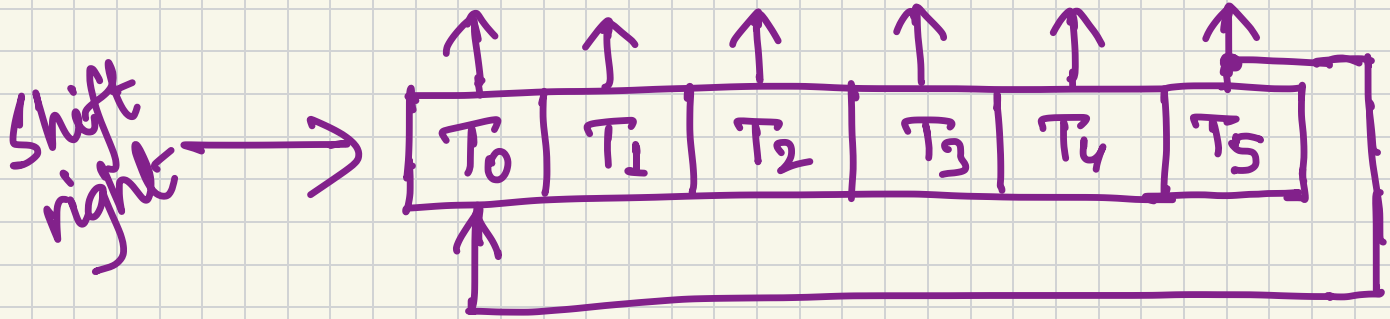
Quiz 5 (Solution)

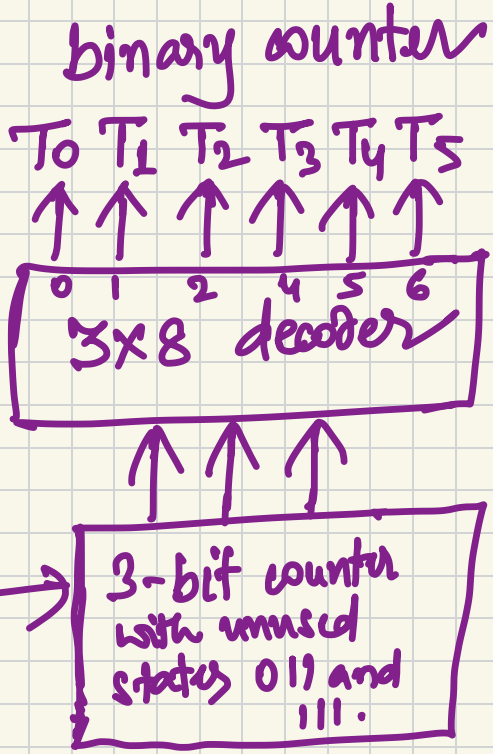
1. a) We can use a 6-bit ring counter.



6-bit Ring Counter (Initial value 100000)

There are no AND gates needed in this design.

b) We could use a 3-bit binary counter with 2 unused states (for example, see the state table 6.7 in the book).



The decoder would need 8 3-input AND gates if we use a standard 3-to-8-line decoder.

2. 128 K x 8 RAM can store $2^7 \times 2^{10}$ words of 8 bits each. This equals 2^{17} bytes.

Therefore, to provide a memory of

2^M bytes $= 2 \times 2^{20}$ bytes

$= 2^{21}$ bytes, we need 2^4 such chips.

No. of address lines required = 4 (for deciding the chip) + 17 for deciding the word in that chip

= 21. Ans.