In [1]:
```
pip install seaborn
```

...

In [2]:
```
pip install matplotlib
```

...

In [3]:
```
import pandas as pd
import numpy as np
import statistics

data={'Name':['A','B','C','D','E',' F'],
      'Age':[12,17,22,18,24,30],
      'Gender':['M','M','M','M','F','F'],
      'Marks':[70,56,89,67,67,78],
      'PhD':['Y','Y','N','Y','N','Y']
      }
df=pd.DataFrame(data)                     #k
df
```

Out[3]:

	Name	Age	Gender	Marks	PhD
0	A	12	M	70	Y
1	B	17	M	56	Y
2	C	22	M	89	N
3	D	18	M	67	Y
4	E	24	F	67	N
5	F	30	F	78	Y

In [4]:
```
data2={'Name':['A','B','C','D','E','F'],
      'Age':[12,17,22,18,np.NaN,30],
      'Gender':['M','M','N/a','M','F','na'],
      'Marks':[70,56,89,np.nan,67,78],                #c
      'PhD':['Y','Y','N',15,'N',np.nan]
}
df2=pd.DataFrame(data2)
df2
```

Out[4]:

	Name	Age	Gender	Marks	PhD
0	A	12.0	M	70.0	Y
1	B	17.0	M	56.0	Y
2	C	22.0	N/a	89.0	N
3	D	18.0	M	NaN	15
4	E	NaN	F	67.0	N
5	F	30.0	na	78.0	NaN

In [5]:

```
print (df2['Age'])
print(df2['Age'].isnull())
```

```
0    12.0
1    17.0
2    22.0
3    18.0
4     NaN
5    30.0
Name: Age, dtype: float64
0    False
1    False
2    False
3    False
4     True
5    False
Name: Age, dtype: bool
```

In [6]:

```
print(df2['Gender'])
print(df2['Gender'].isnull())   #a
```

```
0      M
1      M
2    N/a
3      M
4      F
5     na
Name: Gender, dtype: object
0    False
1    False
2    False
3    False
4    False
5    False
Name: Gender, dtype: bool
```

In [7]:

```
print(df2['PhD'])    #1
print(df2['PhD'].isnull())
```

```
0      Y
1      Y
2      N
3     15
4      N
5    NaN
Name: PhD, dtype: object
0    False
1    False
2    False
3    False
4    False
5     True
Name: PhD, dtype: bool
```

In [8]:

```
cnt=0
for row in df2['PhD']:
  try:
    int(row)
    df2.loc[cnt,'PhD']=np.nan
  except ValueError:
    pass
  cnt+=1
print(df2['PhD'])
print(df2['PhD'].isnull())
```

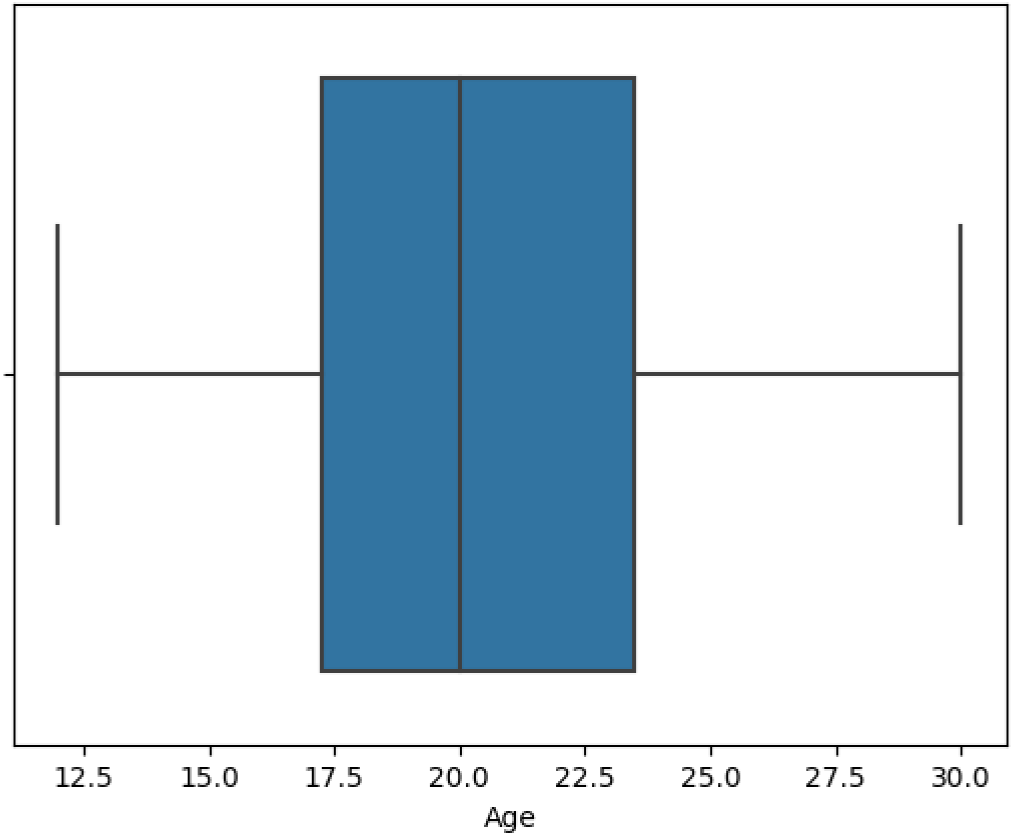
```
0      Y
1      Y
2      N
3    NaN
4      N
5    NaN
Name: PhD, dtype: object
0    False
1    False
2    False
3     True
4    False
5     True
Name: PhD, dtype: bool
```

In [9]:

```
import seaborn as sns
import matplotlib.pyplot as plt
sns.boxplot(x=df['Age'])
```

Out[9]:

```
<Axes: xlabel='Age'>
```



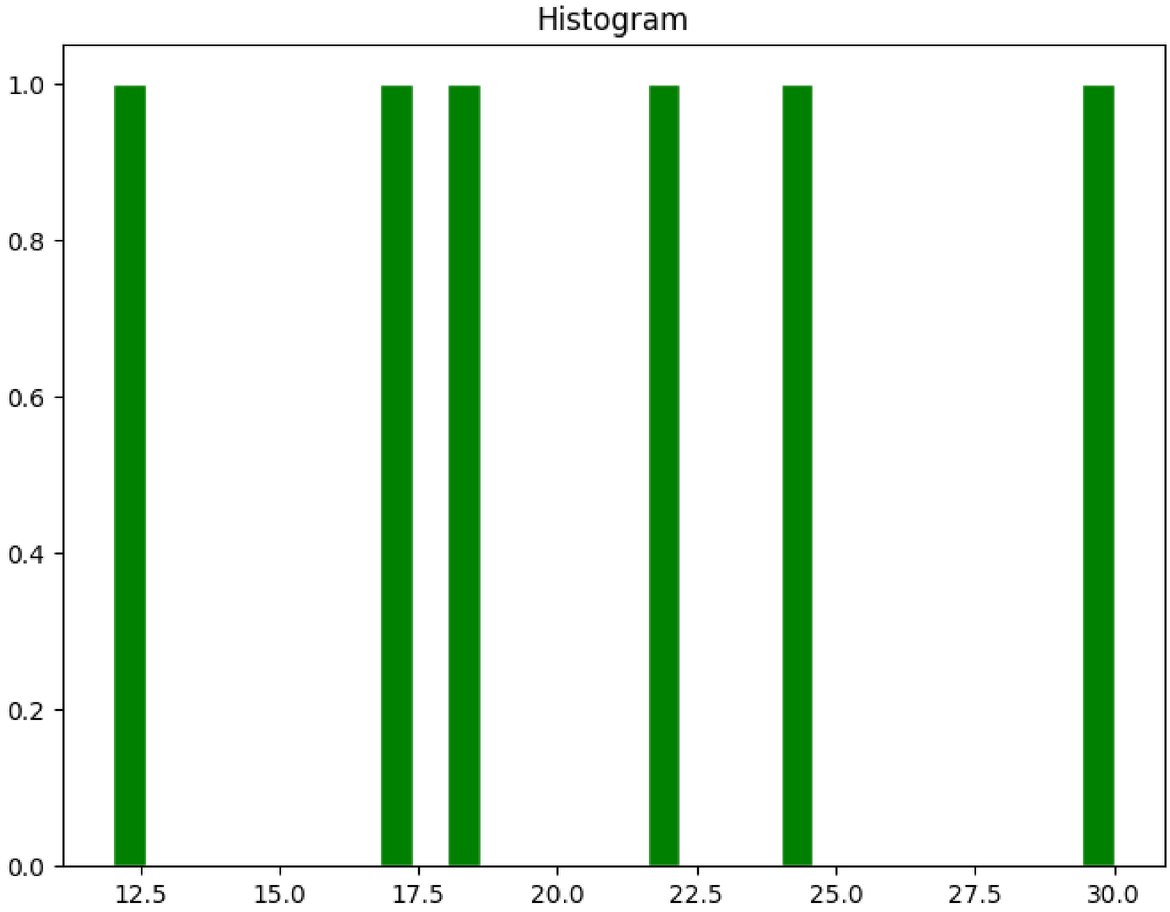
In [10]:

```
print(np.where(df['Age']>20))
```

```
(array([2, 4, 5], dtype=int64),)
```

In [11]:

```
fig,x=plt.subplots(figsize=(8,6))
ax=plt.hist(df['Age'],bins=30,color='g',edgecolor='w')      #v
plt.title('Histogram')
plt.show()
```

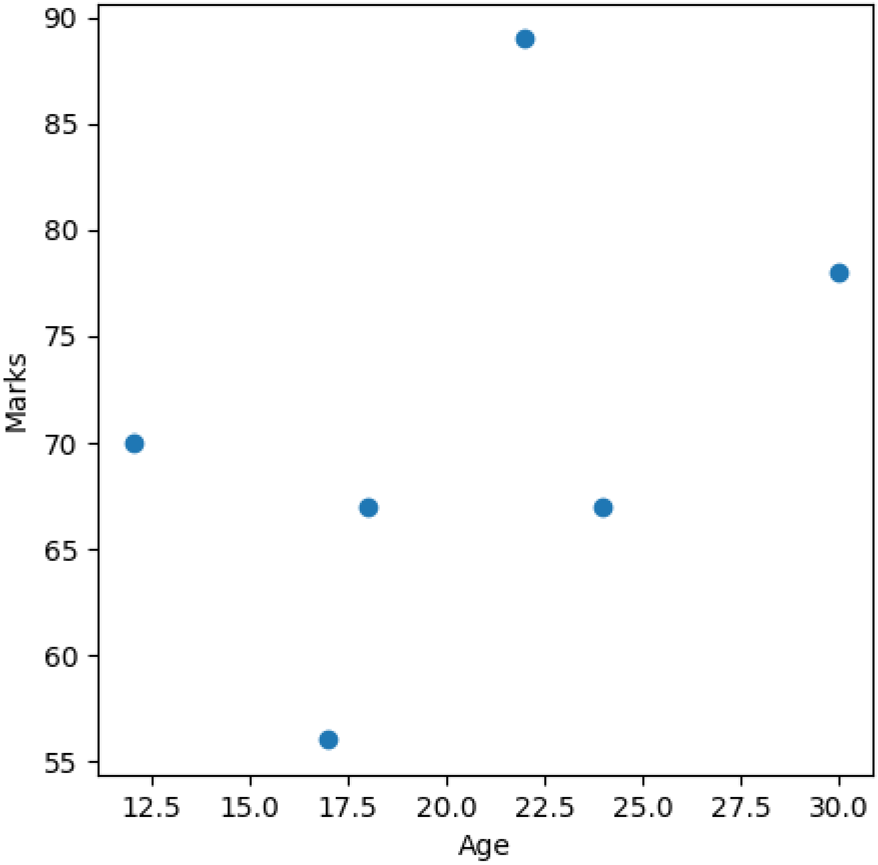


In [12]:

```
fig,ax=plt.subplots(figsize=(5,5))
ax.scatter(df['Age'],df['Marks'])

#x-axis label
ax.set_xlabel('Age')

#y- axis label
ax.set_ylabel('Marks')
plt.show()
```



In [13]:

```
df['Log_Age']=np.log(df['Age'])
df
```

Out[13]:

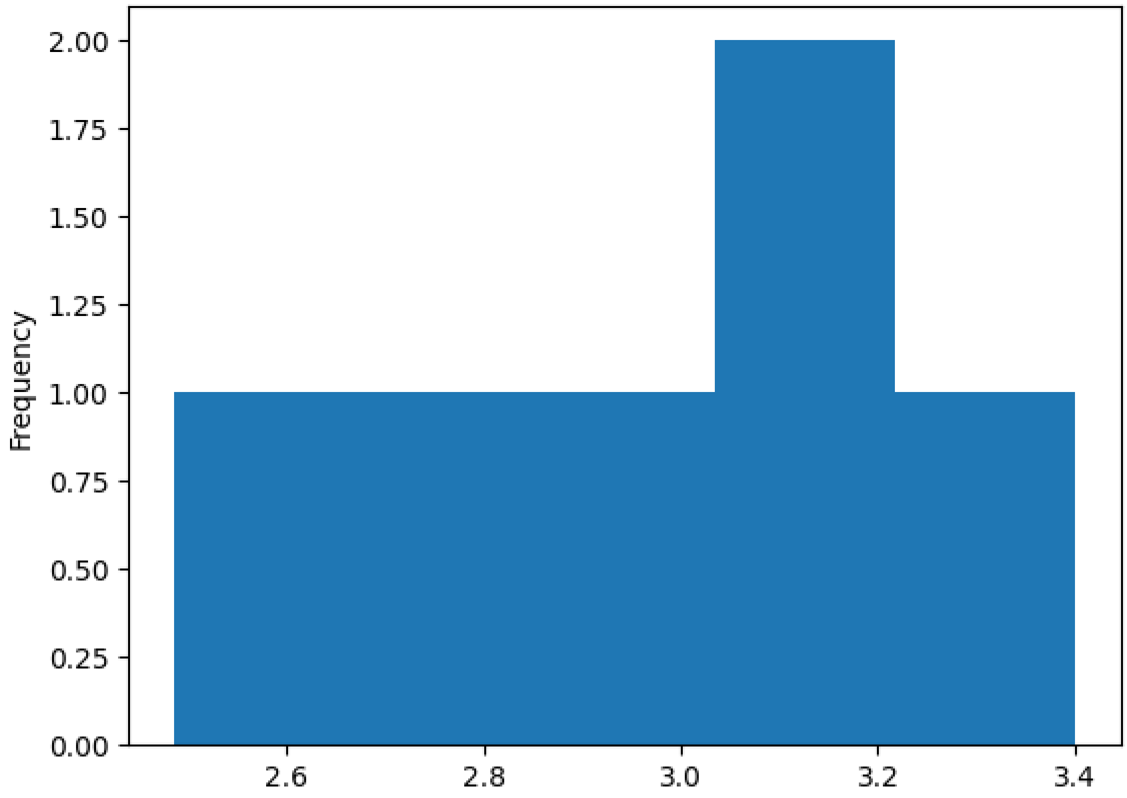
	Name	Age	Gender	Marks	PhD	Log_Age
0	A	12	M	70	Y	2.484907
1	B	17	M	56	Y	2.833213
2	C	22	M	89	N	3.091042
3	D	18	M	67	Y	2.890372
4	E	24	F	67	N	3.178054
5	F	30	F	78	Y	3.401197

In [14]:

```
df['Log_Age'].plot.hist(bins=5)
```

Out[14]:

```
<Axes: ylabel='Frequency'>
```



In [15]:

```
df_scaled=df.copy()
col=['Age','Marks']
features=df_scaled[col]
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler()
df_scaled[col]=scaler.fit_transform(features.values)
df_scaled
```

Out[15]:

	Name	Age	Gender	Marks	PhD	Log_Age
0	A	0.000000	M	0.424242	Y	2.484907
1	B	0.277778	M	0.000000	Y	2.833213
2	C	0.555556	M	1.000000	N	3.091042
3	D	0.333333	M	0.333333	Y	2.890372
4	E	0.666667	F	0.333333	N	3.178054
5	F	1.000000	F	0.666667	Y	3.401197