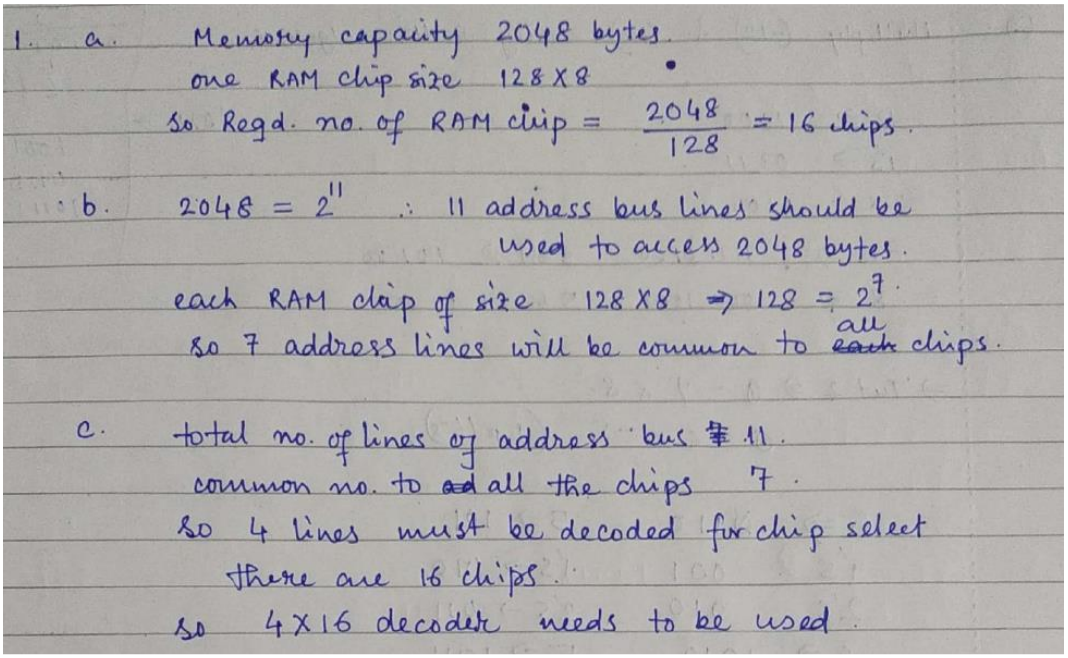
Practice Set 1:

1. a. How many 128 × 8 RAM chips are required to provide a memory capacity of 2048 Bytes? You can assume the size of one memory location is 1 Byte.

   b. How many lines of the address bus must be used to access 2048 Bytes of memory? How many of these lines will be common to all chips?

   c. How many lines must be decoded for chip select? Specify the size of the decoders.



2. A type of Minicomputer has 18 address signals and of course, the 18-bit address bus. Answer the following questions:

   a) What was the address space of these computers?

   b) What may have been the largest possible memory of these computers in bytes if the memory location is 1 Byte?

   c) What would be needed to change in these computers if we would like to increase address space 8-times?

Solution:

a) 2 ^ 18 = 2 ^ 8 * 2 ^ 10 = 256k (2 ^ 10 = 1K, 2 ^ 20 = 1M, 2 ^ 30 = 1G, 2 ^ 40 = 1T ...)

b) 2 ^ 18B = 256KB

c) add 3 address signals towards the higher order bits. ($x / 2^{18} = 8 \Rightarrow x = 2^{18}.2^3 = 2^{21}$)