In [61]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from datetime import datetime
colors = ['red','blue','green','magenta']
def fToC(f):
    return (f - 32) * 5.0/9.0

def plotDfStuff(df, dataName, second = False):
    # time plot
    fig, ax = plt.subplots(3,figsize = (10,28))
    x = df.index
    c = colors[0:len(df.columns)]
    # plot mean
    for iter, i in enumerate(df.columns):
        mean = df[i].mean()
        y = np.array([mean for x in range(len(x))])
        ax[0].plot(x, y, label = f'{i} mean', linestyle='--', color = c[iter])

    # set the second axis in celcius degrees
    if second:
        ax_c = ax[0].twinx()
        y1, y2 = ax[0].get_ylim()
        ax_c.set_ylim(fToC(y1), fToC(y2))
        ax_c.figure.canvas.draw()
        ax_c.set_ylabel('Celcius')

    ax[0].legend()
    ax[0].set_ylim(bottom = 0, top = np.max(df.max()))
    df.plot(title = dataName,
            ylabel = dataName,
            rot = 30, ax = ax[0], color = c)


    # histogram
    for iter, i in enumerate(df.columns):
        df[i].hist(ax=ax[1], label = i, color = c[iter] )
    ax[1].legend()
    ax[1].set_title("Bar plot of the dataframe")
    ax[1].set_xlabel(dataName)
    ax[1].set_ylabel("# of data")
    ax[1].set_ylim(bottom = 0)
    # kernel density
    df.plot.kde(title = 'PDF', xlabel = dataName, ax = ax[2], color = c)
    ax[2].set_ylim(bottom = 0)
    # statistics
    return df.describe()
```

In [62]:

```
usa = pd.read_csv('usa.csv', index_col = 0, parse_dates = True, header=1, names = ['Week
', 'US'])
uk = pd.read_csv('uk.csv', index_col = 0, parse_dates = True, header=1, names = ['Week',
'UK'])
pl = pd.read_csv('poland.csv', index_col = 0, parse_dates = True, header=1, names = ['We
ek','PL'])

all = pd.merge(
    pd.merge(uk, pl, 'outer', left_on = 'Week', right_on = 'Week'),
    usa, how = 'outer', left_on = 'Week', right_on = 'Week',
)
```

PLOT THE DF

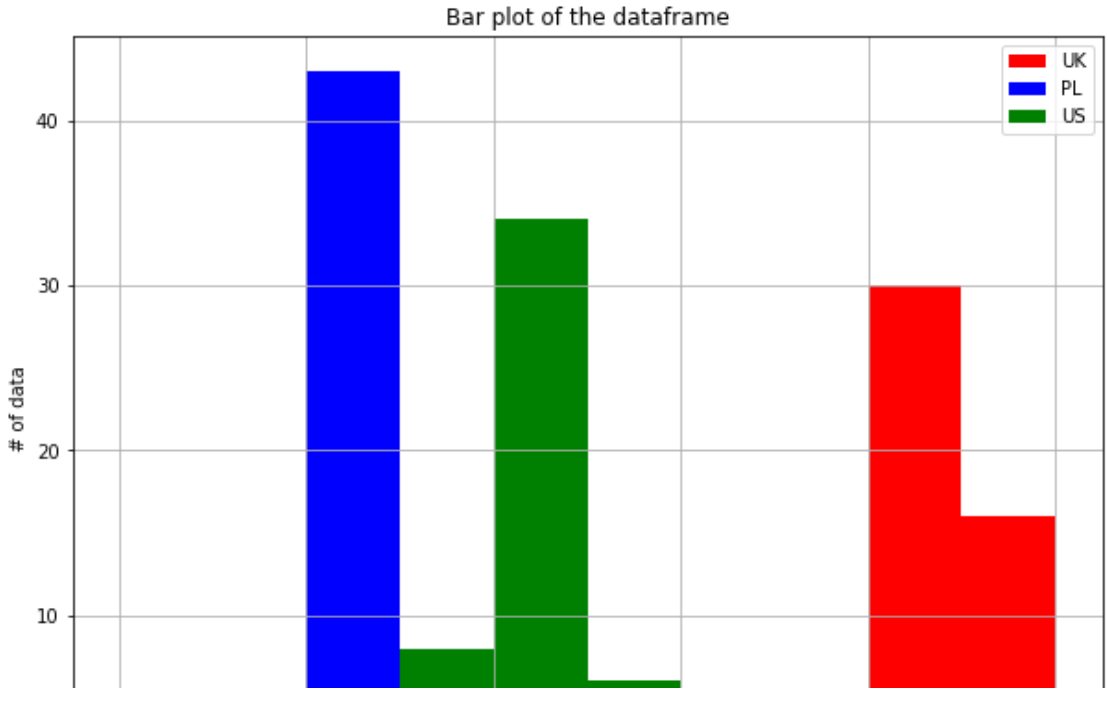
In [63]:

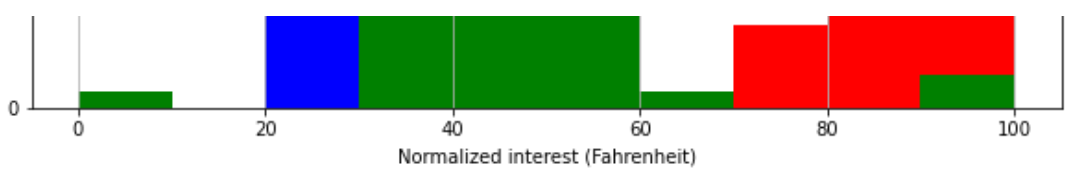
In [63]:

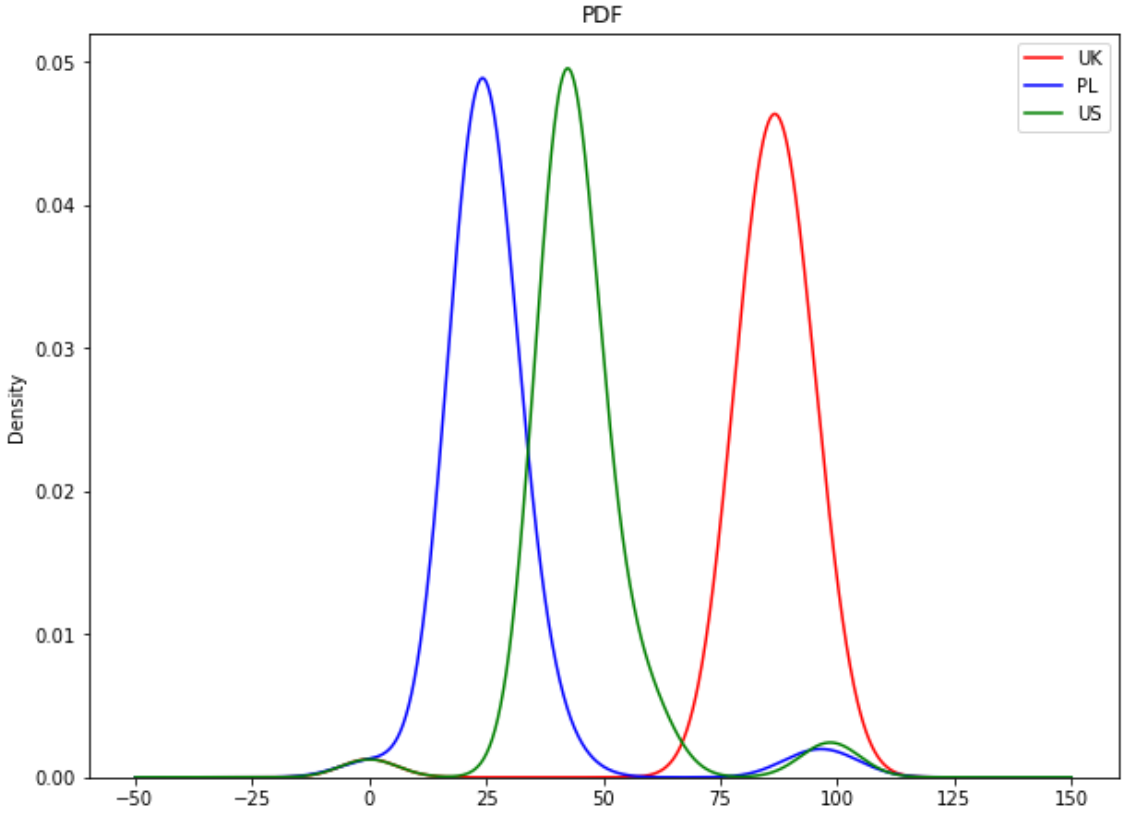
```
plotDfStuff(all, 'Normalized interest (Fahrenheit)', False)
```

Out[63]:

	UK	PL	US
count	52.000000	52.000000	52.000000
mean	85.153846	27.307692	45.365385
std	13.311332	14.962094	13.487872
min	0.000000	0.000000	0.000000
25%	81.750000	22.750000	40.000000
50%	86.500000	24.000000	42.500000
75%	90.000000	26.250000	46.000000
max	100.000000	100.000000	100.000000







SECOND

In [64]:

```
temp = pd.read_csv(
                    'temperature.csv', index_col = 0,
                    parse_dates = True, header=1,
                    names = ['Date','Value', 'Anomaly'],
                    skiprows=4, na_values=-99,
                    date_parser = lambda x: datetime.strptime(x,'%Y%M').date()
                  ).fillna(np.nan)
# interpolate nans if there are any
temp = temp.interpolate()

# plot like before
plotDfStuff(temp, 'Average temperature in St. Louis, Missouri', True)

# get departure from mean
mean = temp['Value'].mean()
first_year = list(temp.index)[0].year
last_year = list(temp.index)[-1].year
deg = u"\N{DEGREE SIGN}"
name = f'Departure from mean ({mean:.1f}{deg}F) {first_year}-{last_year} base period'.upp
er()

print(name)
temp[name] = mean - temp['Value']
temp
```

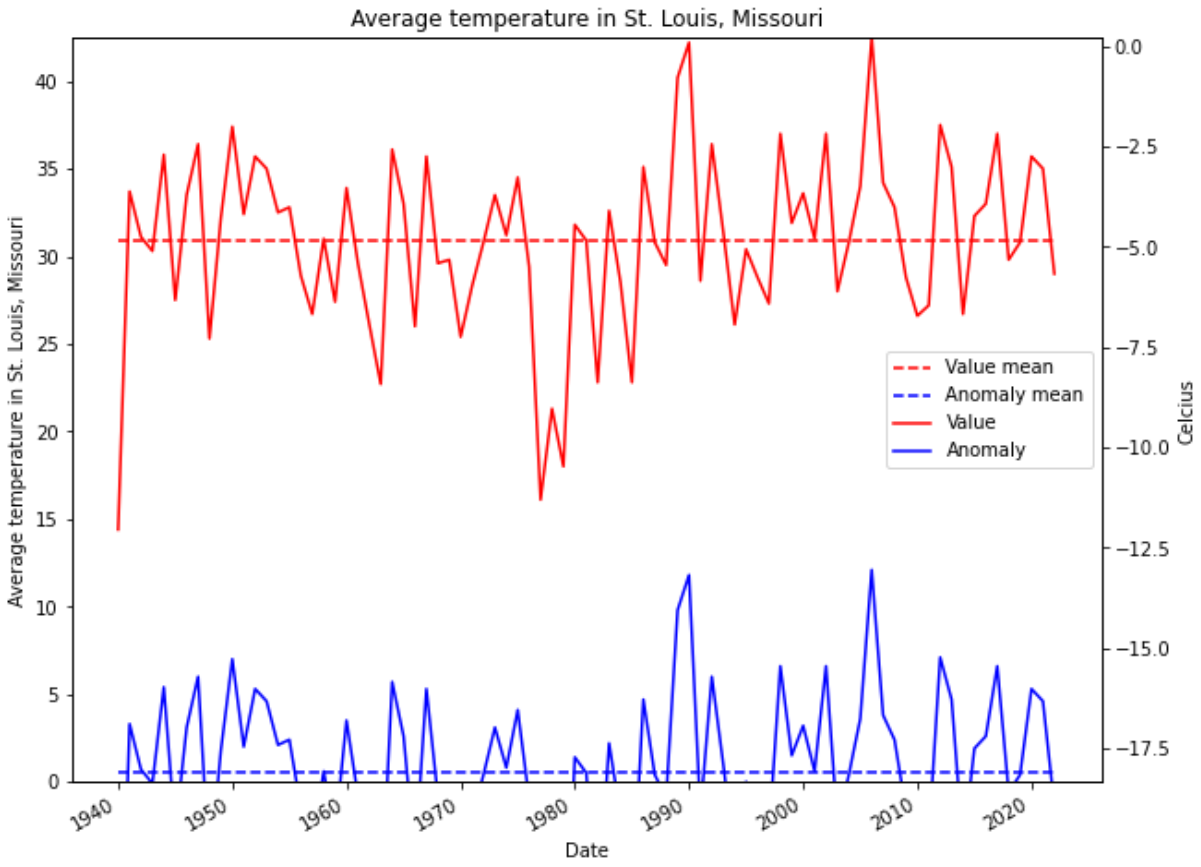
```
DEPARTURE FROM MEAN (30.9°F) 1940-2022 BASE PERIOD
```

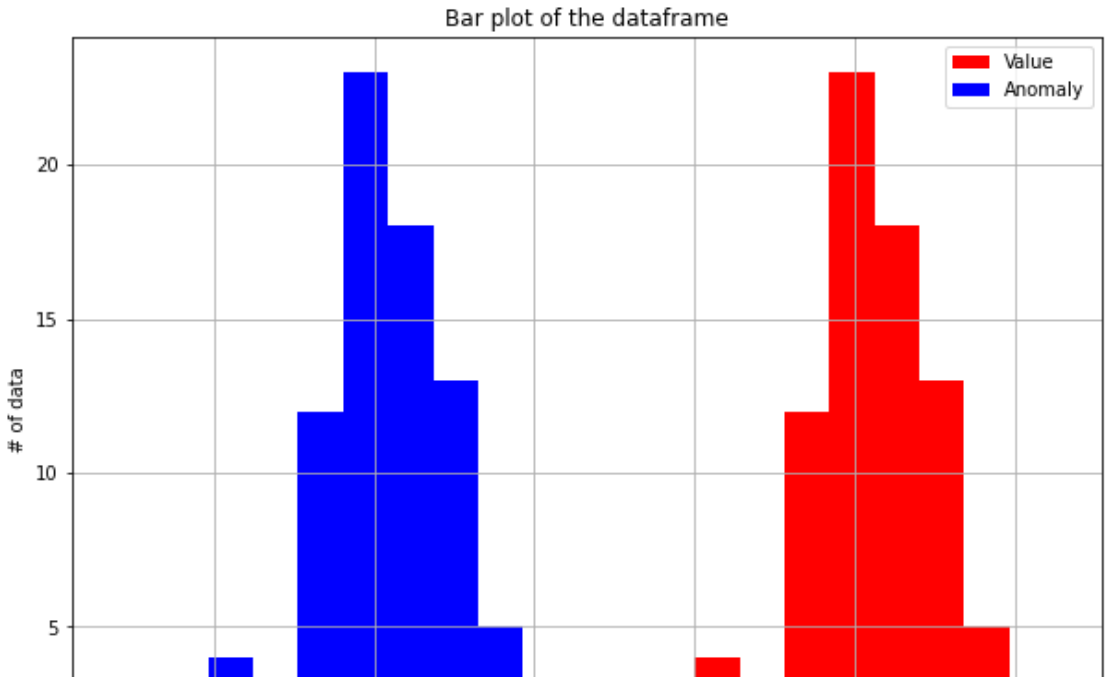
Out[64]:

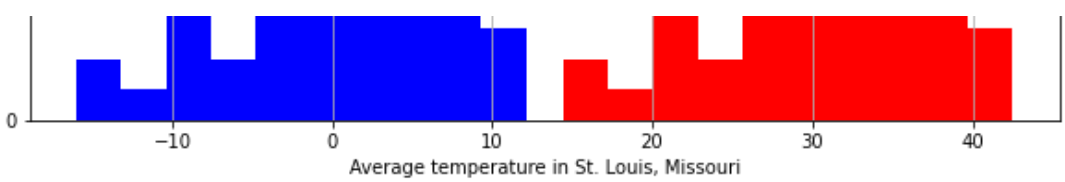
Date	Value	Anomaly	DEPARTURE FROM MEAN (30.9°F) 1940-2022 BASE PERIOD

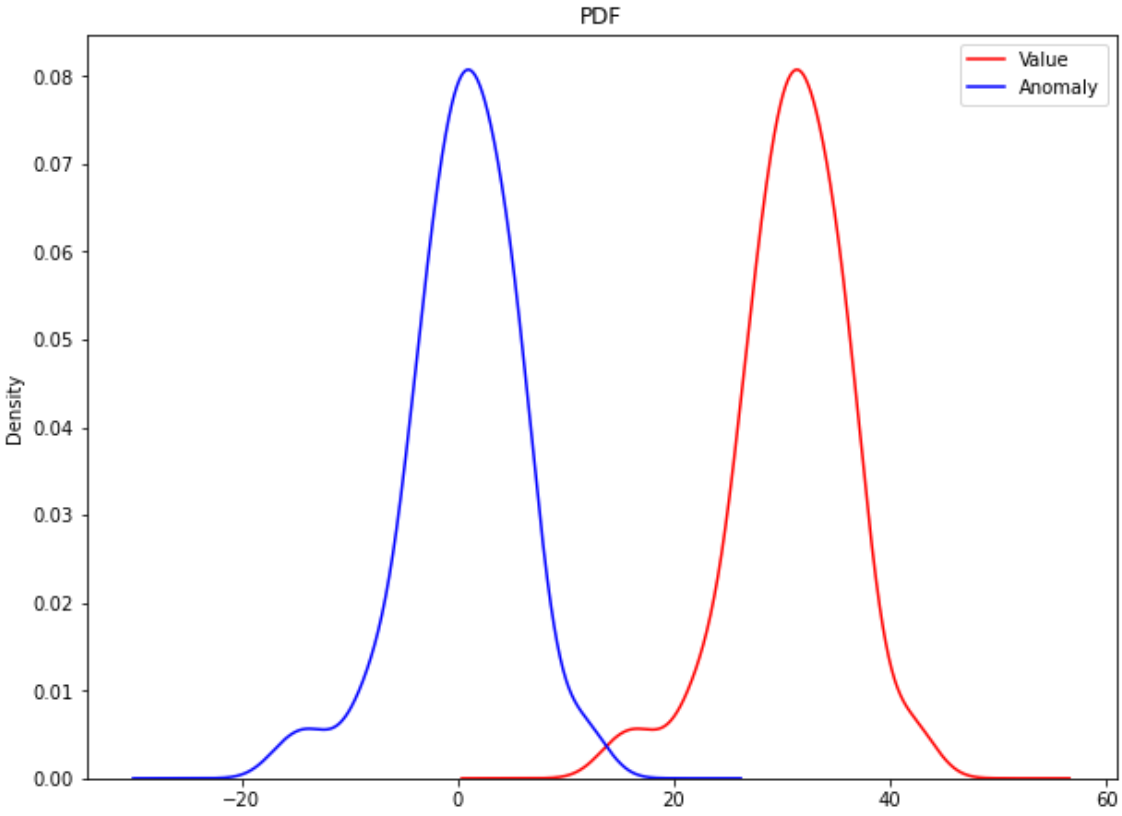
Date	Value	Anomaly	DEPARTURE FROM MEAN (30.9°F) 1940-2022 BASE PERIOD
1940-01-01	14.4	-16.0	16.49759
1941-01-01	33.7	3.3	-2.80241
1942-01-01	31.1	0.7	-0.20241
1943-01-01	30.3	-0.1	0.59759
1944-01-01	35.8	5.4	-4.90241
...	...	...	...
2018-01-01	29.8	-0.6	1.09759
2019-01-01	30.8	0.4	0.09759
2020-01-01	35.7	5.3	-4.80241
2021-01-01	35.0	4.6	-4.10241
2022-01-01	29.0	-1.4	1.89759

83 rows × 3 columns






0
−10
0
10
20
30
40
Average temperature in St. Louis, Missouri


PDF
Value
Anomaly
Density
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
−20
0
20
40
60