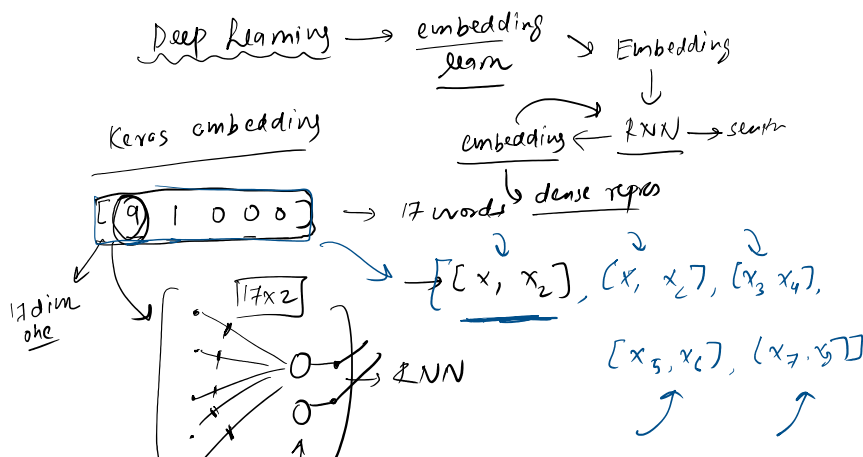


Let say vocab size is 1000 , then a word is represented as [0,1,,,,,,,,,0] (sparse), but in embedding it is like [0,7 0.1 0.3] (dense).

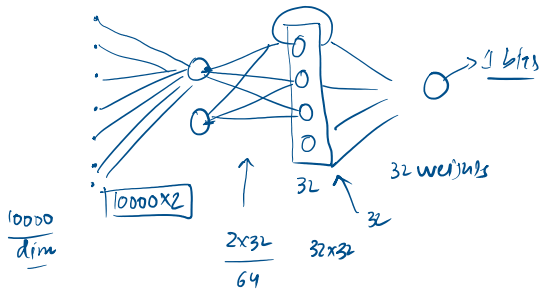
Silly for seq length like when padded then so many 0's , lead to sparse , check review wala example. Also these non-zero values , denote some semantic meanings.

For example : (if 3 values , then one may denote grammar , punctuation etc , just as a example)





7 nodes



Step 1: Input X  $\Rightarrow$  (2,3)  $\Rightarrow$  batch\_size=2, seq\_len=3  
 Step 2: Weight Matrix  $\Rightarrow$  (8,4)  $\Rightarrow$  embedding\_dim=4  
 Step 3: Output  $\Rightarrow$  (2,3,4)  $\Rightarrow$  embeddings for each token

Actually its like loopup which access index ,  
 there is no such one hot encoding happens inside.

population in 9th year  $\leftarrow x$

$$\frac{x + 10\% \text{ of } x}{x + 0.1x} = 10000$$

$t(n-1)$

$$\frac{x-1}{x} + \frac{1}{2} \left( \frac{x-1}{x} \right)^2 + \frac{1}{3} \left( \frac{x-1}{x} \right)^3 + \frac{1}{4} \left( \frac{x-1}{x} \right)^4 + \dots$$

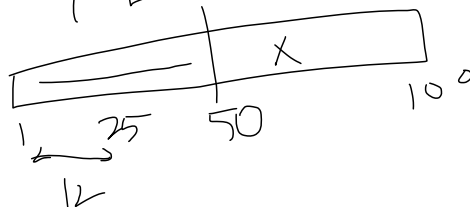
$$\frac{1.1x}{1.1} = 10000$$

$$+ (n-1) + 2 +$$



$A[35] \rightarrow t \text{ sec}$   
 $A[35] \rightarrow$

35  $\rightarrow 1 \times 4 \times 35$



$O(n)$

$O(n^2) \rightarrow$  nested loops

input  $\rightarrow 10$   
 time  $\rightarrow 10 \times 10$   
 $O(n^2)$

Binary Search

1 - 100  $\rightarrow$  (6)