Review				Sentiment
x_1 [movie] [was] [good]				1
x_{11} x_{12} x_{13}				
x_2 movie was [bad]				0
x_{21} x_{22} x_{23}				
x_3 movie was [not] good				0
x_{31} x_{32} x_{33} x_{34}				

5 unique words in the dataset

movie: $[1\ 0\ 0\ 0\ 0]$
was: $[0\ 1\ 0\ 0\ 0]$
· good: $[0\ 0\ 1\ 0\ 0]$ } Vectorized the 5 unique words using one hot encoding.
bad: $[0\ 0\ 0\ 1\ 0]$
not: $[0\ 0\ 0\ 0\ 1]$

timestamp $t=1$

1
0
(movie) 0
0
0    $W_i = (5 \times 3)$

} Initial feedback for timestamp $t=1$
Could be $=0$ or any random no.
(1×3)

$W_h = (3 \times 3) \rightarrow$ Recurring feedback for hidden recurrent layer

timestamp $t=2$

0
1
(was) 0
0
0    $W_i = (5 \times 3)$
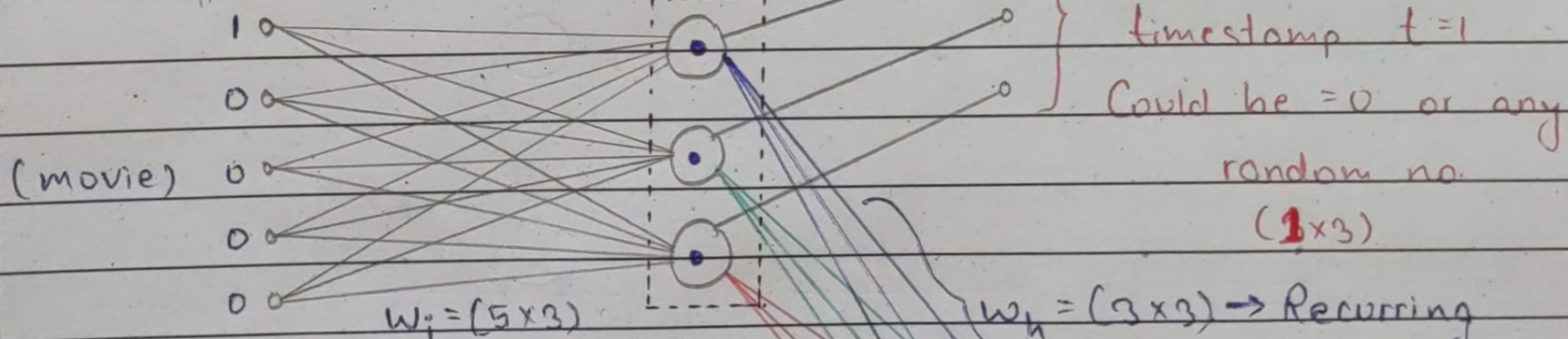
Recurrent hidden layer
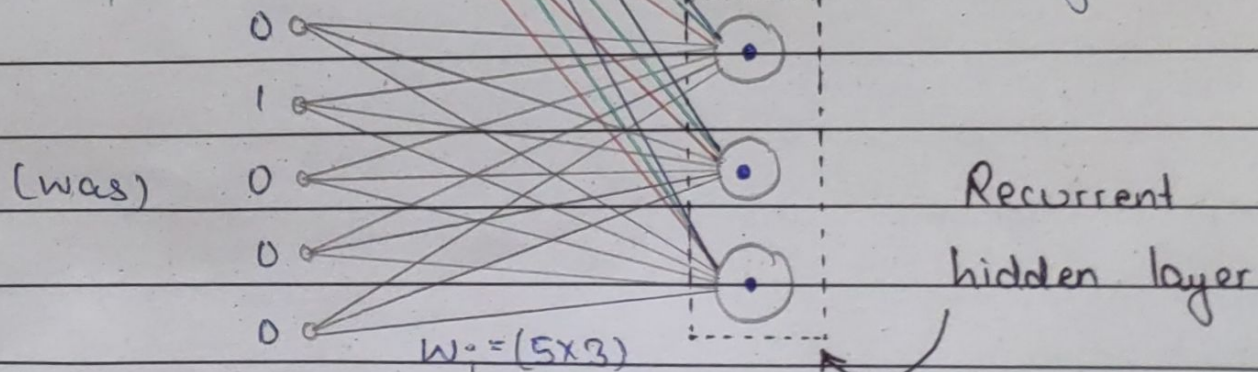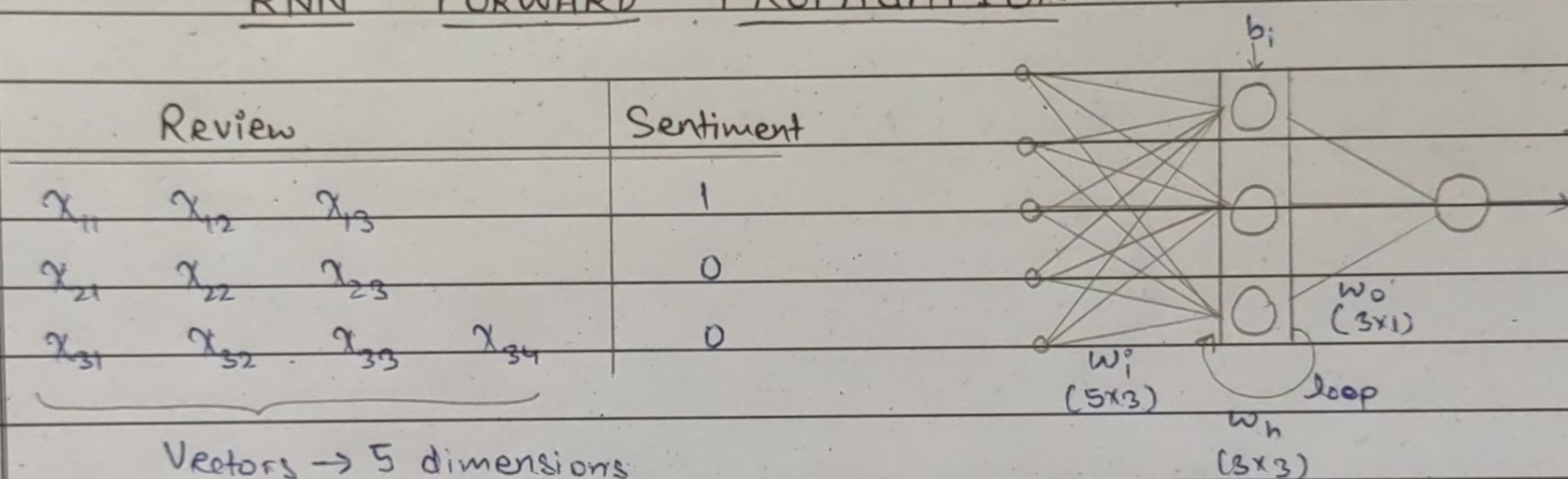
A feedback is the activation output of the nodes in a recurrent hidden layer that is recursively passed to all the nodes of that layer until last time step is reached of the given sequential datapoint. Activation functions are typically tanh or ReLU.

RNN FORWARD PROPAGATION

Review				Sentiment
x_{11}	x_{12}	x_{13}		1
x_{21}	x_{22}	x_{23}		0
x_{31}	x_{32}	x_{33}	x_{34}	0

Vectors → 5 dimensions

Vectors are passed into the RNN one-by-one

Unfolding through time: Recursively passing feedbacks into the recurrent hidden layer in a loop until timestep ends for a given sequential datapoint.
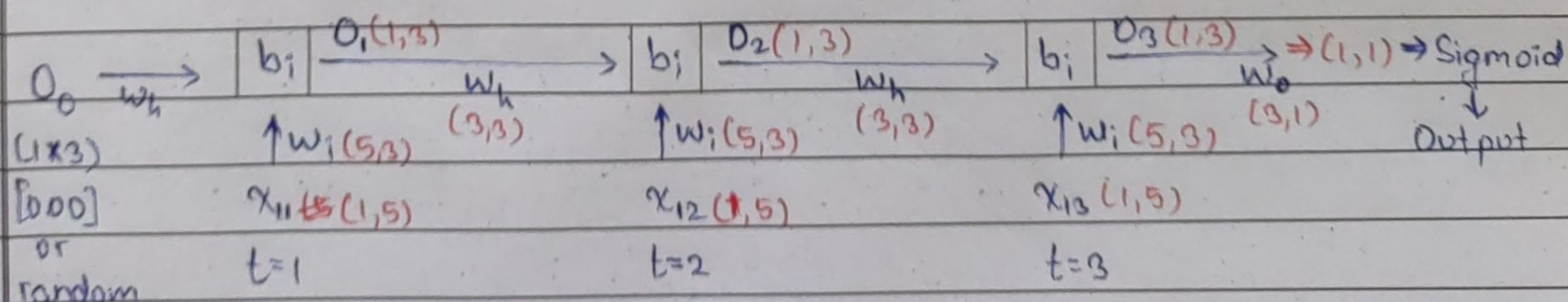
$O_1 = x_{11} W_i + O_0 W_h + b_i \qquad O_2 = x_{12} W_i + O_1 W_h + b_i \qquad O_3 = x_{13} W_i + O_2 W_h + b_i$

W_i = Input weights, W_h = feedback loop weights

b_i = Biases of recurrent hidden layer nodes

O_0, O_1, O_2, O_3 = Weighted feedbacks of recurrent hidden layer