Лабораторная работа №4

Загрузка данных

В качестве набора данных будем использовать набор данных о хоралах Баха

Набор данных содержит следующие колонки:

- chorale_ID - номер хорала
- event_number - id события
- pitch_1 - pitch_12 - наличие в аккорде каждой из 12 нот
- bass - нижняя нота аккорда
- meter - важность аккорда
- chord_label - название аккорда

In [13]:
```
# Импорт библиотек
import numpy as np
import pandas as pd
import seaborn as sns
from io import StringIO
import graphviz
import pydotplus
from IPython.display import Image
import matplotlib.pyplot as plt
%matplotlib inline
sns.set(style="ticks")

from sklearn.preprocessing import LabelEncoder
from sklearn.datasets import load_wine
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.tree import DecisionTreeClassifier, export_graphviz
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix, plot_confusion_matrix

# Загрузка датасета
dataset = pd.read_csv('/content/drive/MyDrive/Colab Notebooks/datasets/bach_choral_set_dataset.csv')
```

In [14]:
```
# Первые 5 строк датасета
dataset.head()
```

Out[14]:

	choral_ID	event_number	pitch_1	pitch_2	pitch_3	pitch_4	pitch_5	pitch_6	pitch_7	pitch_8	pitch_9	pitch_10	pitch_11	pitch_12	bass	meter	chord_label
0	000106b_	1	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	F	3	F_M
1	000106b_	2	YES	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	E	5	C_M
2	000106b_	3	YES	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	E	2	C_M
3	000106b_	4	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	F	3	F_M
4	000106b_	5	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	F	2	F_M

In [15]:
```
# Типы колонок
dataset.dtypes
```

Out[15]:
```
choral_ID       object
event_number     int64
pitch_1         object
pitch_2         object
pitch_3         object
pitch_4         object
pitch_5         object
pitch_6         object
pitch_7         object
pitch_8         object
pitch_9         object
pitch_10        object
pitch_11        object
pitch_12        object
bass            object
meter            int64
chord_label     object
dtype: object
```

In [16]:
```
# Количество классов
len(dataset['chord_label'].unique())
```

Out[16]:
```
102
```

In [17]:
```
# Будем использовать только те классы, которые составляют более 5%
```

```
freqs = dataset['chord_label'].value_counts(normalize=True)*100
ind = []
for i in range(0, dataset.shape[0]):
  if freqs[dataset.iloc[i]['chord_label']]<5:
    ind.append(i)
dataset.drop(axis=0, index=ind, inplace = True)
dataset.shape
```

Out[17]:
```
(2828, 17)
```

In [18]:
```
# Новое количество классов
len(dataset['chord_label'].unique())
```

Out[18]:
```
7
```

In [19]:
```
# Кодирование категориальных признаков
le = LabelEncoder()
dataset['choral_ID'] = le.fit_transform(dataset['choral_ID'])
for i in range(1,13):
  col = 'pitch_'+str(i)
  dataset[col] = le.fit_transform(dataset[col])
dataset['bass'] = le.fit_transform(dataset['bass'])
dataset['chord_label'] = le.fit_transform(dataset['chord_label'])
```

In [20]:
```
# Разделение данных на целевые и нецелвые колонки
data = pd.DataFrame(dataset[dataset.columns.difference(['chord_label'])])
target = dataset['chord_label'].copy()
```

Разделение на обучающую и тестовую выборки

In [33]:
```
# Разделение на обучающую и тестовую выборки
xtrain, xtest, ytrain, ytest = train_test_split(
    data, target, test_size=0.3, random_state=1)

train_acc = dict()
test_acc = dict()
```

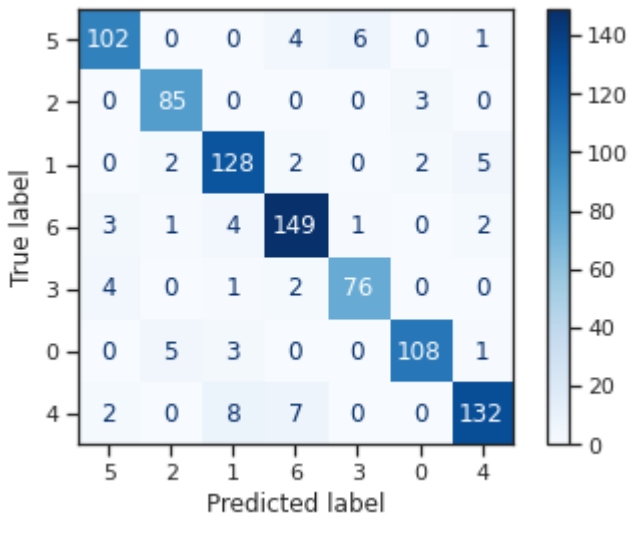
Обучение моделей

In [34]:
```
# Логистическая регрессия
lr = LogisticRegression(solver='lbfgs', max_iter=10000)
lr.fit(xtrain, ytrain)
train_acc['Logistic Regression'] = accuracy_score(ytrain, lr.predict(xtrain))
test_acc['Logistic Regression'] = accuracy_score(ytest, lr.predict(xtest))
print('Train accuracy: ', train_acc['Logistic Regression'])
print('Test accuracy: ', test_acc['Logistic Regression'], '\n')
plot_confusion_matrix(lr, xtest, ytest,
                      display_labels=target.unique(), cmap=plt.cm.Blues)
```

```
Train accuracy:  0.9277412834765033
Test accuracy:  0.9187279151943463
```

```
/usr/local/lib/python3.7/dist-packages/sklearn/utils/deprecation.py:87: FutureWarning: Function plot_confusion_matrix is deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_predictions or ConfusionMatrixDisplay.from_estimator.
  warnings.warn(msg, category=FutureWarning)
```

Out[34]:
```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7fdef38828d0>
```



In [35]:
```
# SVM
svc = SVC(kernel='linear')
svc.fit(xtrain, ytrain)
train_acc['SVC'] = accuracy_score(ytrain, svc.predict(xtrain))
test_acc['SVC'] = accuracy_score(ytest, svc.predict(xtest))
print('Train accuracy: ', train_acc['SVC'])
print('Test accuracy: ', test_acc['SVC'], '\n')
```

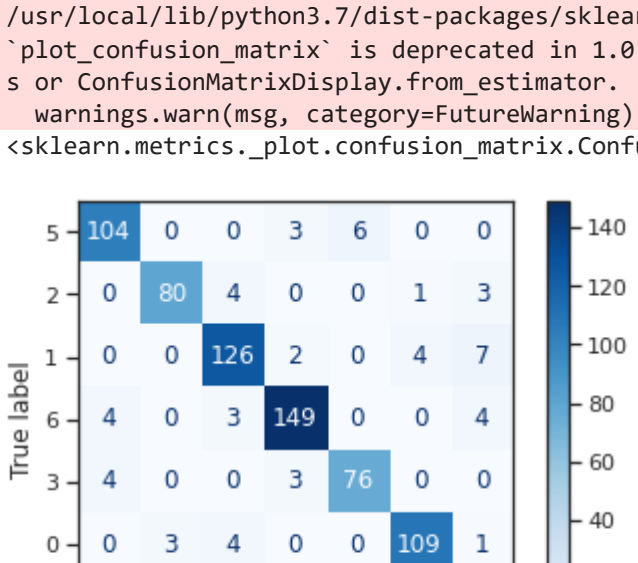
```
plot_confusion_matrix(svc, xtest, ytest,
                      display_labels=target.unique(), cmap=plt.cm.Blues)
```

```
Train accuracy:  0.9297625063163214
Test accuracy:  0.9210836277974087
```

```
/usr/local/lib/python3.7/dist-packages/sklearn/utils/deprecation.py:87: FutureWarning: Function plot_confusion_matrix is deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_predictions or ConfusionMatrixDisplay.from_estimator.
  warnings.warn(msg, category=FutureWarning)
```

Out[35]:

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7fdef3450a90>
```



In [36]:

```
# Решающее дерево
dtc = DecisionTreeClassifier()
dtc.fit(xtrain, ytrain)
train_acc['Decision Tree'] = accuracy_score(ytrain, dtc.predict(xtrain))
test_acc['Decision Tree'] = accuracy_score(ytest, dtc.predict(xtest))
print('Train accuracy: ', train_acc['Decision Tree'])
print('Test accuracy: ', test_acc['Decision Tree'], '\n')
plot_confusion_matrix(dtc, xtest, ytest,
                      display_labels=target.unique(), cmap=plt.cm.Blues)
```

```
Train accuracy:  1.0
Test accuracy:  0.9069493521790342
```

```
/usr/local/lib/python3.7/dist-packages/sklearn/utils/deprecation.py:87: FutureWarning: Function plot_confusion_matrix is deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_predictions or ConfusionMatrixDisplay.from_estimator.
  warnings.warn(msg, category=FutureWarning)
```

Out[36]:

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7fdef32b5d50>
```

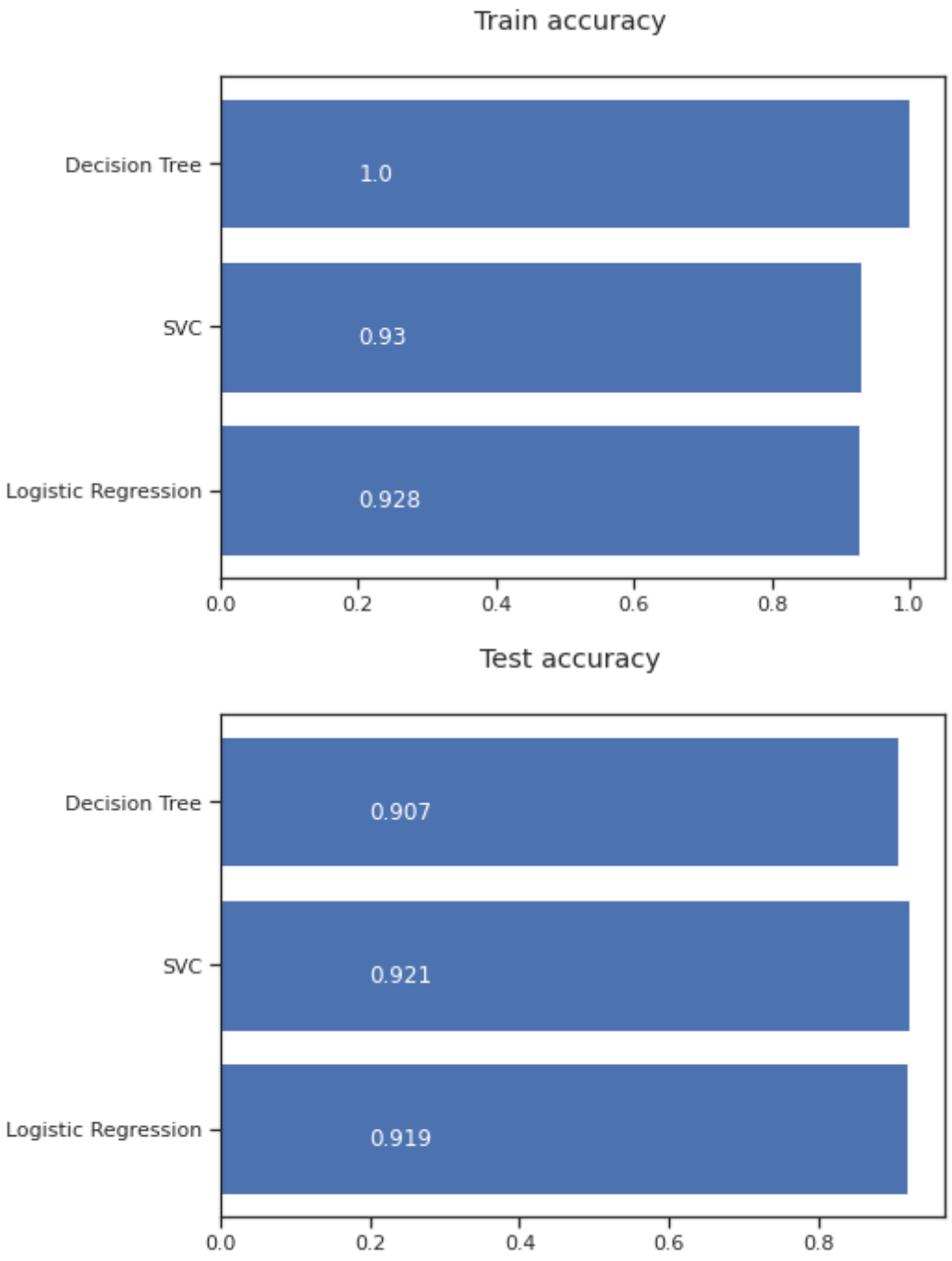

Сравнение качества моделей

In [37]:

```
def plot_acc(metric, suptitle):
  fig, ax = plt.subplots(figsize=(7,5))
  fig.suptitle(suptitle)
  ind = np.arange(len(metric))
  plt.barh(ind, metric.values())
  plt.yticks(ind, metric)
  # Вывод значений
  for a,b in zip(ind, metric.values()):
        plt.text(0.2, a-0.1, str(round(b,3)), color='white')
  plt.show()
  return
```

In [38]:

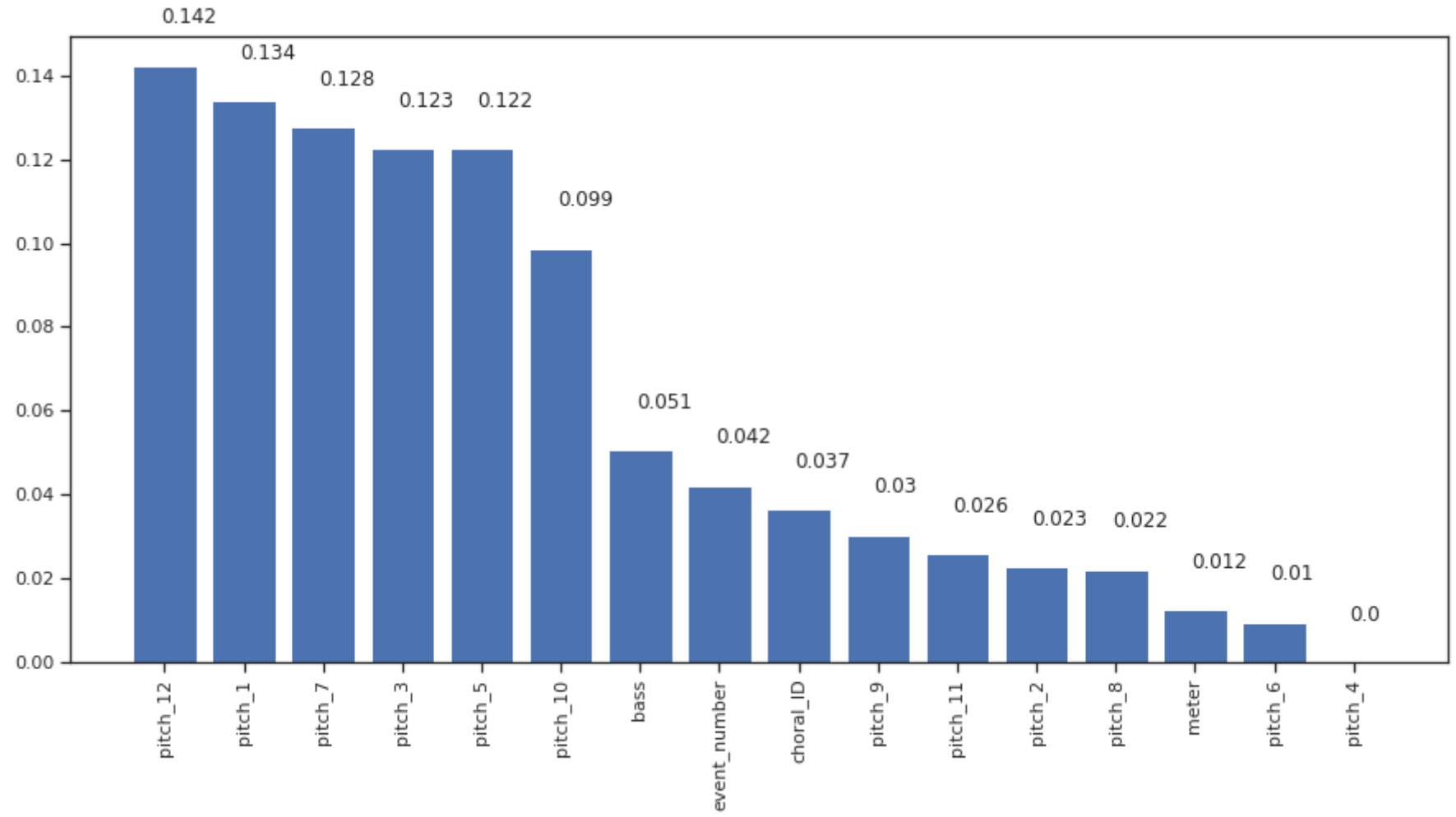
```
plot_acc(train_acc, 'Train accuracy')
plot_acc(test_acc, 'Test accuracy')
```



Визуализация решающего дерева

In [39]:

```
# График важности признаков
from operator import itemgetter
# Сортировка значений важности признаков по убыванию
list_to_sort = list(zip(pd.DataFrame(data=data, columns=data.columns).columns.values, dtc.feature_importances_))
sorted_list = sorted(list_to_sort, key=itemgetter(1), reverse = True)
# Названия признаков
labels = [x for x,_ in sorted_list]
# Важности признаков
dat = [x for _,x in sorted_list]
# Вывод графика
fig, ax = plt.subplots(figsize=(15,7))
ind = np.arange(len(labels))
plt.bar(ind, dat)
plt.xticks(ind, labels, rotation='vertical')
# Вывод значений
for a,b in zip(ind, dat):
    plt.text(a-0.05, b+0.01, str(round(b,3)))
plt.show()
```



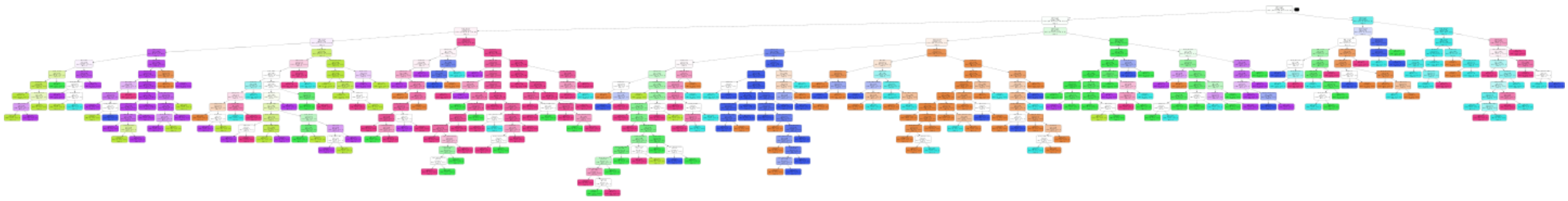
In [40]:

```
# Визуализация дерева
dot_data = export_graphviz(dtc, out_file=None,
                           feature_names=data.columns,
                           class_names=list(dataset['chord_label'].map(lambda x: str(x))),
                           filled=True, rounded=True, special_characters=True)
pydot_graph = pydotplus.graph_from_dot_data(dot_data)
```

In [41]:

```
# Сохранение изображения в png
pydot_graph.set_size('"150,150!"')
pydot_graph.write_png('tree.png')
# Вывод изображения
pydot_graph.set_size('"15,15!"')
graph = pydot_graph.create_png()
Image(graph)
```

Out[41]:



In [42]:

```
# Правила дерева решений
from IPython.core.display import HTML
from sklearn.tree import export_text
tree_rules = export_text(dtc, feature_names=list(data.columns))
HTML('<pre>' + tree_rules + '</pre>')
```

Out[42]:

```
|--- pitch_7 <= 0.50
|   |--- pitch_5 <= 0.50
|   |   |--- pitch_12 <= 0.50
|   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |--- pitch_10 <= 0.50
|   |   |   |   |   |--- bass <= 11.50
|   |   |   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 37.00
|   |   |   |   |   |   |   |   |   |--- pitch_1 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |   |--- pitch_1 >  0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |--- choral_ID >  37.00
|   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |--- pitch_8 >  0.50
|   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |--- bass >  11.50
|   |   |   |   |   |   |--- pitch_6 <= 0.50
|   |   |   |   |   |   |   |--- choral_ID <= 12.00
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |--- choral_ID >  12.00
|   |   |   |   |   |   |   |   |--- choral_ID <= 27.00
|   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |--- choral_ID >  27.00
```

```
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |---  pitch_6 >  0.50
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |---  pitch_10 >  0.50
|   |   |   |   |   |---  pitch_2 <= 0.50
|   |   |   |   |   |   |---  pitch_6 <= 0.50
|   |   |   |   |   |   |   |---  bass <= 12.50
|   |   |   |   |   |   |   |   |---  choral_ID <= 33.50
|   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |---  choral_ID >  33.50
|   |   |   |   |   |   |   |   |   |---  event_number <= 58.50
|   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |   |---  event_number >  58.50
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |---  bass >  12.50
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |---  pitch_6 >  0.50
|   |   |   |   |   |   |   |   |---  pitch_11 <= 0.50
|   |   |   |   |   |   |   |   |   |---  meter <= 2.50
|   |   |   |   |   |   |   |   |   |   |---  bass <= 2.00
|   |   |   |   |   |   |   |   |   |   |   |---  choral_ID <= 25.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |   |   |---  choral_ID >  25.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 2
|   |   |   |   |   |   |   |   |   |   |---  bass >  2.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |---  meter >  2.50
|   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |---  pitch_11 >  0.50
|   |   |   |   |   |   |   |   |   |---  event_number <= 135.50
|   |   |   |   |   |   |   |   |   |   |---  choral_ID <= 15.50
|   |   |   |   |   |   |   |   |   |   |   |---  choral_ID <= 12.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |   |   |---  choral_ID >  12.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |   |   |---  choral_ID >  15.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |---  event_number >  135.50
|   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |---  pitch_2 >  0.50
|   |   |   |   |   |   |   |---  pitch_1 <= 0.50
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |---  pitch_1 >  0.50
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |---  pitch_3 >  0.50
|   |   |   |   |---  pitch_11 <= 0.50
|   |   |   |   |   |---  bass <= 13.00
|   |   |   |   |   |   |---  pitch_6 <= 0.50
|   |   |   |   |   |   |   |---  bass <= 6.50
|   |   |   |   |   |   |   |   |---  pitch_8 <= 0.50
|   |   |   |   |   |   |   |   |   |---  pitch_1 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |---  pitch_1 >  0.50
|   |   |   |   |   |   |   |   |   |   |---  meter <= 2.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |   |---  meter >  2.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |---  pitch_8 >  0.50
|   |   |   |   |   |   |   |   |   |---  pitch_1 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |---  pitch_1 >  0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |---  bass >  6.50
|   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |---  pitch_6 >  0.50
|   |   |   |   |   |   |   |---  pitch_8 <= 0.50
|   |   |   |   |   |   |   |   |---  bass <= 11.00
|   |   |   |   |   |   |   |   |   |---  choral_ID <= 33.50
|   |   |   |   |   |   |   |   |   |   |---  event_number <= 20.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 2
|   |   |   |   |   |   |   |   |   |   |---  event_number >  20.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 2
|   |   |   |   |   |   |   |   |   |---  choral_ID >  33.50
|   |   |   |   |   |   |   |   |   |   |---  pitch_10 <= 0.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 2
|   |   |   |   |   |   |   |   |   |   |---  pitch_10 >  0.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 3
|   |   |   |   |   |   |   |   |   |---  bass >  11.00
|   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |---  pitch_8 >  0.50
|   |   |   |   |   |   |   |   |   |---  bass <= 9.50
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |   |---  bass >  9.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
```

```
|   |   |   |   |   |--- bass >  13.00
|   |   |   |   |   |   |--- event_number <= 111.00
|   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |--- event_number >  111.00
|   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |--- pitch_11 >  0.50
|   |   |   |   |   |--- choral_ID <= 54.50
|   |   |   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |--- pitch_8 >  0.50
|   |   |   |   |   |   |   |--- choral_ID <= 42.50
|   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |--- choral_ID >  42.50
|   |   |   |   |   |   |   |   |--- meter <= 3.50
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |--- meter >  3.50
|   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |--- choral_ID >  54.50
|   |   |   |   |   |   |--- meter <= 3.50
|   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |--- meter >  3.50
|   |   |   |   |   |   |   |--- class: 1
|   |   |   |--- pitch_12 >  0.50
|   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |   |--- bass <= 9.50
|   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 10.50
|   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |--- choral_ID >  10.50
|   |   |   |   |   |   |   |   |   |--- meter <= 4.00
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 102.00
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 34.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID >  34.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 2
|   |   |   |   |   |   |   |   |   |   |--- event_number >  102.00
|   |   |   |   |   |   |   |   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- meter >  4.00
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |--- bass >  9.50
|   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |--- pitch_6 <= 0.50
|   |   |   |   |   |   |--- pitch_2 <= 0.50
|   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |--- pitch_2 >  0.50
|   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |--- pitch_6 >  0.50
|   |   |   |   |   |   |--- class: 3
|   |   |   |--- pitch_8 >  0.50
|   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |--- choral_ID <= 3.00
|   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |--- choral_ID >  3.00
|   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |--- pitch_6 <= 0.50
|   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |--- pitch_6 >  0.50
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |--- event_number <= 48.50
|   |   |   |   |   |   |   |   |--- bass <= 4.00
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |--- bass >  4.00
|   |   |   |   |   |   |   |   |   |--- event_number <= 47.50
|   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 21.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 5
|   |   |   |   |   |   |   |   |   |   |--- choral_ID >  21.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- event_number >  47.50
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |--- event_number >  48.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 30.00
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |--- choral_ID >  30.00
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 33.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 70.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
```

```
|   |   |   |   |   |   |   |   |   |   |--- event_number >  70.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |   |--- choral_ID >  33.50
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 37.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 3
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID >  37.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |--- pitch_10 <= 0.50
|   |   |   |   |   |   |   |--- choral_ID <= 43.50
|   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |--- choral_ID >  43.50
|   |   |   |   |   |   |   |   |--- event_number <= 8.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 49.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- choral_ID >  49.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 4.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |--- event_number >  4.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |--- event_number >  8.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 45.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 47.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |--- event_number >  47.00
|   |   |   |   |   |   |   |   |   |   |   |--- event_number <= 63.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |   |   |--- event_number >  63.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- choral_ID >  45.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |--- pitch_10 >  0.50
|   |   |   |   |   |   |   |--- event_number <= 21.50
|   |   |   |   |   |   |   |   |--- event_number <= 13.50
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |--- event_number >  13.50
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- event_number >  21.50
|   |   |   |   |   |   |   |   |--- class: 6
|   |   |--- pitch_5 >  0.50
|   |   |   |--- pitch_1 <= 0.50
|   |   |   |   |--- pitch_10 <= 0.50
|   |   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |   |--- bass <= 12.00
|   |   |   |   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |   |   |   |--- bass <= 6.50
|   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |--- bass >  6.50
|   |   |   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |--- pitch_8 >  0.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 4.00
|   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |--- choral_ID >  4.00
|   |   |   |   |   |   |   |   |   |--- event_number <= 99.00
|   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 8.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |--- choral_ID >  8.00
|   |   |   |   |   |   |   |   |   |   |   |--- meter <= 1.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |   |--- meter >  1.50
|   |   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 7
|   |   |   |   |   |   |   |   |   |--- event_number >  99.00
|   |   |   |   |   |   |   |   |   |   |--- bass <= 6.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |--- bass >  6.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |--- bass >  12.00
|   |   |   |   |   |   |   |--- choral_ID <= 53.50
|   |   |   |   |   |   |   |   |--- meter <= 4.50
|   |   |   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 33.50
|   |   |   |   |   |   |   |   |   |   |   |--- event_number <= 127.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |   |--- event_number >  127.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |--- choral_ID >  33.50
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |--- meter >  4.50
|   |   |   |   |   |   |   |   |   |--- class: 3
```

```
|   |   |   |   |   |   |   |--- choral_ID >  53.50
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |   |--- pitch_2 <= 0.50
|   |   |   |   |   |   |   |--- pitch_12 <= 0.50
|   |   |   |   |   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |--- pitch_12 >  0.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 44.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 9.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 37.00
|   |   |   |   |   |   |   |   |   |   |   |--- event_number <= 31.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |   |   |--- event_number >  31.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |   |--- event_number >  37.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |--- choral_ID >  9.50
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |--- choral_ID >  44.50
|   |   |   |   |   |   |   |   |   |--- meter <= 3.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 32.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |--- event_number >  32.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 33.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |   |--- event_number >  33.50
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 5
|   |   |   |   |   |   |   |   |   |--- meter >  3.50
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |--- pitch_2 >  0.50
|   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |--- bass <= 12.50
|   |   |   |   |   |   |   |   |   |--- event_number <= 82.50
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |--- event_number >  82.50
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |--- bass >  12.50
|   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |--- pitch_10 >  0.50
|   |   |   |   |   |--- pitch_2 <= 0.50
|   |   |   |   |   |   |--- bass <= 5.00
|   |   |   |   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |   |   |   |--- event_number <= 75.50
|   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |--- event_number >  75.50
|   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |--- bass >  5.00
|   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |--- event_number <= 83.00
|   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |--- event_number >  83.00
|   |   |   |   |   |   |   |   |   |--- event_number <= 134.00
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- event_number >  134.00
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |--- event_number <= 64.00
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |--- event_number >  64.00
|   |   |   |   |   |   |   |   |   |--- event_number <= 140.50
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- event_number >  140.50
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |--- pitch_2 >  0.50
|   |   |   |   |   |   |--- bass <= 9.00
|   |   |   |   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |   |   |   |--- pitch_12 <= 0.50
|   |   |   |   |   |   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |   |   |   |   |   |--- bass <= 4.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- bass >  4.50
|   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 33.00
|   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 3
|   |   |   |   |   |   |   |   |   |   |--- choral_ID >  33.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- pitch_8 >  0.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 77.50
```

```
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- event_number >  77.50
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 78.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |   |--- event_number >  78.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |--- pitch_12 >  0.50
|   |   |   |   |   |   |   |   |   |--- event_number <= 52.00
|   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |--- event_number >  52.00
|   |   |   |   |   |   |   |   |   |   |--- bass <= 3.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |   |--- bass >  3.00
|   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |   |   |   |--- bass <= 3.00
|   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |--- bass >  3.00
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |--- bass >  9.00
|   |   |   |   |   |   |   |--- bass <= 12.00
|   |   |   |   |   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |   |   |   |   |--- event_number <= 151.00
|   |   |   |   |   |   |   |   |   |   |--- event_number <= 24.50
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 8.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID >  8.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |   |--- event_number >  24.50
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID <= 16.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |   |   |   |   |--- choral_ID >  16.00
|   |   |   |   |   |   |   |   |   |   |   |   |--- truncated branch of depth 3
|   |   |   |   |   |   |   |   |   |--- event_number >  151.00
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |--- bass >  12.00
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |--- pitch_1 >  0.50
|   |   |   |--- pitch_10 <= 0.50
|   |   |   |   |--- pitch_9 <= 0.50
|   |   |   |   |   |--- pitch_12 <= 0.50
|   |   |   |   |   |   |--- pitch_11 <= 0.50
|   |   |   |   |   |   |   |--- pitch_6 <= 0.50
|   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |--- pitch_6 >  0.50
|   |   |   |   |   |   |   |   |--- event_number <= 20.00
|   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |--- event_number >  20.00
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |--- pitch_11 >  0.50
|   |   |   |   |   |   |   |--- bass <= 12.00
|   |   |   |   |   |   |   |   |--- pitch_3 <= 0.50
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |--- pitch_3 >  0.50
|   |   |   |   |   |   |   |   |   |--- bass <= 6.00
|   |   |   |   |   |   |   |   |   |   |--- class: 1
|   |   |   |   |   |   |   |   |   |--- bass >  6.00
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |--- bass >  12.00
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |--- pitch_12 >  0.50
|   |   |   |   |   |   |--- event_number <= 67.50
|   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |--- event_number >  67.50
|   |   |   |   |   |   |   |--- choral_ID <= 43.00
|   |   |   |   |   |   |   |   |--- event_number <= 90.00
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |--- event_number >  90.00
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |--- choral_ID >  43.00
|   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |--- pitch_9 >  0.50
|   |   |   |   |   |--- choral_ID <= 32.00
|   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |--- choral_ID >  32.00
|   |   |   |   |   |   |--- class: 2
|   |   |   |--- pitch_10 >  0.50
|   |   |   |   |--- choral_ID <= 38.00
|   |   |   |   |   |--- bass <= 1.50
|   |   |   |   |   |   |--- choral_ID <= 24.00
|   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |--- choral_ID >  24.00
```

```
|   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |--- bass >  1.50
|   |   |   |   |   |   |   |--- pitch_6 <= 0.50
|   |   |   |   |   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 19.50
|   |   |   |   |   |   |   |   |   |   |--- meter <= 1.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |   |   |--- meter >  1.50
|   |   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |--- choral_ID >  19.50
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 33.00
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |   |--- choral_ID >  33.00
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- pitch_6 >  0.50
|   |   |   |   |   |   |   |   |--- bass <= 11.00
|   |   |   |   |   |   |   |   |   |--- bass <= 7.50
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |   |--- bass >  7.50
|   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |--- bass >  11.00
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |--- choral_ID >  38.00
|   |   |   |   |   |   |--- event_number <= 91.50
|   |   |   |   |   |   |   |--- bass <= 2.50
|   |   |   |   |   |   |   |   |--- choral_ID <= 46.50
|   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |   |--- choral_ID >  46.50
|   |   |   |   |   |   |   |   |   |--- event_number <= 82.00
|   |   |   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |   |   |--- event_number >  82.00
|   |   |   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |   |--- bass >  2.50
|   |   |   |   |   |   |   |   |--- class: 5
|   |   |   |   |   |   |--- event_number >  91.50
|   |   |   |   |   |   |   |--- class: 2
|   |--- pitch_7 >  0.50
|   |   |--- pitch_3 <= 0.50
|   |   |   |--- pitch_12 <= 0.50
|   |   |   |   |--- pitch_2 <= 0.50
|   |   |   |   |   |--- pitch_1 <= 0.50
|   |   |   |   |   |   |--- choral_ID <= 13.00
|   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |--- choral_ID >  13.00
|   |   |   |   |   |   |   |--- choral_ID <= 44.50
|   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- choral_ID >  44.50
|   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |--- pitch_1 >  0.50
|   |   |   |   |   |   |--- bass <= 13.50
|   |   |   |   |   |   |   |--- choral_ID <= 7.00
|   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- choral_ID >  7.00
|   |   |   |   |   |   |   |   |--- event_number <= 27.50
|   |   |   |   |   |   |   |   |   |--- choral_ID <= 36.50
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |   |--- choral_ID >  36.50
|   |   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |   |   |--- event_number >  27.50
|   |   |   |   |   |   |   |   |   |--- class: 2
|   |   |   |   |   |   |--- bass >  13.50
|   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |--- pitch_2 >  0.50
|   |   |   |   |   |--- event_number <= 128.50
|   |   |   |   |   |   |--- choral_ID <= 7.50
|   |   |   |   |   |   |   |--- bass <= 7.50
|   |   |   |   |   |   |   |   |--- class: 4
|   |   |   |   |   |   |   |--- bass >  7.50
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |--- choral_ID >  7.50
|   |   |   |   |   |   |   |--- choral_ID <= 49.00
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |   |   |--- choral_ID >  49.00
|   |   |   |   |   |   |   |   |--- bass <= 7.00
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- bass >  7.00
|   |   |   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |--- event_number >  128.50
|   |   |   |   |   |   |--- class: 6
|   |   |   |--- pitch_12 >  0.50
|   |   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |   |--- bass <= 1.50
```

```
|   |   |   |   |   |--- class: 3
|   |   |   |   |--- bass >  1.50
|   |   |   |   |   |--- class: 4
|   |   |   |--- pitch_8 >  0.50
|   |   |   |   |--- class: 2
|   |--- pitch_3 >  0.50
|   |   |--- pitch_12 <= 0.50
|   |   |   |--- pitch_2 <= 0.50
|   |   |   |   |--- bass <= 6.00
|   |   |   |   |   |--- meter <= 4.50
|   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |--- meter >  4.50
|   |   |   |   |   |   |--- pitch_1 <= 0.50
|   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |--- pitch_1 >  0.50
|   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |--- bass >  6.00
|   |   |   |   |   |--- class: 3
|   |   |   |--- pitch_2 >  0.50
|   |   |   |   |--- bass <= 3.00
|   |   |   |   |   |--- class: 0
|   |   |   |   |--- bass >  3.00
|   |   |   |   |   |--- choral_ID <= 4.00
|   |   |   |   |   |   |--- class: 0
|   |   |   |   |   |--- choral_ID >  4.00
|   |   |   |   |   |   |--- class: 3
|   |   |--- pitch_12 >  0.50
|   |   |   |--- pitch_8 <= 0.50
|   |   |   |   |--- event_number <= 62.50
|   |   |   |   |   |--- event_number <= 7.50
|   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |--- event_number >  7.50
|   |   |   |   |   |   |--- meter <= 2.50
|   |   |   |   |   |   |   |--- pitch_10 <= 0.50
|   |   |   |   |   |   |   |   |--- event_number <= 30.00
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |   |--- event_number >  30.00
|   |   |   |   |   |   |   |   |   |--- event_number <= 43.50
|   |   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |   |--- event_number >  43.50
|   |   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |   |--- pitch_10 >  0.50
|   |   |   |   |   |   |   |   |--- event_number <= 48.00
|   |   |   |   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |   |   |   |--- event_number >  48.00
|   |   |   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |--- meter >  2.50
|   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |--- event_number >  62.50
|   |   |   |   |   |--- event_number <= 121.50
|   |   |   |   |   |   |--- class: 6
|   |   |   |   |   |--- event_number >  121.50
|   |   |   |   |   |   |--- event_number <= 155.00
|   |   |   |   |   |   |   |--- class: 3
|   |   |   |   |   |   |--- event_number >  155.00
|   |   |   |   |   |   |   |--- class: 4
|   |   |   |--- pitch_8 >  0.50
|   |   |   |   |--- class: 6
```