

## Reasons for Exploding Gradients:

1. **Deep Networks:** In very deep networks, the gradients can grow exponentially during backpropagation due to repeated multiplication of large weights.
2. **Poor Weight Initialization:** If weights are not properly initialized, they can start off too large, leading to large gradients.
3. **Learning Rate:** A very high learning rate can cause the weights to change too drastically, resulting in exploding gradients.
4. **Lack of Regularization:** Without regularization techniques, the model can overfit and gradients can become unstable.

## Techniques to Reduce Exploding Gradients:

1. **Gradient Clipping:** Limit the gradients to a certain threshold during backpropagation.
2. **Proper Weight Initialization:** Use appropriate weight initialization methods like He initialization or Xavier initialization.
3. **Normalization Techniques:** Use techniques like Batch Normalization or Layer Normalization to stabilize the learning process.
4. **Adjust Learning Rate:** Use a smaller learning rate or learning rate schedules to control the update step size.
5. **Regularization:** Techniques like L2 regularization (weight decay) can help in keeping the weights under control.
6. **Residual Networks:** Use architectures like Residual Networks (ResNets) which help in mitigating the issue of exploding gradients by using skip connections.

