Here's a list of 100 practical questions covering Deep Learning frameworks (Keras, TensorFlow, PyTorch, MXNet, etc.), categorized for hands-on understanding:

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1. TensorFlow & Keras (30 Questions)
Basics & Model Building
1. How do you create a simple neural network in TensorFlow using `tf.keras`?
2. What is the difference between `tf.keras.Sequential` and `tf.keras.Model`?
3. How do you add layers (Dense, Conv2D, LSTM) in Keras?
4. How do you define custom loss functions in TensorFlow?
5. How do you use `Lambda` layers in Keras?
6. What is the difference between `model.compile()` and `model.fit()`?
7. How do you implement dropout and batch normalization in Keras?
8. How do you save and load a Keras model?
9. What is the difference between `model.save()` and `tf.saved_model.save()`?
10. How do you visualize a TensorFlow/Keras model architecture?

Training & Optimization
11. How do you use callbacks (e.g., `ModelCheckpoint`, `EarlyStopping`) in Keras?
12. How do you implement learning rate scheduling in TensorFlow?
13. How do you monitor training using TensorBoard?
14. How do you use mixed-precision training in TensorFlow?
15. How do you implement gradient clipping in Keras?
16. How do you use `tf.data.Dataset` for efficient data loading?
17. How do you handle imbalanced datasets in TensorFlow?
18. How do you implement transfer learning using pre-trained models (e.g., ResNet, BERT)?
19. How do you fine-tune a pre-trained model without overfitting?
20. How do you debug NaN losses in TensorFlow?

Deployment & Inference
21. How do you convert a Keras model to TensorFlow Lite (TFLite)?
22. How do you optimize a TensorFlow model with TensorRT?
23. How do you deploy a TensorFlow model as a REST API using Flask?
24. How do you use `tf.serving` for model deployment?
25. How do you quantize a TensorFlow model for edge devices?
26. How do you run inference on a GPU using TensorFlow?
27. How do you batch predictions for efficiency?
28. How do you handle model versioning in production?
29. How do you use ONNX to convert a TensorFlow model to PyTorch?
30. How do you profile TensorFlow model performance?

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## 2. PyTorch (30 Questions)

### Basics & Model Building

31. How do you create a neural network using `torch.nn.Module`?
32. What is the difference between `torch.Tensor` and `torch.tensor`?
33. How do you move a PyTorch model to GPU?
34. How do you define custom loss functions in PyTorch?
35. How do you implement a custom layer in PyTorch?
36. How do you save and load a PyTorch model (`state_dict` vs. full model)?
37. How do you use `DataLoader` and `Dataset` for efficient data loading?
38. How do you visualize a PyTorch model architecture?
39. How do you implement weight initialization in PyTorch?
40. How do you use `torch.jit.script` for model optimization?

### Training & Optimization

41. How do you implement a training loop in PyTorch?
42. How do you use `torch.optim` optimizers (SGD, Adam, etc.)?
43. How do you implement learning rate scheduling in PyTorch?
44. How do you use mixed-precision training with `torch.cuda.amp`?
45. How do you implement gradient clipping in PyTorch?
46. How do you use `torch.utils.tensorboard` for logging?
47. How do you implement early stopping in PyTorch?
48. How do you debug CUDA memory issues in PyTorch?
49. How do you implement distributed training with `DistributedDataParallel`?
50. How do you fine-tune a Hugging Face transformer in PyTorch?

### Deployment & Inference

51. How do you convert a PyTorch model to TorchScript?
52. How do you deploy a PyTorch model using Flask/FastAPI?
53. How do you optimize a PyTorch model with ONNX?
54. How do you quantize a PyTorch model for mobile devices?
55. How do you run inference in batches with PyTorch?
56. How do you use `torch.jit.trace` vs. `torch.jit.script`?
57. How do you profile PyTorch model performance?
58. How do you deploy a PyTorch model on AWS SageMaker?
59. How do you use PyTorch with TensorRT?
60. How do you handle model versioning in PyTorch?

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## 3. MXNet & Other Frameworks (20 Questions)

### MXNet

61. How do you define a neural network in MXNet (`gluon.nn`)?
62. How do you use `DataLoader` in MXNet?
63. How do you implement custom loss functions in MXNet?

64. How does MXNet's hybridize mode improve performance?
65. How do you deploy an MXNet model using AWS SageMaker?
66. How do you fine-tune a pre-trained MXNet model?
67. How do you use MXNet with Apache MXNet Model Server?
68. How do you optimize an MXNet model with TensorRT?
69. How do you debug memory leaks in MXNet?
70. How does MXNet compare to TensorFlow/PyTorch?

Other Frameworks (JAX, Caffe, etc.)
71. How do you implement a neural network in JAX?
72. How does JAX's `jit` and `vmap` improve performance?
73. How do you use Caffe for image classification?
74. How do you convert a Caffe model to TensorFlow?
75. How do you use DeepSpeed with PyTorch?
76. How do you implement a model in Chainer?
77. How does Fast.ai simplify PyTorch model training?
78. How do you use Hugging Face's `transformers` with TensorFlow?
79. How do you train a model using Apple's Core ML?
80. How do you use ONNX Runtime for inference?

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4. Practical Scenarios & Debugging (20 Questions)
Model Debugging & Optimization
81. How do you fix vanishing/exploding gradients?
82. How do you handle overfitting in deep learning models?
83. How do you choose the right batch size for training?
84. How do you debug a model that is not learning?
85. How do you interpret loss curves (underfitting vs. overfitting)?

Data Handling
86. How do you preprocess images for a CNN in TensorFlow/PyTorch?
87. How do you handle missing data in deep learning?
88. How do you implement data augmentation in Keras/PyTorch?
89. How do you use `tf.data` vs. PyTorch `DataLoader` for large datasets?
90. How do you balance a dataset using oversampling/undersampling?

Deployment Challenges
91. How do you reduce model size for mobile deployment?
92. How do you handle model drift in production?
93. How do you ensure low-latency inference in real-time apps?
94. How do you version-control trained models?
95. How do you A/B test different deep learning models?

Advanced Scenarios

96. How do you implement federated learning with TensorFlow?

97. How do you train a GAN in PyTorch?

98. How do you fine-tune a Vision Transformer (ViT)?

99. How do you optimize a model for edge devices (e.g., Raspberry Pi)?

100. How do you build a real-time object detection pipeline?


## 1. TensorFlow & Keras (30 Questions)

### Beginner (10 Questions)

1. What is TensorFlow, and how does it differ from Keras?
2. How do you create a simple neural network using `tf.keras.Sequential`?
3. What are the key components of a Keras model (`compile()`, `fit()`, `evaluate()`)?
4. How do you add a Dense layer with ReLU activation in Keras?
5. What is the difference between `model.predict()` and `model.evaluate()`?
6. How do you save and load a Keras model?
7. What is a callback in Keras? Give examples (`EarlyStopping`, `ModelCheckpoint`).
8. How do you visualize model architecture in TensorFlow?
9. What is the purpose of `Flatten()` in a CNN?
10. How do you handle overfitting in Keras (Dropout, L2 regularization)?

### Intermediate (10 Questions)

11. How does automatic differentiation work in TensorFlow?
12. How do you implement custom loss functions in TensorFlow?
13. What is the difference between `tf.function` and eager execution?
14. How do you use `tf.data.Dataset` for efficient data loading?
15. How do you implement transfer learning with a pre-trained model (e.g., ResNet50)?
16. How do you debug NaN losses in TensorFlow?
17. What is mixed-precision training, and how do you enable it?
18. How do you implement gradient clipping in Keras?
19. How do you use TensorBoard for visualization?
20. How do you fine-tune only the last few layers of a pre-trained model?

### Advanced (10 Questions)

21. How does distributed training work in TensorFlow (`MirroredStrategy`, `MultiWorkerMirroredStrategy`)?
22. How do you convert a Keras model to TensorFlow Lite (TFLite)?
23. How do you optimize a model with TensorRT?
24. How do you deploy a TensorFlow model using TF Serving?
25. How do you implement custom training loops with `tf.GradientTape`?
26. How do you use ONNX to convert a TensorFlow model to PyTorch?
27. How do you profile TensorFlow model performance?
28. How do you implement quantization-aware training?

29. How do you handle model versioning in production?
30. How do you implement federated learning in TensorFlow?

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 2. PyTorch (30 Questions)
Beginner (10 Questions)
31. What is PyTorch, and how does it differ from TensorFlow?
32. How do you create a neural network using `torch.nn.Module`?
33. What is the difference between `torch.Tensor` and `torch.tensor`?
34. How do you move a model to GPU (`to(device)`)?
35. How do you define a custom loss function in PyTorch?
36. How do you save and load a PyTorch model (`state_dict`)?
37. What is `DataLoader`, and how do you use it?
38. How do you implement early stopping in PyTorch?
39. How do you visualize a model architecture?
40. How do you use `torch.optim` (SGD, Adam)?

Intermediate (10 Questions)
41. How does autograd work in PyTorch?
42. How do you implement learning rate scheduling (`ReduceLROnPlateau`)?
43. How do you use mixed-precision training (`torch.cuda.amp`)?
44. How do you debug CUDA memory issues?
45. How do you implement gradient clipping?
46. How do you use TensorBoard with PyTorch?
47. How do you implement transfer learning with `torchvision.models`?
48. How do you fine-tune a Hugging Face transformer?
49. How do you implement custom layers in PyTorch?
50. How do you use `torch.jit.script` for model optimization?

Advanced (10 Questions)
51. How does DistributedDataParallel (DDP) work in PyTorch?
52. How do you convert a PyTorch model to TorchScript?
53. How do you deploy a PyTorch model using Flask/FastAPI?
54. How do you optimize a model with ONNX Runtime?
55. How do you quantize a PyTorch model for mobile deployment?
56. How do you use DeepSpeed for large-scale training?
57. How do you profile PyTorch model performance?
58. How do you implement pruning in PyTorch?
59. How do you use PyTorch with TensorRT?
60. How do you implement reinforcement learning in PyTorch?

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3. MXNet & Other Frameworks (20 Questions)

MXNet (10 Questions)

61. How do you define a neural network in MXNet (`gluon.nn`)?
62. How does hybridize mode improve performance in MXNet?
63. How do you implement custom loss functions in MXNet?
64. How do you use `DataLoader` in MXNet?
65. How do you deploy an MXNet model on AWS SageMaker?
66. How do you fine-tune a pre-trained MXNet model?
67. How do you debug memory leaks in MXNet?
68. How does MXNet compare to TensorFlow/PyTorch?
69. How do you use MXNet Model Server?
70. How do you optimize an MXNet model with TensorRT?

Other Frameworks (10 Questions)

71. How do you implement a neural network in JAX?
72. How does JAX's `jit` and `vmap` improve performance?
73. How do you use Caffe for image classification?
74. How do you convert a Caffe model to TensorFlow?
75. How do you use Fast.ai with PyTorch?
76. How do you train a model in Apple's Core ML?
77. How do you use ONNX Runtime for inference?
78. How do you implement federated learning with PySyft?
79. How do you use Hugging Face with TensorFlow?
80. How do you compare TensorFlow, PyTorch, and MXNet?

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4. Practical & Scenario-Based (20 Questions)

Model Debugging & Optimization

81. How do you fix vanishing/exploding gradients?
82. How do you handle overfitting in deep learning?
83. How do you choose the right batch size?
84. How do you debug a model that isn't learning?
85. How do you interpret loss curves (underfitting vs. overfitting)?

Data Handling

86. How do you preprocess images for a CNN?
87. How do you handle missing data in deep learning?
88. How do you implement data augmentation in Keras/PyTorch?
89. How do you use `tf.data` vs. PyTorch `DataLoader`?
90. How do you balance a dataset (oversampling/undersampling)?

Deployment & Production

91. How do you reduce model size for mobile deployment?

92. How do you handle model drift in production?
93. How do you ensure low-latency inference?
94. How do you version-control trained models?
95. How do you A/B test different deep learning models?

Advanced Scenarios
96. How do you implement federated learning?
97. How do you train a GAN in PyTorch?
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