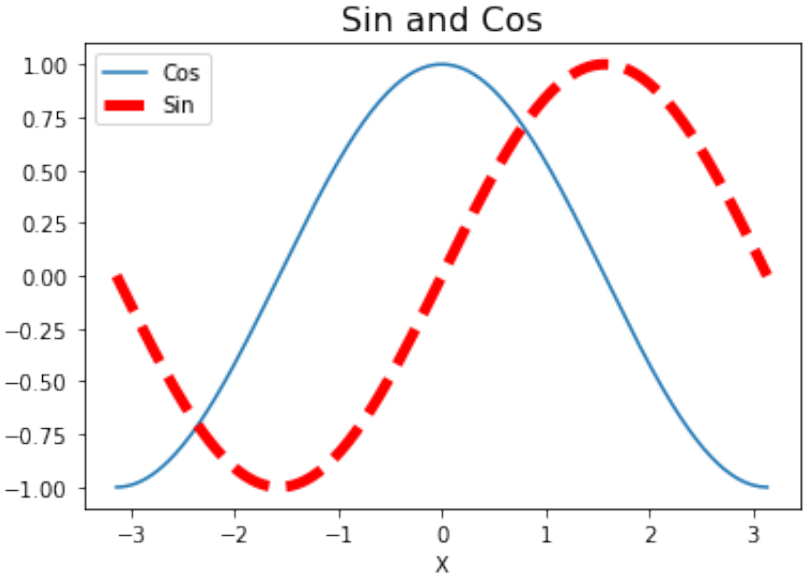
In [6]:
```
#task5 iz dz
import numpy as np
a=np.arange(16).reshape(4,4)
vals=[np.diagonal(a[0:4,3: :-1],k) for k in range(3,-3,-1)]
vals
```

Out[6]:
```
[array([0]),
 array([1, 4]),
 array([2, 5, 8]),
 array([ 3,  6,  9, 12]),
 array([ 7, 10, 13]),
 array([11, 14])]
```

In [12]:
```
import matplotlib.pyplot as plt
X=np.linspace(-np.pi, np.pi,256,endpoint=True)
C,S=np.cos(X),np.sin(X)

plt.plot(X,C,label='Cos')
plt.plot(X,S,color='r',ls='--',lw=5, label='Sin')
plt.title('Sin and Cos',fontsize=16)
plt.xlabel('X')
plt.legend()
plt.show()
```

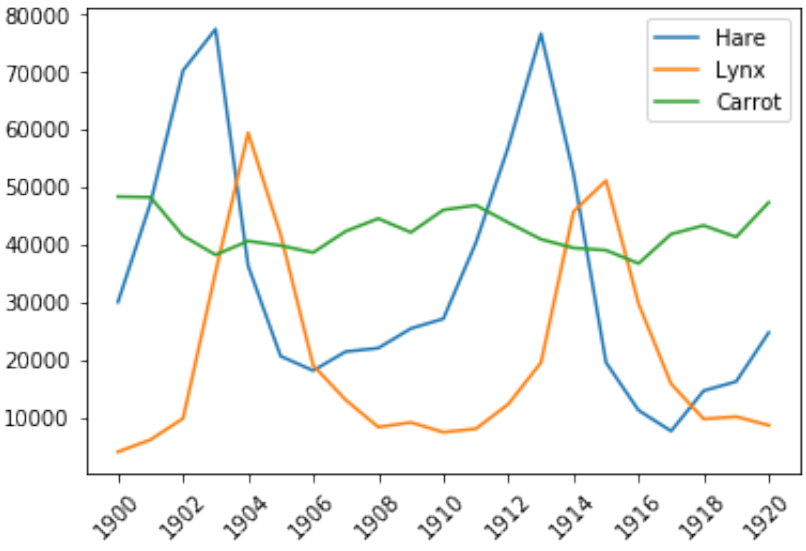


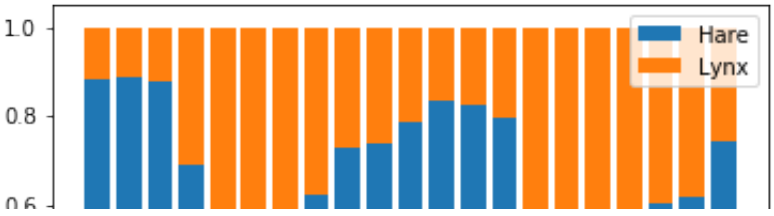
In [38]:
```
import matplotlib.pyplot as plt
import numpy as np
data=np.loadtxt('http://scipy-lectures.org/_downloads/populations.txt'
print(data)
plt.plot(data[:,0],data[:,1],label='Hare')
plt.plot(data[:,0],data[:,2],label='Lynx')
plt.plot(data[:,0],data[:,3],label='Carrot')
plt.legend()
```

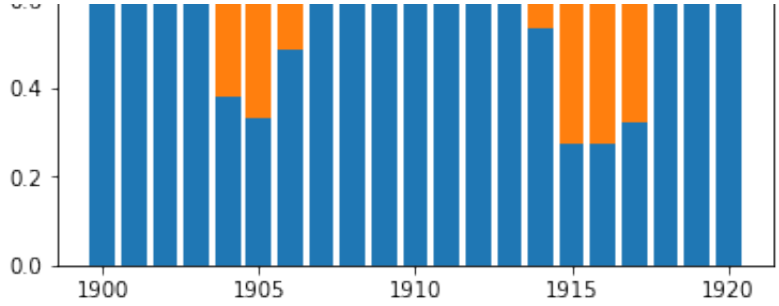
```
plt.xticks(data[0::2,0],rotation=45)
plt.show()

total=data[:,1]+data[:,2]
plt.bar(data[:,0],data[:,1]/total,label='Hare')
plt.bar(data[:,0],(data[:,2]/total),bottom=(data[:,1]/total),label='Ly
plt.legend()
plt.show()
```

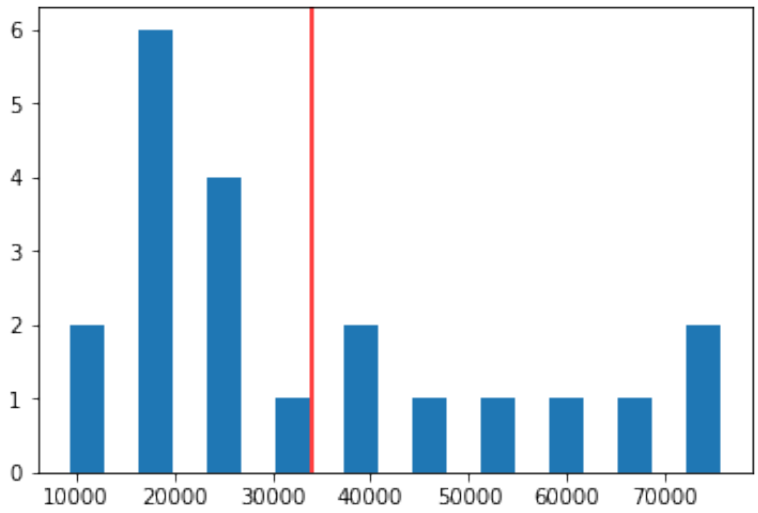
```
[[ 1900. 30000.  4000. 48300.]
 [ 1901. 47200.  6100. 48200.]
 [ 1902. 70200.  9800. 41500.]
 [ 1903. 77400. 35200. 38200.]
 [ 1904. 36300. 59400. 40600.]
 [ 1905. 20600. 41700. 39800.]
 [ 1906. 18100. 19000. 38600.]
 [ 1907. 21400. 13000. 42300.]
 [ 1908. 22000.  8300. 44500.]
 [ 1909. 25400.  9100. 42100.]
 [ 1910. 27100.  7400. 46000.]
 [ 1911. 40300.  8000. 46800.]
 [ 1912. 57000. 12300. 43800.]
 [ 1913. 76600. 19500. 40900.]
 [ 1914. 52300. 45700. 39400.]
 [ 1915. 19500. 51100. 39000.]
 [ 1916. 11200. 29700. 36700.]
 [ 1917.  7600. 15800. 41800.]
 [ 1918. 14600.  9700. 43300.]
 [ 1919. 16200. 10100. 41300.]
 [ 1920. 24700.  8600. 47300.]]
```







In [39]:
```
plt.hist(data[:,1],rwidth=0.5)
plt.axvline(data[:,1].mean(),c='r')
plt.show()
```



In [46]:
```
data[np.argmax(data[:,1:],axis=0),0] #podstavili indexes b pervuy sto
```

Out[46]:
```
array([1903., 1904., 1900.])
```

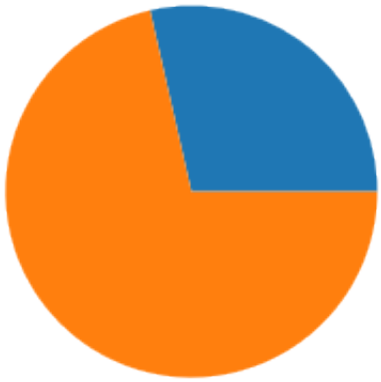
In [50]:
```
#1sposob
np.array(['H','L'])[np.argmax(data[:,1:3],axis=1)]
```

Out[50]:
```
array(['H', 'H', 'H', 'H', 'L', 'L', 'L', 'H', 'H', 'H', 'H', 'H', '
H',
       'H', 'H', 'L', 'L', 'L', 'H', 'H', 'H'], dtype='<U1')
```

In [49]:
```
#2sposob
np.where(data[:,1] > data[:,2],'H','L')
```

Out[49]:
```
array(['H', 'H', 'H', 'H', 'L', 'L', 'L', 'H', 'H', 'H', 'H', 'H', '
H',
       'H', 'H', 'L', 'L', 'L', 'H', 'H', 'H'], dtype='<U1')
```

In [52]:
```
x=np.argmax(data[:,1:3],axis=1)
plt.pie([x.sum(),(1-x).sum()])
plt.show()
```



In [ ]:
```

```