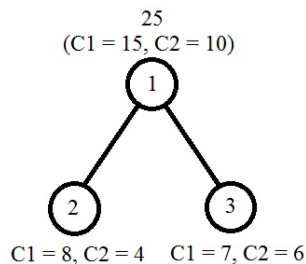


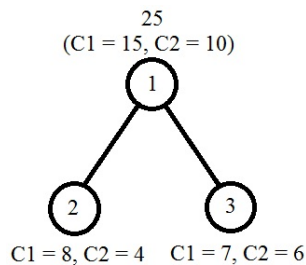
Assignment questions on lecture 13

Answer all Questions.

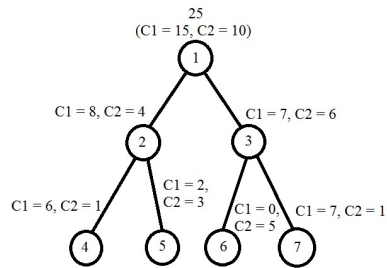
1. Calculate entropy at nodes 1, 2 and 3 of the decision tree shown below.



- (a) -0.30, -0.28, -0.29
 (b) 0.30, 0.28, 0.29
 (c) 0.29, 0.28, 0.30
 (d) -0.29, -0.28, -0.30
2. Calculate the value of information gain at last layer of the decision tree shown below.



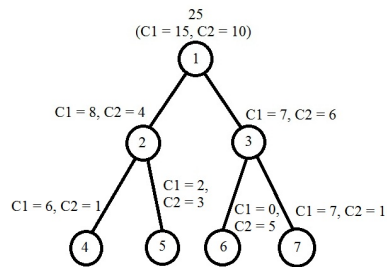
- (a) 0
 (b) -0.29
 (c) 0.29
 (d) None of the above
3. In the decision tree shown below, which nodes of the last layer will split further?
- (a) 4, 5, 6
 (b) 4, 5, 7



(c) 4, 5

(d) All nodes

4. Calculate entropy at nodes 4, 5, 6 and 7 of the decision tree shown below.



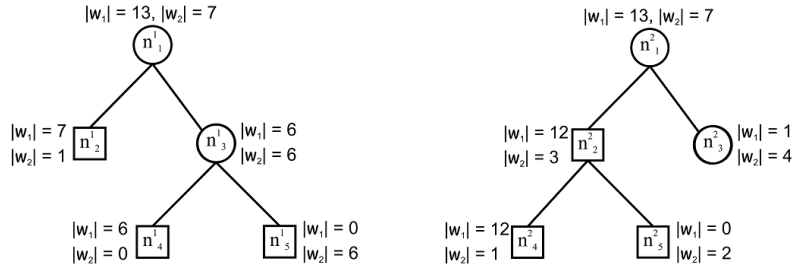
(a) 0.18, 0.29, 0, 0.16

(b) -0.18, -0.29, 0, -0.16

(c) 0.18, 0.29, 0.13, 0.16

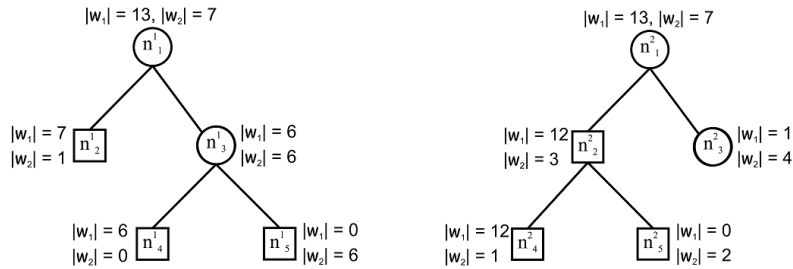
(d) -0.18, -0.29, -0.13, -0.16

5. What are the entropy at the node $\{n_2^1, n_4^1, n_5^1, n_3^2, n_4^2, n_5^2\}$ of 1st and 2nd tree :



- (a) 0.118, 0.217, 0.164, 0, 0.456, 0.756
(b) 0.164, 0, 0, 0.217, 0, 0
(c) 0.217, 0, 0, 0.164, 0.118, 0
(d) 0.164, 0, 0, 0.217, 0.118, 0

6. What is the value of information gains at decision node n_3^1 and n_2^2 :

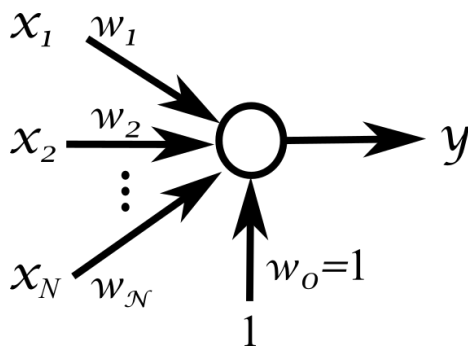


- (a) 0.246, 0.115
(b) 0.115, 0.246
(c) 0, 0.115
(d) 0.246, 0

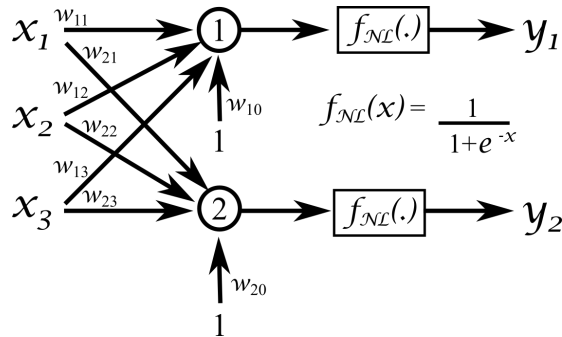
7. What are the values of posterior probability of $p(w_1, n_5^1), p(w_2, n_5^1), p(w_1, n_5^2)$ and $p(w_2, n_5^2)$

- (a) 0, 1, 0.5, 0.5
(b) 0.5, 0.5, 0.5, 0.5
(c) 0, 1, 0, 1
(d) 0.5, 0.5, 0, 1

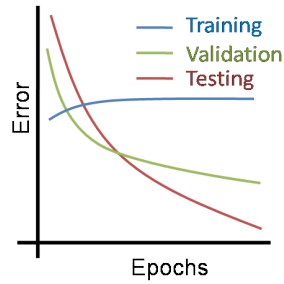
8. What are the values of posterior probability of *class1* and *class2* for the total forest. Assume the forest consists of 5 trees and the posterior probability for *class1* are $\{0.375, 0.625, 0.5, 0.555, 0.667\}$ and *class2* are $\{0.625, 0.375, 0.5, 0.445, 0.333\}$.
- (a) 0.375, 0.333
 (b) 0.46, 0.54
 (c) 0.667, 0.625
 (d) 0.54, 0.46
9. The neuron shown below has weights w_1, w_2, \dots, w_N and inputs x_1, x_2, \dots, x_N . The output y can be expressed as,



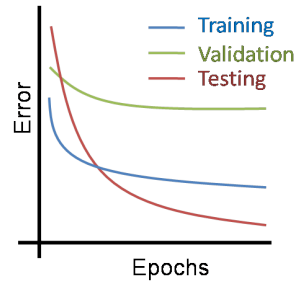
- (a) $y = \sum_{i=1}^N w_i x_i$
 (b) $y = w_0 + \sum_{i=1}^N w_i x_i$
 (c) $y = \sum_{i=1}^N w_i x_i^2$
 (d) None of these
10. For $y = f(x)$, where $f(x) = \frac{1}{1+e^{-x}}$, $\frac{\partial y}{\partial x}$ is given by,
- (a) $(1 - y)^2$
 (b) $y(1 - y)^2$
 (c) $y^2(1 - y)$
 (d) $y(1 - y)$
11. For the network shown below, find $J(W)$ for $w_{10} = 0.2, w_{20} = 0.05, w_{11} = 0.1, w_{21} = 0.05, w_{12} = 0.15, w_{22} = 0.01, w_{13} = 0.3, w_{23} = 0.03, X = [1 \ 2 \ 3]^T$ and $Y = [1 \ 0]^T$.
- (a) 0
 (b) 0.78
 (c) 0.61
 (d) None of these



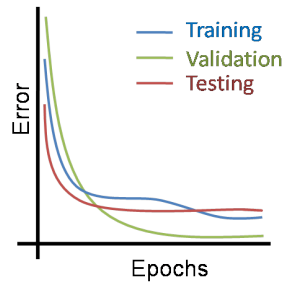
12. Which among the following error curves indicate faster convergence rate?



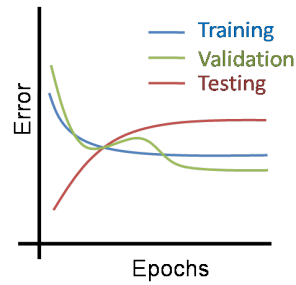
A



B



C



D

- (a) A
- (b) B
- (c) C
- (d) D

13. Out of the networks A, B, C, D, identify which are deep neural networks. A-Convolutional Neural Network, B-Support Vector Machine, C-Autoencoder, D-Deep Belief Network

- (a) A and D
 - (b) A, C and D
 - (c) A, D and B
 - (d) A, B, C and D
14. State whether the following statement is *True* or *False*. Deep learning does not require extraction of hand-crafted features for the task of classification, regression etc.
- (a) True
 - (b) False
15. Consider the following code snippet written using Torch library and answer the question that follows:
- ```
net = nn.Sequential()
net.add(nn.SpatialConvolution(3,6,5,5,1,1,0,0))
```
- For an image  $\mathcal{I}$  of size  $3 \times 32 \times 32$ , what would be the output of the network (mentioned as *net* in the code snippet)?
- (a)  $6 \times 28 \times 28$
  - (b)  $3 \times 28 \times 28$
  - (c)  $3 \times 32 \times 32$
  - (d)  $6 \times 32 \times 32$
16. Consider the following code snippet written using Torch library and answer the question that follows:
- ```
net = nn.Sequential()
net = add(nn.SpatialConvolution(3,6,5,5,1,1,0,0))
net.add(nn.View(4704))
net.add(nn.Linear(4704,120))
```
- For an image \mathcal{I} of size $3 \times 32 \times 32$, what would be the output of the network (mentioned as *net* in the code snippet)?
- (a) 4704
 - (b) 60
 - (c) 120
 - (d) None of these
17. Give the full form of RNN in the context of deep learning
- (a) Recursive Neural Network
 - (b) Reversed Neural Network
 - (c) Residual Neural Network
 - (d) Recurrent Neural Network

18. Give the full form of LSTM in the context of deep learning
- (a) Long Short Time Memory
 - (b) Long Short Term Memory
 - (c) Long Short Time Module
 - (d) Lucky Short Time Management
19. Restricted Boltzmann Machine (RBM) is a type of:
- (a) Belief Network
 - (b) Autoencoder
 - (c) Convolutional Neural Network
 - (d) Recurrent Neural Network
20. From the given list of neural networks, identify which are Convolutional Neural Networks A - U-Nets, B - Convolutional Autoencoder, C - Res-Net, D - GoogLeNet
- (a) B, C, D
 - (b) A, C, D
 - (c) Only D
 - (d) A, B, C, D

End