End of Ch # 11 Exercises

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11.5) As described in the text, the PCI Express bus consists of 32 'lanes'. Each lane is capable of a maximum data rate of 500 MB per sec. Lanes are allocated to a device 1, 2, 3, 8, 16 or 32 lanes at a time. Assume that a PCI-bus is to be connected to a high definition video card that is supporting a 1980 × 1080 true color (3 bytes per pixel) progressive scan monitor with a refresh rate of 60 frames per second. How many lanes will this video card require to support the monitor at full capability?

Sol) Each lane has maximum Data rate of 500 MB per sec

Lanes are 1, 2, 3, 8, 16 or 32

HD video card : $1920 \times 1080 \times 3 \times 60$ (frame) bytes/sec

: 373, 249, 080 bytes/sec

= 355.9580 MB/sec

As 1 lane can support 500 MB/sec, 1 lane is enough to support 355.9580 MB/sec

11.7) How many PCI-Express busses are required to support a 10 GB per sec Ethernet card

Sol) 10 GB = 10, 240 MB

As each lane can handle 500 MB, 20.48 lanes are required.

∴ 32 lanes are used.