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STAT 1129
Midterm

Github Link:

Question 1

In [1]:
```
unsorted =
[2,4,6,8,4,5,2,1,9,0,4,6,7,4,3,2,1,9,10,3,7,9,6,0,1,3,5,6,7,8,9,10,2,3,6,8,9,
10,6,7,4,3]
count = {}
unsorted.sort()
```

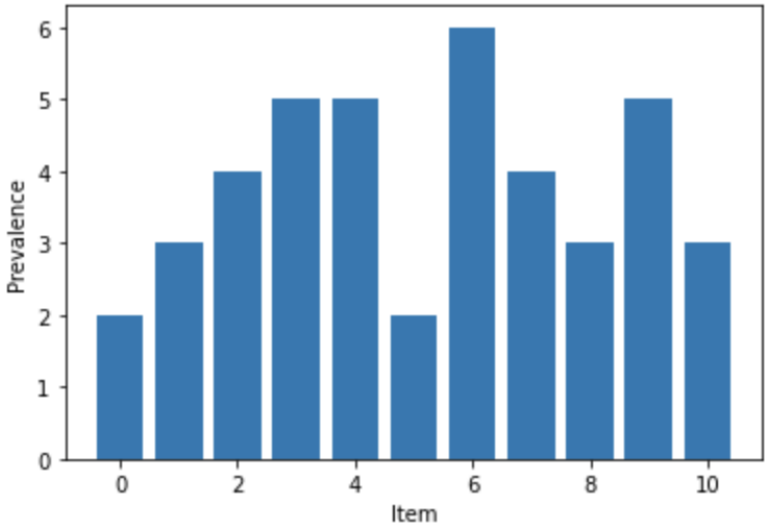
In [2]:
```
for number in unsorted:
    if number in count:
        count[number] += 1
    else:
        count[number]=1

print("Output")
print()
for key, value in count.items():
    print(key, ':', value)

print()
print('Explanation:')
print()
for key, value in count.items():
    print('Here', key, 'appears', value, 'times')
```

```
Output

0 : 2
1 : 3
2 : 4
3 : 5
4 : 5
5 : 2
6 : 6
7 : 4
8 : 3
9 : 5
10 : 3

Explanation:

Here 0 appears 2 times
Here 1 appears 3 times
Here 2 appears 4 times
Here 3 appears 5 times
Here 4 appears 5 times
```

```
Here 5 appears 2 times
Here 6 appears 6 times
Here 7 appears 4 times
Here 8 appears 3 times
Here 9 appears 5 times
Here 10 appears 3 times
```

In [3]:
```
import matplotlib
import matplotlib.pyplot as plt
import numpy as np
```

In [4]:
```
x = count.keys()
y = count.values()

plt.xlabel('Item')
plt.ylabel('Prevalence')
plt.bar(x,y)
plt.show()
```



In [5]:
```
import json
with open("Item_Prevalence.json", "w") as out:
    json.dump(count, out)

rd = open("Item_Prevalence.json", "r")
rd.read()
```

Out[5]:
```
'{"0": 2, "1": 3, "2": 4, "3": 5, "4": 5, "5": 2, "6": 6, "7": 4, "8": 3, "9"
: 5, "10": 3}'
```

Question 2

In [6]:
```
import pandas as pd
```

In [7]:
```
df = pd.read_json('data.json')
```

In [8]:
```
df.head(1)
```

Out[8]:

	timestamp	attachments	data	title
0	2019-01-06 19:24:34	[{'data': [{'place': {'name': 'American Son', ...	[]	Jalen Jeudy was at American Son.

In [9]:
```
#change the name of the timestamp column
df.rename(columns={'timestamp': 'date'}, inplace=True)
```

In [10]:
```
#delete unimportant columns
df = df.drop(['attachments', 'title'], axis=1)
```

In [11]:
```
#format the datatime
pd.to_datetime(df['date'])
```

Out[11]:
```
0   2019-01-06 19:24:34
1   2019-02-25 03:57:45
2   2020-01-30 14:29:00
3   2020-04-16 18:36:23
4   2020-10-25 00:59:47
5   2021-04-16 19:03:12
Name: date, dtype: datetime64[ns]
```

In [12]:
```
print(df.shape)
(6, 2)
```

In [13]:
```
df = df.set_index('date')
post_counts = df['data'].resample('MS').size()
post_counts
```

Out[13]:

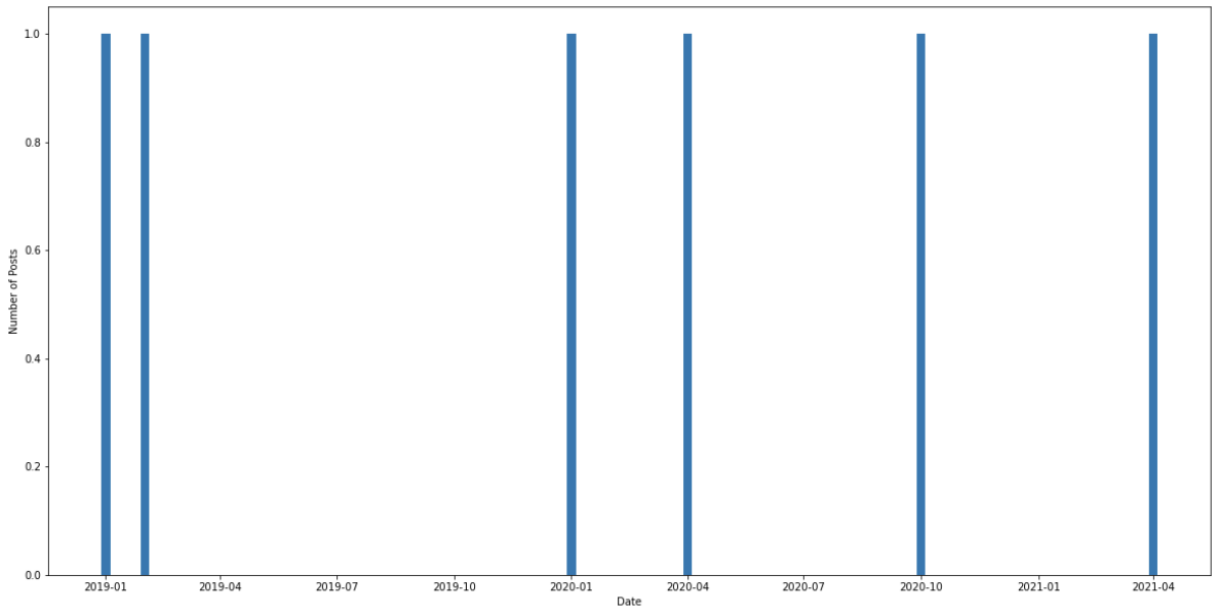
```
date
2019-01-01    1
2019-02-01    1
2019-03-01    0
2019-04-01    0
2019-05-01    0
2019-06-01    0
2019-07-01    0
2019-08-01    0
2019-09-01    0
2019-10-01    0
2019-11-01    0
2019-12-01    0
2020-01-01    1
2020-02-01    0
2020-03-01    0
2020-04-01    1
2020-05-01    0
2020-06-01    0
2020-07-01    0
2020-08-01    0
2020-09-01    0
2020-10-01    1
2020-11-01    0
2020-12-01    0
2021-01-01    0
2021-02-01    0
2021-03-01    0
2021-04-01    1
Freq: MS, Name: data, dtype: int64
```

In [14]:

```
import matplotlib
import matplotlib.pyplot as plt
from matplotlib.pyplot import figure
import numpy as np
```

In [15]:

```
x = post_counts.index
y = post_counts

figure(figsize=(20,10))
plt.xlabel('Date')
plt.ylabel('Number of Posts')
plt.bar(x, y, width=7)
plt.show()
```


1.0
0.8
0.6
0.4
0.2
0.0
Number of Posts
2019-01
2019-04
2019-07
2019-10
2020-01
2020-04
2020-07
2020-10
2021-01
2021-04
Date