

Programmer's Guide

The documents in this unit dive into the details of writing TensorFlow code. This section begins with the following guides, each of which explain a particular aspect of TensorFlow:

- [Variables: Creation, Initialization, Saving, and Loading](https://www.tensorflow.org/programmers_guide/variables) (https://www.tensorflow.org/programmers_guide/variables), which details the mechanics of TensorFlow Variables.
- [Tensor Ranks, Shapes, and Types](https://www.tensorflow.org/programmers_guide/dims_types) (https://www.tensorflow.org/programmers_guide/dims_types), which explains Tensor rank (the number of dimensions), shape (the size of each dimension), and datatypes.
- [Sharing Variables](https://www.tensorflow.org/programmers_guide/variable_scope) (https://www.tensorflow.org/programmers_guide/variable_scope), which explains how to share and manage large sets of variables when building complex models.
- [Threading and Queues](https://www.tensorflow.org/programmers_guide/threading_and_queues) (https://www.tensorflow.org/programmers_guide/threading_and_queues), which explains TensorFlow's rich queuing system.
- [Reading Data](https://www.tensorflow.org/programmers_guide/reading_data) (https://www.tensorflow.org/programmers_guide/reading_data), which documents three different mechanisms for getting data into a TensorFlow program.

The following guide is helpful when training a complex model over multiple days:

- [Supervisor: Training Helper for Days-Long Trainings](https://www.tensorflow.org/programmers_guide/supervisor) (https://www.tensorflow.org/programmers_guide/supervisor), which explains how to gracefully handle system crashes during a lengthy training session.

TensorFlow provides a debugger named `tfdbg`, which is documented in the following two guides:

- [TensorFlow Debugger \(tfdbg\) Command-Line-Interface Tutorial: MNIST](https://www.tensorflow.org/programmers_guide/debugger) (https://www.tensorflow.org/programmers_guide/debugger), which walks you through the use of `tfdbg` within an application written in the low-level TensorFlow API.
- [How to Use TensorFlow Debugger \(tfdbg\) with tf.contrib.learn](https://www.tensorflow.org/programmers_guide/tfdbg-tflearn) (https://www.tensorflow.org/programmers_guide/tfdbg-tflearn), which demonstrates how to use `tfdbg` within the Estimators API.

A `MetaGraph` consists of both a computational graph and its associated metadata. A `MetaGraph` contains the information required to continue training, perform evaluation, or

run inference on a previously trained graph. The following guide details **MetaGraph** objects:

- [Exporting and Importing a MetaGraph](https://www.tensorflow.org/programmers_guide/meta_graph)
(https://www.tensorflow.org/programmers_guide/meta_graph).

SavedModel is the universal serialization format for TensorFlow models. TensorFlow provides SavedModel CLI (command-line interface) as a tool to inspect and execute a MetaGraph in a SavedModel. The detailed usages and examples are documented in the following guide:

- [SavedModel CLI \(Command-Line Interface\)](https://www.tensorflow.org/programmers_guide/saved_model_cli)
(https://www.tensorflow.org/programmers_guide/saved_model_cli).

To learn about the TensorFlow versioning scheme, consult the following two guides:

- [TensorFlow Version Semantics](https://www.tensorflow.org/programmers_guide/version_semantics)
(https://www.tensorflow.org/programmers_guide/version_semantics), which explains TensorFlow's versioning nomenclature and compatibility rules.
- [TensorFlow Data Versioning: GraphDefs and Checkpoints](https://www.tensorflow.org/programmers_guide/data_versions)
(https://www.tensorflow.org/programmers_guide/data_versions), which explains how TensorFlow adds versioning information to computational graphs and checkpoints in order to support compatibility across versions.

We conclude this section with a FAQ about TensorFlow programming:

- [Frequently Asked Questions](https://www.tensorflow.org/programmers_guide/faq) (https://www.tensorflow.org/programmers_guide/faq)

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