Neural Networks - intro

Part 1 - XOR

1. Using the XOR dataset below, train (400 epochs) a neural network (NN) using 1, 2, 3, 4, and 5 hidden layers (where each layer has only 2 neurons). For each n layers, store the resulting loss score along with n. Plot the results to find what the optimal number of layers is.
2. Repeat the above with 3 neurons in each Hidden layers. How do these results compare to the 2 neuron layers?
3. Repeat the above with 4 neurons in each Hidden layers. How do these results compare to the 2 and 3 neuron layers?
4. Using the most optimal configuraion (n-layers, k-neurons per layer), compare how `tanh`, `sigmoid`, `softplus` and `relu` effect the loss after 400 epochs. Try other Activation functions as well (https://keras.io/activations/)
5. Again with the most optimal setup, try other optimizers (instead of `SGD`) and report on the loss score. (https://keras.io/optimizers/)

Part 2 - BYOD (Bring your own Dataset)

Using your own dataset, experiment and find the best Neural Network configuration. You may use any resource to improve results, just reference it.

While you may use any dataset, I'd prefer you didn't use the diabetes dataset used in the lesson.

https://stackoverflow.com/questions/34673164/how-to-train-and-tune-an-artificial-multilayer-perceptron-neural-network-using-k

https://keras.io/

In [44]:
```python
from keras.models import Sequential
from keras.layers import Dense
from keras.optimizers import SGD
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
%matplotlib inline
```

Part 1 - XOR

1. Using the XOR dataset below, train (400 epochs) a neural network (NN) using 1, 2, 3, 4, and 5 hidden layers (where each layer has only 2 neurons). For each n layers, store the resulting loss score along with n. Plot the results to find what the optimal number of layers is.
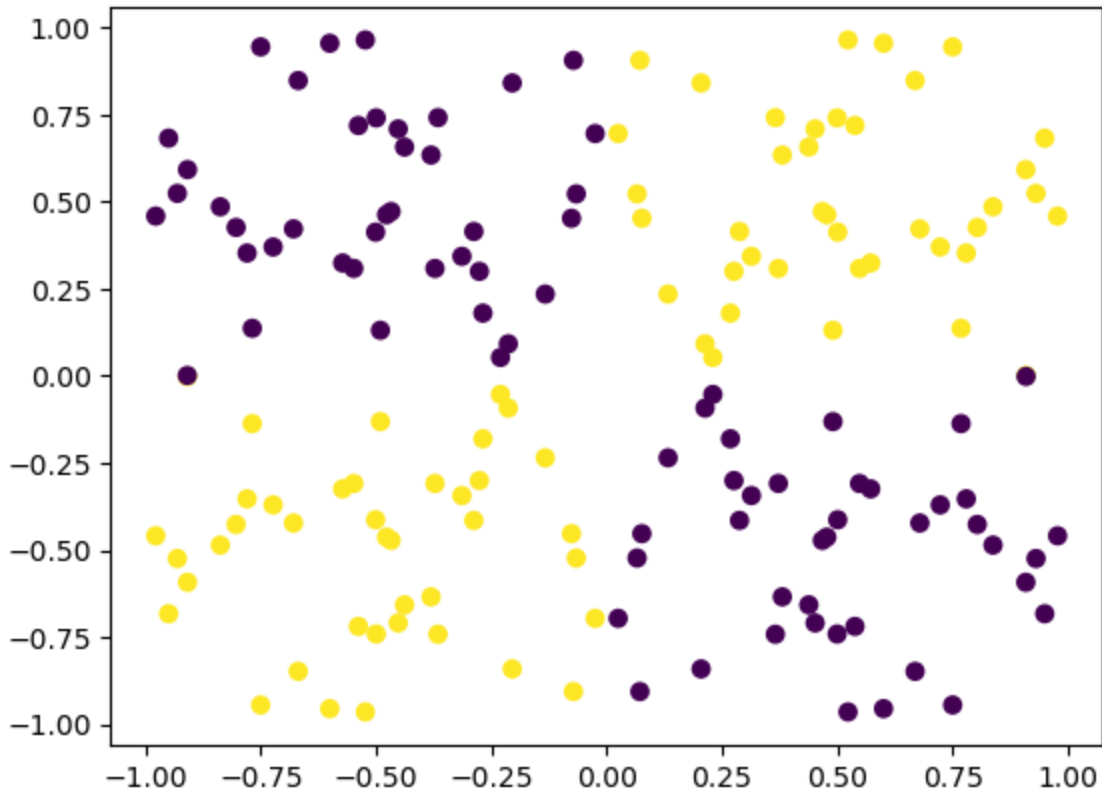
In [45]:
```python
np.random.seed(7)
```

In [46]:
```python
n = 40
xx = np.random.random((n,1))
yy = np.random.random((n,1))
```

```
In [47]: X = np.array([np.array([xx,-xx,-xx,xx]),np.array([yy,-yy,yy,-yy])]).reshape(2,4*n).T
         y = np.array([np.ones([2*n]),np.zeros([2*n])]).reshape(4*n)
```

```
In [48]: plt.scatter(*zip(*X), c=y)
```

Out[48]: <matplotlib.collections.PathCollection at 0x2d360f4c0>

```
In [49]: num_layers = [1,2,3,4,5]
         scores = []
         for num_layer in num_layers:
             np.random.seed(7)
             model = Sequential()
             layer = Dense(2, input_dim=2, activation='sigmoid')
             for i in range(0, num_layer):
                 model.add(layer)
             model.add(Dense(1, input_dim=2, activation='sigmoid'))
             sgd = SGD(lr=0.1)
             model.compile(loss='binary_crossentropy', optimizer='sgd')
             model.fit(X, y, batch_size=2, epochs=400, verbose=0)
             score = model.evaluate(X, y)
             scores.append(score)

         # plot scores
```

```
2022-12-09 18:44:13.192633: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 5ms/step - loss: 0.6928
```

```
2022-12-09 18:45:37.830777: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 18:45:37.991049: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 5ms/step - loss: 0.6924
```

In [50]:
```python
scores
```

Out[50]:
```
[0.6927945613861084,
 0.69243985414505,
 0.6931564211845398,
 0.6931503415107727,
 0.6931729316711426]
```

In [51]:
```python
plt.figure()
plt.plot(num_layers,scores)
plt.xlabel('Number of Layers')
plt.ylabel('Loss score')
plt.show()
```
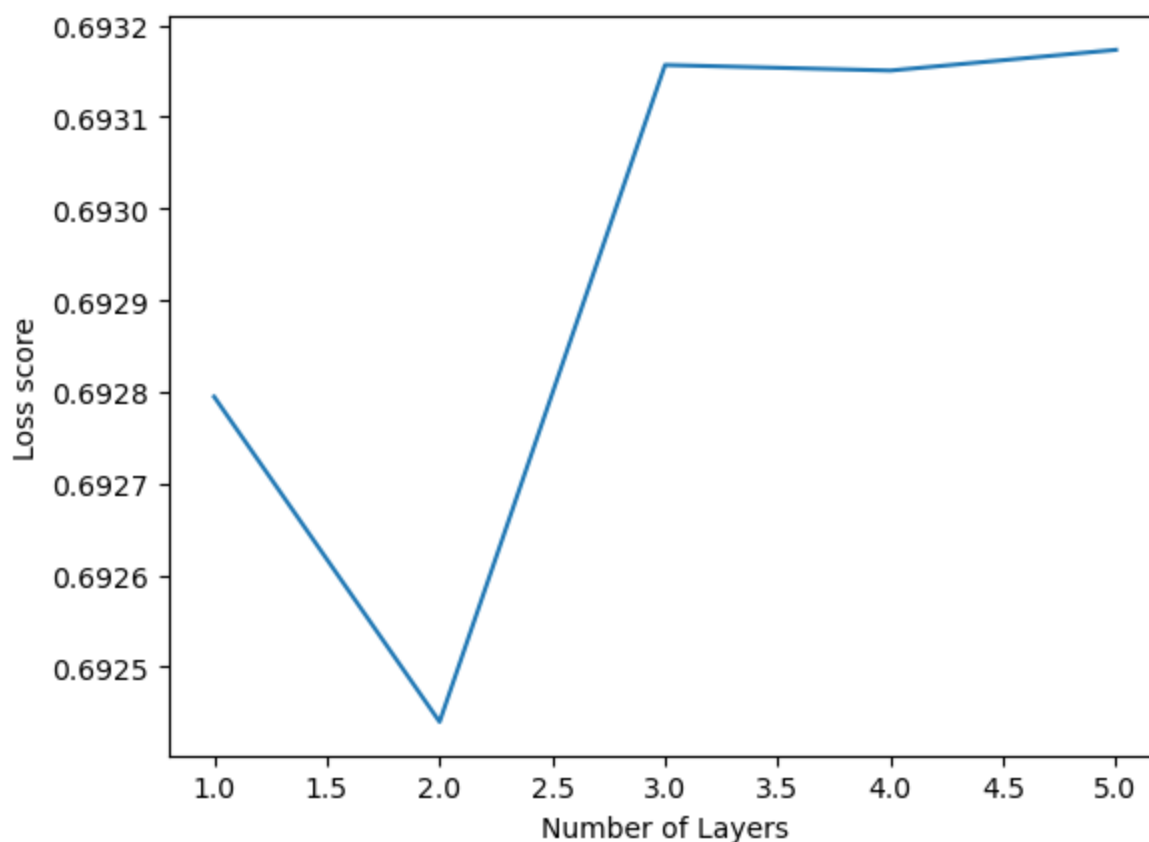

2. Repeat the above with 3 neurons in each Hidden layers. How do these results compare to the 2

neuron layers?

In [52]:
```python
num_layers = [1,2,3,4,5]
scores2 = []
```

In [53]:
```python
for num_layer in num_layers:
    model = Sequential()
    model.add(Dense(3, input_dim=2, activation='sigmoid'))
    layer = Dense(3, input_dim=3, activation='sigmoid')
    for i in range(0, num_layer-1):
        model.add(layer)
    model.add(Dense(1, input_dim=3, activation='sigmoid'))
    sgd = SGD(lr=0.1)
    model.compile(loss='binary_crossentropy', optimizer='sgd')
    model.fit(X, y, batch_size=2, epochs=400, verbose=0)
    score = model.evaluate(X, y)
    scores2.append(score)
```

```
2022-12-09 18:53:00.156825: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 0.4022

2022-12-09 18:54:25.716971: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 18:54:25.917695: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 4ms/step - loss: 0.6927

2022-12-09 18:56:05.359690: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 18:56:05.544813: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 5ms/step - loss: 0.6931

2022-12-09 18:57:54.318740: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 18:57:54.511642: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 0.6931

2022-12-09 18:59:53.283691: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 18:59:53.506607: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 5ms/step - loss: 0.6931

2022-12-09 19:01:58.241701: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

In [54]:
```python
scores2
```

Out[54]:
```
[0.40215545892715454,
 0.6927071809768677,
 0.6931077241897583,
 0.693148136138916,
 0.6931480765342712]
```

In [55]:
```python
plt.figure()
plt.plot(num_layers,scores2)
plt.xlabel('Number of Layers')
plt.ylabel('Loss score')
plt.show()
```
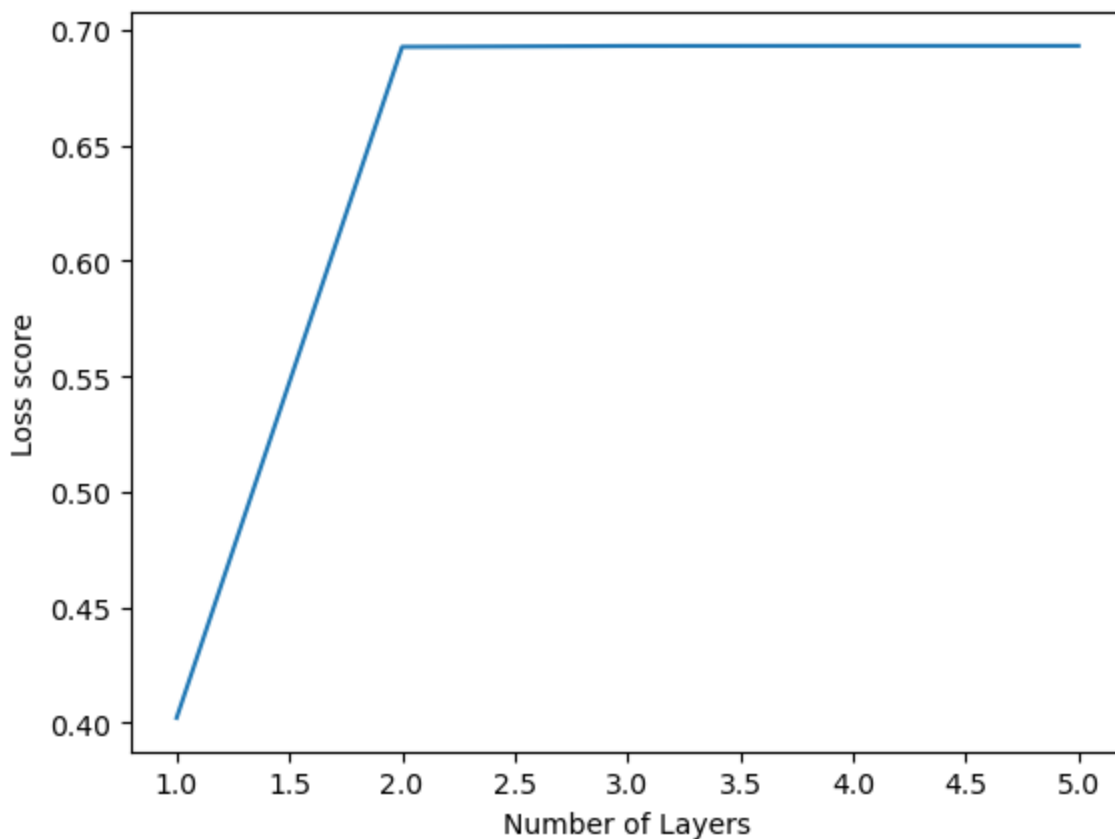
3. Repeat the above with 4 neurons in each Hidden layers. How do these results compare to the 2 and 3 neuron layers?

```
In [56]:  scores3 = []
          for num_layer in num_layers:
              np.random.seed(7)
              model = Sequential()
              model.add(Dense(4, input_dim=2, activation='sigmoid'))
              layer = Dense(4, input_dim=4, activation='sigmoid')
              for i in range(0, num_layer-1):
                  model.add(layer)
              model.add(Dense(1, input_dim=4, activation='sigmoid'))
              sgd = SGD(lr=0.1)
              model.compile(loss='binary_crossentropy', optimizer='sgd')
              model.fit(X, y, batch_size=2, epochs=400, verbose=0)
              score = model.evaluate(X, y)
              scores3.append(score)
```

```
2022-12-09 19:01:58.497070: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 4ms/step - loss: 0.6402
```
```
2022-12-09 19:03:24.860548: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 19:03:25.025989: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 4ms/step - loss: 0.6911
```
```
2022-12-09 19:05:03.087144: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 19:05:03.279248: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 7ms/step - loss: 0.6931
```

In [57]: 
```
scores3
```

Out[57]: 
```
[0.6402463316917419,
 0.6911436915397644,
 0.6931401491165161,
 0.6931451559066772,
 0.6931589245796204]
```

In [58]: 
```
plt.figure()
plt.plot(num_layers,scores3)
plt.xlabel('Number of Layers')
plt.ylabel('Loss score')
plt.show()
```
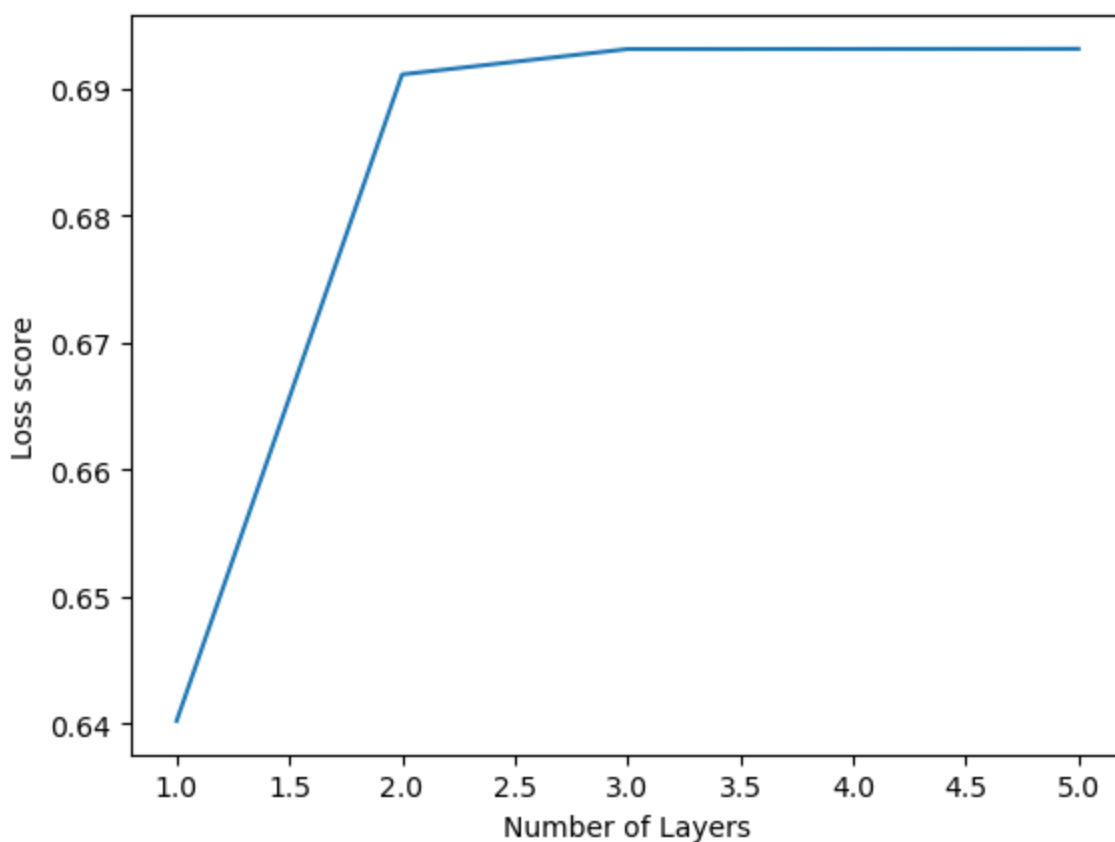


4. Using the most optimal configuraion (n-layers, k-neurons per layer), compare how `tanh`, `sigmoid`, `softplus` and `relu` effect the loss after 400 epochs. Try other Activation functions as well (https://keras.io/activations/)

In [59]: 
```
plt.figure()
plt.plot(num_layers,scores,c='r',label='2')
```

```
plt.plot(num_layers,scores2,c='b',label='3')
plt.plot(num_layers,scores3,c='g',label='4')
plt.legend(title='# of Nodes')
plt.xlabel('Number of Layers')
plt.ylabel('Loss score')
plt.show()
```
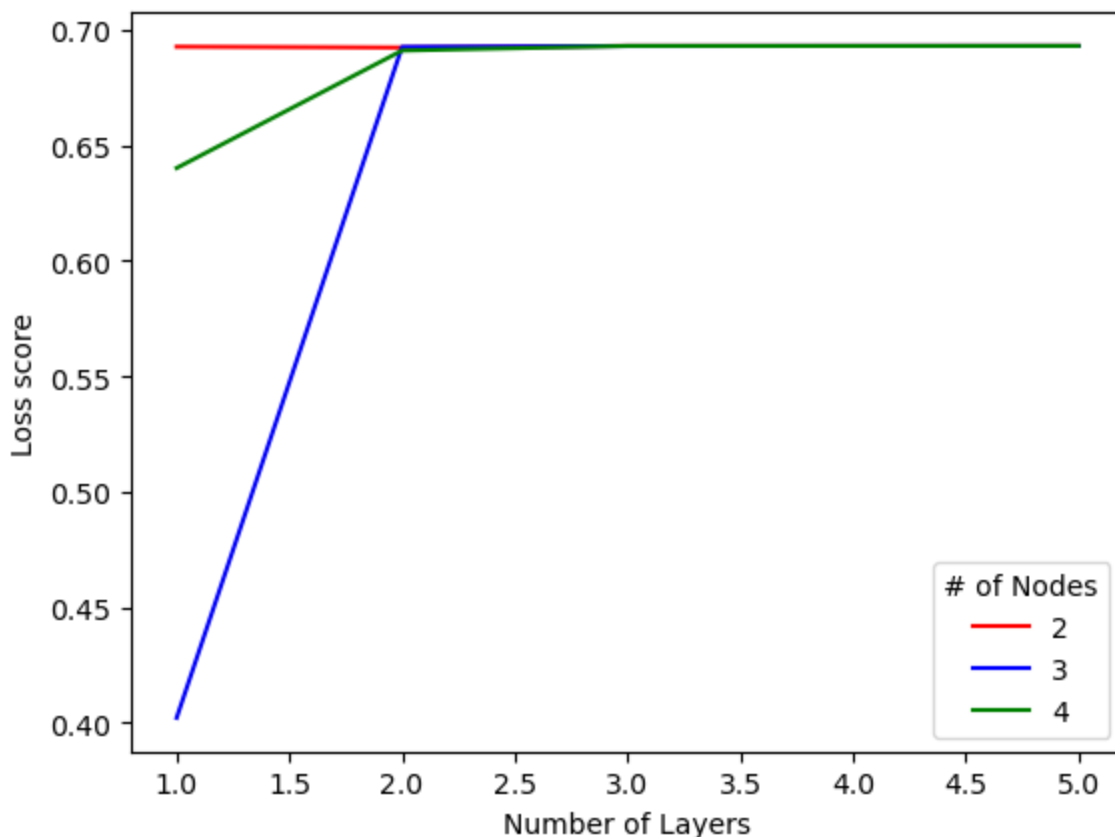

In [78]: `acts = ['relu', 'sigmoid', 'softmax', 'softplus', 'softsign', 'tanh', 'selu','elu', 'exp`

In [79]:
```
scores4 = []
for act in acts:
    np.random.seed(7)
    model = Sequential()
    model.add(Dense(3, input_dim=2, activation=act))
    model.add(Dense(1, input_dim=4, activation=act))
    model.compile(loss='binary_crossentropy', optimizer='sgd')
    model.fit(X, y, batch_size=2, epochs=400, verbose=0)
    score = model.evaluate(X, y)
    scores4.append(score)
```

```
2022-12-09 20:25:55.239337: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 4ms/step - loss: 7.7125
```

```
2022-12-09 20:27:28.619817: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:27:28.775497: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 5ms/step - loss: 0.4980
```

```
2022-12-09 20:28:53.066570: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:28:53.224934: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 4ms/step - loss: 0.5601
```

```
2022-12-09 20:30:21.274296: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:30:21.445782: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 8ms/step - loss: 0.2974
2022-12-09 20:32:37.642967: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:32:37.835214: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 7ms/step - loss: 0.2238
2022-12-09 20:35:30.763577: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:35:30.943499: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 3ms/step - loss: 0.2056
2022-12-09 20:37:03.275965: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:37:03.444815: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 7.6246
2022-12-09 20:39:55.712816: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:39:55.909236: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 8ms/step - loss: 7.6246
2022-12-09 20:42:48.820050: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 20:42:49.020806: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 7.6246
2022-12-09 20:44:20.615412: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

In [80]: `scores4`

Out[80]:
```
[7.712474346160889,
 0.49795839190483093,
 0.5601326823234558,
 0.29742977023124695,
 0.22382782399654388,
 0.20555880665779114,
 7.624619483947754,
 7.624619483947754,
 7.624619483947754]
```

In [81]:
```python
df = pd.DataFrame(acts,scores4).reset_index()
df.sort_values('index')
```

	index	0
5	0.205559	tanh
4	0.223828	softsign
3	0.297430	softplus
1	0.497958	sigmoid
2	0.560133	softmax
6	7.624619	selu
7	7.624619	elu
8	7.624619	exponential
0	7.712474	relu

5. Again with the most optimal setup, try other optimizers (instead of `SGD`) and report on the loss score. (https://keras.io/optimizers/)

In [84]:
```python
from keras.optimizers import RMSprop, Adam, Adadelta, Adagrad, Nadam
opts = ['SGD', 'RMSprop', 'Adam', 'Adadelta', 'Adagrad', 'Nadam']
```

In [85]:
```python
scores5 = []
for opt in opts:
    np.random.seed(7)
    model = Sequential()
    model.add(Dense(3, input_dim=2, activation='tanh'))
    model.add(Dense(1, input_dim=4, activation='tanh'))
    model.compile(loss='binary_crossentropy', optimizer=opt)
    model.fit(X, y, batch_size=2, epochs=400, verbose=0)
    score = model.evaluate(X, y)
    scores5.append(score)
```

```
2022-12-09 21:10:49.760501: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 8ms/step - loss: 3.8763
2022-12-09 21:12:20.513330: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 21:12:20.728467: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 4.2091
2022-12-09 21:14:37.004341: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 21:14:37.217159: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 6ms/step - loss: 3.8749
2022-12-09 21:16:23.934171: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 21:16:24.167370: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 7ms/step - loss: 4.2940
2022-12-09 21:18:03.079491: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 21:18:03.480010: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 9ms/step - loss: 4.1403
```

```
2022-12-09 21:19:37.248863: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 21:19:37.525542: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
5/5 [==============================] - 0s 8ms/step - loss: 3.8698
2022-12-09 21:23:30.125949: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

In [86]: `scores5`

Out[86]:
```
[3.8762593269348145,
 4.209130764007568,
 3.874945878982544,
 4.293966770172119,
 4.140272617340088,
 3.869826555252075]
```

Based on the results above, the optimal model for the XOR dataset is 1 layer of 3 nodes with a tanh activation and a Nadam optimizer. After multiple runs, the adamax and ftrl optimizer continued to throw errors, so I omitted them from the analysis.

Part 2 - BYOD (Bring your own Dataset)

Using your own dataset, experiment and find the best Neural Network configuration. You may use any resource to improve results, just reference it.

In [87]:
```python
raisin = pd.read_excel('../add_data/raisin/Raisin_Dataset.xlsx')
raisin.columns
```

Out[87]:
```
Index(['Area', 'MajorAxisLength', 'MinorAxisLength', 'Eccentricity',
       'ConvexArea', 'Extent', 'Perimeter', 'Class'],
      dtype='object')
```

In [88]: `raisin['Class'].value_counts()`

Out[88]:
```
Kecimen    450
Besni      450
Name: Class, dtype: int64
```

In [89]:
```python
raisin['Class'] = np.where(raisin['Class']=='Kecimen',0,1)
raisin['Class'].value_counts()
```

Out[89]:
```
0    450
1    450
Name: Class, dtype: int64
```

In [90]:
```python
matrix = raisin.to_numpy()
xx = matrix[:,0:7]
yy = matrix[:,7]
```

In [91]:
```python
xx = xx.astype('float32')
yy = yy.astype('float32')
xx
```

```
Out[91]: array([[8.7524000e+04, 4.4224600e+02, 2.5329115e+02, ..., 9.0546000e+04,
                 7.5865060e-01, 1.1840400e+03],
                [7.5166000e+04, 4.0669067e+02, 2.4303244e+02, ..., 7.8789000e+04,
                 6.8412960e-01, 1.1217860e+03],
                [9.0856000e+04, 4.4226706e+02, 2.6632831e+02, ..., 9.3717000e+04,
                 6.3761282e-01, 1.2085750e+03],
                ...,
                [9.9657000e+04, 4.3170697e+02, 2.9883731e+02, ..., 1.0626400e+05,
                 7.4109852e-01, 1.2928280e+03],
                [9.3523000e+04, 4.7634409e+02, 2.5417606e+02, ..., 9.7653000e+04,
                 6.5879828e-01, 1.2585480e+03],
                [8.5609000e+04, 5.1208179e+02, 2.1527197e+02, ..., 8.9197000e+04,
                 6.3201994e-01, 1.2728621e+03]], dtype=float32)
```

```python
In [92]: num_layers = [1, 2, 3]
         num_nodes = [2, 3, 4]
         acts = ['relu', 'sigmoid', 'softmax','tanh']
         opts = ['SGD', 'RMSprop', 'Adam', 'Nadam']
```

```python
In [93]: results = pd.DataFrame(columns=['layers','nodes','activation','optimizer','score','accur
         for opt in opts:
             for act in acts:
                 for num_node in num_nodes:
                     for num_layer in num_layers:
                         print('layers =',num_layer,'nodes =',num_node,'act =',act,'opt = ',opt)
                         np.random.seed(7)
                         model = Sequential()
                         model.add(Dense(num_node, input_dim=7, activation=act))
                         layer = Dense(num_node, input_dim=num_node, activation=act)
                         for i in range(0, num_layer-1):
                             model.add(layer)
                         model.add(Dense(1, input_dim=num_node, activation=act))
                         model.compile(loss='binary_crossentropy', optimizer=opt, metrics=['accur
                         model.fit(xx, yy, batch_size=10, epochs=400, verbose=0)
                         score, accuracy = model.evaluate(xx, yy)
                         results = results.append(pd.Series([num_layer,num_node,act,opt,score,acc
                                                    index=results.columns),ignore_index=T
```

```
layers = 1 nodes = 2 act = relu opt =  SGD
2022-12-09 21:38:38.880186: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:40:34.535622: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 2 act = relu opt =  SGD
/var/folders/x7/6srm3p515nl536_rx3q2gtfm0000gn/T/ipykernel_71372/1096050458.py:17: Futur
eWarning: The frame.append method is deprecated and will be removed from pandas in a fut
ure version. Use pandas.concat instead.
  results = results.append(pd.Series([num_layer,num_node,act,opt,score,accuracy],
2022-12-09 21:40:34.960702: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:42:49.649699: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 2 act = relu opt =  SGD
2022-12-09 21:42:50.121954: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
```

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2022-12-09 21:45:10.847966: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = relu opt =  SGD
2022-12-09 21:45:11.325151: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:47:08.272574: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 3 act = relu opt =  SGD
2022-12-09 21:47:08.707965: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:49:18.018054: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 3 act = relu opt =  SGD
2022-12-09 21:49:18.472994: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] - ETA: 0s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-09 21:51:39.896404: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 1 nodes = 4 act = relu opt =  SGD
2022-12-09 21:51:40.341334: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 8/29 [=======>......................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:53:35.044998: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 4 act = relu opt =  SGD
2022-12-09 21:53:37.081019: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-09 21:55:47.561850: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 3 nodes = 4 act = relu opt =  SGD
2022-12-09 21:55:48.017388: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 21:58:07.512595: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 2 act = sigmoid opt =  SGD
2022-12-09 21:58:07.968145: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 8/29 [=======>......................] - ETA: 0s - loss: 0.6930 - accuracy: 1.0000
2022-12-09 21:59:57.164354: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 2 act = sigmoid opt =  SGD
2022-12-09 21:59:57.609053: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.6901 - accuracy: 1.0000
```

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2022−12−09 22:02:00.266412: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 7ms/step − loss: 0.6932 − accuracy: 0.5000
layers = 3 nodes = 2 act = sigmoid opt =  SGD
2022−12−09 22:02:00.703170: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] − ETA: 0s − loss: 0.6922 − accuracy: 0.9965
2022−12−09 22:04:14.278073: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 7ms/step − loss: 0.6930 − accuracy: 0.5089
layers = 1 nodes = 3 act = sigmoid opt =  SGD
2022−12−09 22:04:14.697582: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] − ETA: 0s − loss: 0.6945 − accuracy: 0.0000e+00
2022−12−09 22:06:05.794400: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 6ms/step − loss: 0.6931 − accuracy: 0.5000
layers = 2 nodes = 3 act = sigmoid opt =  SGD
2022−12−09 22:06:06.199604: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
22/29 [=====================>........] − ETA: 0s − loss: 0.6933 − accuracy: 0.3594
2022−12−09 22:08:14.173535: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 6ms/step − loss: 0.6932 − accuracy: 0.4978
layers = 3 nodes = 3 act = sigmoid opt =  SGD
2022−12−09 22:08:14.554474: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] − ETA: 5s − loss: 0.6912 − accuracy: 1.0000
2022−12−09 22:10:31.348035: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 8ms/step − loss: 0.6931 − accuracy: 0.5000
layers = 1 nodes = 4 act = sigmoid opt =  SGD
2022−12−09 22:10:31.823813: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] − ETA: 0s − loss: 0.6963 − accuracy: 0.0000e+00
2022−12−09 22:12:22.926774: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 8ms/step − loss: 0.6932 − accuracy: 0.5000
layers = 2 nodes = 4 act = sigmoid opt =  SGD
2022−12−09 22:12:23.394800: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 8/29 [=======>......................] − ETA: 0s − loss: 0.6960 − accuracy: 0.0000e+00
2022−12−09 22:14:31.888137: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 8ms/step − loss: 0.6932 − accuracy: 0.5000
layers = 3 nodes = 4 act = sigmoid opt =  SGD
2022−12−09 22:14:32.357220: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
10/29 [=========>....................] − ETA: 0s − loss: 0.6942 − accuracy: 0.0000e+00
2022−12−09 22:16:49.743706: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] − 0s 8ms/step − loss: 0.6931 − accuracy: 0.5000
layers = 1 nodes = 2 act = softmax opt =  SGD
2022−12−09 22:16:50.187411: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 8/29 [=======>......................] − ETA: 0s − loss: 0.6883 − accuracy: 0.0000e+00
```

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2022-12-09 22:18:50.608806: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 2 act = softmax opt =  SGD
2022-12-09 22:18:51.041056: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [=====>........................] - ETA: 0s - loss: 0.6942 - accuracy: 0.0000e+00
2022-12-09 22:21:13.546852: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 2 act = softmax opt =  SGD
2022-12-09 22:21:14.039645: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6942 - accuracy: 0.0000e+00
2022-12-09 22:23:47.497002: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 3 act = softmax opt =  SGD
2022-12-09 22:23:48.040016: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6914 - accuracy: 0.0000e+00
2022-12-09 22:25:45.671266: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 3 act = softmax opt =  SGD
2022-12-09 22:25:46.185178: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 0.6928 - accuracy: 0.0000e+00
2022-12-09 22:28:05.337876: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 3 act = softmax opt =  SGD
2022-12-09 22:28:05.783949: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6920 - accuracy: 0.0000e+00
2022-12-09 22:30:35.968163: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 11ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 4 act = softmax opt =  SGD
2022-12-09 22:30:36.535919: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] - ETA: 0s - loss: 0.6942 - accuracy: 0.0000e+00
2022-12-09 22:32:34.833783: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 4 act = softmax opt =  SGD
2022-12-09 22:32:35.280002: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
12/29 [==========>...................] - ETA: 0s - loss: 0.6943 - accuracy: 0.0000e+00
2022-12-09 22:34:57.117353: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 4 act = softmax opt =  SGD
2022-12-09 22:34:57.567786: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 4s - loss: 0.6946 - accuracy: 0.0000e+00
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2022-12-09 22:37:30.883133: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 2 act = tanh opt =  SGD
2022-12-09 22:37:31.392063: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 0.7791 - accuracy: 0.0000e+00
2022-12-09 22:39:32.546049: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 0.6966 - accuracy: 0.5000
layers = 2 nodes = 2 act = tanh opt =  SGD
2022-12-09 22:39:32.995987: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 9/29 [========>.....................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 22:41:47.184903: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 2 act = tanh opt =  SGD
2022-12-09 22:41:47.713851: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 22:44:09.394605: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = tanh opt =  SGD
2022-12-09 22:44:09.992796: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 22:46:03.939594: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 3 act = tanh opt =  SGD
2022-12-09 22:46:04.473139: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 22:48:15.678476: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 3 act = tanh opt =  SGD
2022-12-09 22:48:16.245506: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.7076 - accuracy: 0.0000e+00
2022-12-09 22:50:40.052706: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 1 nodes = 4 act = tanh opt =  SGD
2022-12-09 22:50:42.384702: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
20/29 [===================>..........] - ETA: 0s - loss: 4.5793 - accuracy: 0.7031
2022-12-09 22:52:36.835232: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 4 act = tanh opt =  SGD
2022-12-09 22:52:37.260400: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] - ETA: 0s - loss: 0.7337 - accuracy: 0.0000e+00
```

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2022-12-09 22:54:56.127887: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6939 - accuracy: 0.5000
layers = 3 nodes = 4 act = tanh opt =  SGD
2022-12-09 22:54:56.615127: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 22:57:24.896887: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 2 act = relu opt =  RMSprop
2022-12-09 22:57:25.458125: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 23:00:15.758843: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 2 act = relu opt =  RMSprop
2022-12-09 23:00:16.296836: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-09 23:03:46.251129: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 3 nodes = 2 act = relu opt =  RMSprop
2022-12-09 23:03:46.878819: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 3/29 [==>...........................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 23:07:31.308882: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = relu opt =  RMSprop
2022-12-09 23:07:31.911285: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 23:10:25.956533: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 3 act = relu opt =  RMSprop
2022-12-09 23:10:26.505371: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 23:13:48.496251: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 3 act = relu opt =  RMSprop
2022-12-09 23:13:49.099350: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-09 23:17:22.343512: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 1 nodes = 4 act = relu opt =  RMSprop
2022-12-09 23:17:22.898101: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
```

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2022-12-09 23:20:28.968447: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 4 act = relu opt =  RMSprop
2022-12-09 23:20:29.603701: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 23:23:51.561213: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 4 act = relu opt =  RMSprop
2022-12-09 23:23:52.200417: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-09 23:27:33.631486: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 2 act = sigmoid opt =  RMSprop
2022-12-09 23:27:34.170596: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6982 - accuracy: 0.0000e+00
2022-12-09 23:30:38.061953: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 2 act = sigmoid opt =  RMSprop
2022-12-09 23:30:38.683271: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6916 - accuracy: 1.0000
2022-12-09 23:34:11.966949: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 2 act = sigmoid opt =  RMSprop
2022-12-09 23:34:12.593592: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 23:37:40.389905: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 1 nodes = 3 act = sigmoid opt =  RMSprop
2022-12-09 23:37:41.020452: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 0.6911 - accuracy: 1.0000
2022-12-09 23:40:18.289620: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 3 act = sigmoid opt =  RMSprop
2022-12-09 23:40:18.859093: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6949 - accuracy: 0.0000e+00
2022-12-09 23:43:22.451319: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 3 act = sigmoid opt =  RMSprop
2022-12-09 23:43:23.092244: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6910 - accuracy: 1.0000
2022-12-09 23:46:36.822080: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

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29/29 [==============================] - 1s 12ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 4 act = sigmoid opt =  RMSprop
2022-12-09 23:46:37.460664: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-09 23:49:17.261509: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 4 act = sigmoid opt =  RMSprop
2022-12-09 23:49:17.920191: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6903 - accuracy: 1.0000
2022-12-09 23:52:20.637280: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 4 act = sigmoid opt =  RMSprop
2022-12-09 23:52:21.269440: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6926 - accuracy: 1.0000
2022-12-09 23:55:37.701191: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6918 - accuracy: 0.5100
layers = 1 nodes = 2 act = softmax opt =  RMSprop
2022-12-09 23:55:40.375543: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 0.6948 - accuracy: 0.0000e+00
2022-12-09 23:58:21.381713: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 2 act = softmax opt =  RMSprop
2022-12-09 23:58:21.909440: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6921 - accuracy: 0.0000e+00
2022-12-10 00:01:43.968081: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 2 act = softmax opt =  RMSprop
2022-12-10 00:01:44.538220: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6885 - accuracy: 0.0000e+00
2022-12-10 00:05:21.330275: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 1 nodes = 3 act = softmax opt =  RMSprop
2022-12-10 00:05:21.899959: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.6971 - accuracy: 0.0000e+00
2022-12-10 00:08:04.105835: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 3 act = softmax opt =  RMSprop
2022-12-10 00:08:04.625617: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 7/29 [======>.......................] - ETA: 0s - loss: 0.6978 - accuracy: 0.0000e+00
2022-12-10 00:11:24.630898: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 3 act = softmax opt =  RMSprop
```

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2022-12-10 00:11:25.189543: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6914 - accuracy: 0.0000e+00
2022-12-10 00:15:12.227003: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 4 act = softmax opt =  RMSprop
2022-12-10 00:15:12.804189: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6935 - accuracy: 0.0000e+00
2022-12-10 00:17:53.983835: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 4 act = softmax opt =  RMSprop
2022-12-10 00:17:54.576110: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6913 - accuracy: 0.0000e+00
2022-12-10 00:21:07.731538: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 4 act = softmax opt =  RMSprop
2022-12-10 00:21:08.312106: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6942 - accuracy: 0.0000e+00
2022-12-10 00:24:53.230926: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 2 act = tanh opt =  RMSprop
2022-12-10 00:24:53.818229: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 00:27:41.714093: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 2 act = tanh opt =  RMSprop
2022-12-10 00:27:42.299104: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 00:30:52.935341: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 7ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 2 act = tanh opt =  RMSprop
2022-12-10 00:30:53.489585: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 00:34:15.955938: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = tanh opt =  RMSprop
2022-12-10 00:34:16.581258: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] - ETA: 0s - loss: 0.6835 - accuracy: 1.0000
2022-12-10 00:36:59.943892: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 3 act = tanh opt =  RMSprop
```

2022–12–10 00:37:00.462469: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 6s – loss: 0.6947 – accuracy: 0.0000e+00
2022–12–10 00:40:18.066271: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 3 act = tanh opt = RMSprop
2022–12–10 00:40:18.708443: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 6s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 00:43:44.240758: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 1 nodes = 4 act = tanh opt = RMSprop
2022–12–10 00:43:44.819536: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 5s – loss: 0.6836 – accuracy: 1.0000
2022–12–10 00:46:29.478276: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 11ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 2 nodes = 4 act = tanh opt = RMSprop
2022–12–10 00:46:30.130365: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 6s – loss: 0.6776 – accuracy: 1.0000
2022–12–10 00:49:46.494871: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6933 – accuracy: 0.5000
layers = 3 nodes = 4 act = tanh opt = RMSprop
2022–12–10 00:49:47.120410: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 6s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 00:53:07.945840: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 11ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 1 nodes = 2 act = relu opt = Adam
2022–12–10 00:53:08.567972: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 5s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 00:55:20.580342: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 2 nodes = 2 act = relu opt = Adam
2022–12–10 00:55:21.183002: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 5s – loss: 15.2492 – accuracy: 0.0000e+00
2022–12–10 00:57:54.745797: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 7.6246 – accuracy: 0.5000
layers = 3 nodes = 2 act = relu opt = Adam
2022–12–10 00:57:57.191794: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>..............................] – ETA: 5s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 01:00:38.958893: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 1 nodes = 3 act = relu opt = Adam

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2022-12-10 01:00:39.520513: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 6/29 [=====>........................] - ETA: 0s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 01:02:51.557562: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 3 act = relu opt =  Adam
2022-12-10 01:02:52.123945: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 01:05:24.950577: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.6264 - accuracy: 0.5056
layers = 3 nodes = 3 act = relu opt =  Adam
2022-12-10 01:05:25.528789: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 01:08:06.993625: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 4 act = relu opt =  Adam
2022-12-10 01:08:07.543040: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-10 01:10:19.116473: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 2 nodes = 4 act = relu opt =  Adam
2022-12-10 01:10:19.679599: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 01:12:51.647909: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 4 act = relu opt =  Adam
2022-12-10 01:12:52.247758: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 01:15:34.251553: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 2 act = sigmoid opt =  Adam
2022-12-10 01:15:34.872870: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6903 - accuracy: 1.0000
2022-12-10 01:17:43.380211: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 2 act = sigmoid opt =  Adam
2022-12-10 01:17:43.960421: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6945 - accuracy: 0.0000e+00
2022-12-10 01:20:10.436781: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 2 act = sigmoid opt =  Adam
```

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2022-12-10 01:20:11.031780: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6877 - accuracy: 1.0000
2022-12-10 01:22:46.654955: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 1 nodes = 3 act = sigmoid opt =  Adam
2022-12-10 01:22:47.278612: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 4s - loss: 0.6923 - accuracy: 1.0000
2022-12-10 01:24:56.097747: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 3 act = sigmoid opt =  Adam
2022-12-10 01:24:56.651244: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6942 - accuracy: 0.0000e+00
2022-12-10 01:27:23.574238: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 3 act = sigmoid opt =  Adam
2022-12-10 01:27:24.148904: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6926 - accuracy: 1.0000
2022-12-10 01:29:59.184417: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 4 act = sigmoid opt =  Adam
2022-12-10 01:29:59.785370: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6972 - accuracy: 0.0000e+00
2022-12-10 01:32:05.146501: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 4 act = sigmoid opt =  Adam
2022-12-10 01:32:05.724320: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6930 - accuracy: 1.0000
2022-12-10 01:34:32.404736: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6931 - accuracy: 0.5011
layers = 3 nodes = 4 act = sigmoid opt =  Adam
2022-12-10 01:34:33.048539: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 01:37:11.051156: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 1 nodes = 2 act = softmax opt =  Adam
2022-12-10 01:37:11.695997: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 4s - loss: 0.6893 - accuracy: 0.0000e+00
2022-12-10 01:39:20.806473: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 8ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 2 act = softmax opt =  Adam
2022-12-10 01:39:21.313096: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

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   1/29 [>.............................] – ETA: 4s – loss: 0.6900 – accuracy: 0.0000e+00
2022-12-10 01:41:56.144520: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 3 nodes = 2 act = softmax opt =  Adam
2022-12-10 01:41:56.747817: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 01:44:44.651257: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 12ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 1 nodes = 3 act = softmax opt =  Adam
2022-12-10 01:44:45.336290: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 5s – loss: 0.6920 – accuracy: 0.0000e+00
2022-12-10 01:46:55.434069: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 8ms/step – loss: 0.6928 – accuracy: 0.5000
layers = 2 nodes = 3 act = softmax opt =  Adam
2022-12-10 01:46:55.974138: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 01:49:33.879969: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 11ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 3 act = softmax opt =  Adam
2022-12-10 01:49:34.561616: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 5s – loss: 0.6920 – accuracy: 0.0000e+00
2022-12-10 01:52:22.107246: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 11ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 1 nodes = 4 act = softmax opt =  Adam
2022-12-10 01:52:22.709231: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 5s – loss: 0.6932 – accuracy: 0.0000e+00
2022-12-10 01:54:32.170399: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 2 nodes = 4 act = softmax opt =  Adam
2022-12-10 01:54:32.749764: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 5s – loss: 0.6930 – accuracy: 0.0000e+00
2022-12-10 01:57:11.548207: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 4 act = softmax opt =  Adam
2022-12-10 01:57:13.843090: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 6s – loss: 0.6876 – accuracy: 0.0000e+00
2022-12-10 02:00:03.522891: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 11ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 1 nodes = 2 act = tanh opt =  Adam
2022-12-10 02:00:04.157069: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
   1/29 [>.............................] – ETA: 5s – loss: 0.0000e+00 – accuracy: 1.0000
2022-12-10 02:02:16.544257: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

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 29/29 [==============================] – 0s 10ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 2 nodes = 2 act = tanh opt =  Adam
2022–12–10 02:02:17.121266: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  1/29 [>.............................] – ETA: 4s – loss: 0.6989 – accuracy: 0.0000e+00
2022–12–10 02:04:49.331765: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 0s 11ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 3 nodes = 2 act = tanh opt =  Adam
2022–12–10 02:04:49.908594: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022–12–10 02:07:30.844033: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 1s 11ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 1 nodes = 3 act = tanh opt =  Adam
2022–12–10 02:07:31.523937: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  3/29 [==>...........................] – ETA: 0s – loss: 0.6982 – accuracy: 0.9896
2022–12–10 02:09:46.702437: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 0s 10ms/step – loss: 0.6901 – accuracy: 0.5089
layers = 2 nodes = 3 act = tanh opt =  Adam
2022–12–10 02:09:47.230485: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  1/29 [>.............................] – ETA: 5s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 02:12:19.894299: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 1s 11ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 3 nodes = 3 act = tanh opt =  Adam
2022–12–10 02:12:20.539918: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022–12–10 02:15:02.384466: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 1s 11ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 1 nodes = 4 act = tanh opt =  Adam
2022–12–10 02:15:03.054349: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  1/29 [>.............................] – ETA: 4s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 02:17:15.025722: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 0s 11ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 2 nodes = 4 act = tanh opt =  Adam
2022–12–10 02:17:15.607787: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  1/29 [>.............................] – ETA: 5s – loss: 0.0000e+00 – accuracy: 1.0000
2022–12–10 02:19:51.173815: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 0s 9ms/step – loss: 7.7125 – accuracy: 0.5000
layers = 3 nodes = 4 act = tanh opt =  Adam
2022–12–10 02:19:51.774076: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
  1/29 [>.............................] – ETA: 5s – loss: 0.7030 – accuracy: 0.0000e+00
2022–12–10 02:22:34.289773: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 29/29 [==============================] – 1s 11ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 1 nodes = 2 act = relu opt =  Nadam
```

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2022-12-10 02:22:34.945745: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 02:26:58.498067: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 2 act = relu opt =  Nadam
2022-12-10 02:26:59.207320: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 02:32:32.413382: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 2 act = relu opt =  Nadam
2022-12-10 02:32:33.143769: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 02:39:14.620530: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = relu opt =  Nadam
2022-12-10 02:39:15.342390: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-10 03:03:36.998262: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 2 nodes = 3 act = relu opt =  Nadam
2022-12-10 03:03:37.625111: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 03:23:53.458326: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 9ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 3 act = relu opt =  Nadam
2022-12-10 03:23:54.170799: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 03:29:21.072025: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 4 act = relu opt =  Nadam
2022-12-10 03:29:21.754954: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-10 03:33:43.733410: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 2 nodes = 4 act = relu opt =  Nadam
2022-12-10 03:33:44.392587: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 15.2492 - accuracy: 0.0000e+00
2022-12-10 03:39:17.523802: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 7.6246 - accuracy: 0.5000
layers = 3 nodes = 4 act = relu opt =  Nadam
2022-12-10 03:39:20.245314: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 4s - loss: 0.0000e+00 - accuracy: 1.0000
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2022-12-10 03:45:01.798803: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 2 act = sigmoid opt =  Nadam
2022-12-10 03:45:02.433364: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 5/29 [====>.........................] - ETA: 0s - loss: 0.6908 - accuracy: 1.0000
2022-12-10 03:49:12.179681: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 2 act = sigmoid opt =  Nadam
2022-12-10 03:49:12.780971: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6897 - accuracy: 1.0000
2022-12-10 04:26:07.911895: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 2 act = sigmoid opt =  Nadam
2022-12-10 04:26:08.575913: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6941 - accuracy: 0.0000e+00
2022-12-10 04:31:32.048116: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 3 act = sigmoid opt =  Nadam
2022-12-10 04:31:32.679787: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6946 - accuracy: 0.0000e+00
2022-12-10 04:35:52.303673: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 3 act = sigmoid opt =  Nadam
2022-12-10 04:35:52.932557: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 05:12:13.833029: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 3 act = sigmoid opt =  Nadam
2022-12-10 05:12:14.526639: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6931 - accuracy: 1.0000
2022-12-10 05:48:31.747276: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 4 act = sigmoid opt =  Nadam
2022-12-10 05:48:32.420684: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6923 - accuracy: 1.0000
2022-12-10 06:23:53.949961: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 4 act = sigmoid opt =  Nadam
2022-12-10 06:23:54.594130: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6924 - accuracy: 1.0000
2022-12-10 06:28:57.065872: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

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29/29 [==============================] – 1s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 4 act = sigmoid opt =  Nadam
2022-12-10 06:28:57.757353: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 06:34:22.902486: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 1s 10ms/step – loss: 0.6932 – accuracy: 0.5000
layers = 1 nodes = 2 act = softmax opt =  Nadam
2022-12-10 06:34:23.574561: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6953 – accuracy: 0.0000e+00
2022-12-10 06:38:34.068810: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 2 nodes = 2 act = softmax opt =  Nadam
2022-12-10 06:38:34.706748: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6942 – accuracy: 0.0000e+00
2022-12-10 06:43:53.070578: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 2 act = softmax opt =  Nadam
2022-12-10 06:43:53.700176: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6952 – accuracy: 0.0000e+00
2022-12-10 06:49:35.397426: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 1 nodes = 3 act = softmax opt =  Nadam
2022-12-10 06:49:36.005360: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6951 – accuracy: 0.0000e+00
2022-12-10 06:53:41.463874: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 2 nodes = 3 act = softmax opt =  Nadam
2022-12-10 06:53:42.071002: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6927 – accuracy: 0.0000e+00
2022-12-10 06:58:57.625898: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 3 nodes = 3 act = softmax opt =  Nadam
2022-12-10 06:58:58.270522: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6934 – accuracy: 0.0000e+00
2022-12-10 07:04:37.450744: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 10ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 1 nodes = 4 act = softmax opt =  Nadam
2022-12-10 07:04:40.399579: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] – ETA: 5s – loss: 0.6912 – accuracy: 0.0000e+00
2022-12-10 07:25:37.732889: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] – 0s 9ms/step – loss: 0.6931 – accuracy: 0.5000
layers = 2 nodes = 4 act = softmax opt =  Nadam
```

```
2022-12-10 07:25:38.363800: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6925 - accuracy: 0.0000e+00
2022-12-10 07:31:12.058629: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 3 nodes = 4 act = softmax opt =  Nadam
2022-12-10 07:31:12.752917: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6931 - accuracy: 0.0000e+00
2022-12-10 07:36:50.128456: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 12ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 1 nodes = 2 act = tanh opt =  Nadam
2022-12-10 07:36:50.829977: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.6924 - accuracy: 1.0000
2022-12-10 07:40:59.247295: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
layers = 2 nodes = 2 act = tanh opt =  Nadam
2022-12-10 07:40:59.888504: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 07:46:22.301165: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 3 nodes = 2 act = tanh opt =  Nadam
2022-12-10 07:46:23.067905: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 07:51:51.484999: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 3 act = tanh opt =  Nadam
2022-12-10 07:51:52.188211: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 6s - loss: 0.6886 - accuracy: 1.0000
2022-12-10 07:56:01.437955: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 2 nodes = 3 act = tanh opt =  Nadam
2022-12-10 07:56:02.114268: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 08:01:32.224442: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 10ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 3 act = tanh opt =  Nadam
2022-12-10 08:01:32.961872: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
2022-12-10 08:06:56.174466: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 1 nodes = 4 act = tanh opt =  Nadam
2022-12-10 08:06:56.890003: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
2022-12-10 08:11:08.003344: I tensorflow/core/grappler/optimizers/custom_graph_optimizer
_registry.cc:114] Plugin optimizer for device_type GPU is enabled.
```

```
29/29 [==============================] - 0s 10ms/step - loss: 7.7125 - accuracy: 0.5000
layers = 2 nodes = 4 act = tanh opt =  Nadam
```
```
29/29 [==============================] - 1s 11ms/step - loss: 0.6932 - accuracy: 0.5000
layers = 3 nodes = 4 act = tanh opt =  Nadam
```
```
 1/29 [>.............................] - ETA: 5s - loss: 0.0000e+00 - accuracy: 1.0000
```
```
29/29 [==============================] - 1s 11ms/step - loss: 7.7125 - accuracy: 0.5000
```

In [94]: `results.sort_values('score')`

Out[94]:

	layers	nodes	activation	optimizer	score	accuracy
102	1	3	tanh	Adam	0.690094	0.508889
53	3	4	sigmoid	RMSprop	0.691809	0.510000
93	1	3	softmax	Adam	0.692768	0.500000
11	3	2	sigmoid	SGD	0.692997	0.508889
88	2	4	sigmoid	Adam	0.693104	0.501111
...	...	...	...	...	...	...
64	2	2	tanh	RMSprop	7.712473	0.500000
63	1	2	tanh	RMSprop	7.712473	0.500000
44	3	4	relu	RMSprop	7.712473	0.500000
106	2	4	tanh	Adam	7.712473	0.500000
143	3	4	tanh	Nadam	7.712473	0.500000

144 rows × 6 columns

Based on the above results of a for loop over samples of layer, node, activation, and optimizer combinations, a a layer, 3 node NN with a tanh activation and Adam optimizer has the best lost score, followed closely by a 3 layer, 4 node NN with a sigmoid activation and either a RMSprop optimizer.