In [1]:

```
import operator
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.metrics import mean_squared_error
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import PolynomialFeatures
%matplotlib inline
```

In [2]:

```
df = pd.read_csv("dataset.csv")

df.head()
```

Out[2]:

	x	y
0	4.98	24.0
1	9.14	21.6
2	4.03	34.7
3	2.94	33.4
4	5.33	36.2

In [3]:

```
x = df[['x']].values
y = df.y.values
```

In [4]:

```
x_train, x_val, y_train, y_val = train_test_split(x,y, train_size=.75, random_state=1)
```

In [5]:

```
maxdeg = 18

training_error, validation_error = [],[]

for d in range(1, maxdeg+1):

    x_poly_train = PolynomialFeatures(degree = d).fit_transform(x_train)

    x_poly_val = PolynomialFeatures(degree = d).fit_transform(x_val)

    lreg = LinearRegression(fit_intercept=False)

    lreg.fit(x_poly_train, y_train)

    y_train_pred = lreg.predict(x_poly_train)

    y_val_pred = lreg.predict(x_poly_val)

    training_error.append(mean_squared_error(y_train, y_train_pred))

    validation_error.append(mean_squared_error(y_val, y_val_pred))
```

In [6]:

```
min_mse = min(validation_error)
best_degree = validation_error.index(min_mse)

print("The best degree of the model is",best_degree)
```

```
The best degree of the model is 1
```

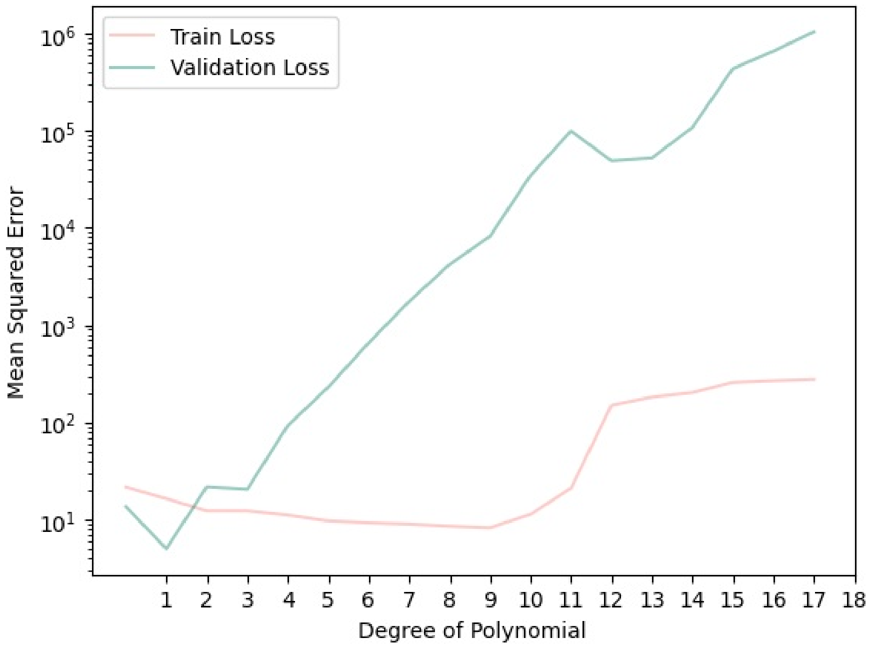
In [7]:

```
fig, ax = plt.subplots()

ax.plot(training_error, label= 'Train Loss', color='#FF7E79', alpha=0.4)

ax.plot(validation_error, label= 'Validation Loss', color='#007D66', alpha=0.4)

ax.set_xlabel('Degree of Polynomial')
ax.set_xticks(range(1, maxdeg+1))
ax.set_ylabel('Mean Squared Error')
ax.legend(loc = 'best')
ax.set_yscale('log')
plt.show();
```



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