Introduction to Computer Science Homework#3

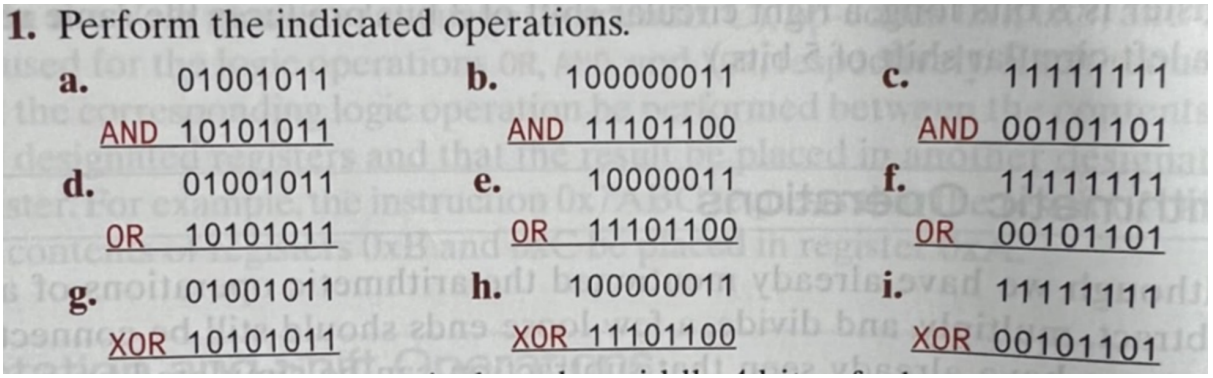
#1

What information must the CPU supply to the main memory circuitry to write a value into a memory cell?

#2

Mass storage, main memory and general-purpose registers are all storage systems. What is the difference in their use?

#3



1. Perform the indicated operations.

a. 01001011 AND 10101011	b. 100000011 AND 11101100	c. 11111111 AND 00101101
d. 01001011 OR 10101011	e. 10000011 OR 11101100	f. 11111111 OR 00101101
g. 01001011 XOR 10101011	h. 100000011 XOR 11101100	i. 11111111 XOR 00101101

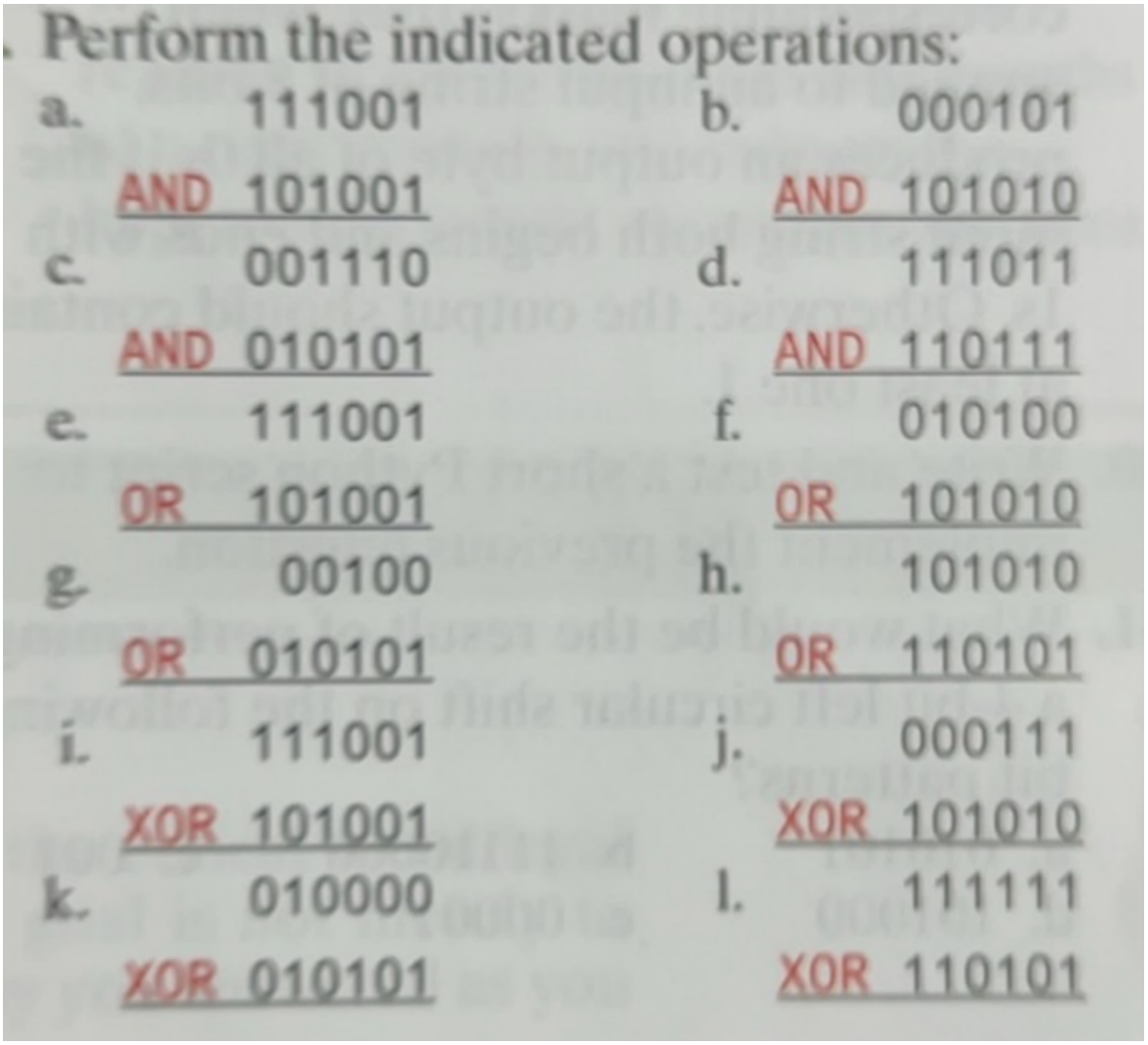
#4

Suppose three values x, y and z are stored in a machine's memory. Describe the sequence of events (loading registers from memory, saving values in memory and so on) that leads to the computation of x+y+z. How about (2x)+y?

#5

Suppose a machine language is designed with an op-code field of 4 bits. How many different instruction types can the language contain? What if the op-code field is increased to 6 bits?

#6



#7

Identify a logical operation (along with a corresponding mask) that, when applied to an input string of 8 bits, produces an output string of all 0s if and only if the input string is 10000001.

#8

Suppose a machine has 200 GB of storage space available on a hard disk and receives data over a broadband connection at the rate of 15 Mbps. At this rate, how long will it take to fill the available storage space?

#9

Summarize the difference between a CISC architecture and a RICS architecture.

#10

We assume that integers are in 2’s complement format. Mathematically, we show the operation as:

$$C = A + B$$

Therefore, writing a simple program to do the simple addition needs 5 instructions.

#11

What is the purpose of cache memory?

#12

What are the components of a CPU?

#13

A computer has 32 MB of memory. How many bits are needed to address any single byte in memory?

#14

Assume the right shift operation is >> and the left operation is <<. So use the shift operation to divide an integer by 4 and to multiply an integer by 16.