What is the fundamental difference between shallow and deep learning?
Shallow learning we have have input layer and output layer whereas in deep learning we have input layer ,output layer and many hidden layers.The main difference is that the deep leep learning works as neural network which is similar to human brain with neuron.

Can you explain the concept of backpropagation and its significance in training neural networks?
In each layer of a neural network the input of before layer passed into the next layer and each layer has weights for each neuron and with bias likewise in the output layer we get the output.Based on the error in the output layer the backpropagation is makes changes in the weights and bias to reduce the error in the output,this is known as back propagation.

What is the vanishing gradient problem, and how does it affect training in deep neural networks?
The vanishing gradient problem is that when we are using gradient descent as optimizer the step size should not be very small since if its very small the gradient becomes like vanishing ,the can be resolved by taking stepsize good for minizmising the error.

Describe the purpose and function of activation functions in neural networks
The activation function in the neural network works in the hidden layer.for each hidden layer we have to give an activation function such that it makes which neurons the hidden should contribute for the prediction in other words from which neurons should the input should be passed to the next layer. .

What are some common activation functions used in deep learning, and when would you choose one over another?
The common activation function are sigmoid,Relu,leaky relu,,tanH.sigmoid is used in the last layer if our problem is binary classification.relu and tanH are used any problems.

Explain the concept of overfitting in deep learning models and methods to prevent it.
The overfitting in deep learning is such that the model is perfectly fitted to the training set and it is gives less error for training set but for test set it gives high errors.To prevent overfitting we can change the weights and bias such that error for train and test set is more or less equal.

What is dropout regularization, and how does it work to prevent overfitting?
The dropout regularisation is adding extra biases in between the layers such it will prevent the overefiting model.

What is the role of convolutional layers in convolutional neural networks (CNNs), and how do they differ from fully connected layers?
The convolutional layers contains filters of some matrix mxm such it is dot productted to the input matix of the image such that the resultant will have less size matrix.which will get into pooling layer.

What is the purpose of pooling layers in CNNs, and how do they help in feature extraction?

The pooping layer takes the matix from the before layer dives them into some mxm matrices finding average or max or min inthose matrices and create new matrix from the values.

Describe the architecture of a recurrent neural network (RNN) and its applications in sequential data analysis.

The recurrent neural network similar to other neural network such that the input inputs in each is append on to the next layer and it the memory also passed to each layers and the output layer in based on the errors using its memory it changes the weights and bias .

Explain YoLo Algorithm in depth along with it's real life applications.

The yolo algorithm is a cnn algorithm and it divides each input image into grid cell and for each it predicts the probability of presence of an object and the bounding box of the object.This is singl layer.The main application is object detection in images.