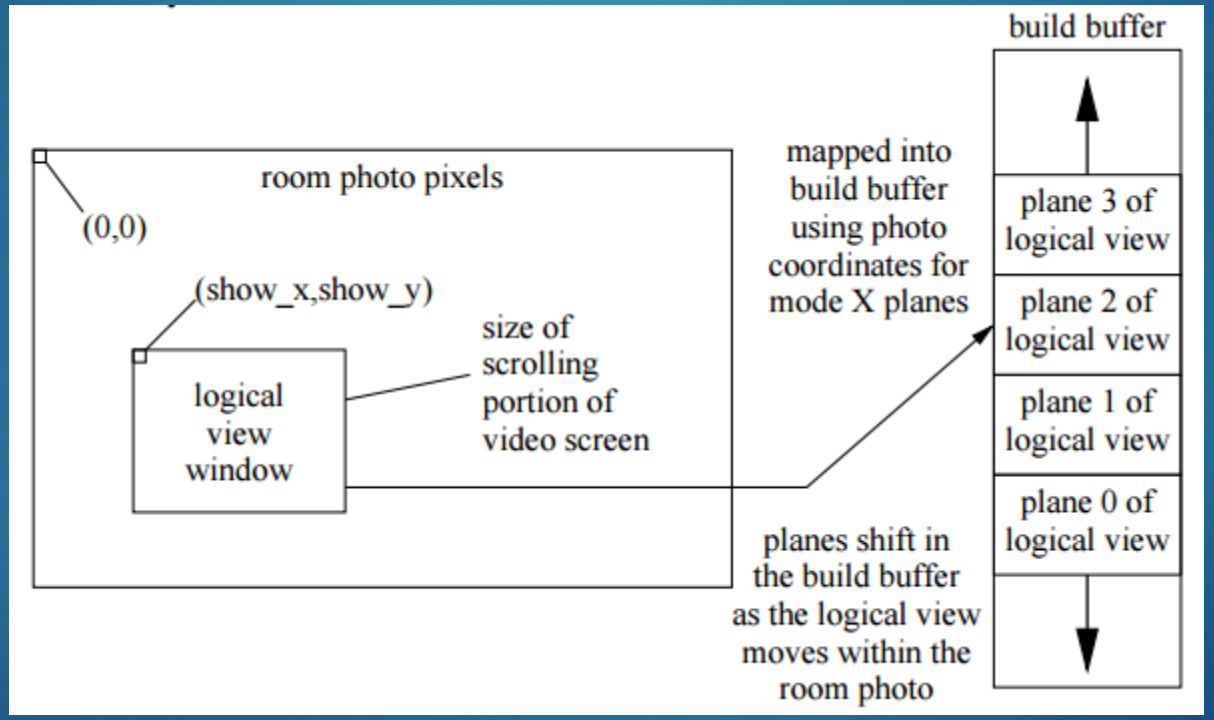
ECE 391 Discussion Week 6

Announcements

- MP2.1 is due on the following Monday (Oct 8)at 6:00 pm
  - Grade sheets for checkpoint 1 & 2 on course site
- MP2.2 is due the following week (Oct 15 at 6:00pm
- Plan your time accordingly!
- Returning exams tomorrow in lecture
  - Grades up on compass
  - Exam 1 regrade request due Tuesday Oct 9 at 2:00 pm

Mode X (cont.)

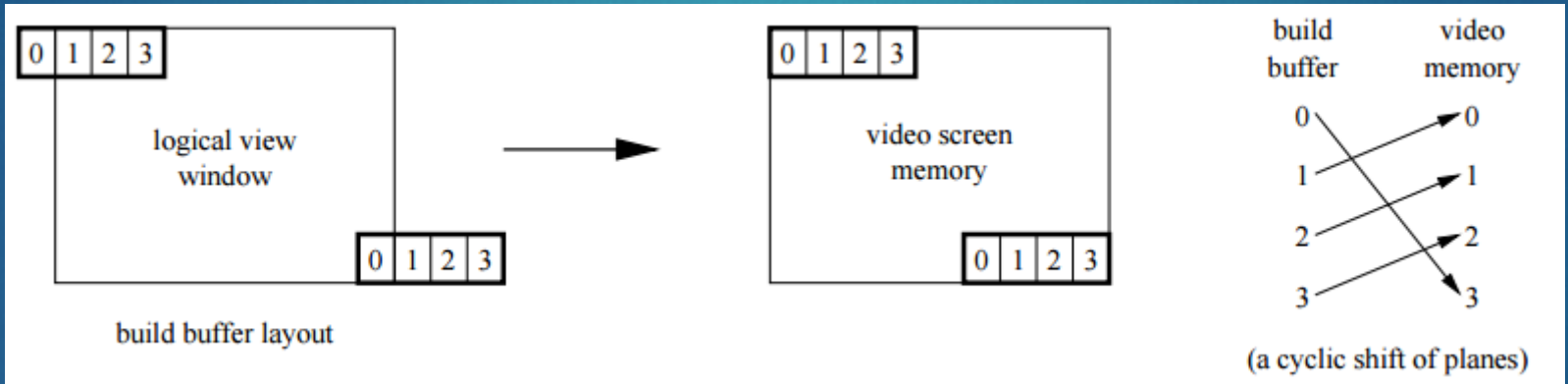
- Build buffer



Mode X (cont.)

- The img3 and img3_off variables provide the additional level of indirection. At any point in time, adding the address calculated from the logical view window coordinates (show_x, show_y) to the img3 pointer produces a pointer to the start of plane 3 in the build buffer

Mode X (cont.)


0 1 2 3
logical view window
0 1 2 3
build buffer layout
0 1 2 3
video screen memory
0 1 2 3
build buffer
video memory
0
1
2
3
0
1
2
3
(a cyclic shift of planes)

Octrees

- Algorithm to display images with a multitude of colors on devices that can only display a limited number of colors (color quantization)
- .photo files
  - Each pixel is 16-bits: RRRRRGGGGGGBBBBB
  - 1st 64/256 VGA palette colors already set up and used by game objects
  - Other 192 colors are for you to represent the room photos
- Use arrays, not a pointer-based data structure
- Use 64 colors for the 2nd level nodes and the remaining 128 to represent the nodes in the 4th level
- Don't leave "holes"!

Octrees (continued)

1. Count the number of pixels in each node at level 4 of your octree
2. Sort the level 4 nodes based on the count and select the most frequent 128
    a. Need to keep track of the original order. How?
3. Calculate the averages for red, green, and blue separately for the most frequent 128 level 4 nodes and assign them to the palette
    a. Note that red and blue are 5 bits while green is 6 bits!
    b. You should be able to figure out the VGA index from here
4. Repeat 1-3 for level 2 nodes
    a. Remember to remove the contribution of any pixels assigned to the level 4 nodes
    b. There's a more efficient way than just simply repeating steps 1-3 again
5. Finally, reassign the colors to each pixel of the room photo