शिक्षा मंत्रालय
MINISTRY OF
EDUCATION
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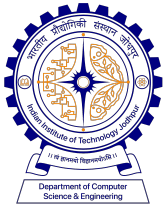
INDIAN INSTITUTE OF TECHNOLOGY
JODHPUR

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NPTEL



PMRF
Prime Minister's Research Fellowship

Week 6 - Live Session

Data Mining

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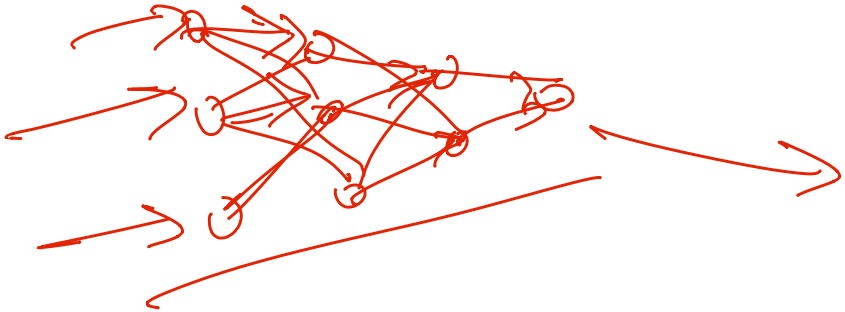
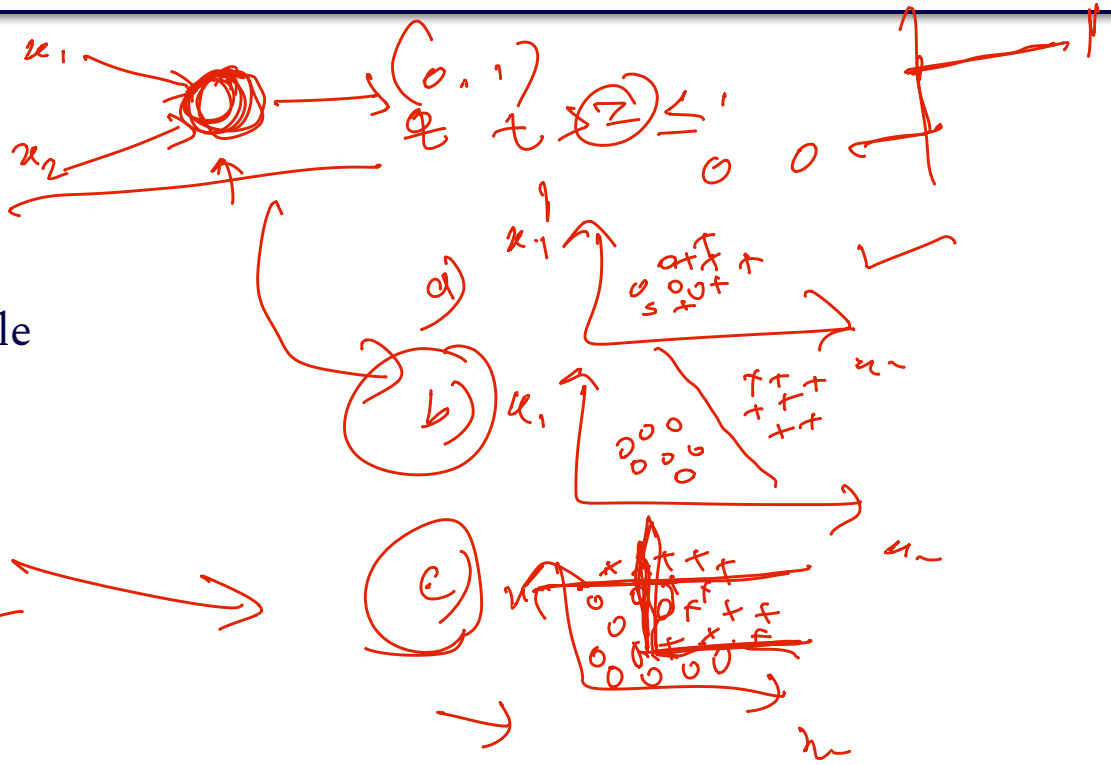
Q1. Artificial neural networks can be used for:

a) Pattern Recognition
b) Classification
c) Clustering
d) All of the above

Q2. A perceptron can correctly classify instances into two classes where the classes are:

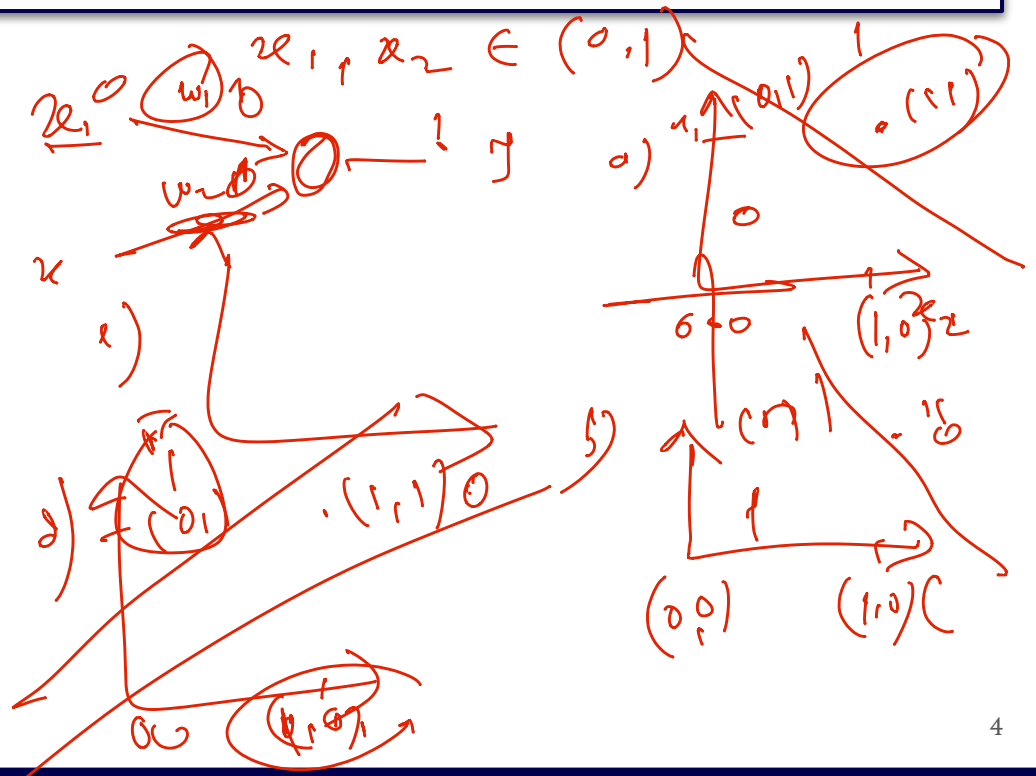
a) Overlapping
b) Linearly separable
c) Non-linearly separable
d) None of the above





Q3. The logic function that cannot be implemented by a perceptron having two inputs is?

a) AND
b) OR
c) NOR
d) XOR



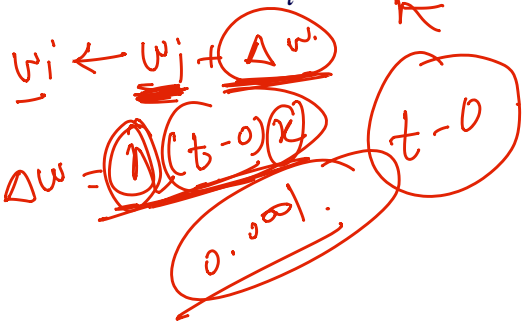
Q4. A training input x is used for a perceptron learning rule. The desired output is t, and the actual output is o. If the learning rate is η, the weight update performed by the learning rule is described by?

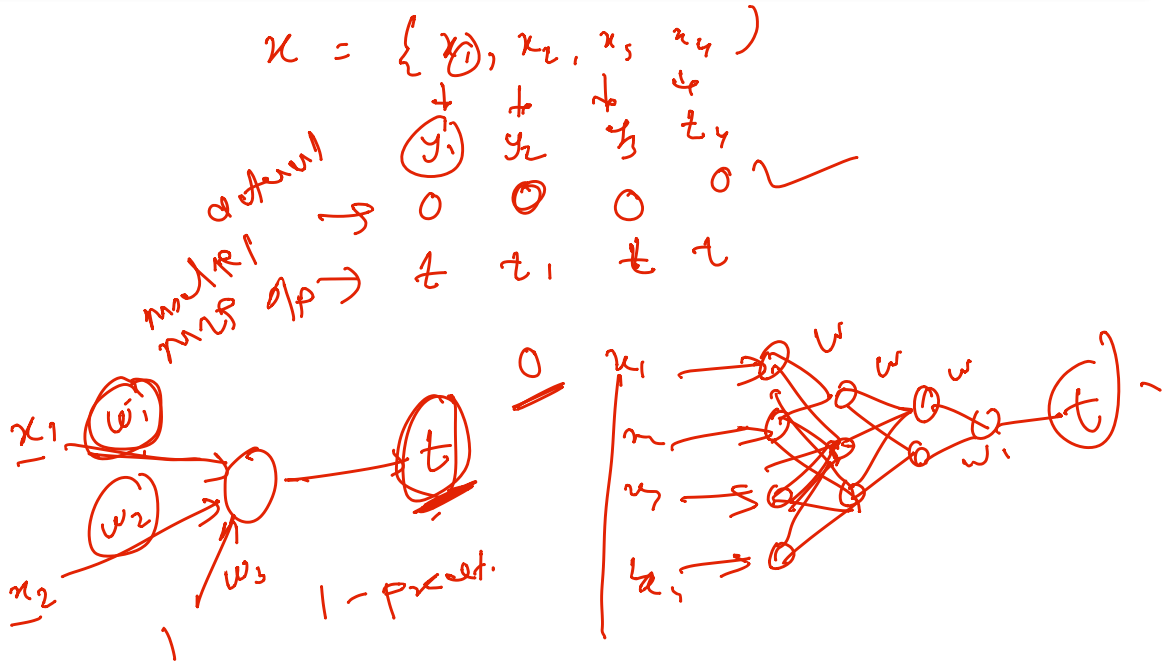
a) $w_i \leftarrow w_i + \eta(t - o)$

b) $w_i \leftarrow w_i + \eta(t - o)\, x$

c) $w_i \leftarrow \eta(t - o)\, x$

d) $w_i \leftarrow wi + (t - o)\, x$





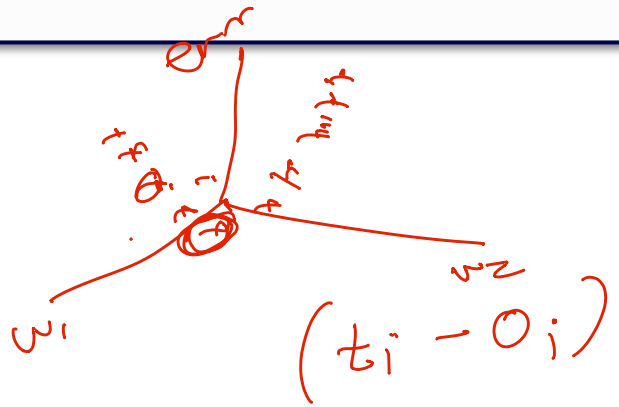
Q5. Suppose we have n training examples x_i, $i=1...n$, whose desired outputs are t_i, $i=1...n$. The output of a perceptron for these training examples x_i's are o_i, $i=1...n$. The error function minimized by the gradient descend perceptron learning algorithm is:

a. $$E = \frac{1}{2}\sum_{i=1}^{n}(t_i + o_i)$$

b. $$E = \frac{1}{2}\sum_{i=1}^{n}(t_i + o_i)^2$$

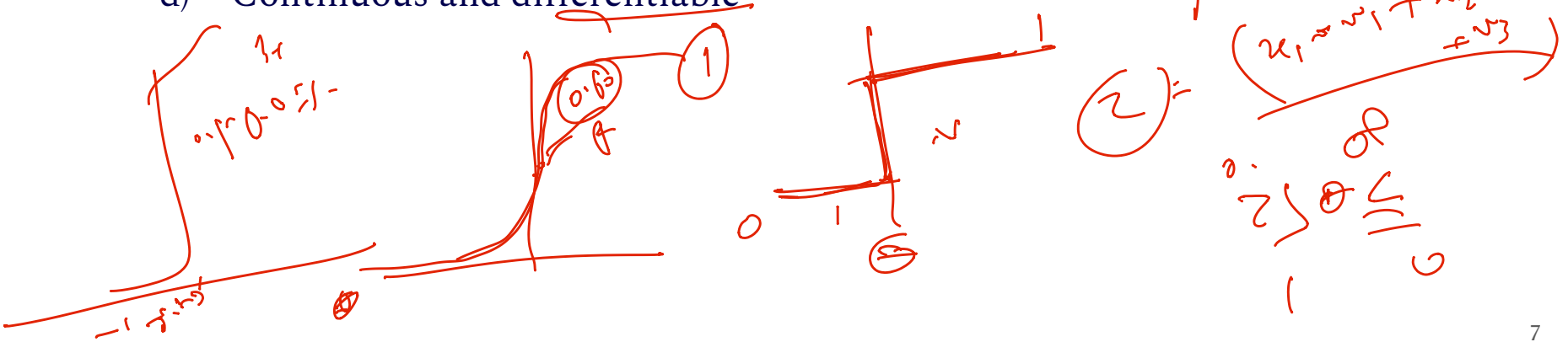
c. $$E = \frac{1}{2}\sum_{i=1}^{n}(t_i - o_i)^2$$

d. $$E = \frac{1}{2}\sum_{i=1}^{n}(t_i - o_i)$$

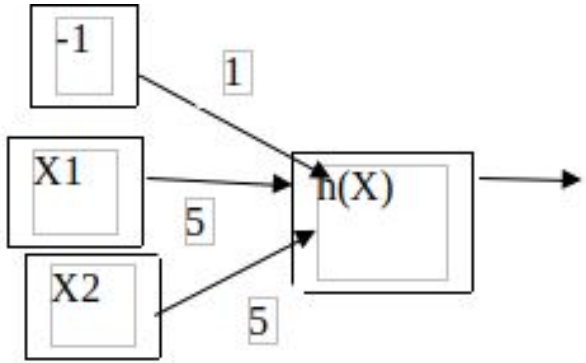


Q6. The *tanh* activation function $h(z) = \dfrac{2}{1+e^{-2z}} - 1$ is:

a) Discontinuous and not differentiable
b) Discontinuous but differentiable
c) Continuous but not differentiable
d) Continuous and differentiable



Q7. The neural network given below takes two binary valued inputs *x1, x2* ϵ *{0,1}* and the activation function is the binary threshold function (*h(z)=1* if z>0; 0 otherwise).
Which of the following logical functions does it compute?



a) OR
b) AND
c) NAND
d) NOR

$h(x) = x_1 w_1 + x_2 w_2 - 1$

$= x_1 5 + x_2 5 - 1$

$(x_1=0, x_2=1) = 5 - 1 = 4 \Rightarrow 0$

$= 5 \cdot 1 = 4 \Rightarrow 1$

$= 0 - 1 = -1 \Rightarrow 0$

$= 5 + 5 - 1 = 9 \Rightarrow 1$

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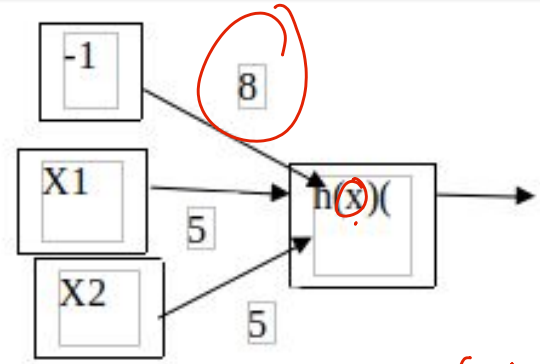
Q8. The neural network given below takes two binary valued inputs $x1, x2 \in \{0,1\}$ and the activation function is the binary threshold function ($h(z)=1$ if $z>0$; 0 otherwise).

Which of the following logical functions does it compute?



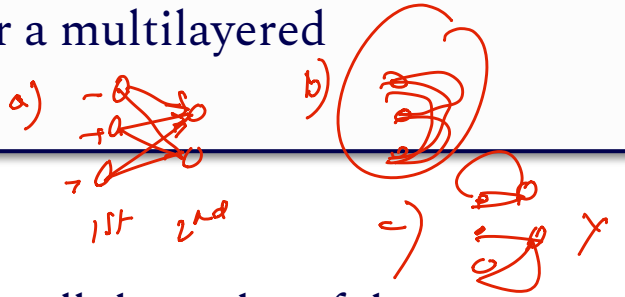
a) OR

b) AND

c) NAND

d) NOR

Q9. Which of the following statement is true for a multilayered perceptron?



a) Output of all the nodes of a layer is input to all the nodes of the next layer

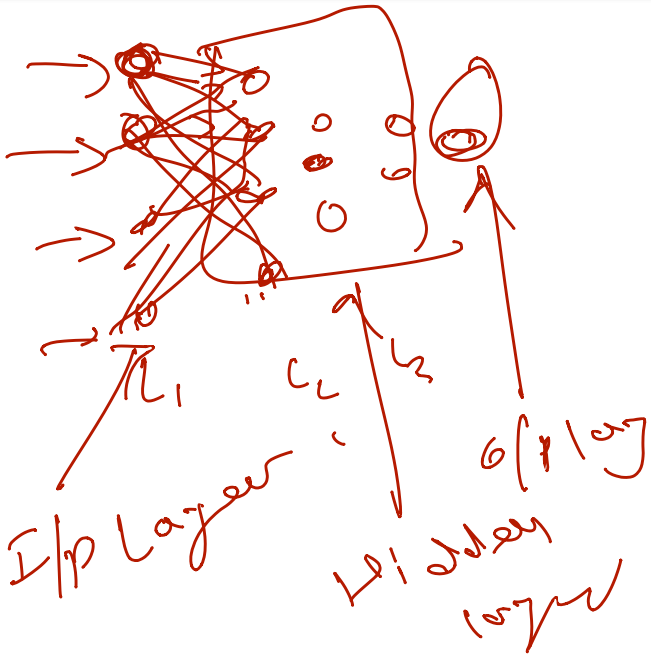
b) Output of all the nodes of a layer is input to all the nodes of the same layer

c) Output of all the nodes of a layer is input to all the nodes of the previous layer

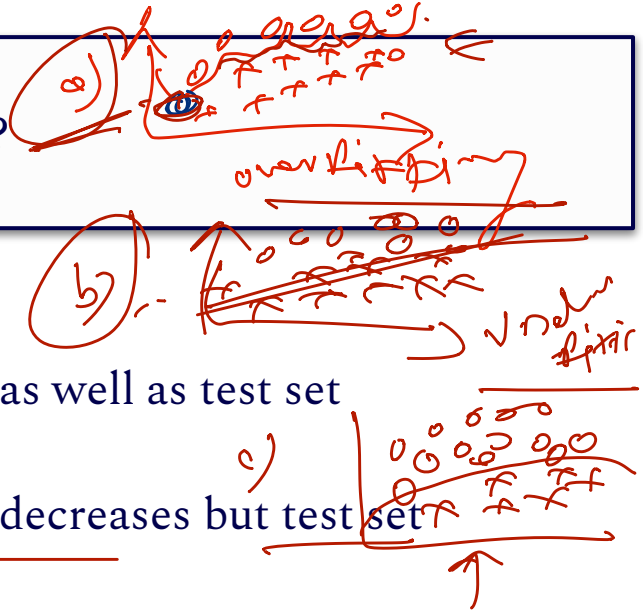
d) Output of all the nodes of a layer is input to all the nodes of the output layer

Q10. A multi-layered perceptron is usually trained using:

a) Margin maximization algorithm
b) Single linkage algorithm
c) Belief propagation algorithm
d) Backpropagation algorithm



Q11. Overfitting is expected when we observe that?



a) With training iterations, error on training set as well as test set decreases
b) With training iterations, error on training set decreases but test set increases
c) With training iterations, error on training set as well as test set increases
d) With training iterations, the training set as well as test set error remain constant