

Chapter 6-7 Exercises

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Chapter 6

7. What is the assembly language equivalent of each of the following binary machine language instructions? Assume that the format described in figure 6.13 and the numerical opcode values shown in figure 6.5

a. 0101 001100001100

b. 0011 000000000111

In figure 6.13, the instruction format is:

* Op Code: 4 bits

* Address: 12 bits

We can find the operation in figure 6.5

a. 0101 - SUBTRACT X

b. 0011 - ADD X

The next thing we can do is to translate the 14 bit binary address into decimal

a. 001100001100 = 780

b. 001100001100 = 7

Therefore the assembly language equivalent of a and b would be:

a. Subtract 780 -- Subtract contents of memory location 780 from whatever is in the registry and store result in registry

b. Add 7 -- Add contents of registry to contents of location 7 and store in registry.

Chapter 7

4. Determine the total time it takes to transmit an uncompressed grayscale image (with 8 bits/pixel) from a screen with a resolution of 1,280 x 840 pixels using the following media:

First, we should determine the total memory needed for the image.

To find the total pixels we can multiply the dimensions of the image:

$$1,280 * 840 = 1,075,200 \text{ pixels.}$$

Then we can calculate the total bits needed by multiplying the total pixels by 8 (8 bits per pixel):

$$1,075,200 * 8 = 8,601,600 \text{ bits total}$$

Then we can just divide the total bits by the following kbps/mbps to find the total time in seconds/minutes.

a. A 56 kbps modem

$$56 \text{ kilobits} = 56,000 \text{ bits}$$

$$8,601,600 / 56,000 = \mathbf{153.6 \text{ seconds or } 2.56 \text{ minutes}}$$

b. A 1.5 Mbps DSL line

$$1.5 \text{ Mb} = 1,500,000 \text{ bits}$$

$$8,601,600 / 1,500,000 = \mathbf{5.7344 \text{ seconds}}$$

c. A 100 Mbps Ethernet link

$$100 \text{ Megabits} = 100,000,000 \text{ bits}$$

$$8,601,600 / 100,000,000 = \mathbf{0.086016 \text{ seconds or } 86.016 \text{ milliseconds.}}$$