In [1]:
```
#library
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import pandasql as sql
import numpy as np
```

In [2]:
```
data=pd.read_excel("/home/sd/Downloads/Effort_Data.xlsx")
data.head()
```

Out[2]:

	ITILProcessType	Complexity	Effort	Service Domain type
0	Release Management	Medium	55	App suport
1	Release Management	Medium	55	App suport
2	Service Request	Medium	72	Database Support
3	Release Management	Medium	55	App suport
4	Release Management	Medium	55	App suport

In [3]:
```
# remove special characters and space in the column name
data.columns = data.columns.str.replace('[#]', '')
data.columns = data.columns.str.replace(' ', '')
```

Out[3]:

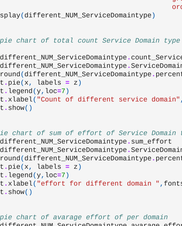
	ITILProcessType	Complexity	Effort	ServiceDomaintype
0	Release Management	Medium	55	App suport
1	Release Management	Medium	55	App suport
2	Service Request	Medium	72	Database Support
3	Release Management	Medium	55	App suport
4	Release Management	Medium	55	App suport

Data set and short descreption for numeric variable

In [4]:
```
data.Effort.describe()
```

Out[4]:
```
count    6460.000000
mean       81.263777
std        84.607490
min         1.000000
25%        30.000000
50%        52.000000
75%       103.000000
max       646.000000
Name: Effort, dtype: float64
```

In [57]:
```
#histogram plot
x=data.Effort
plt.hist(x,bins=30,rwidth=.9)
plt.show()
```



comment: most of the work are less effort and very few work take very high effort.

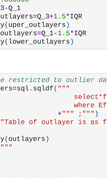
The histogram is positively Skewed.

Domain Wise descreption

In [41]:
```
#total effort count
total_Effort=sql.sqldf("""
                       select sum(Effort)
                       from data""")
```

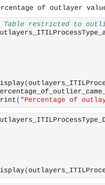
In [38]:
```
d=np.shape(data)[0]/100
different_NUM_ServiceDomaintype=sql.sqldf("""
                                          select ServiceDomaintype,count(ServiceDomaintype) as count_ServiceD
                                          ,count(ServiceDomaintype)/"""+str(d)+""" as percentage_servicedomai
                                          ,sum(Effort)/count(ServiceDomaintype) as avarage_effort
                                          from data
                                          group by ServiceDomaintype
                                          order by count_ServiceDomaintype desc""")
display(different_NUM_ServiceDomaintype)


# pie chart of total count Service Domain type

x=different_NUM_ServiceDomaintype.count_ServiceDomaintype
y=different_NUM_ServiceDomaintype.ServiceDomaintype
z=round(different_NUM_ServiceDomaintype.percentage_servicedomain)
plt.pie(x, labels = z)
plt.legend(y,loc=7)
plt.xlabel("Count of different service domain",fontsize=18)
plt.show()


#pie chart of sum of effort of Service Domain type
x=different_NUM_ServiceDomaintype.sum_effort
y=different_NUM_ServiceDomaintype.ServiceDomaintype
z=round(different_NUM_ServiceDomaintype.percentage_effort)
plt.pie(x, labels = z)
plt.legend(y,loc=7)
plt.xlabel("effort for different domain ",fontsize=18)
plt.show()


# pie chart of avarage effort of per domain
x=different_NUM_ServiceDomaintype.avarage_effort
y=different_NUM_ServiceDomaintype.ServiceDomaintype

plt.pie(x, labels = x)
plt.legend(y,loc=7)
plt.xlabel("avarage effort per work ",fontsize=18)
plt.show()
```

	ServiceDomaintype	count_ServiceDomaintype	percentage_servicedomain	sum_effort	percentage_effort	avarage_effort
0	Database Support	4080	63.157895	294729	56.142707	72
1	App support	2380	36.842105	230235	43.857293	96



Count of different service domain

effort for different domain



avarage effort per work

comment: Average effort for Database Support service domain is less compare to App Support service domain. Although there are approxmately 70% more work in Database support (in count) than App Support domain.

Box plot of effort

In [42]:
```
x=data.Effort
plt.boxplot(x)
plt.show()
```


There are many upper outliers that means there are small number of works which takes more time compare to other work.

Outliers Identification

In [9]:
```
#IQR=Q_3-Q_1
Q_3=103.000000
Q_1=30.000000
IQR=Q_3-Q_1
uper_outlayers=Q_3+1.5*IQR
display(uper_outlayers)
lower_outlayers=Q_1-1.5*IQR
display(lower_outlayers)
```

```
212.5
-79.5
```

In [47]:
```
# Table restricted to outlier data
outlayers=sql.sqldf("""
                    select*from data
                    where Effort>""" +str(uper_outlayers)
                  +""" ;""")
print("Table of outlayer is as follows")

display(outlayers)
print("""


""")
percentage_of_outlier=(100*np.shape(outlayers)[0])/(np.shape(data)[0])
print("Percentage of outlayer values is approxmately "+str(round(percentage_of_outlier)))

print("""


""")
```

```
Table of outlayer is as follows
```

	ITILProcessType	Complexity	Effort	ServiceDomaintype
0	Service Request	Medium	605	App suport
1	Release Management	Medium	511	App suport
2	Service Request	Medium	258	App suport
3	Service Request	Medium	410	App suport
4	Incident Management	Medium	225	App suport
...	...	...	...	...
436	Service Request	Simple	238	App suport
437	Service Request	Simple	236	Database Support
438	Incident Management	Medium	314	Database Support
439	Incident Management	Complex	360	Database Support
440	Incident Management	Complex	275	Database Support

441 rows × 4 columns

```
Percentage of outlayer values is approxmately 7
```

In [ ]:
```
# Table restricted to outlier data and App suuupport service domain
outlayers_ITILProcessType_appsupport=sql.sqldf("""
                                               select ITILProcessType as ITILProcessType_appsupport_Support,count(ITILProc
                                               from outlayers
                                               where ServiceDomaintype="App suport"
                                               group by ITILProcessType
                                               """)

display(outlayers_ITILProcessType_appsupport)
percentage_of_outlier_came_from_appsunnport=(100*np.shape(outlayers)[0])/(np.shape(outlayers)[0])
print("Percentage of outlayer values is approxmately "+str(round(percentage_of_outlier)))
```

In [ ]:
```
outlayers_ITILProcessType_Database_Support=sql.sqldf("""
                                               select ITILProcessType as ITILProcessType_Database_Support ,count(ITILProc
                                               from outlayers
                                               where ServiceDomaintype="Database Support"
                                               group by ITILProcessType
                                               """)
display(outlayers_ITILProcessType_Database_Support)
```

In [ ]:
```
outlayers_count_complexcity=sql.sqldf("""
                    select Complexity  as complexcity_outlayer,count(Complexity) as count_complexcity,sum(E
                    from data
                    where Effort>""" +str(uper_outlayers)
                  +""" group by Complexity order by count_complexcity desc ;""")
display(outlayers_count_complexcity)
```