Question 1

Question 1. A boolean function having n=2 variables have 2^(2^n) = 16 functions where 14 are linearly separable only 2 of them are not they are (XOR and XNOR). So for n =3 variable there will be 2^(2^3)= 2^8 = 256 functions. There are 152 functions are not linearly separable. Can you find a boolean function in terms of a,b,c 3 boolean variables to form any function that is linearly separable. You may think of feature map. Can you find the generic formula for any number of N.

N = 2 linearly not separable 2
N = 3 linearly not separable 152
N=4 ??
N=5 ??

Implement the following boolean logic with perceptron network.

$$F(A,B,C) = AB' + BA' + BC' + CB'$$

Where A,B,C are inputs and F is the output. You can assume each neuron with threshold 2. Is it linearly separable?? Explain please.

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Question 2

Write the core difference of RNN ,Peephole-LSTM and GRU? What is the basic difference of LSTM forget gate and GRU's reset gate. Show the matrix workflow of the LSTM.

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Question 3

What is update gate and reset gate of GRU(Gated Recurrent Unit)? What is the difference of the work flow of LSTM and GRU? Show your reasons why GRU is faster in compare to RNN??

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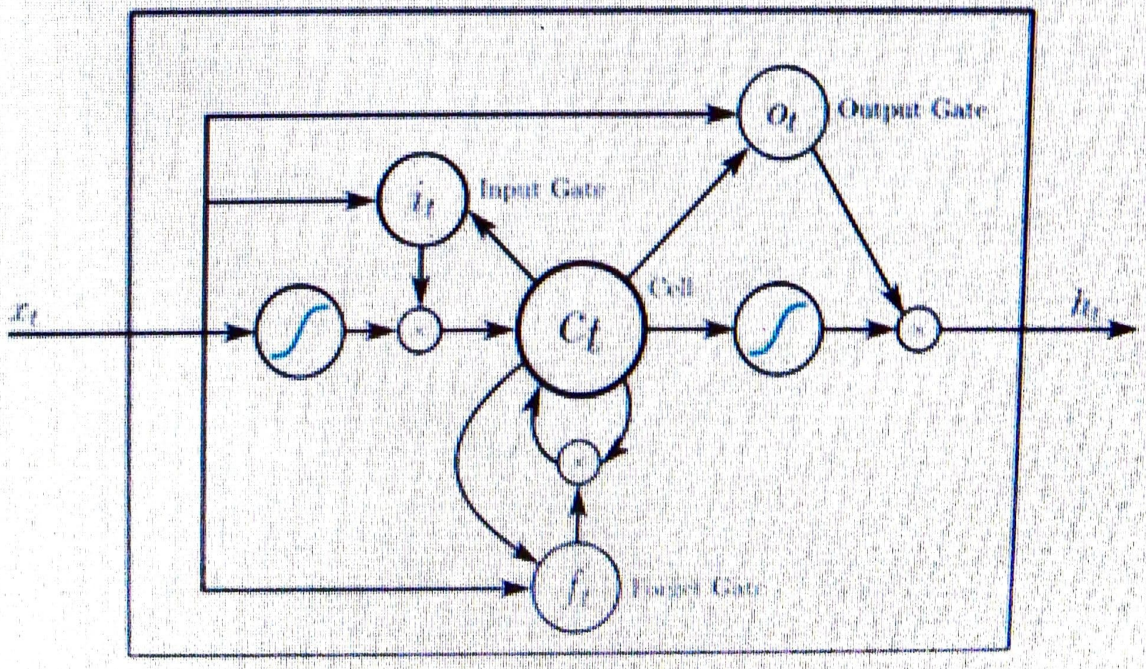
Question 4

Q 1. What is vanishing gradient problem? How does LSTM solve the vanishing gradient problem? Explain your answer with help of cell gates.



LSTM cell Structure

Question 5

Draw a RNN network for the following scenario.

In the lockdown you are gaining weight by sitting idle in the home. So you decided to go to gym after the lockdown. The gym is equipped with lots of heavy lifting equipments. As you are no clue where to start your instructor tries to help you in first by showing you the equipments which you can use first and which day you can use it.

Equipment list :

Telehandler>Bulldozer>Forklift>ScissorLift
Most heavy .....Least heavy

As you are fancy dresser you would like to do the lifting with the mode of your dressing. The brighter the dress color you wear the more heavy lift you are lifting. If you heavy lift on the previous day you won't lift heavy on next day. You have dress color (black <white< red <yellow) with respective brightness mostly yellow and less black. So decide the input and output of the weight-lifting sequence. You can test your designed RNN with some specific input output. Necessary calculations need to be shown.

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