

CIS 350 – INFRASTRUCTURE TECHNOLOGIES
SMALL GROUP ACTIVITY #6

Names of group

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Topic: Chapter 11 - PCI-Express Bus and Displays

Logistics

1. Get in touch with your group. (See Groups folder on Blackboard.)
2. Discuss and complete the assignment together via E-mail, Discussion Forum, Blackboard Collaborate Ultra, and/or MS Teams.
3. Choose a recorder to prepare the final copy (one per group) and submit it via the Blackboard Assignments/Small Group Activities folder to the instructor.
4. Be sure all group members' names are on final copy. Do not add names of your group classmates who did not participate in the assignment.

Work the following problems.

1. Assume that a PCI-Express bus consists of 32 lanes. Each lane is capable of a maximum data rate of 120 MB per second. Lanes are allocated to a device 1, 2, 4, 8, 16, or 32 lanes at a time. Assume that the PCI-Express bus is connected to a high definition video card that is supporting a 2560×1440 true color (3 bytes per pixel) progressive scan Dell S3222DGM 32" monitor with a refresh rate of 100 frames per second. How many lanes will this video card require to support the monitor at full capability? You must show your calculations. Assume that 1KB = 1024 Bytes and 1MB = 1024KB.

A non-motion true color image needs: $2560 \times 1440 \times 3 = 11059200$ bytes = 10800 KB = 10.55 MB

A motion of a true color image needs: $10.55 \text{ MB} \times 100 \text{ frame/sec} = 1055 \text{ MB}$

Lanes: $1055 \text{ MB} / 120 \text{ MB} = 8.79$ lanes

Round it up to 16 lanes.

2. A 2560-pixel by 1440-pixel display is generated on a 32" diagonal Dell S3222DGM monitor.
 - (a) How many pixels/dots per inch are displayed on this monitor?
 - (b) How many pixels/dots per millimeter [mm] are displayed on this monitor?
 - (c) What is the size of an individual pixel in [mm]?

Note that 1"=25.4 mm. Approach: Use the Pythagoras theorem to calculate the number of pixels on the 32" diagonal of the monitor for a 2560-pixel by 1440-pixel display. You must show your calculations.

(a) The number of the main diagonal: $\text{sqrt}(2560^2 + 1440^2) = 2937$
The number of pixels per inch: $2937/32'' = 91.78$

(b) The number of pixels per mm: $2937/(32'' \times 25.4) = 91.78 = 3.61$

(c). The size of pixel in mm: $1/3.61 = 0.277 \text{ mm}$