In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
```

1.studying the dataset

1.1) Importing the dataset

In [3]:
```
df = pd.read_csv('country_vaccinations.csv')
df.head()
```

Out[3]:

	country	iso_code	date	total_vaccinations	people_vaccinated	people_fully_vacci
0	Afghanistan	AFG	2021-02-22	0.0	0.0	
1	Afghanistan	AFG	2021-02-23	NaN	NaN	
2	Afghanistan	AFG	2021-02-24	NaN	NaN	
3	Afghanistan	AFG	2021-02-25	NaN	NaN	
4	Afghanistan	AFG	2021-02-26	NaN	NaN	

1.2) Finding the null values

In [4]:
```
df.isna().sum()
```

Out[4]:
```
country                                0
iso_code                               0
date                                   0
total_vaccinations                 42905
people_vaccinated                  45218
people_fully_vaccinated            47710
daily_vaccinations_raw             51150
daily_vaccinations                   299
total_vaccinations_per_hundred     42905
people_vaccinated_per_hundred      45218
people_fully_vaccinated_per_hundred    47710
daily_vaccinations_per_million       299
vaccines                               0
source_name                            0
source_website                         0
dtype: int64
```

1.3) Replacing all the null values with 0

In [5]:
```
df = df.fillna(0)
```

In [6]:
```
df.head()
```

Out[6]:

	country	iso_code	date	total_vaccinations	people_vaccinated	people_fully_vacci
0	Afghanistan	AFG	2021-02-22	0.0	0.0	
1	Afghanistan	AFG	2021-02-23	0.0	0.0	
2	Afghanistan	AFG	2021-02-24	0.0	0.0	
3	Afghanistan	AFG	2021-02-25	0.0	0.0	
4	Afghanistan	AFG	2021-02-26	0.0	0.0	

2) Data preprocessing

2.1) removing unwanted column

In [7]:
```
del df['vaccines']
del df['source_name']
del df['source_website']
del df['total_vaccinations_per_hundred']
del df['people_vaccinated_per_hundred']
del df['people_fully_vaccinated_per_hundred']
del df['daily_vaccinations_per_million']
del df['daily_vaccinations_raw']
del df['daily_vaccinations']
del df['people_fully_vaccinated']
del df['iso_code']
df.head()
```

Out[7]:

	country	date	total_vaccinations	people_vaccinated
0	Afghanistan	2021-02-22	0.0	0.0
1	Afghanistan	2021-02-23	0.0	0.0
2	Afghanistan	2021-02-24	0.0	0.0
3	Afghanistan	2021-02-25	0.0	0.0
4	Afghanistan	2021-02-26	0.0	0.0

2.2) preprocessing the date column

In [8]:
```
month_ = {1:'Jan', 2:'Feb' , 3:'Mar' , 4:'Apr' , 5:'May' , 6:'Jun',
        7:'Jul', 8:'Aug' , 9:'Sept' , 10:'Oct' , 11:'Nov' , 12:'Dec'}

year = []
month = []
day = []

for i in df['date']:
    year.append(int(i.split('-')[0]))
    month.append(int(i.split('-')[1]))
    day.append(int(i.split('-')[2]))

df['day'] = day
df['month'] = month
df['year'] = year
```

In [9]:
```
months =[]
for i in df['month']:
    months.append(month_[i])
df['month'] = months

df.head()
```

Out[9]:

	country	date	total_vaccinations	people_vaccinated	day	month	year
0	Afghanistan	2021-02-22	0.0	0.0	22	Feb	2021
1	Afghanistan	2021-02-23	0.0	0.0	23	Feb	2021
2	Afghanistan	2021-02-24	0.0	0.0	24	Feb	2021
3	Afghanistan	2021-02-25	0.0	0.0	25	Feb	2021
4	Afghanistan	2021-02-26	0.0	0.0	26	Feb	2021

2.3) preprocessing total_vaccinations column

In [10]:
```
total_vaccinations =[]

for i in df['total_vaccinations']:
    total_vaccinations.append(int(i))

df['total_vaccinations'] = total_vaccinations
```

2.4) preprocessing people_vaccinations column

In [11]:
```
people_vaccinated = []

for i in df['people_vaccinated']:
    people_vaccinated.append(int(i))

df['people_vaccinated'] = people_vaccinated

df.head()
```

Out[11]:

	country	date	total_vaccinations	people_vaccinated	day	month	year
0	Afghanistan	2021-02-22	0	0	22	Feb	2021
1	Afghanistan	2021-02-23	0	0	23	Feb	2021
2	Afghanistan	2021-02-24	0	0	24	Feb	2021
3	Afghanistan	2021-02-25	0	0	25	Feb	2021
4	Afghanistan	2021-02-26	0	0	26	Feb	2021

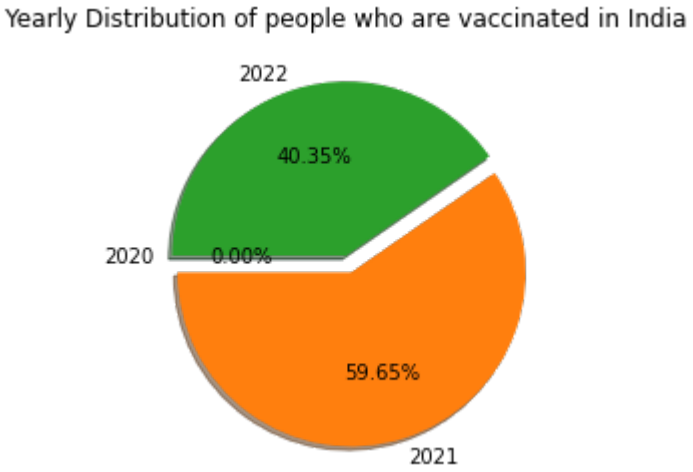
Q1.) Find the number of Total Vaccinations in India in Year 2020,2021 and 2022

In [12]:
```
# number of people vaccinated in india in the year 2020
c1 = 0

for i in df.values:
    if (i[0]=='India'and i[6] =='2020'):
        c1 += int(i[3])

print('Total number of people vaccinated in the year 2020: ',c1)


# number of people vaccinated in india in the year 2021
c2 = 0

for i in df.values:
    if (i[0]=='India'and i[6] == 2021):
        c2 += int(i[3])

print('Total number of people vaccinated in the year 2021: ',c2)


# number of people vaccinated in india in the year 2022
c3 = 0

for i in df.values:
    if (i[0]=='India'and i[6] == 2022):
        c3 += int(i[3])

print('Total number of people vaccinated in the year 2022: ',c3)
```

```
Total number of people vaccinated in the year 2020:  0
Total number of people vaccinated in the year 2021:  122780611620
Total number of people vaccinated in the year 2022:  83039126718
```

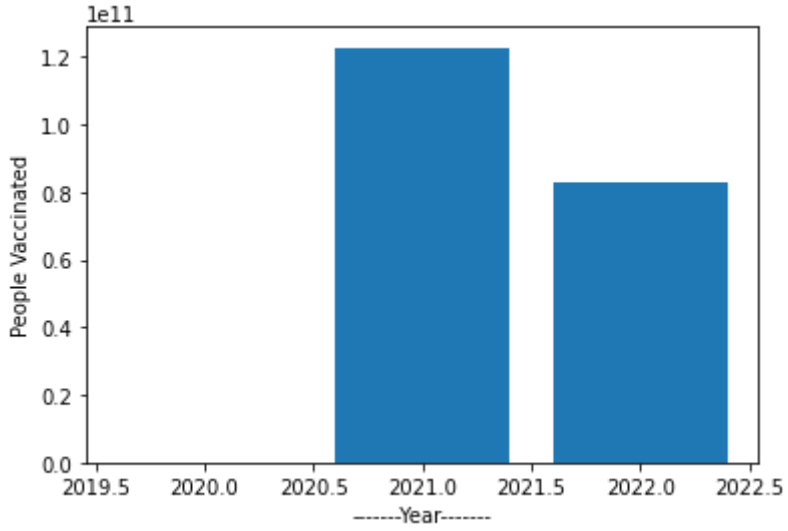
Visualising Covid data with the help of pie chart

In [163]:
```
year_wise_distribution = [c1 , c2 ,c3]
explodes =[0,0.1,0]
labels= ['2020','2021','2022']
plt.pie(year_wise_distribution,labels= labels,startangle = 180,explod

plt.title('Yearly Distribution of people who are vaccinated in India'
plt.show()
```



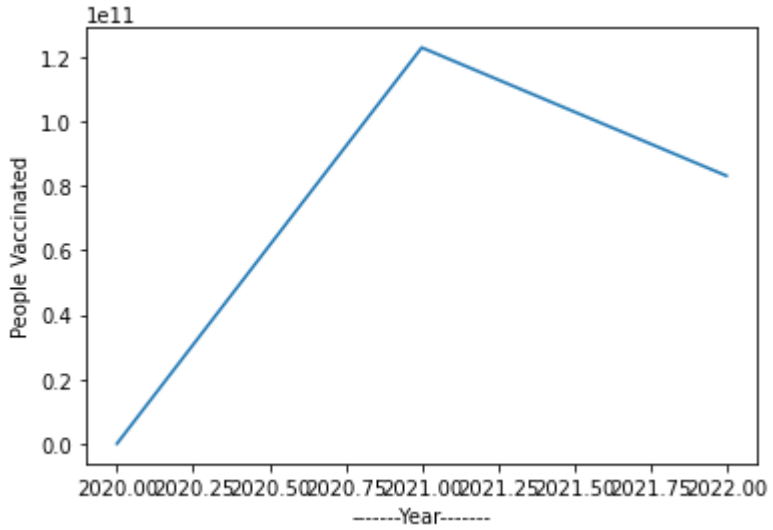
Visualising using Bar plot

In [164]:
```
x = [2020,2021,2022]
y = [c1,c2,c3]

plt.bar(x,y)
plt.xlabel('-------Year-------')
plt.ylabel('People Vaccinated')
plt.show()
```



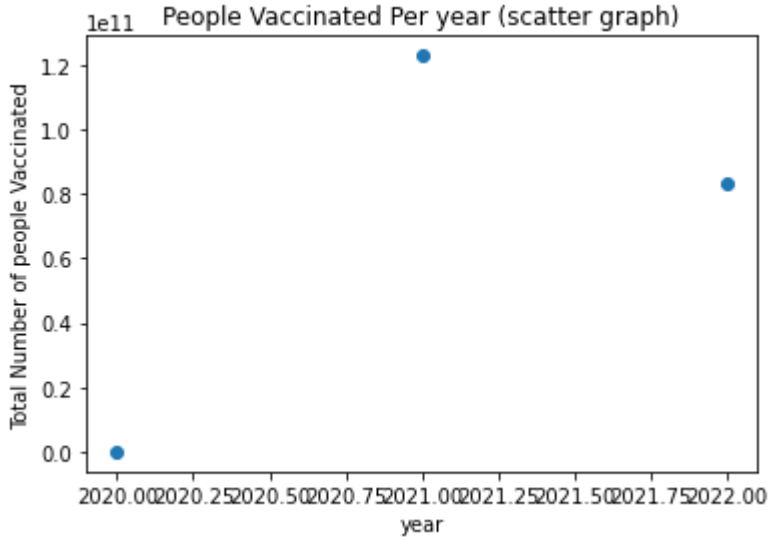
Visualising using line plot

In [165]:
```
x = [2020,2021,2022]
y = [c1,c2,c3]

plt.plot(x,y)
plt.xlabel('-------Year-------')
plt.ylabel('People Vaccinated')
plt.show()
```



visualising using scatterplot

In [166]:
```
plt.scatter(x,y)
plt.title('People Vaccinated Per year (scatter graph)')
plt.xlabel('year')
plt.ylabel('Total Number of people Vaccinated')
plt.show()
```



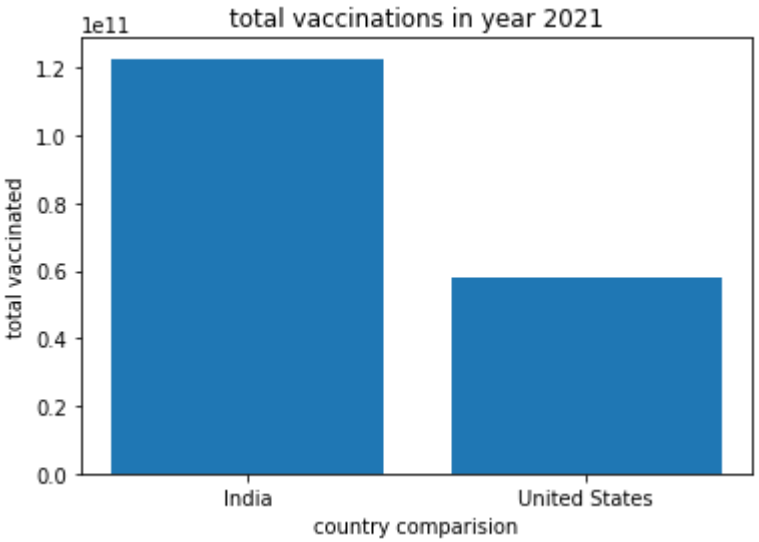
Q2.) Compare number of total vaccinations in year 2021 of India and USA

In [14]:
```
count1 = 0
for i in df.values:
    if i[0]=='India' and i[6] == 2021:
        count1 += i[3]
print('total vaccinations in year 2020 of India :',count1)

count2 = 0
for i in df.values:
    if i[0] == 'United States' and i[6] == 2021:
        count2 += i[3]
print('total vaccinations in year 2020 of United States (US) :',count

x_axis = [count1,count2]
y_axis = ['India','United States']
```

```
total vaccinations in year 2020 of India : 122780611620
total vaccinations in year 2020 of United States (US) : 58077557268
```

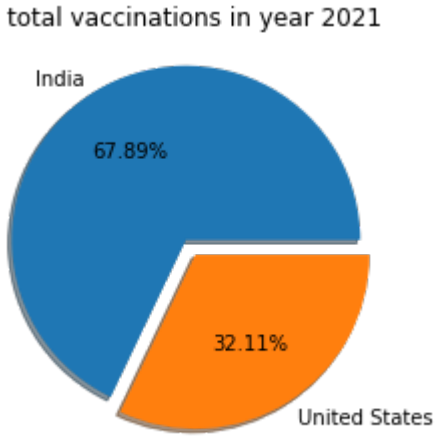
visualising bar chart

In [15]:
```
plt.bar(y_axis,x_axis)
plt.title('total vaccinations in year 2021')
plt.xlabel('country comparision')
plt.ylabel('total vaccinated')
plt.show()
```



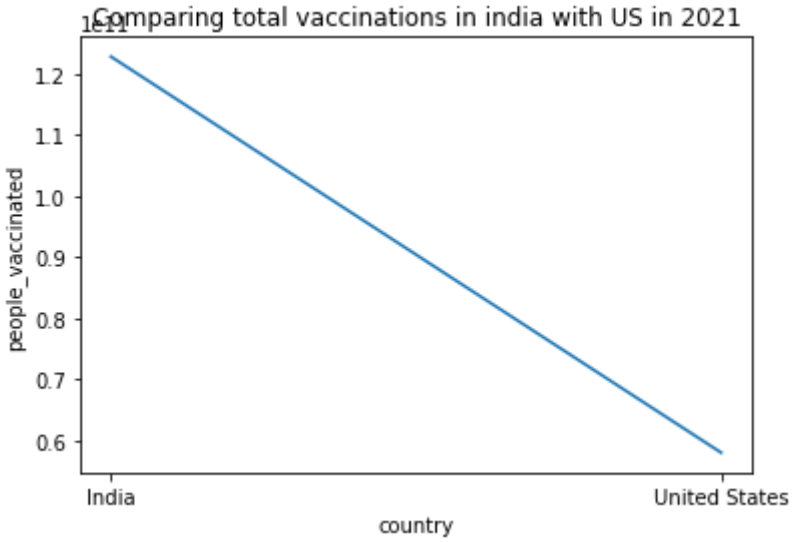
visualising using pie chart

In [17]:
```
plt.pie(x_axis,labels = y_axis,explode =[0.1,0],shadow = True,autopct
plt.title('total vaccinations in year 2021')
plt.show()
```



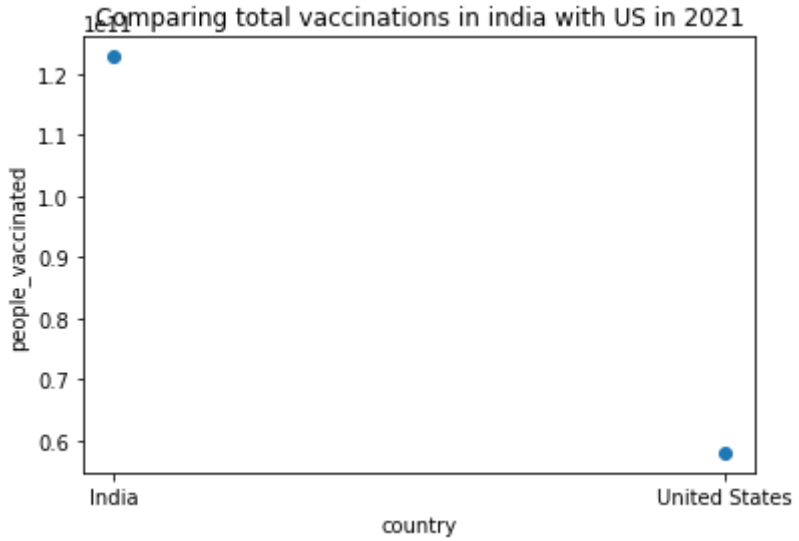
visualising using line graph

In [20]:
```
plt.plot(y_axis,x_axis)
plt.title('Comparing total vaccinations in india with US in 2021')
plt.xlabel('country')
plt.ylabel('people_vaccinated')
plt.show()
```



visualising using scatterplot

In [21]:
```
plt.scatter(y_axis,x_axis)
plt.title('Comparing total vaccinations in india with US in 2021')
plt.xlabel('country')
plt.ylabel('people_vaccinated')
plt.show()
```



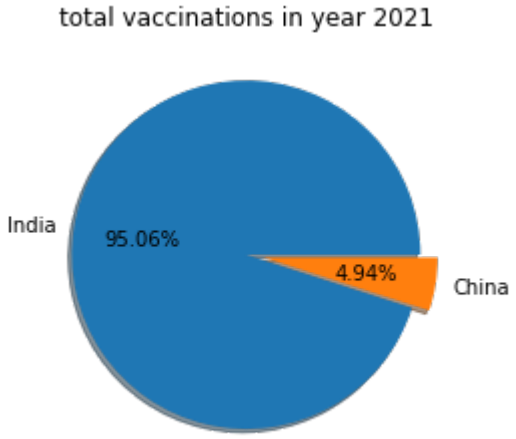
Q3.) Compare number of total vaccinations in year 2021 of India and China

In [168]:
```
tot1 = 0
for i in df.values:
    if i[0]=='India' and i[6] == 2021:
        tot1 += i[3]
print('Total vaccination in India in the year 2021 : ',tot1)


tot2 = 0
for i in df.values:
    if i[0] == 'China' and i[6] == 2021:
        tot2 += i[3]
print('Total vaccination in China in the year 2021 : ',tot2)


x = [tot1,tot2]
y = ['India', 'China']
```

```
Total vaccination in India in the year 2021 :  122780611620
Total vaccination in China in the year 2021 :  6375309000
```

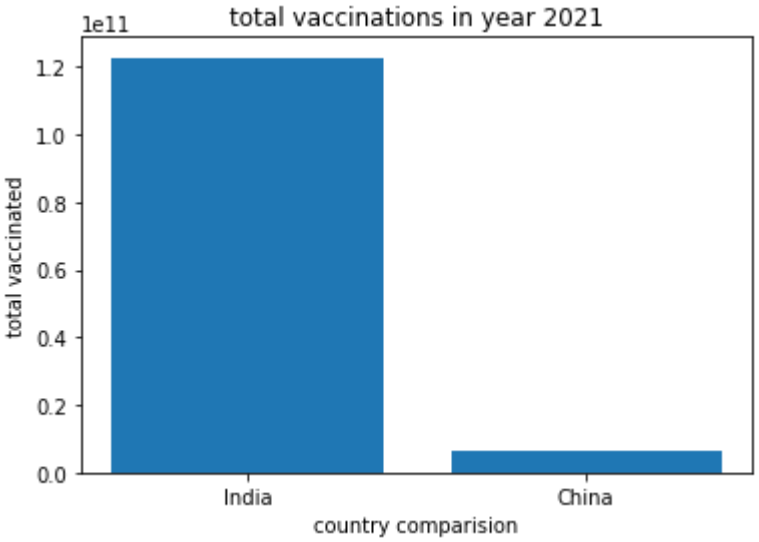
visualising using pie chart

In [169]:
```
plt.pie(x,labels =y,explode =[0,0.1],shadow = True,autopct ='%1.2f%%'
plt.title('total vaccinations in year 2021')
plt.show()
```



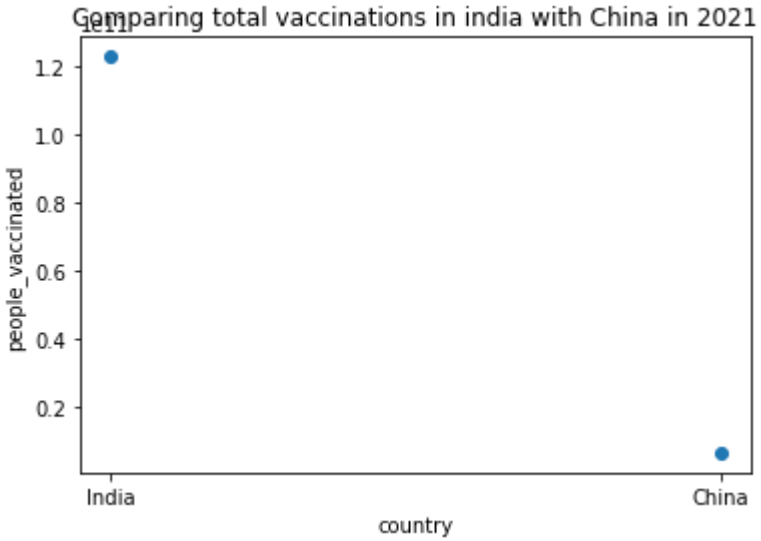
visualising using bar graph

In [170]:
```
plt.bar(y,x)
plt.title('total vaccinations in year 2021')
plt.xlabel('country comparision')
plt.ylabel('total vaccinated')
plt.show()
```



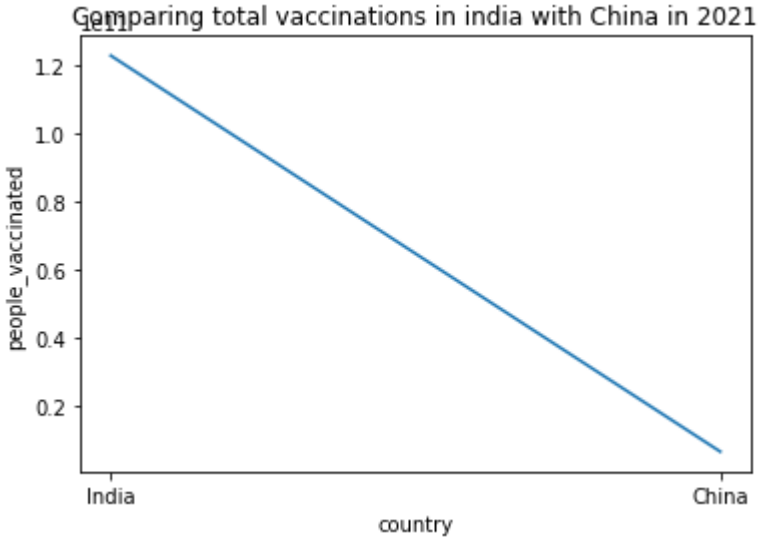
visualising using scatter plot

In [171]:
```
plt.scatter(y,x)
plt.title('Comparing total vaccinations in india with China in 2021')
plt.xlabel('country')
plt.ylabel('people_vaccinated')
plt.show()
```



visualising using line chart

In [172]:
```
plt.plot(y,x)
plt.title('Comparing total vaccinations in india with China in 2021')
plt.xlabel('country')
plt.ylabel('people_vaccinated')
plt.show()
```

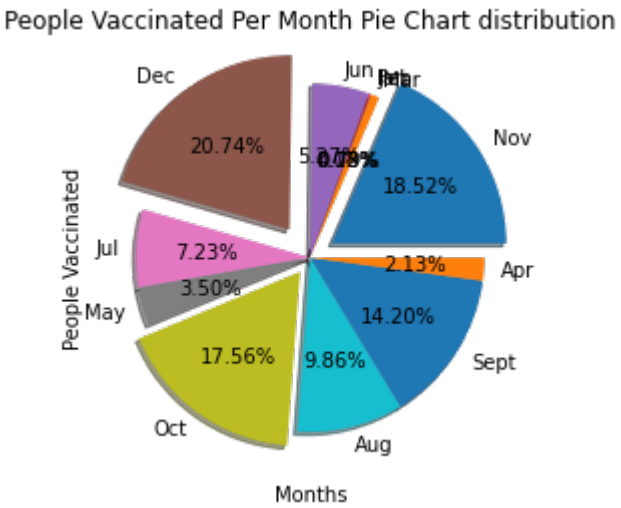


Q4.) Find the number of Vaccinations in each month in India in the year 2021

In [173]:
```
months = []
for i in df.values:
    months.append(i[5])

months = list(set(months))

data = []

for month in months:
    c = 0
    for i in df.values:
        if (i[6] == 2021) and (i[0] == 'India') and month == i[5]:
            c += (i[3])
    data.append([month,c])

df_ = pd.DataFrame(data,columns =['month','people_vaccinated'])
```

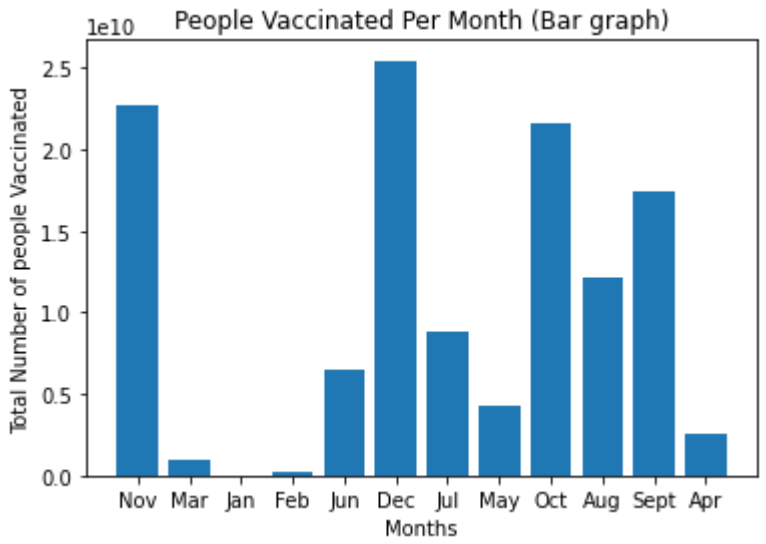
Pie distribution

In [174]:
```
month = []
people_vaccinated = []
for i in data:
    month.append(i[0])
    people_vaccinated.append(i[1])

explodes =[0.15,0,0,0,0,0.2,0,0,0.1,0,0,0]
plt.pie(people_vaccinated , labels = month, explode =explodes , shadc
plt.title('People Vaccinated Per Month Pie Chart distribution')
plt.xlabel('Months')
plt.ylabel('People Vaccinated')

plt.show()
```



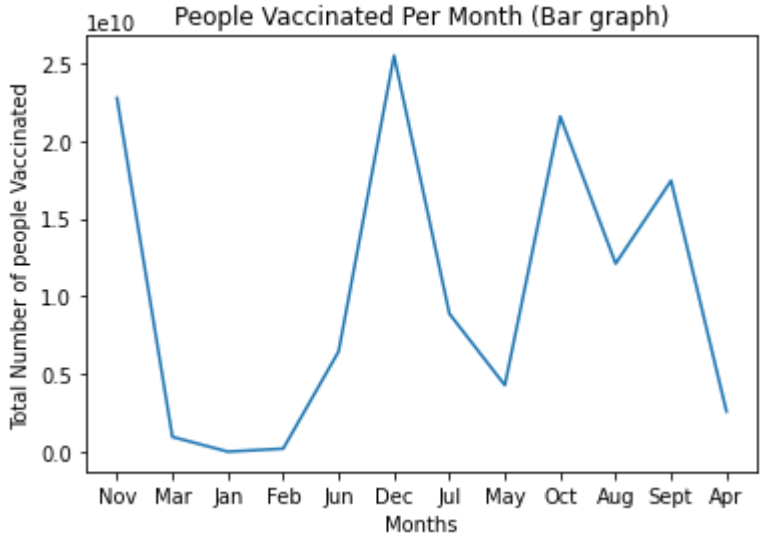
bar Graph

In [175]:
```
plt.bar(month,people_vaccinated)
plt.title('People Vaccinated Per Month (Bar graph)')
plt.xlabel('Months')
plt.ylabel('Total Number of people Vaccinated')
plt.show()
```



line graph

In [176]:
```
plt.plot(month,people_vaccinated)
plt.title('People Vaccinated Per Month (Bar graph)')
plt.xlabel('Months')
plt.ylabel('Total Number of people Vaccinated')
plt.show()
```



Q5.) Which month has the most number of total vaccinations in India in 2021?

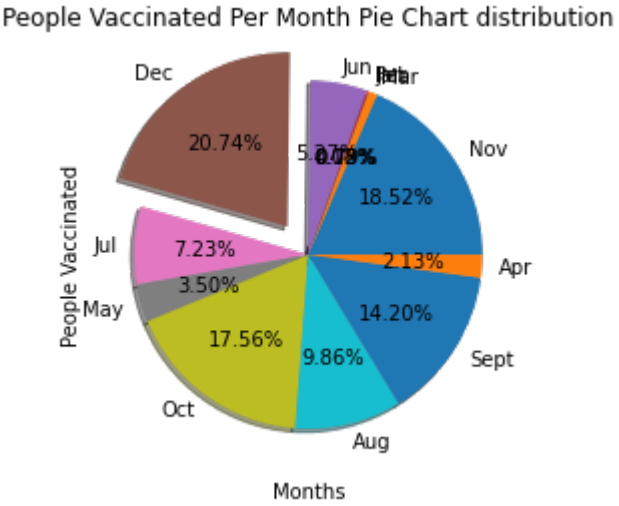
In [177]:
```
df_[df_['people_vaccinated']==max(df_['people_vaccinated'])]
```

Out[177]:

	month	people_vaccinated
5	Dec	25463519203

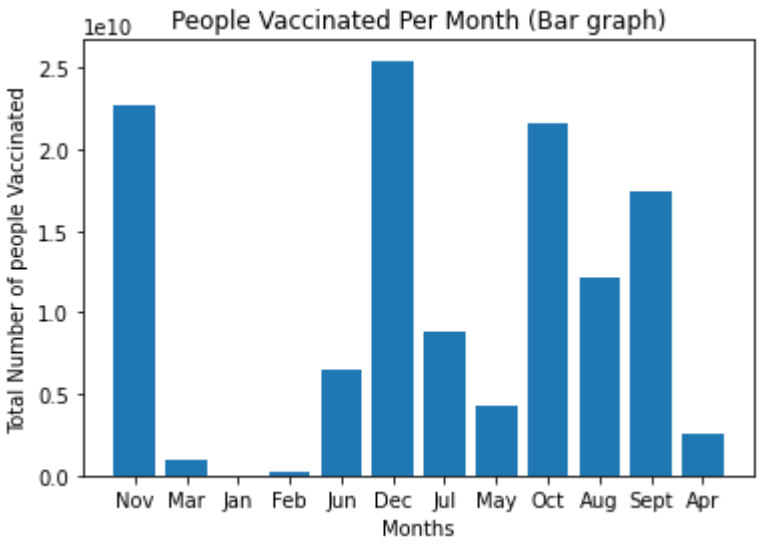
visualising using pie chart

In [178]:
```
month = []
people_vaccinated = []
for i in data:
    month.append(i[0])
    people_vaccinated.append(i[1])

explodes =[0,0,0,0,0,0.2,0,0,0,0,0,0]
plt.pie(people_vaccinated , labels = month, explode =explodes , shadc
plt.title('People Vaccinated Per Month Pie Chart distribution')
plt.xlabel('Months')
plt.ylabel('People Vaccinated')

plt.show()
```



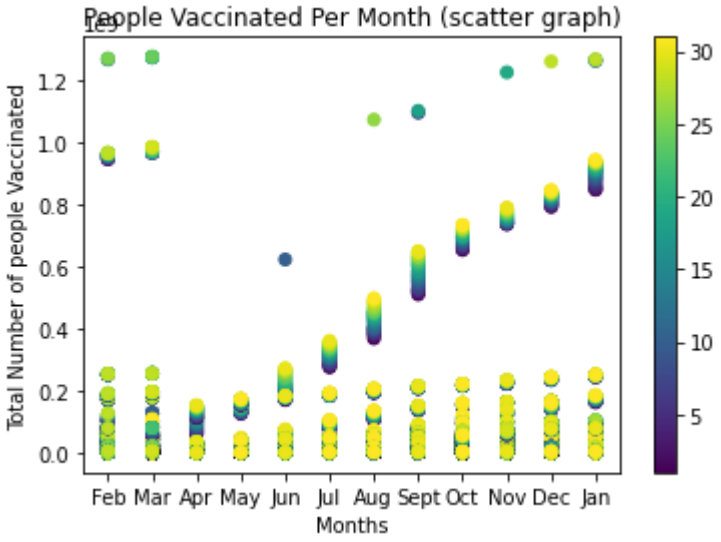
visualising using bar

In [179]:
```
plt.bar(month,people_vaccinated)
plt.title('People Vaccinated Per Month (Bar graph)')
plt.xlabel('Months')
plt.ylabel('Total Number of people Vaccinated')
plt.show()
```



visualising using scatterplot

In [180]:
```
plt.scatter(df['month'],df['people_vaccinated'],c=df['day'])
plt.title('People Vaccinated Per Month (scatter graph)')
plt.xlabel('Months')
plt.ylabel('Total Number of people Vaccinated')
plt.colorbar()
plt.show()
```



visualising using line graph

In [181]:
```
plt.plot(month,people_vaccinated)
plt.title('People Vaccinated Per Month (Bar graph)')
plt.xlabel('Months')
plt.ylabel('Total Number of people Vaccinated')
plt.show()
```