matplotlib

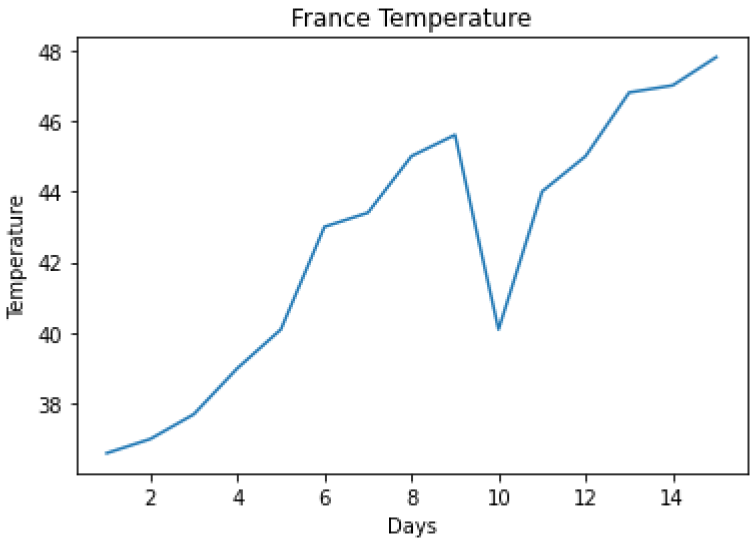
In [1]:

```
import matplotlib.pyplot as plt
```

Line Plot

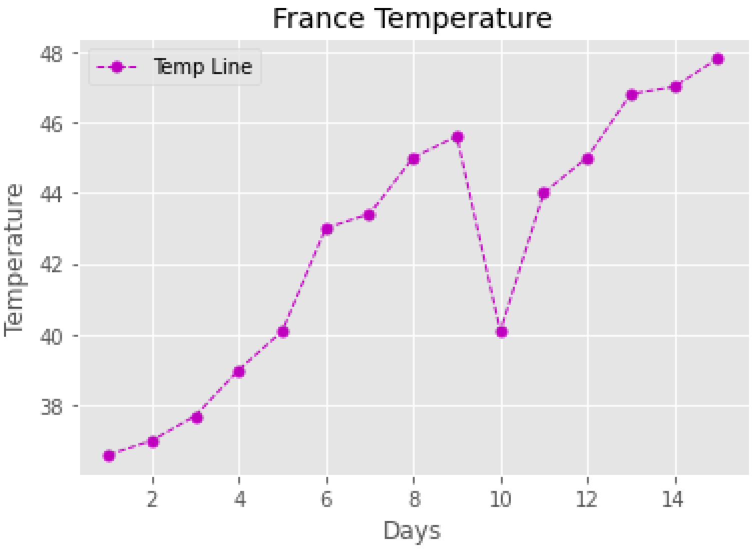
In [2]:

```
days = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
temperature = [36.6,37,37.7,39,40.1,43,43.4,45,45.6,40.1,44,45,46.8,47,47.8]

plt.plot(days,temperature)
# plt.axis([0,30,0,50])
plt.title('France Temperature')
plt.xlabel('Days')
plt.ylabel('Temperature')
plt.show()
```



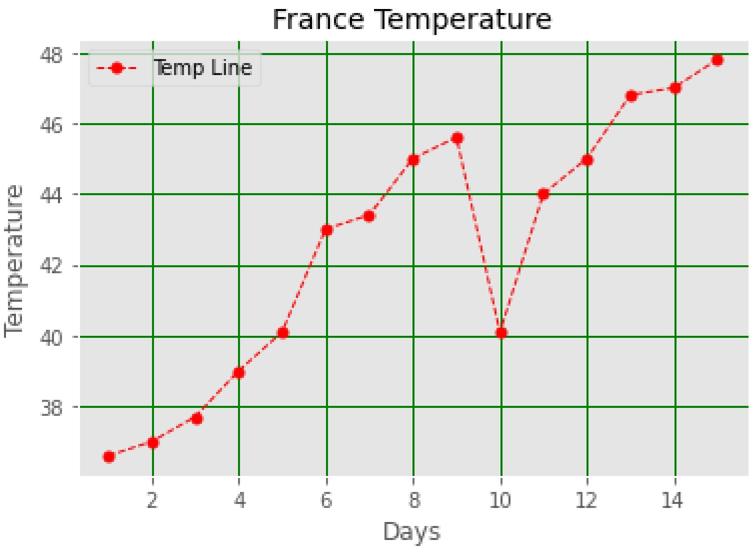
In [3]:

```
from matplotlib import style

days = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
temperature = [36.6,37,37.7,39,40.1,43,43.4,45,45.6,40.1,44,45,46.8,47,47.8]

style.use('ggplot')
plt.plot(days,temperature,color = 'm',marker = 'o',linestyle = '--',linewidth
# plt.axis([0,30,0,50])
plt.title('France Temperature',fontsize = 14)
plt.xlabel('Days',fontsize = 12)
plt.ylabel('Temperature',fontsize = 12)
plt.legend(['Temp Line'],loc = 0)
# plt.grid()
plt.show()
```



In [4]:

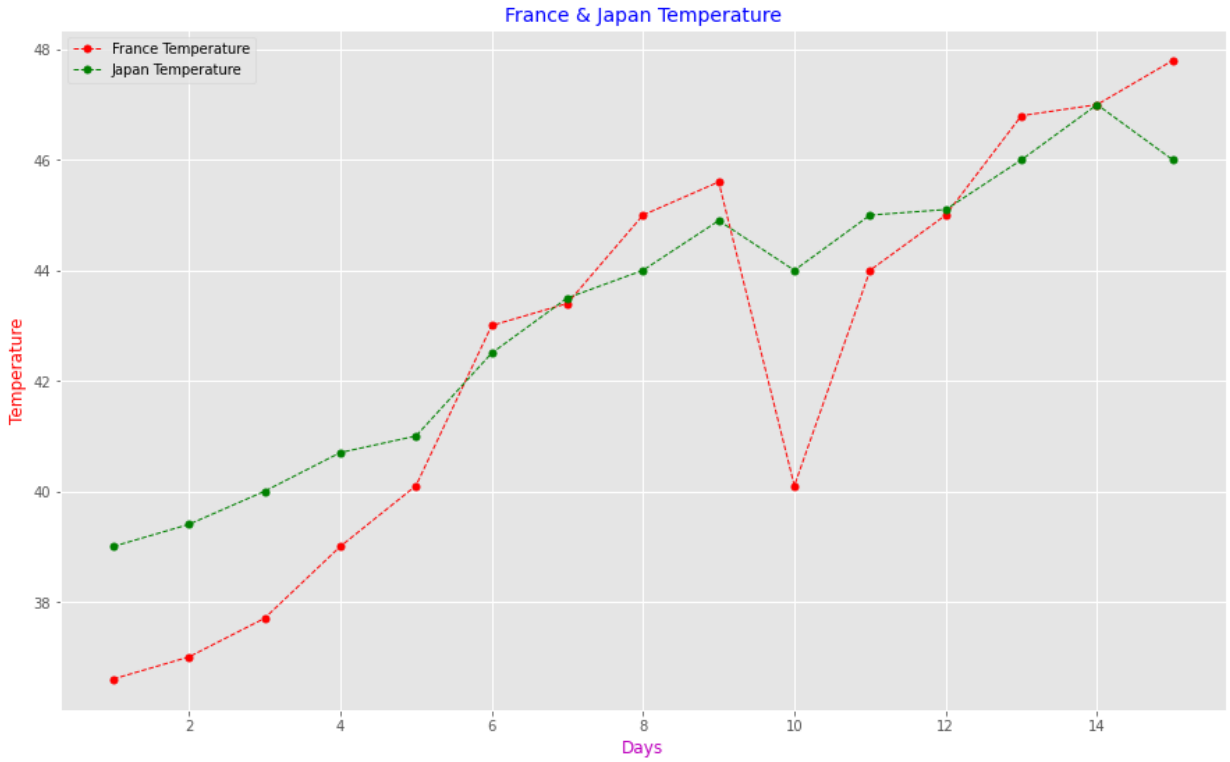
```
from matplotlib import style

days = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
temperature = [36.6,37,37.7,39,40.1,43,43.4,45,45.6,40.1,44,45,46.8,47,47.8]

style.use('ggplot')
plt.plot(days,temperature,color = 'red',marker = 'o',linestyle = '--',linewidt
# plt.axis([0,30,0,50])
plt.title('France Temperature',fontsize = 14)
plt.xlabel('Days',fontsize = 12)
plt.ylabel('Temperature',fontsize = 12)
plt.legend(['Temp Line'],loc = 0)
plt.grid(color = 'green',linestyle = '-',linewidth = 1)
plt.show()
```



In [5]:

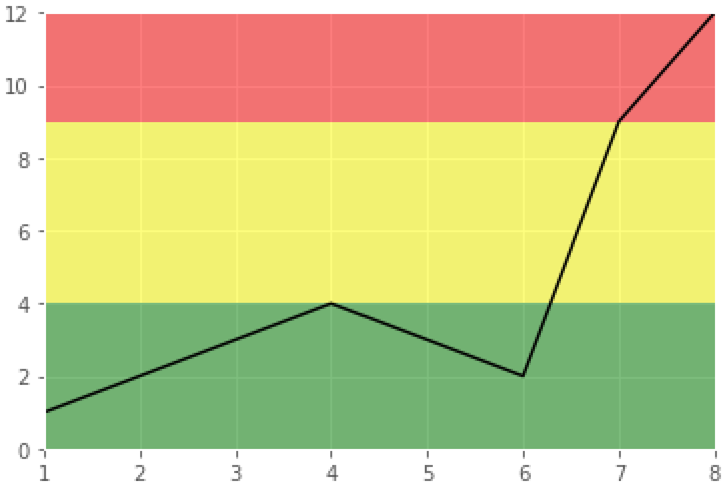
```
from matplotlib import style

days = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
```

```
france_temperature = [36.6,37,37.7,39,40.1,43,43.4,45,45.6,40.1,44,45,46.8,47,4
japan_temperature = [39,39.4,40,40.7,41,42.5,43.5,44,44.9,44,45,45.1,46,47,46]

style.use('ggplot')
plt.figure(figsize = (15,9))
plt.plot(days,france_temperature,color = 'red',marker = 'o',linestyle = '--',li
plt.plot(days,japan_temperature,color = 'green',marker = 'o',linestyle = '--',l
# plt.axis([0,30,0,50])
plt.title('France & Japan Temperature',fontsize = 14,color = 'blue')
plt.xlabel('Days',fontsize = 12,color = 'm')
plt.ylabel('Temperature',fontsize = 12,color = 'red')
# plt.legend(['Temp Line'],loc = 0)
plt.legend(loc = 0)
plt.grid(color = 'white',linestyle = '-',linewidth = 1)
plt.show()
```



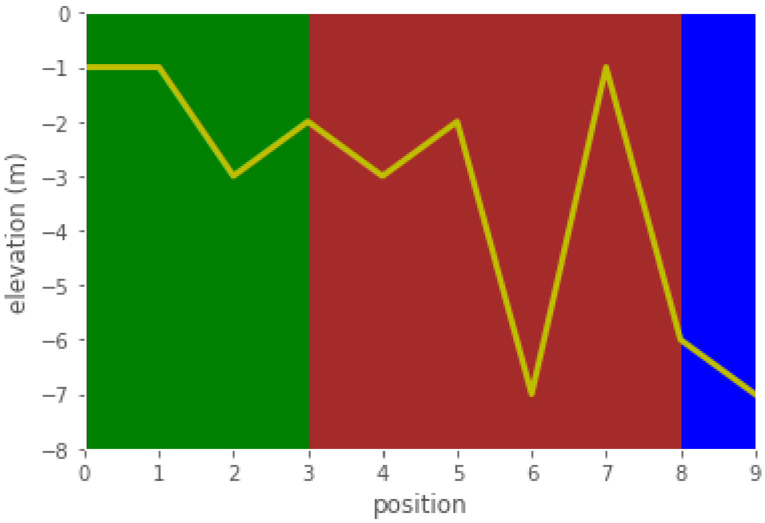
In [6]:

```
x = [1,2,3,4,5,6,7,8]
y = [1,2,3,4,3,2,9,12]

fig, ax = plt.subplots()

ax.plot(x,y,'k')
ax.figesize = (20,5)
# ax.grid(b = True)
# ax = plt.gca()
# ax.set_facecolor()
ax.margins(0)

ax.axhspan(0,4,facecolor = 'green',alpha = 0.5)
ax.axhspan(4,9,facecolor = 'yellow',alpha = 0.5)
ax.axhspan(9,12,facecolor = 'red',alpha = 0.5)

plt.show()
```



In [7]:

```
import matplotlib.pyplot as plt
import random

# generate random data
elevation = [random.randrange(-y -1, 0) for y in range(10)]
distance = range(10)

# get reference to axes
fig, ax = plt.subplots()

# plot data with a yellow line
ax.plot(distance, elevation, 'y', linewidth=3)

# format axes
ax.grid()
ax.margins(0)
ax.set_ylabel('elevation (m)')
ax.set_xlabel('position')
ax.set_ylim([min(elevation) - 1, max(elevation) + 1])

# get range of axes
ymin, ymax = ax.get_ylim()
xmax = max(distance)

# set background colours
ax.axhspan(ymin, ymax, 0 / xmax, 3 / xmax, facecolor='green')
ax.axhspan(ymin, ymax, 3 / xmax, 8 / xmax, facecolor='brown')
ax.axhspan(ymin, ymax, 8 / xmax, 9 / xmax, facecolor='blue')

# display graph
plt.show()
```



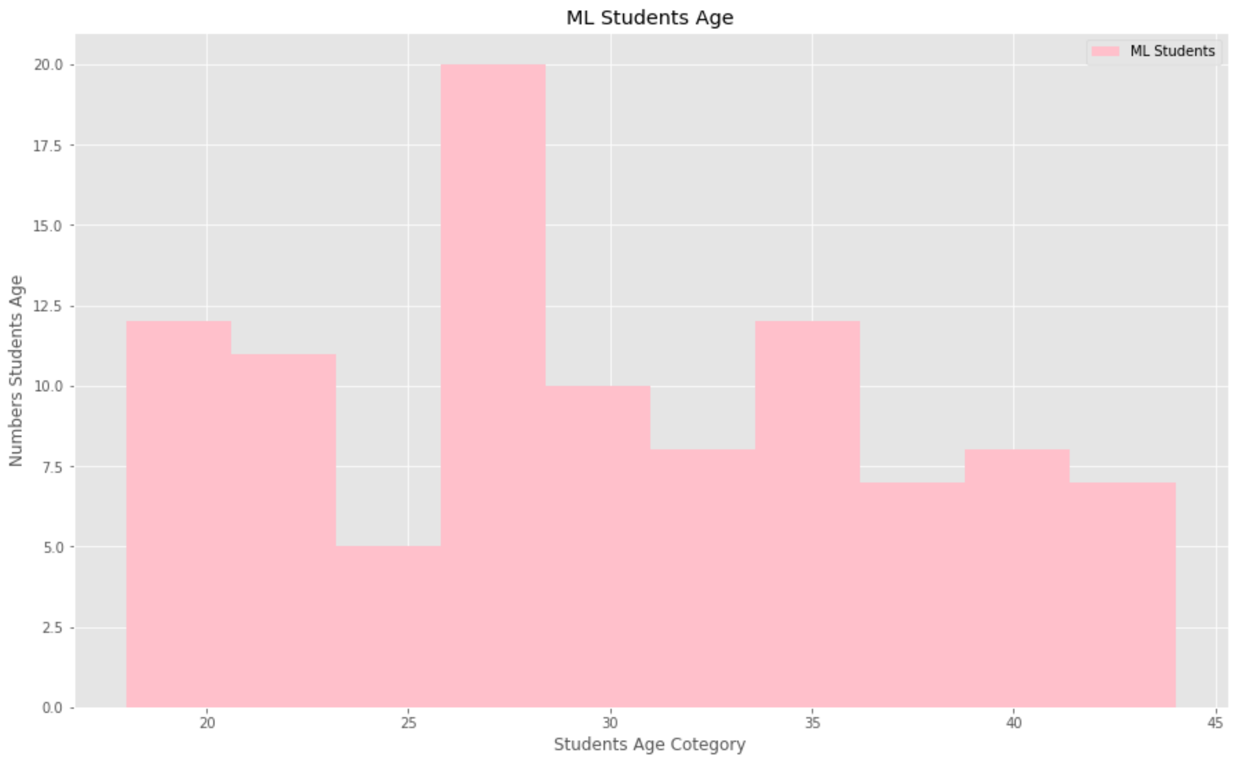
Histogram

In [8]:
```
import matplotlib.pyplot as plt
import numpy as np
import random
```

In [9]:
```
ml_student_age = np.random.randint(18,45,(100))
py_student_age = np.random.randint(15,40,(100))

print(ml_student_age)
print(py_student_age)
```

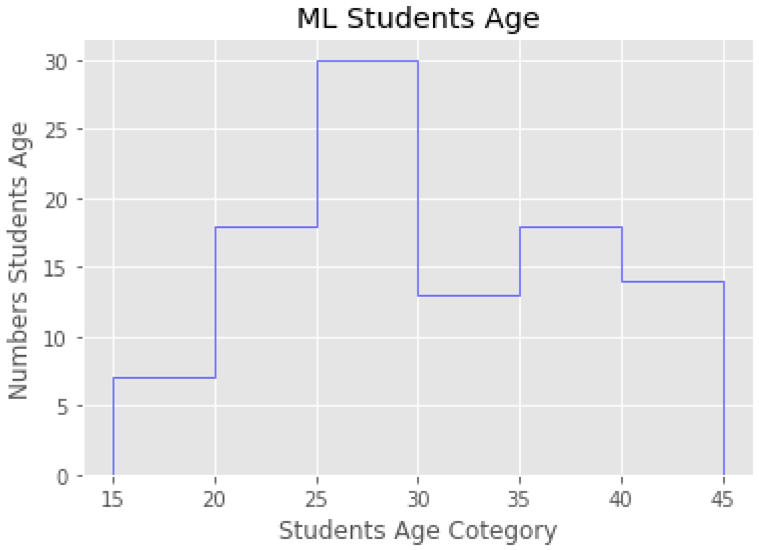
```
[20 34 27 28 28 33 39 38 40 44 32 35 41 37 33 36 26 26 24 18 29 42 24 25
 28 41 36 26 36 29 21 35 22 29 32 38 36 38 37 26 32 26 22 23 35 41 26 27
 32 20 36 38 27 29 23 21 18 21 20 29 44 18 36 28 27 29 42 21 31 28 18 21
 26 25 43 19 43 20 40 36 34 30 28 30 30 18 21 40 43 31 28 20 37 25 26 29
 26 40 21 19]
[35 36 15 29 32 24 23 33 38 27 15 37 33 16 36 35 24 36 23 21 16 22 29 21
 33 18 34 17 33 19 39 31 27 36 35 19 38 29 28 34 22 38 32 38 37 17 22 23
 19 31 39 35 16 30 27 24 21 30 29 22 19 18 22 25 27 16 30 17 16 21 24 36
 19 29 22 36 36 31 32 22 16 25 16 20 27 36 38 24 24 23 27 16 27 38 27 27
 38 28 35 17]
```

In [10]:
```
plt.figure(figsize = (15,9))
plt.hist(ml_student_age,color = 'pink')
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(['ML Students'],loc = 0)
plt.show()
```



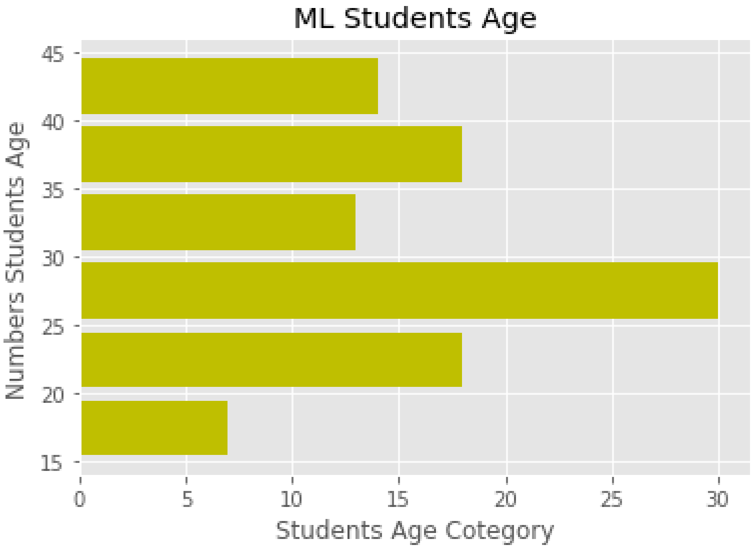
In [11]:

```
bins = [15,20,25,30,35,40,45]
plt.hist(ml_student_age,bins,rwidth = 0.8,color = 'blue',histtype = 'step')

plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.show()
```



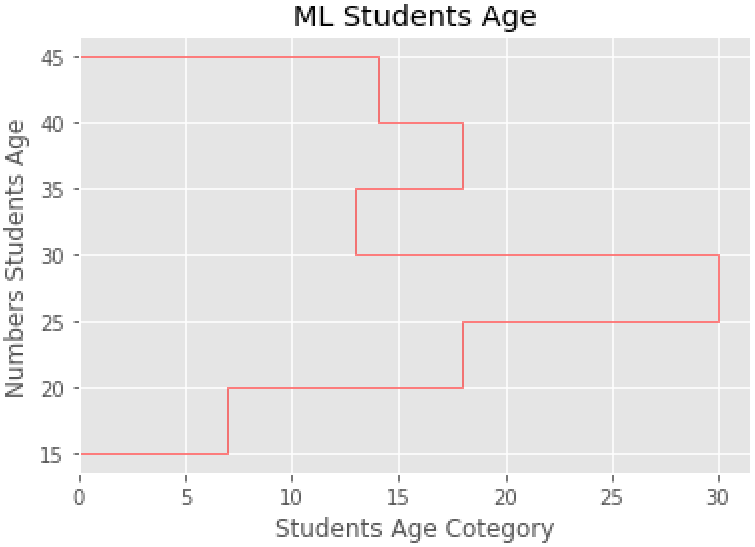
In [12]:

```
bins = [15,20,25,30,35,40,45]
plt.hist(ml_student_age,bins,rwidth = 0.8,color = 'y',orientation = 'horizonta

plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.show()
```



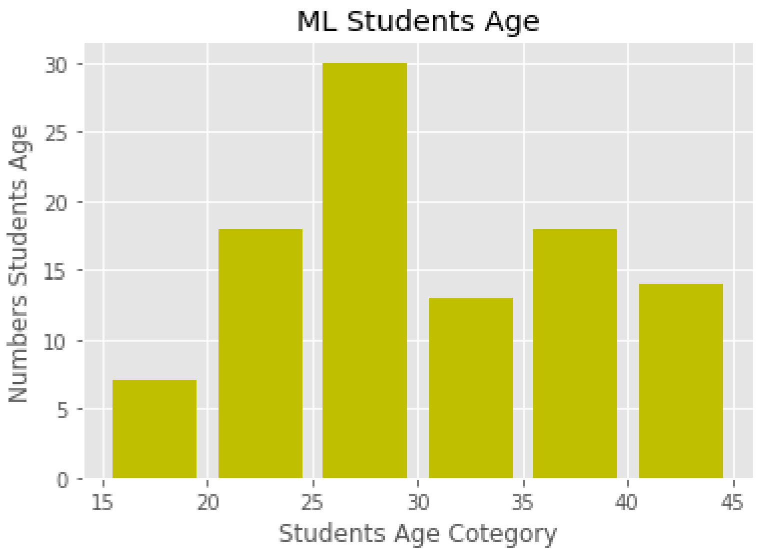
In [13]:

```
bins = [15,20,25,30,35,40,45]
plt.hist(ml_student_age,bins,rwidth = 0.8,color = 'red',orientation = 'horizon

plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.show()
```



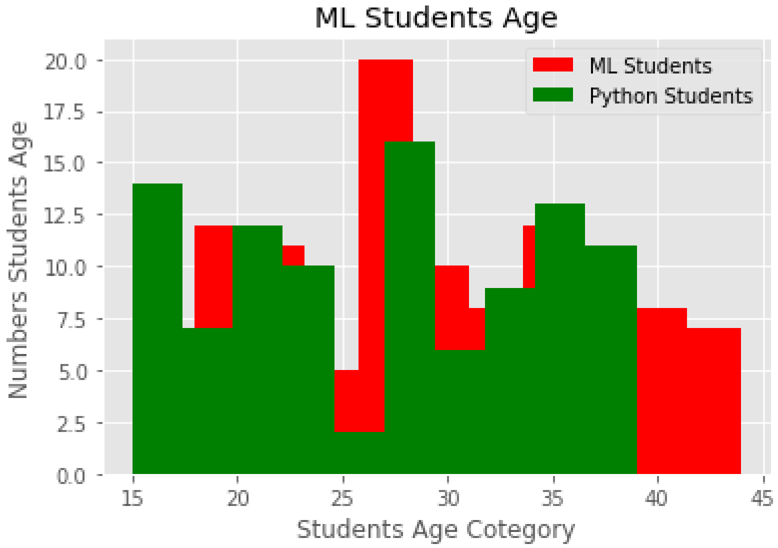
In [14]:

```
bins = [15,20,25,30,35,40,45]
plt.hist(ml_student_age,bins,rwidth = 0.8,color = 'y')

plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.show()
```

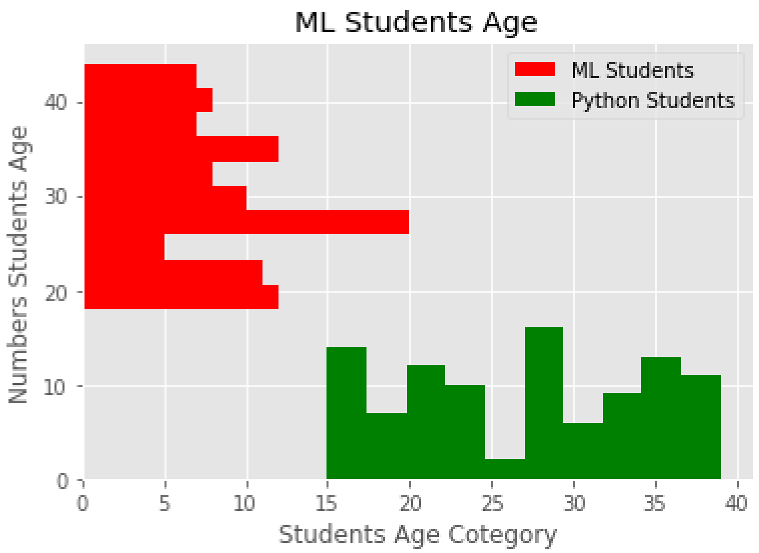


In [15]:
```
# bins = [15,20,25,30,35,40,45]
# plt.hist(ml_student_age,bins,color = 'green')
#
# plt.title('ML Students Age')
# plt.xlabel('Students Age Cotegory')
# plt.ylabel('Numbers Students Age')
# plt.show()
```

In [16]:
```
plt.hist(ml_student_age,color = 'red',label = 'ML Students')
plt.hist(py_student_age,color = 'green',label = 'Python Students')
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```

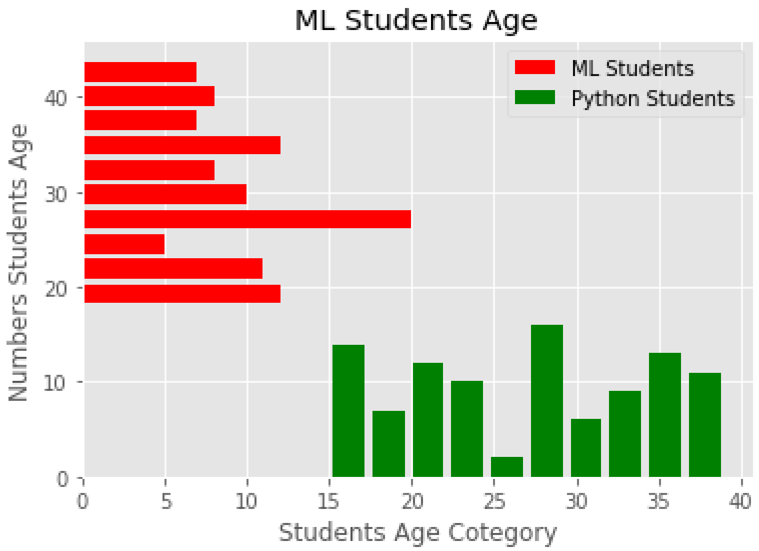


In [17]:
```
plt.hist(ml_student_age,color = 'red',label = 'ML Students',orientation = 'hor
plt.hist(py_student_age,color = 'green',label = 'Python Students')
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



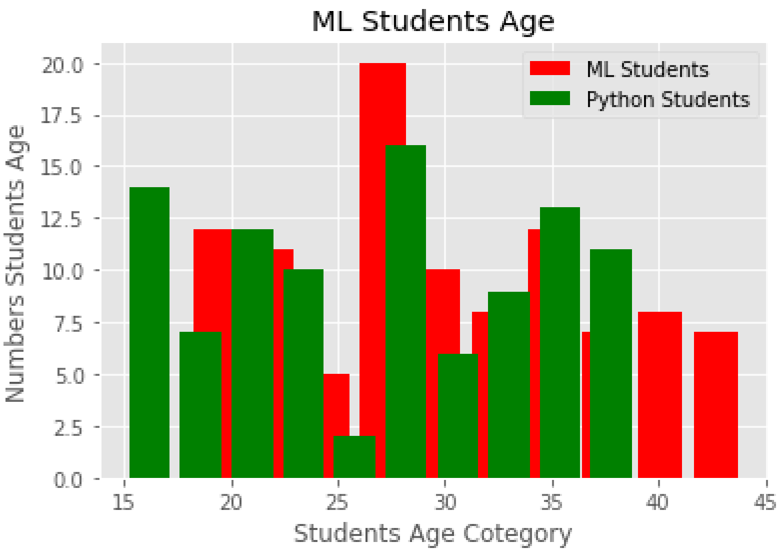
In [18]:

```
plt.hist(ml_student_age,color = 'red',label = 'ML Students',orientation = 'hor
plt.hist(py_student_age,color = 'green',label = 'Python Students',histtype = '
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```

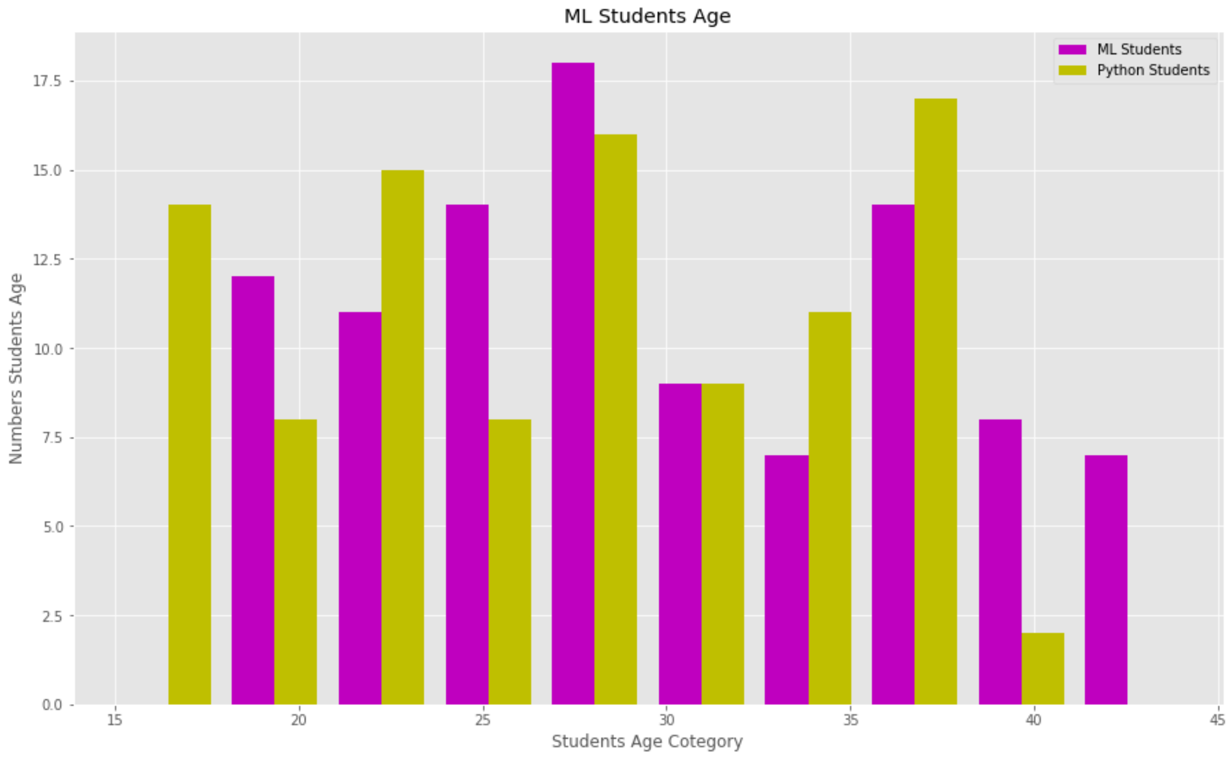


In [19]:

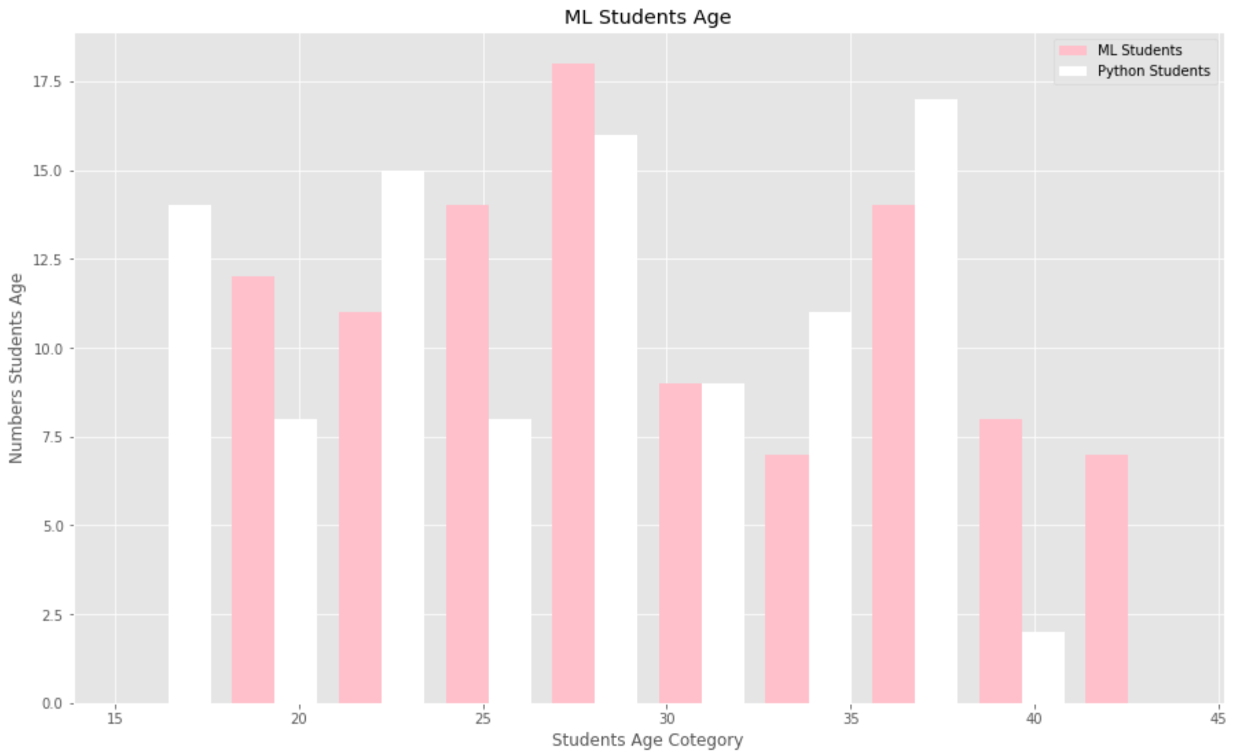
```
plt.hist(ml_student_age,color = 'red',label = 'ML Students',orientation = 'ver
plt.hist(py_student_age,color = 'green',label = 'Python Students',orientation
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



In [20]:
```
plt.figure(figsize = (15,9))
plt.hist([ml_student_age,py_student_age],color = ['m','y'],label = ['ML Studen
# plt.hist(py_student_age,color = 'green',label = 'Python Students',orientatio
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```

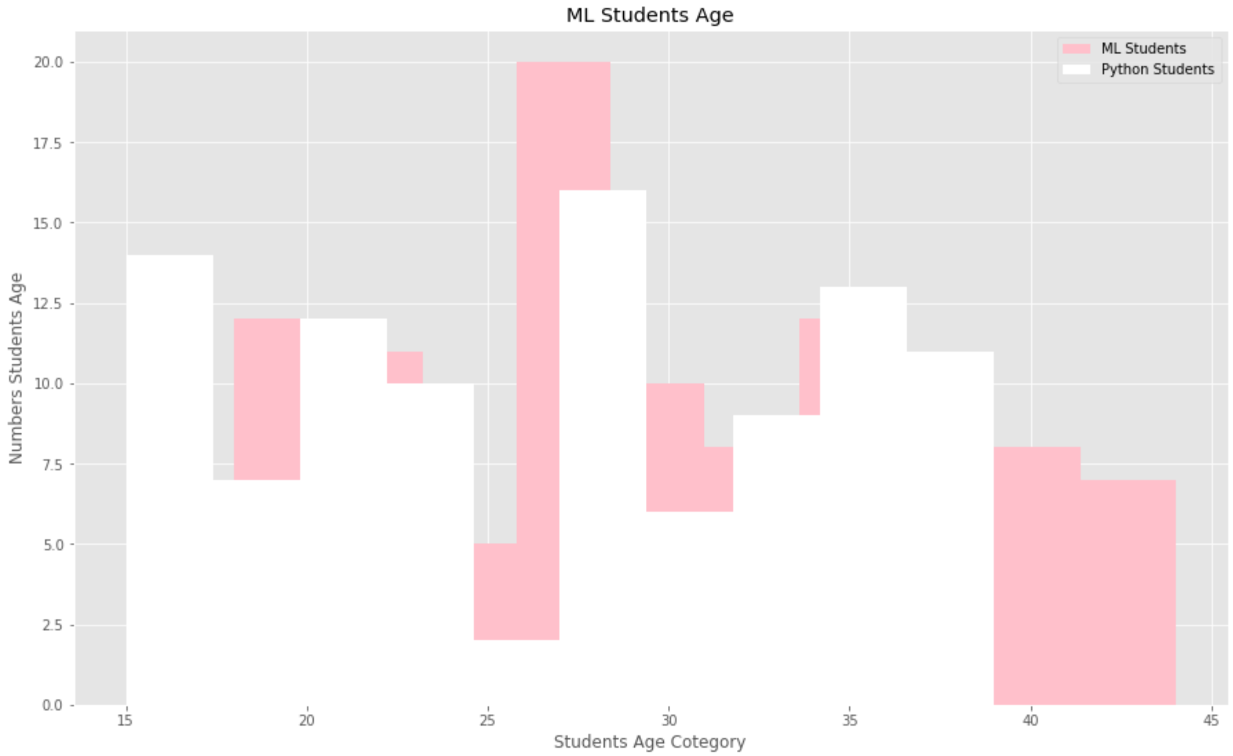


In [21]:
```
plt.figure(figsize = (15,9))
plt.hist([ml_student_age,py_student_age],color = ['pink','white'],label = ['ML
# plt.hist(py_student_age,color = 'green',label = 'Python Students',orientatio
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



In [22]:

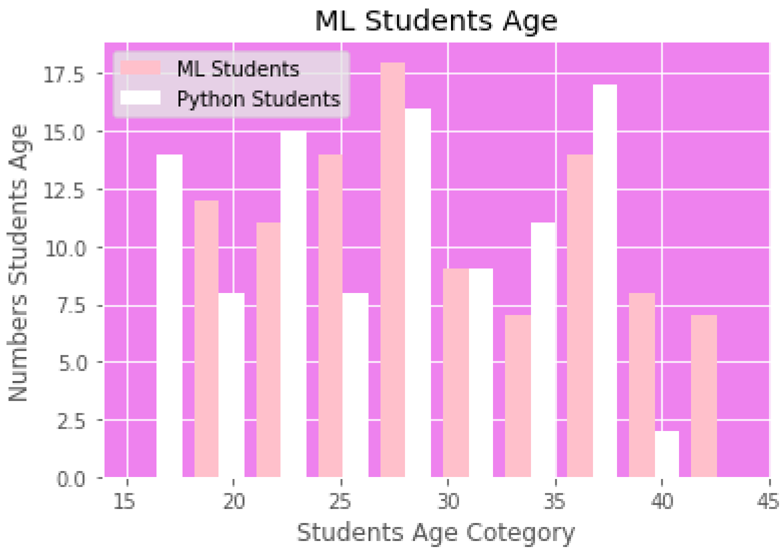
```
plt.figure(figsize = (15,9))
plt.hist(ml_student_age,color = 'pink',label = 'ML Students')
plt.hist(py_student_age,color = 'white',label = 'Python Students')
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



In [23]:

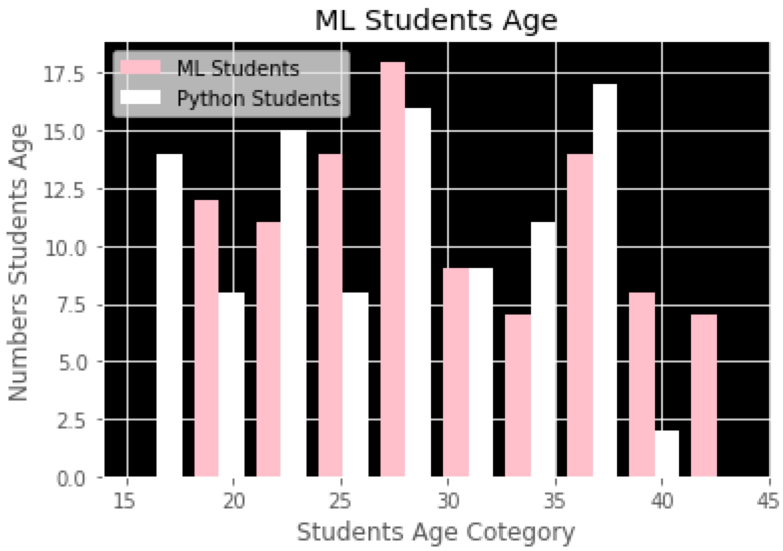
```
ax = plt.axes()
```

```
# plt.figure(figsize = (15,9))
# plt.figure(facecolor = 'r')
ax.set_facecolor('violet')
plt.hist([ml_student_age,py_student_age],color = ['pink','white'],label = ['ML
# plt.hist(py_student_age,color = 'green',label = 'Python Students',orientatio
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



In [24]:

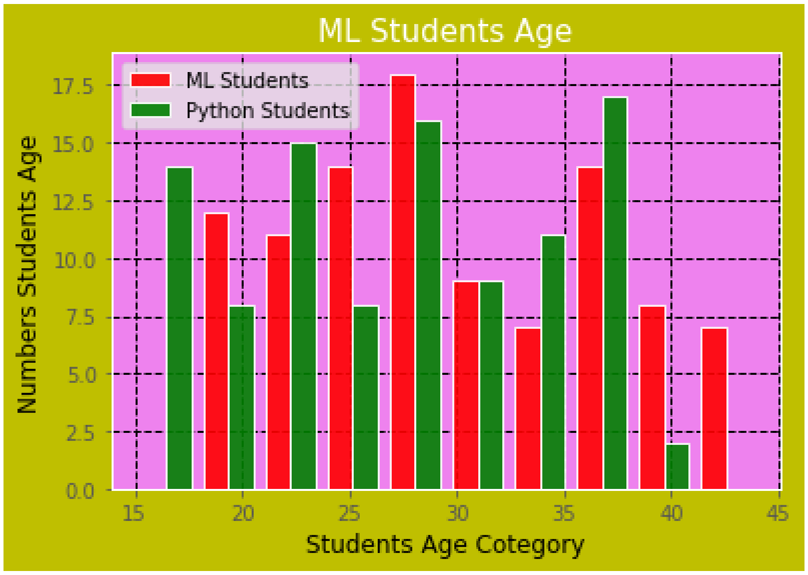
```
ax = plt.axes()
# plt.figure(figsize = (15,9))
ax.set_facecolor('black')
plt.hist([ml_student_age,py_student_age],color = ['pink','white'],label = ['ML
# plt.hist(py_student_age,color = 'green',label = 'Python Students',orientatio
plt.title('ML Students Age')
plt.xlabel('Students Age Cotegory')
plt.ylabel('Numbers Students Age')
plt.legend(loc = 0)
plt.show()
```



In [25]:

```
plt.figure(facecolor = 'y')
```

```
ax = plt.axes()
# plt.figure(figsize = (15,9))
# plt.figure(facecolor = 'r')
ax.set_facecolor('violet')
plt.hist([ml_student_age,py_student_age],color = ['r','g'],label = ['ML Studen
# plt.hist(py_student_age,color = 'green',label = 'Python Students',orientatio
plt.title('ML Students Age',color = 'white',fontsize = 15)
plt.xlabel('Students Age Cotegory',color = 'black',fontsize = 12)
plt.ylabel('Numbers Students Age',color = 'black',fontsize = 12)
plt.grid(color = 'black',linestyle = '--',linewidth = 1)
plt.legend(loc = 0)
plt.show()
```



Bar Chart

In [26]:

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

In [27]:

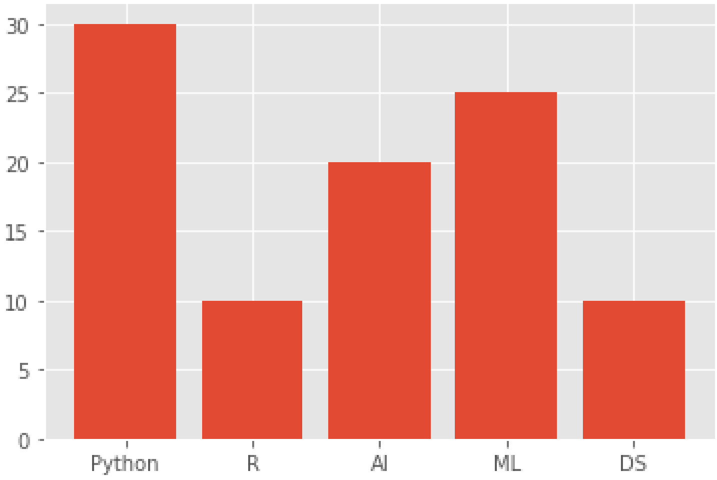
```
classes = ['Python','R','AI','ML','DS']
class1_students = [30,10,20,25,10]
class2_students = [40,5,20,20,10]
class3_students = [35,5,30,15,15]
class4_students = [25,5,35,20,15]
```

In [28]:

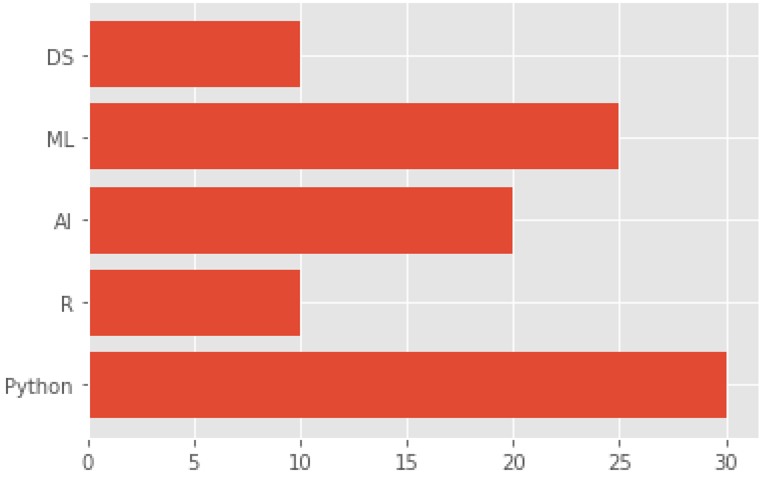
```
plt.bar(classes,class1_students)
```

Out[28]:

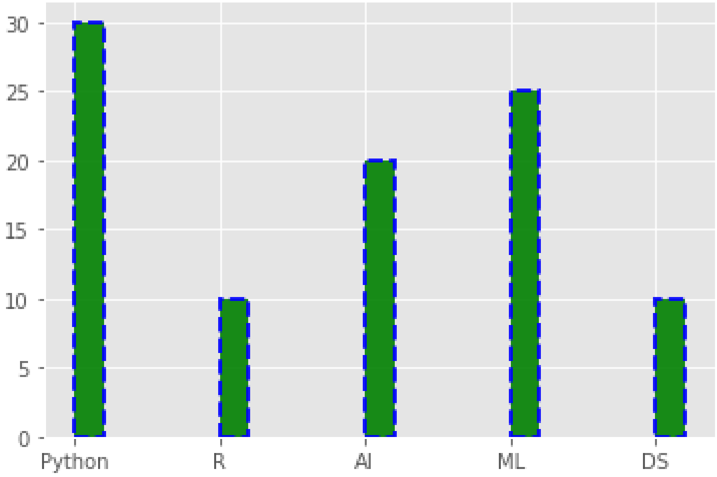
```
<BarContainer object of 5 artists>
```



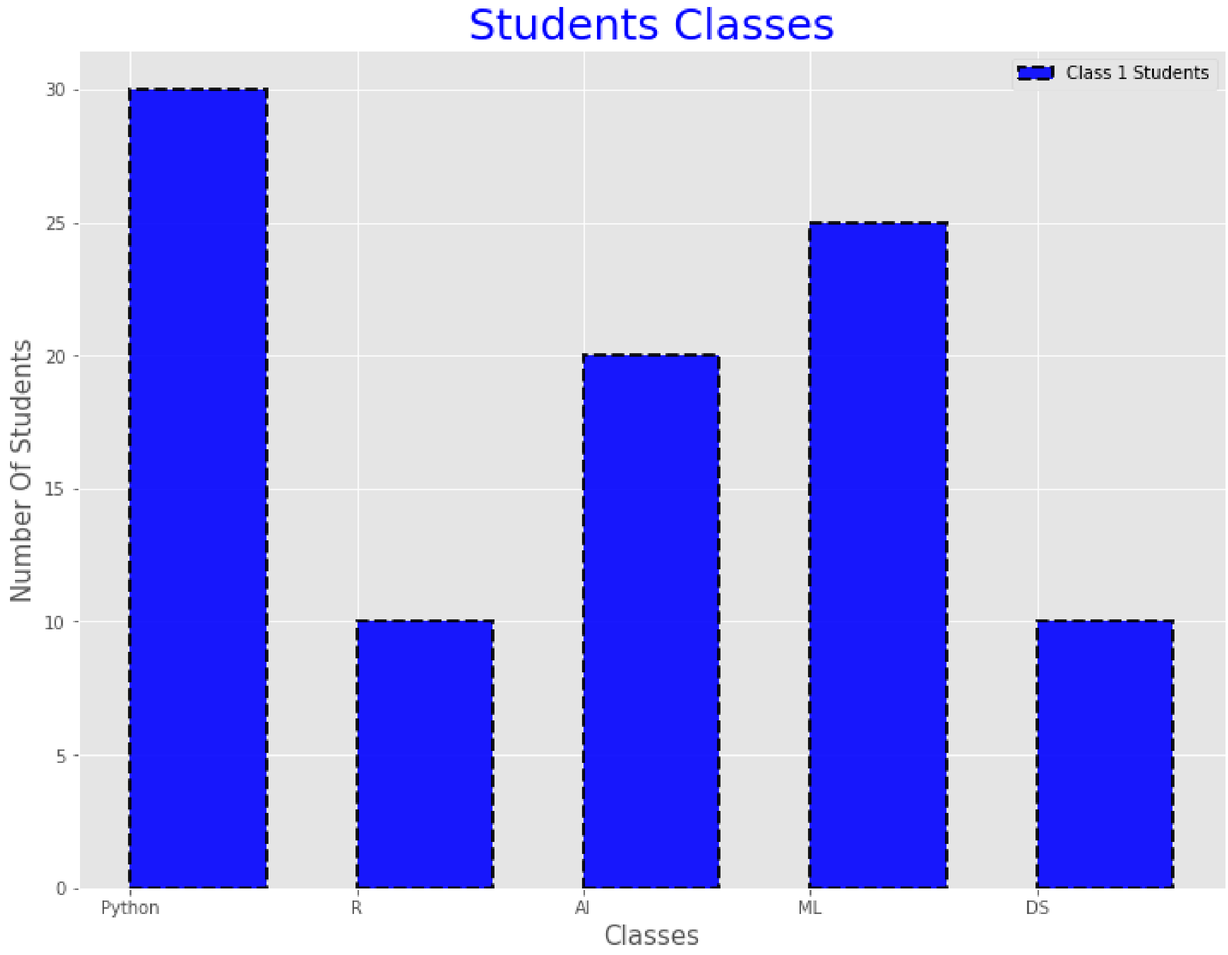
```
In [29]: plt.barh(classes,class1_students)

Out[29]: <BarContainer object of 5 artists>
```



```
In [30]: plt.bar(classes,class1_students,width = 0.2,align = 'edge',color = 'g',edgecol

Out[30]: <BarContainer object of 5 artists>
```

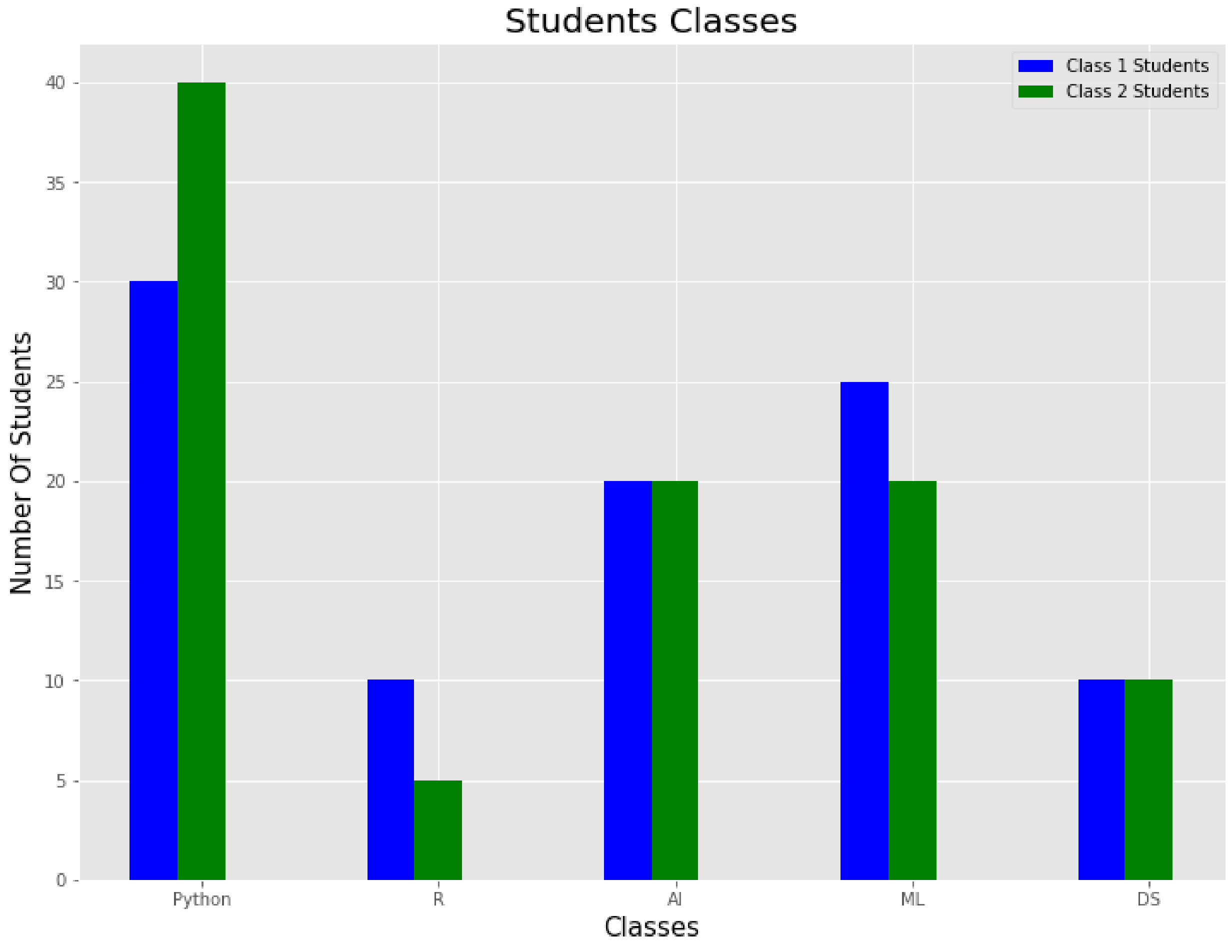


```
In [31]: style.use('ggplot')
         plt.figure(figsize = (12,9))
         plt.bar(classes,class1_students,width = 0.6,align = 'edge',color = 'blue',edge
         plt.title('Students Classes',fontsize = 25,color = 'b')
         plt.xlabel('Classes',fontsize = 15)
         plt.ylabel('Number Of Students',fontsize = 15)
         plt.legend(loc = 0)
         plt.show()
```

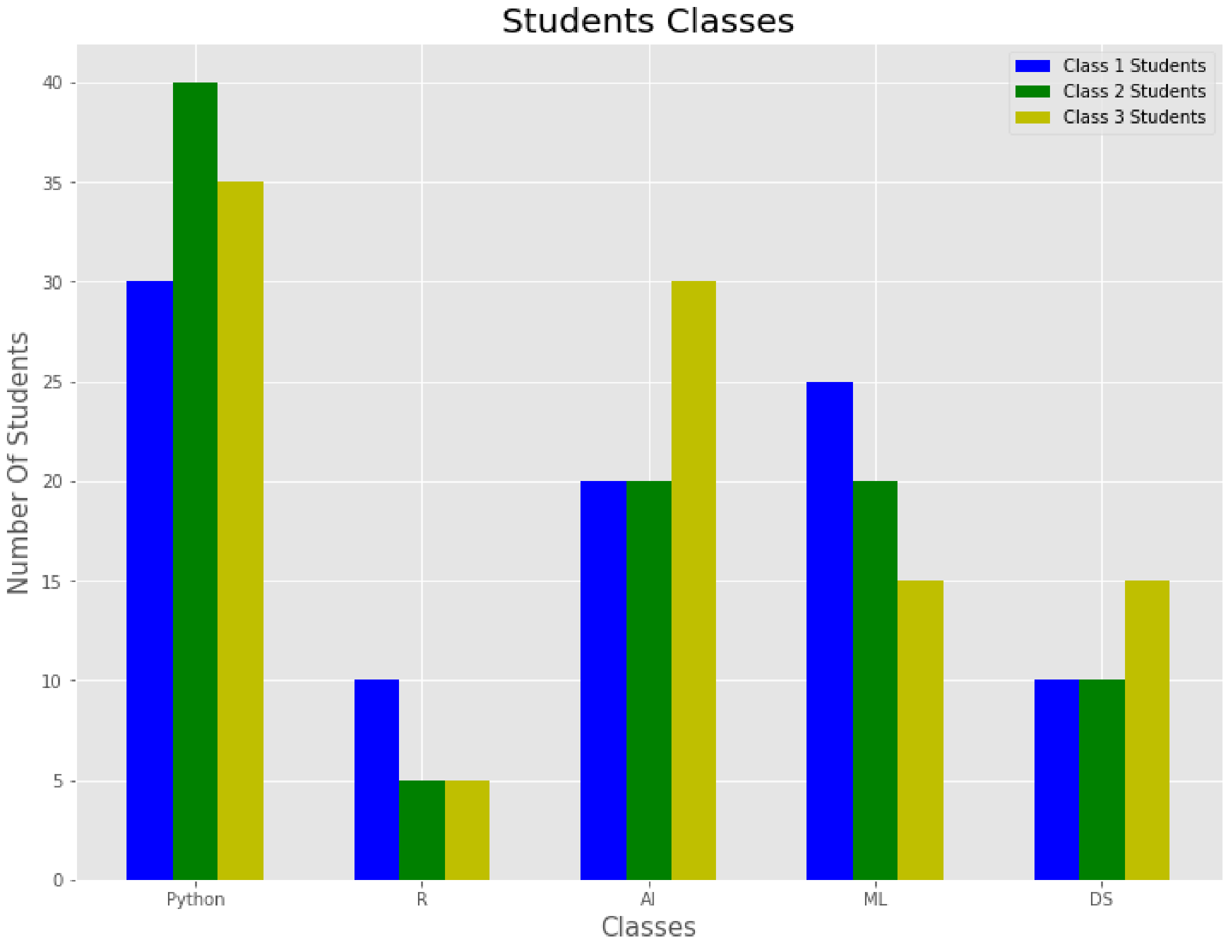


In [32]:

```
plt.figure(figsize = (12,9))
classes_index = np.arange(len(classes))
width = 0.2
plt.bar(classes_index,class1_students,width,color = 'b',label = 'Class 1 Studer
plt.bar(classes_index + width,class2_students,width,color = 'g',label = 'Class
plt.xticks(classes_index + width,classes)
plt.title('Students Classes',fontsize = 20,color = 'k')
plt.xlabel('Classes',fontsize = 15,color = 'k')
plt.ylabel('Number Of Students',fontsize = 15,color = 'k')
plt.legend(loc = 0)
plt.show()
```

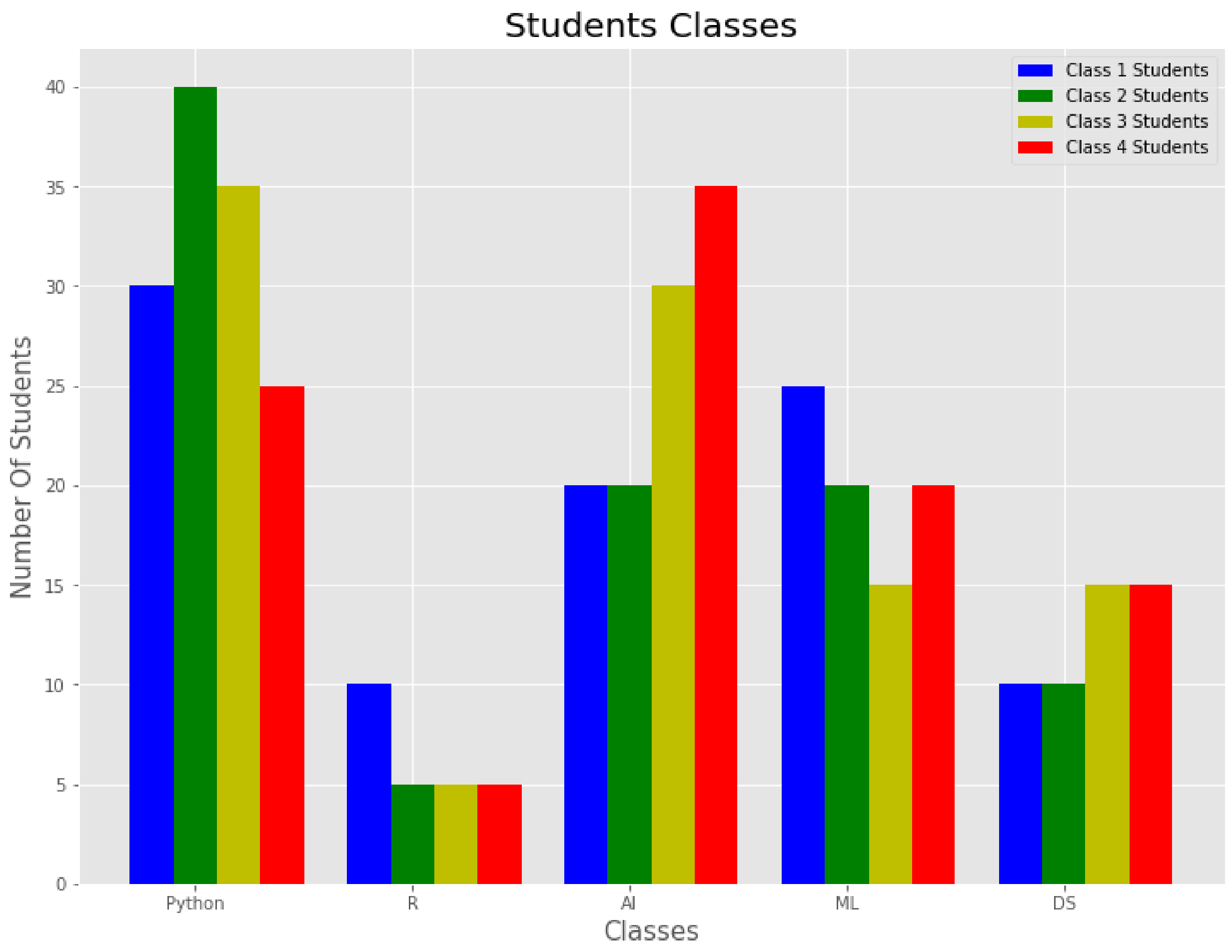


```
In [33]: plt.figure(figsize = (12,9))
         classes_index = np.arange(len(classes))
         width = 0.2
         plt.bar(classes_index,class1_students,width,color = 'b',label = 'Class 1 Studen
         plt.bar(classes_index + width,class2_students,width,color = 'g',label = 'Class
         plt.bar(classes_index + width + width,class3_students,width,color = 'y',label =
         plt.xticks(classes_index + width,classes)
         plt.title('Students Classes',fontsize = 20) # ,color = 'k')
         plt.xlabel('Classes',fontsize = 15) # ,color = 'k')
         plt.ylabel('Number Of Students',fontsize = 15) # ,color = 'k')
         plt.legend(loc = 0)
         plt.show()
```



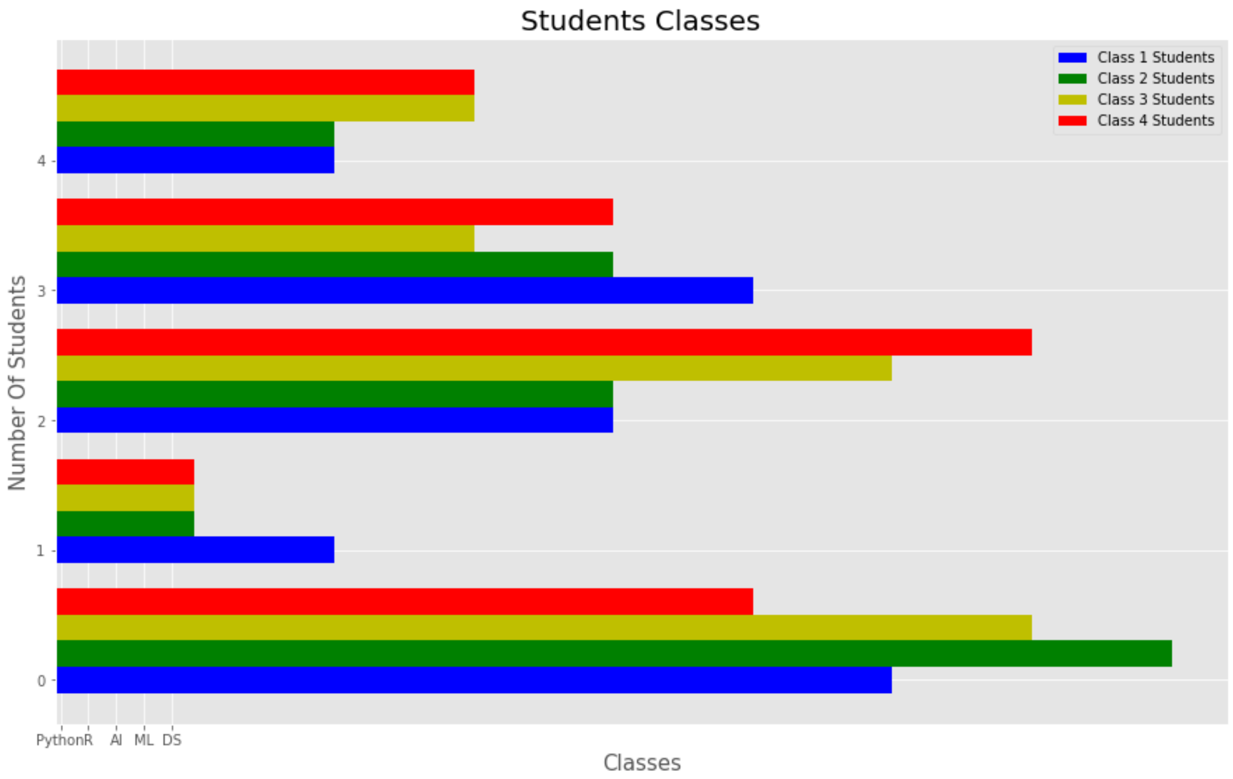
In [34]:

```
plt.figure(figsize = (12,9))
classes_index = np.arange(len(classes))
width = 0.2
plt.bar(classes_index,class1_students,width,color = 'b',label = 'Class 1 Studen
plt.bar(classes_index + width,class2_students,width,color = 'g',label = 'Class
plt.bar(classes_index + width + width,class3_students,width,color = 'y',label =
plt.bar(classes_index + width + width + width,class4_students,width,color = 'r
plt.xticks(classes_index + width,classes)
plt.title('Students Classes',fontsize = 20) # ,color = 'k')
plt.xlabel('Classes',fontsize = 15) # ,color = 'k')
plt.ylabel('Number Of Students',fontsize = 15) # ,color = 'k')
plt.legend(loc = 0)
plt.show()
```



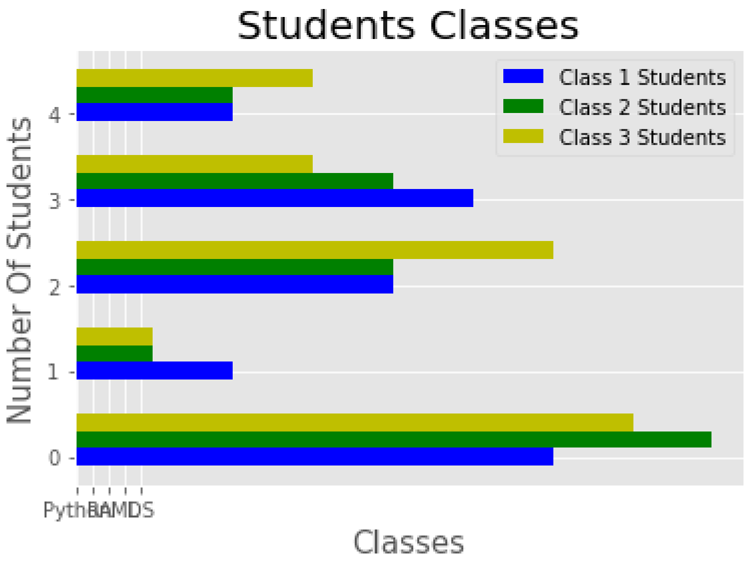
In [35]:

```
plt.figure(figsize = (15,9))
classes_index = np.arange(len(classes))
width = 0.2
plt.barh(classes_index,class1_students,width,color = 'b',label = 'Class 1 Stude
plt.barh(classes_index + width,class2_students,width,color = 'g',label = 'Class
plt.barh(classes_index + width + width,class3_students,width,color = 'y',label 
plt.barh(classes_index + width + width + width,class4_students,width,color = 'r
plt.xticks(classes_index + width,classes)
plt.title('Students Classes',fontsize = 20) # ,color = 'k')
plt.xlabel('Classes',fontsize = 15) # ,color = 'k')
plt.ylabel('Number Of Students',fontsize = 15) # ,color = 'k')
plt.legend(loc = 0)
plt.show()
```



In [36]:

```
# plt.figure(figsize = (12,9))
classes_index = np.arange(len(classes))
width = 0.2
plt.barh(classes_index,class1_students,width,color = 'b',label = 'Class 1 Stude
plt.barh(classes_index + width,class2_students,width,color = 'g',label = 'Class
plt.barh(classes_index + width + width,class3_students,width,color = 'y',label 
plt.xticks(classes_index + width,classes)
plt.title('Students Classes',fontsize = 20) # ,color = 'k')
plt.xlabel('Classes',fontsize = 15) # ,color = 'k')
plt.ylabel('Number Of Students',fontsize = 15) # ,color = 'k')
plt.legend(loc = 0)
plt.show()
```



Scatter Plot

In [37]:
```
import matplotlib.pyplot as plt
import pandas as pd
```

In [38]:
```
df_google_plat_store_apps = pd.read_csv('C:\\Users\prasad jadhav\Downloads\Pand
df_google_plat_store_apps.shape
```

Out[38]:
```
(1000, 13)
```

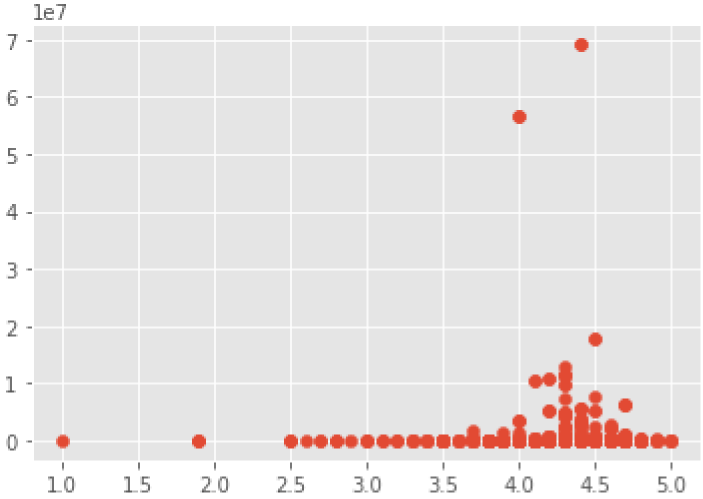
In [39]:
```
df_google_plat_store_apps.head(5)
```

Out[39]:

	App	Category	Rating	Reviews	Size	Installs	Type	Price	Content Rating	
0	Photo Editor & Candy Camera & Grid & ScrapBook	ART_AND_DESIGN	4.1	159	19M	10,000+	Free	0	Everyone	Art &
1	Coloring book moana	ART_AND_DESIGN	3.9	967	14M	500,000+	Free	0	Everyone	Design;
2	U Launcher Lite – FREE Live Cool Themes, Hide ...	ART_AND_DESIGN	4.7	87510	8.7M	5,000,000+	Free	0	Everyone	Art &
3	Sketch - Draw & Paint	ART_AND_DESIGN	4.5	215644	25M	50,000,000+	Free	0	Teen	Art &
4	Pixel Draw - Number Art Coloring Book	ART_AND_DESIGN	4.3	967	2.8M	100,000+	Free	0	Everyone	Design;Cr

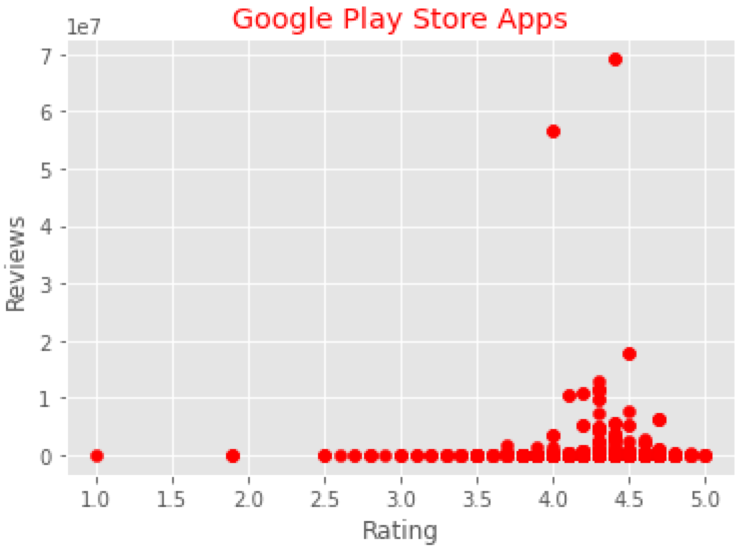
In [40]:
```
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']

plt.scatter(x,y)
```

Out[40]:
```
<matplotlib.collections.PathCollection at 0x28030a34850>
```



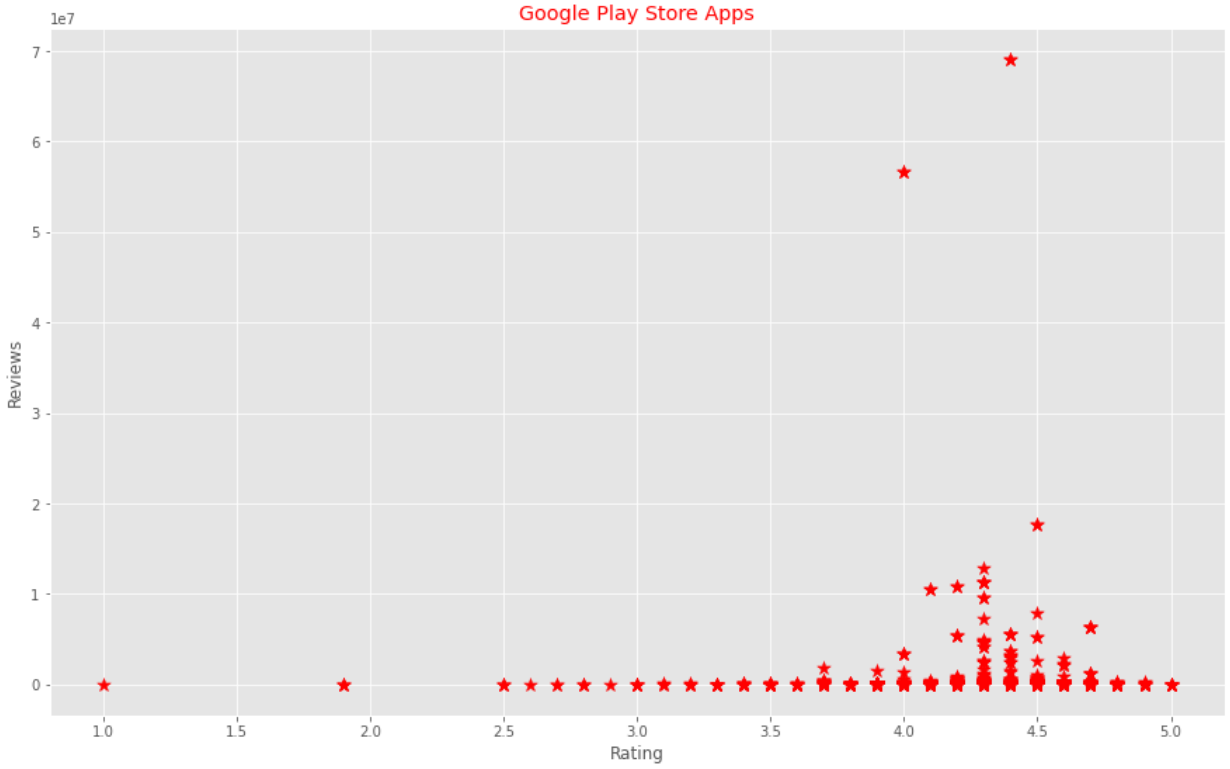
In [41]:

```
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
plt.scatter(x,y, color = 'r')
plt.title('Google Play Store Apps',color = 'r')
plt.xlabel('Rating')
plt.ylabel('Reviews')
plt.show()
```



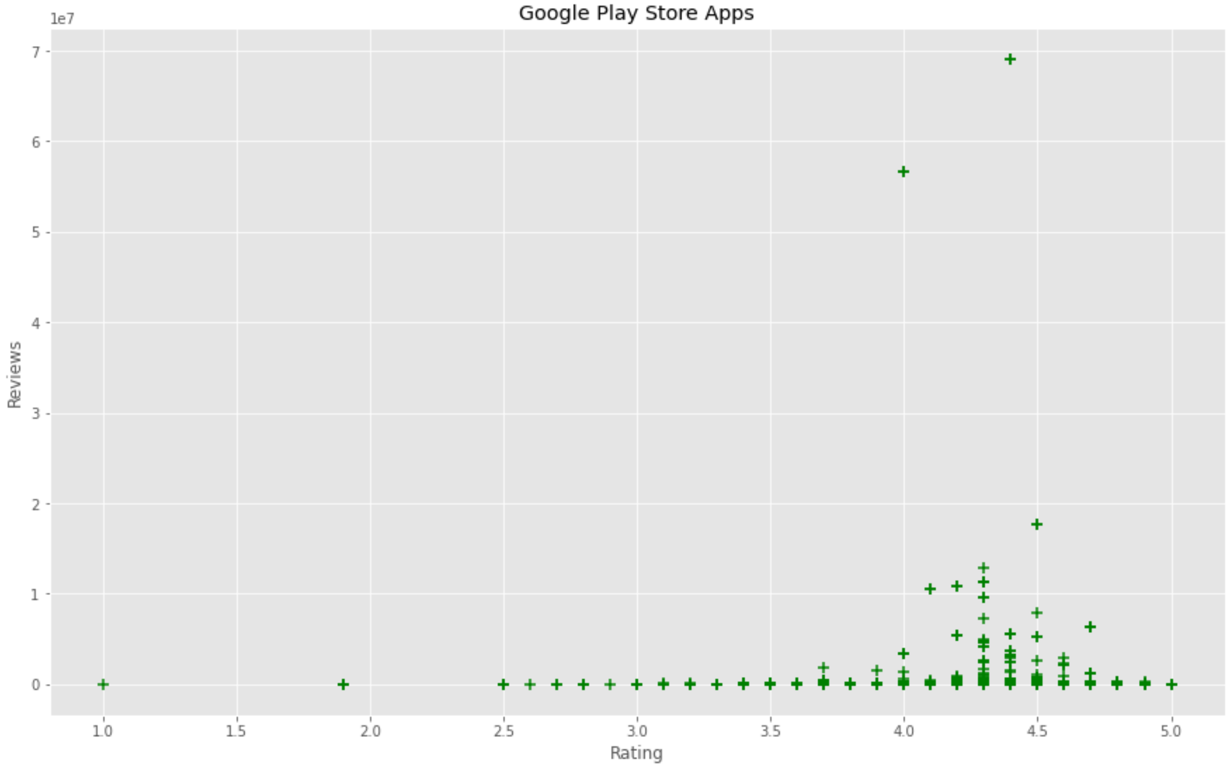
In [42]:

```
plt.figure(figsize = (15,9))
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
plt.scatter(x,y, color = 'r',marker = '*',s = 100) # ,alpha = 0.5)
plt.title('Google Play Store Apps',color = 'r')
plt.xlabel('Rating')
plt.ylabel('Reviews')
plt.show()
```



In [43]:

```
plt.figure(figsize = (15,9))
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
plt.scatter(x,y, color = 'green',marker = '+',s = 75) # ,linewidths = 10) # ,a
plt.title('Google Play Store Apps',color = 'k')
plt.xlabel('Rating')
plt.ylabel('Reviews')
plt.show()
```

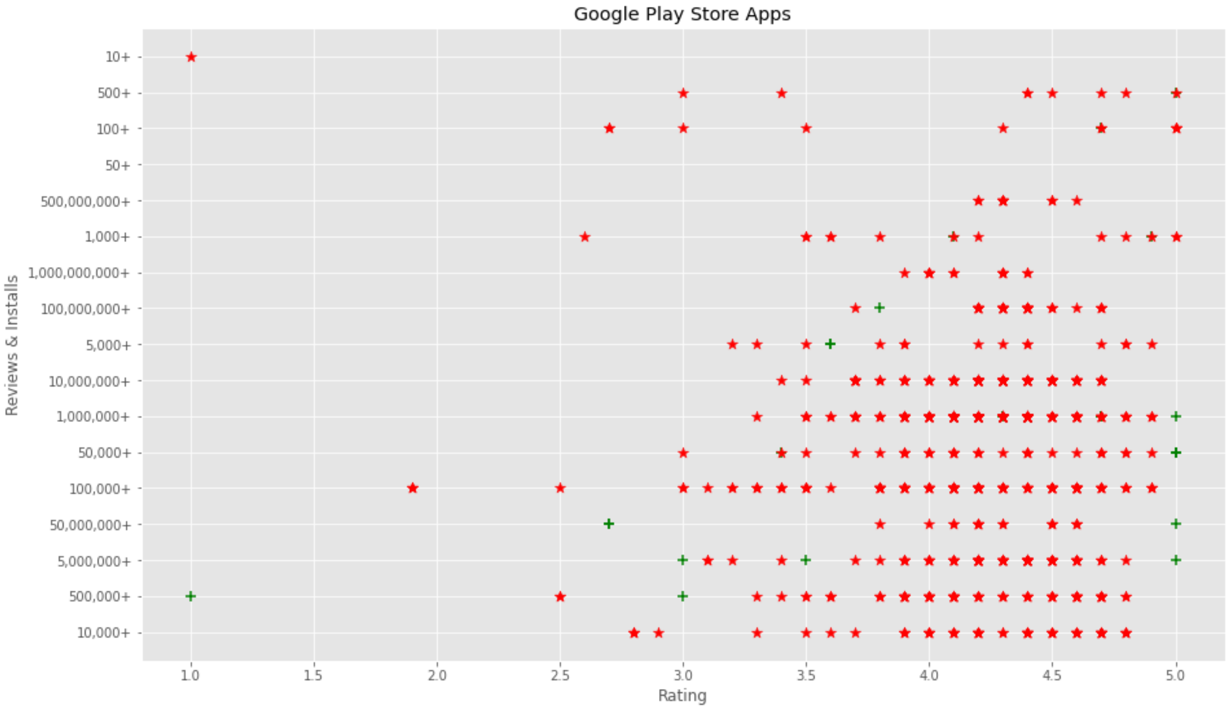


In [44]:

```
# plt.figure(figsize = (15,9))
# x = df_google_plat_store_apps['Rating']
# y = df_google_plat_store_apps['Reviews']
# plt.scatter(x,y, color = 'r',marker = '+',s = 75,linewidths = 10,alpha = 0.5
# plt.title('Google Play Store Apps',color = 'k')
# plt.xlabel('Rating')
# plt.ylabel('Reviews')
# plt.show()
```

In [45]:

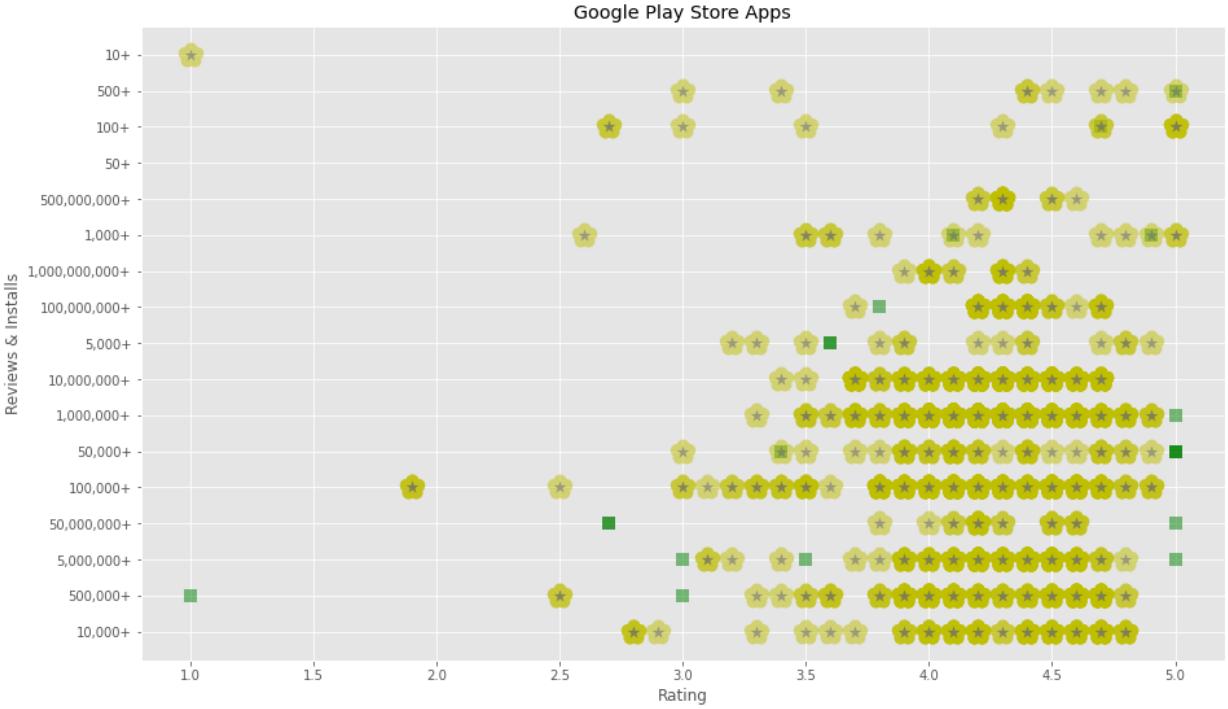
```
plt.figure(figsize = (15,9))
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
# plt.scatter(x,y, color = 'r',marker = '+',s = 75) # ,linewidths = 10,alpha =
plt.scatter(x,y,color = 'g',marker = '+',s = 75)
plt.scatter(x,df_google_plat_store_apps['Installs'],color = 'r',marker = '*',s
plt.title('Google Play Store Apps',color = 'k')
plt.xlabel('Rating')
plt.ylabel('Reviews & Installs')
plt.show()
```



In [46]:

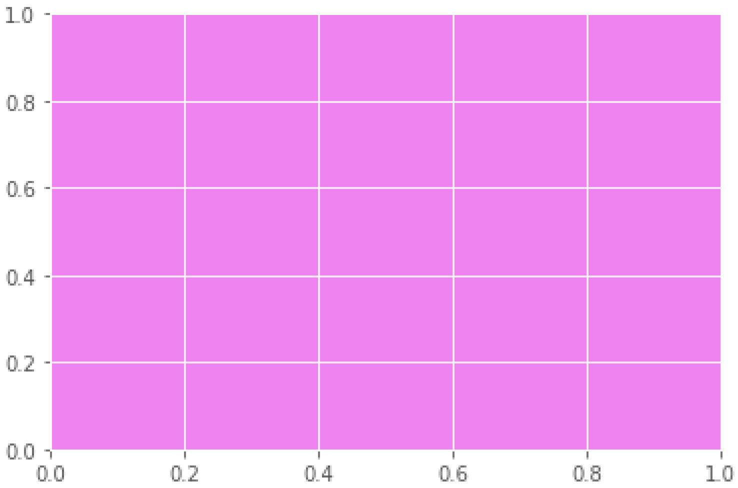
```
plt.figure(figsize = (15,9))
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
# plt.scatter(x,y, color = 'r',marker = '+',s = 75) # ,linewidths = 10,alpha =
plt.scatter(x,y,color = 'g',marker = '+',s = 100,linewidths = 10,alpha = 0.5,ed
plt.scatter(x,df_google_plat_store_apps['Installs'],color = 'b',marker = '*',s
plt.title('Google Play Store Apps',color = 'k')
plt.xlabel('Rating')
plt.ylabel('Reviews & Installs')
plt.show()
```

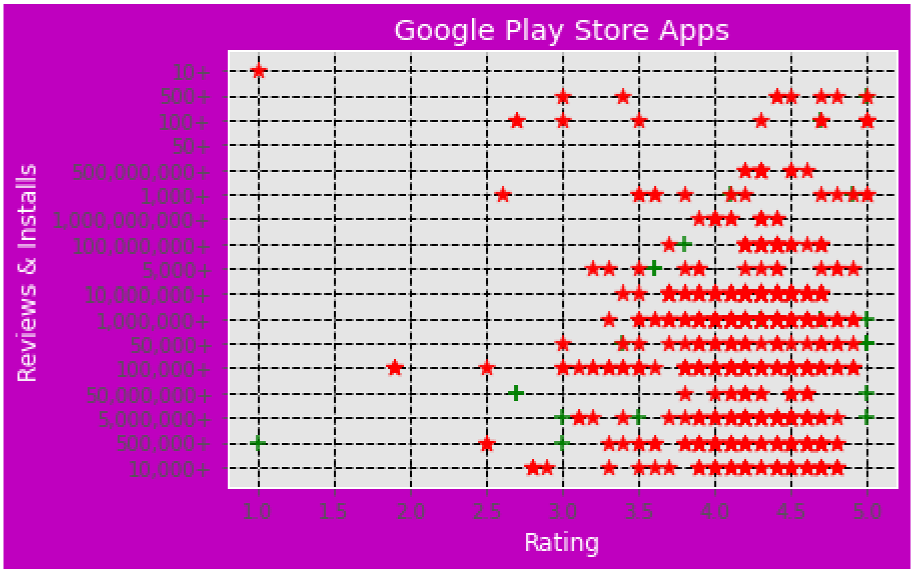
```
C:\Users\prasad jadhav\AppData\Local\Temp\ipykernel_17068\89367763.py:5: UserW
arning: You passed a edgecolor/edgecolors ('b') for an unfilled marker ('+').
Matplotlib is ignoring the edgecolor in favor of the facecolor.  This behavior
may change in the future.
  plt.scatter(x,y,color = 'g',marker = '+',s = 100,linewidths = 10,alpha = 0.
5,edgecolors = 'b')
```



In [47]:

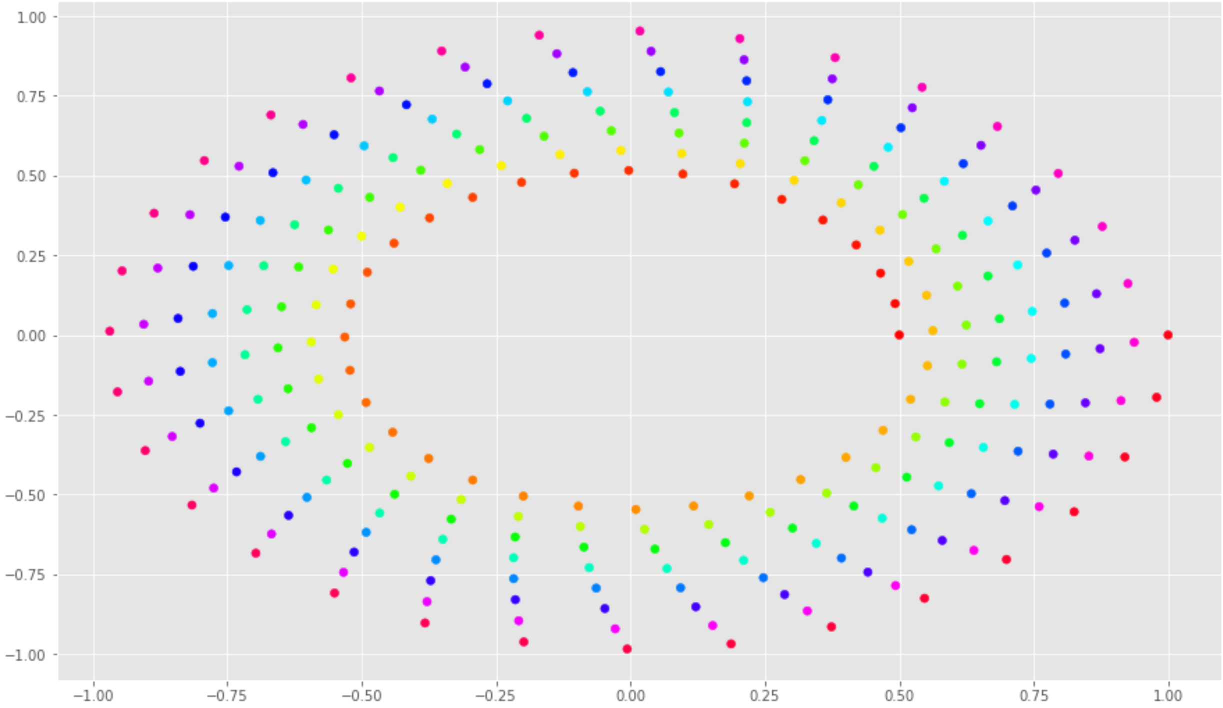
```
ax = plt.axes()
ax.set_facecolor('violet')
# plt.figure(figsize = (15,9))

plt.figure(facecolor = 'm')
x = df_google_plat_store_apps['Rating']
y = df_google_plat_store_apps['Reviews']
# plt.scatter(x,y, color = 'r',marker = '+',s = 75) # ,linewidths = 10,alpha =
plt.scatter(x,y,color = 'green',marker = '+',s = 75) # ,linewidths = 10,alpha
plt.scatter(x,df_google_plat_store_apps['Installs'],color = 'red',marker = '*'
plt.title('Google Play Store Apps',color = 'white')
plt.xlabel('Rating',color = 'white')
plt.ylabel('Reviews & Installs',color = 'white')
plt.grid(color = 'black',linestyle = '--',linewidth = 1)
plt.show()
```





In [48]:

```
import numpy as np
import matplotlib.cm as cm
import matplotlib.pyplot as plt

N = 256
angle = np.linspace(0,8 * 2 * np.pi, N)
radius = np.linspace(.5,1., N)

X = radius * np.cos(angle)
Y = radius * np.sin(angle)

plt.figure(figsize = (15,9))
plt.scatter(X,Y, c = angle, cmap = cm.hsv)
plt.show()
```



Pie Chart

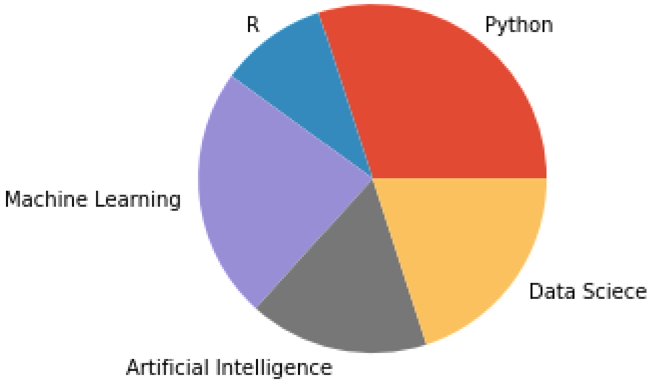
```
import matplotlib.pyplot as plt
```

In [49]:

```
```

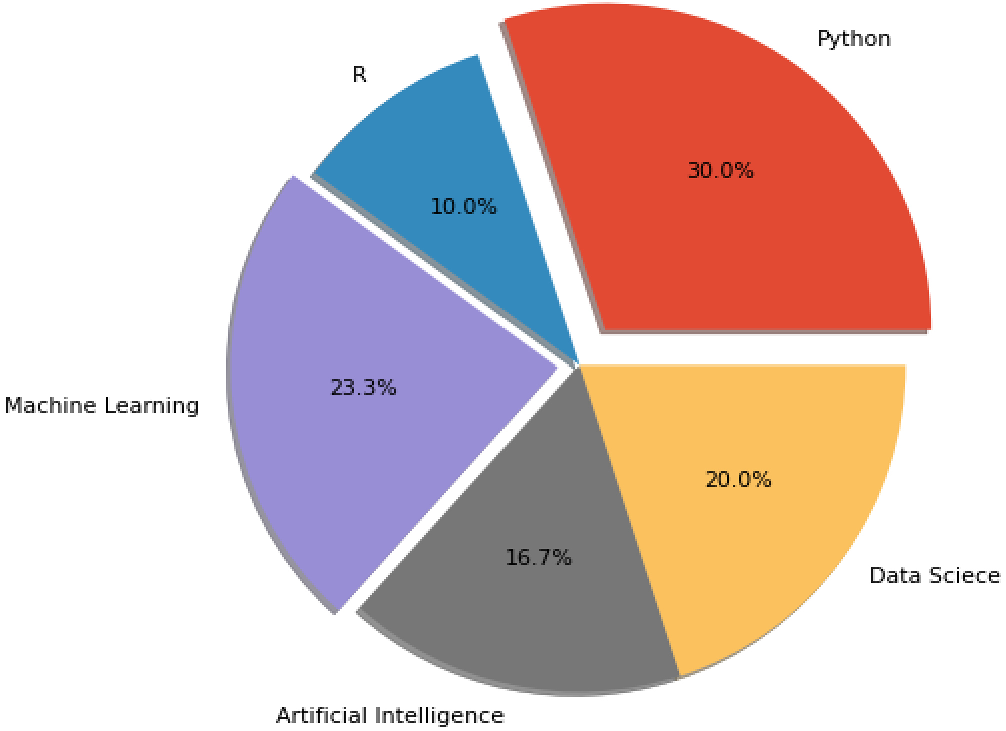
In [50]:

```
classes = ['Python','R','Machine Learning','Artificial Intelligence','Data Scie
class1_students = [45,15,35,25,30]


plt.pie(class1_students,labels = classes)
plt.show()
```



In [51]:

```
classes = ["Python", "R", "Machine Learning", "Artificial Intelligence", "Data

class1_students = [45,15,35,25,30]
explode = [0.2,0,0.1,0,0]
textprops = {"fontsize":11}
plt.figure(figsize = (5,5))
# colors = ['']

plt.pie(class1_students, labels = classes, explode = explode, autopct = "%0.1f
# plt.legend(loc = 2)
plt.show()
```



In [52]:

```
# classes = ["Python", "R", "Machine Learning", "Artificial Intelligence", "Da
#
# class1_students = [45,15,35,25,30]
# explode = [0.2,0,0.1,0,0]
# textprops = {"fontsize":11}
# plt.figure(figsize = (5,5))
# # colors = ['']
#
# wedgeprops = {'linewidth': 4,'width': 1,'edgecolor': 'k'}
# plt.pie(class1_students, labels = classes, explode = explode, autopct = "%0.
# plt.legend(loc = 2)
# plt.show()
```

In [53]:

```
# import numpy as np
# plt.figure(figsize=(7,4))
# #plt.figure(figsize=(16,9))
#
# colors = ['r','w','r','w','r','w','r','w','r','w','r','w','r','w','r','w','r
# labels = np.ones(20)
# #labels = [1.0,1.0,1.0,1.0,1.0,.........,1.0]
#
# plt.pie([1], colors="k", radius = 2.05)
# plt.pie(labels, colors=colors, radius = 2.0)
#
# plt.pie([1], colors="g", radius = 1.8)
# plt.pie([1], colors="y", radius = 1.6)
# plt.pie([1], colors="c", radius = 1.3)
# plt.pie([1], colors="b", radius = 1.1)
# plt.pie([1], colors="m", radius = 0.9)
#
# plt.pie([1], colors="b", radius = 0.31)
# plt.pie(labels, colors=colors, radius = 0.3)
#
# plt.pie([1], colors="w", radius = 0.2)
# plt.pie([1], colors="k", radius = 0.1)
#
# plt.show()
```

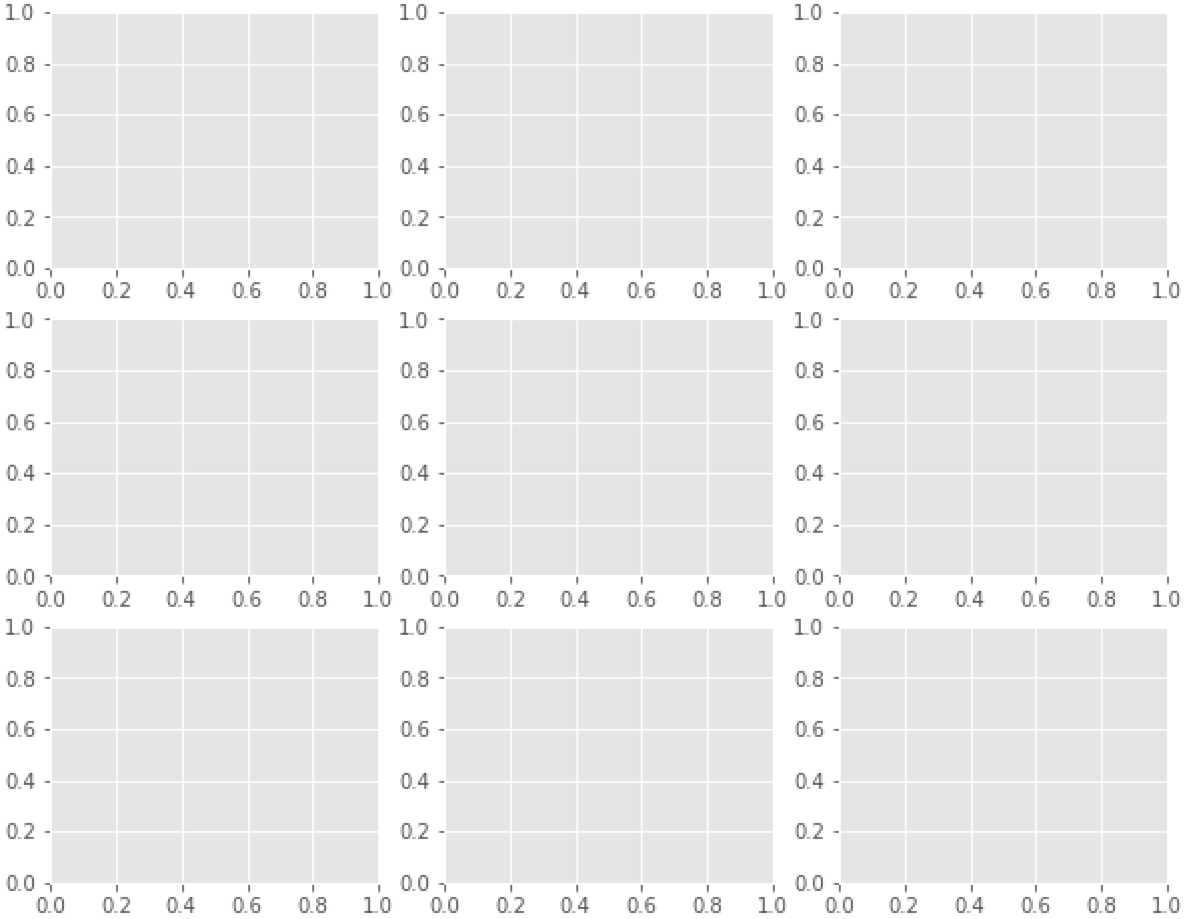
Subplot

In [54]:

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

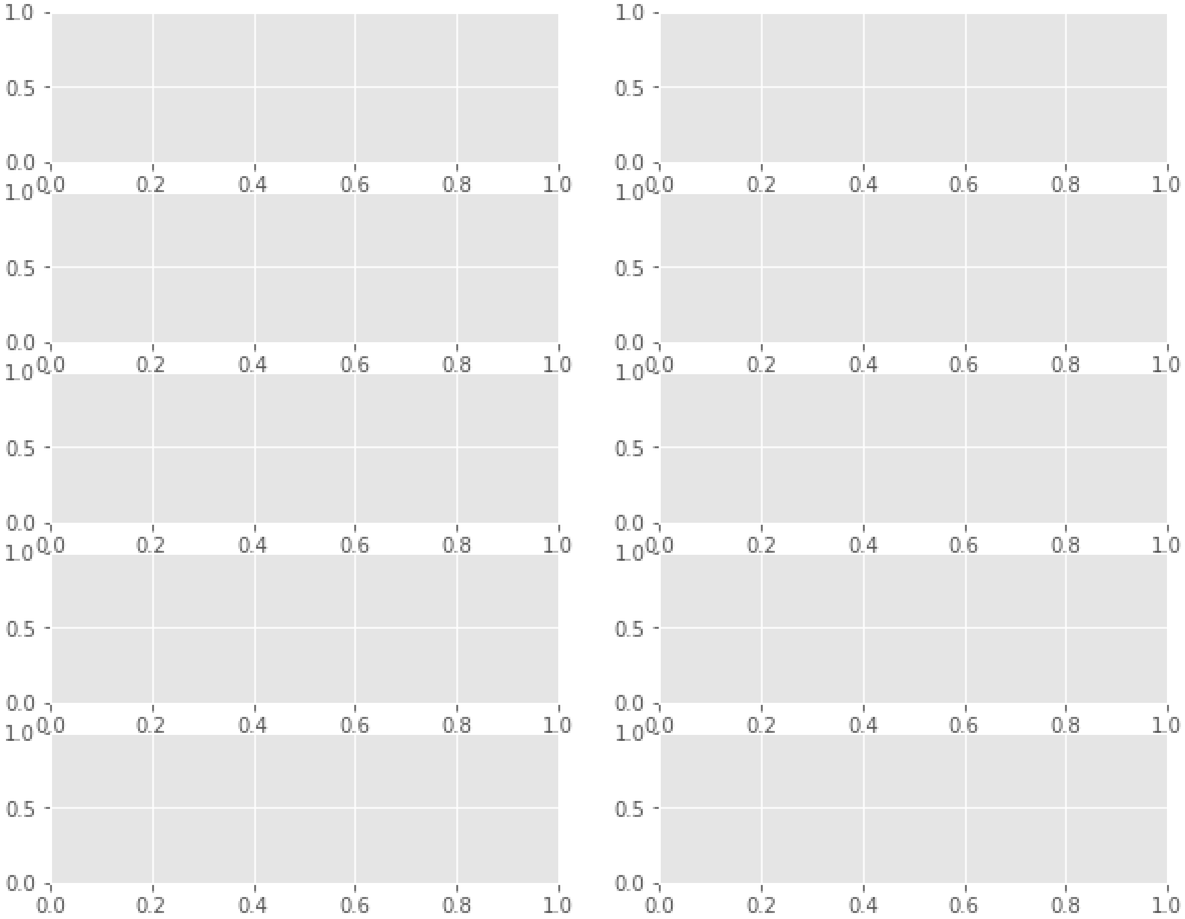
In [55]:

```
fig = plt.figure(figsize=(10,8))
a1 = fig.add_subplot(331)
a2 = fig.add_subplot(332)
a3 = fig.add_subplot(333)
a4 = fig.add_subplot(334)
a5 = fig.add_subplot(335)
a6 = fig.add_subplot(336)
a7 = fig.add_subplot(337)
a8 = fig.add_subplot(338)
a9 = fig.add_subplot(339)
```



In [56]:

```
fig = plt.figure(figsize=(10,8))
a1 = fig.add_subplot(521)
a2 = fig.add_subplot(522)
a3 = fig.add_subplot(523)
a4 = fig.add_subplot(524)
a5 = fig.add_subplot(525)
a6 = fig.add_subplot(526)
a7 = fig.add_subplot(527)
a8 = fig.add_subplot(528)
a9 = fig.add_subplot(529)
a10 = fig.add_subplot(5,2,10)
```



In [57]:

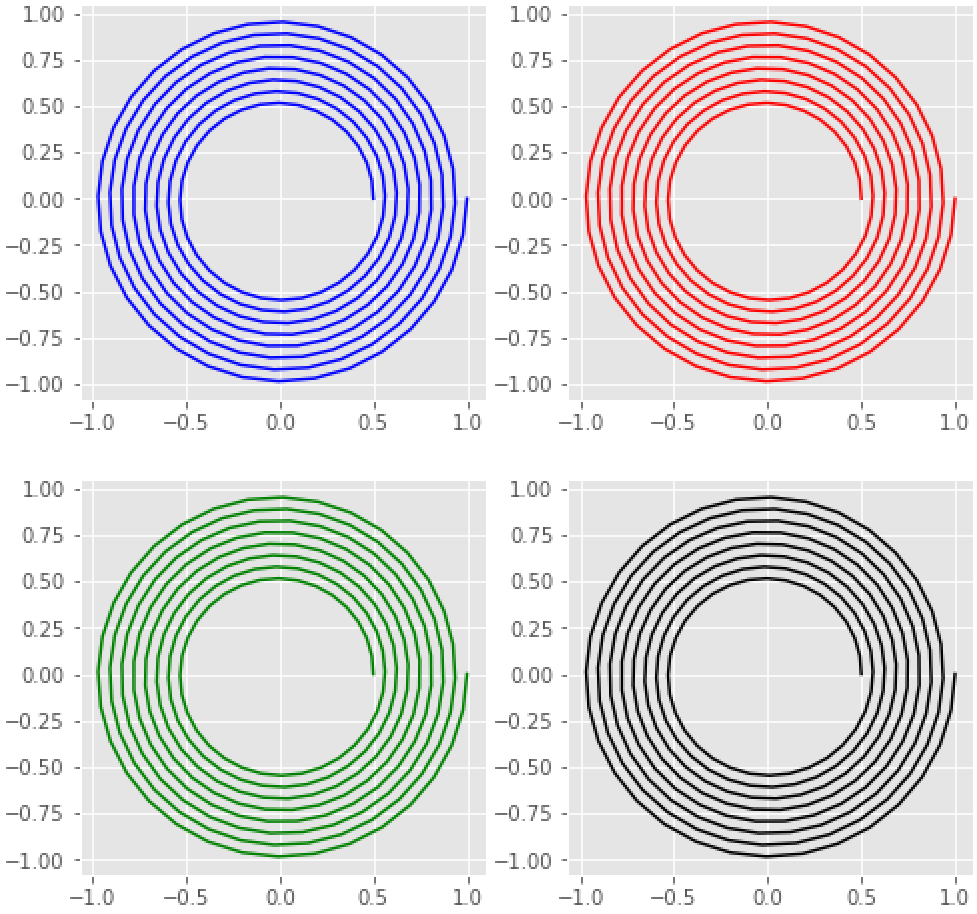
```
# x = np.array([0,1,2,3])
# y = np.array([3,8,1,10])
#
# plt.subplot(1,2,1)
# plt.plot(x,y)
#
#
# x = np.array([0,1,2,3])
# y = ([10,20,30,40])
#
# plt.subplot(1,2,2)
# plt.plot(x,y)
#
# plt.show()
```

In [58]:

```
# x = np.array([0,1,2,3])
# y = np.array([3,8,1,10])
#
# plt.subplot(2,1,1)
# plt.plot(x,y)
#
#
# x = ([0,1,2,3])
# y = ([10,20,30,40])
#
# plt.subplot(2,1,2)
# plt.plot(x,y)
#
# plt.show()
```

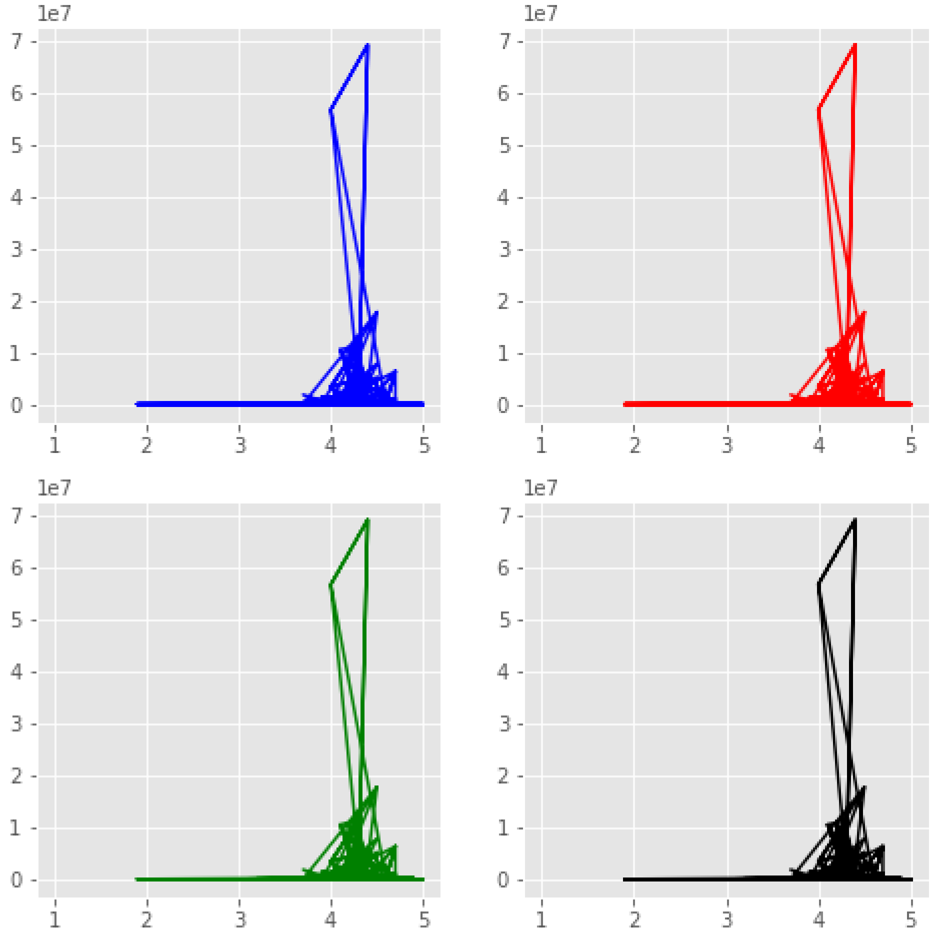
In [59]:

```
plt.figure(figsize = (8,8))

plt.subplot(2,2,1)
plt.plot(X,Y,color = 'blue')

plt.subplot(2,2,2)
plt.plot(X,Y,color = 'red')

plt.subplot(2,2,3)
plt.plot(X,Y,color = 'green')

plt.subplot(2,2,4)
plt.plot(X,Y,color = 'black')

plt.show()
```



In [60]:

```
plt.figure(figsize = (8,8))

plt.subplot(2,2,1)
plt.plot(x,y,color = 'blue')

plt.subplot(2,2,2)
plt.plot(x,y,color = 'red')

plt.subplot(2,2,3)
plt.plot(x,y,color = 'green')

plt.subplot(2,2,4)
plt.plot(x,y,color = 'black')
plt.show()
```



Save Figure

In [61]:

```
# plt.pie([40,30,20])
# plt.savefig('Pie_Chart',dpi = 100,quality = 99,facecolor = 'white')
# plt.show()
```

Image Show & Color Bar

In [62]:

```
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
```

In [63]:

```
img = mpimg.imread("pjofficial_windows11.png")
```

In [64]:

```
img
```

Out[64]:

```
array([[[0.23529412, 0.18039216, 0.8666667 , 1.        ],
        [0.23529412, 0.18039216, 0.8666667 , 1.        ],
        [0.23529412, 0.18039216, 0.8666667 , 1.        ],
        ...,
        [0.21176471, 0.08235294, 0.627451  , 1.        ],
        [0.21176471, 0.08235294, 0.627451  , 1.        ],
        [0.21176471, 0.08235294, 0.627451  , 1.        ]],

       [[0.2       , 0.14117648, 0.85490197, 1.        ],
        [0.2       , 0.14117648, 0.85490197, 1.        ],
        [0.2       , 0.14117648, 0.85490197, 1.        ],
        ...,
        [0.17254902, 0.04313726, 0.6       , 1.        ],
        [0.17254902, 0.04313726, 0.6       , 1.        ],
        [0.17254902, 0.04313726, 0.6       , 1.        ]],

       [[0.2       , 0.14117648, 0.85882354, 1.        ],
        [0.2       , 0.14117648, 0.85882354, 1.        ],
        [0.2       , 0.14117648, 0.85882354, 1.        ],
        ...,
        [0.16862746, 0.03529412, 0.60784316, 1.        ],
        [0.16862746, 0.03529412, 0.60784316, 1.        ],
        [0.16862746, 0.03529412, 0.60784316, 1.        ]],

       ...,

       [[0.04705882, 0.00392157, 0.12156863, 1.        ],
        [0.04705882, 0.00392157, 0.12156863, 1.        ],
        [0.04705882, 0.00392157, 0.12156863, 1.        ],
        ...,
        [0.08627451, 0.01568628, 0.24313726, 1.        ],
        [0.08627451, 0.01568628, 0.24313726, 1.        ],
        [0.08627451, 0.01568628, 0.24313726, 1.        ]],

       [[0.04705882, 0.00392157, 0.12156863, 1.        ],
        [0.04705882, 0.00392157, 0.12156863, 1.        ],
        [0.04705882, 0.00392157, 0.12156863, 1.        ],
        ...,
        [0.08235294, 0.01176471, 0.23921569, 1.        ],
        [0.08235294, 0.01176471, 0.23921569, 1.        ],
        [0.08235294, 0.01176471, 0.23921569, 1.        ]],

       [[0.09019608, 0.04705882, 0.16470589, 1.        ],
        [0.09019608, 0.04705882, 0.16470589, 1.        ],
        [0.09019608, 0.04705882, 0.16470589, 1.        ],
        ...,
        [0.1254902 , 0.05490196, 0.28235295, 1.        ],
        [0.1254902 , 0.05490196, 0.28235295, 1.        ],
        [0.1254902 , 0.05490196, 0.28235295, 1.        ]]], dtype=float32)
```

In [65]:

```
type(img)
```

Out[65]:

```
numpy.ndarray
```

In [66]:

```
img.shape
```

Out[66]:

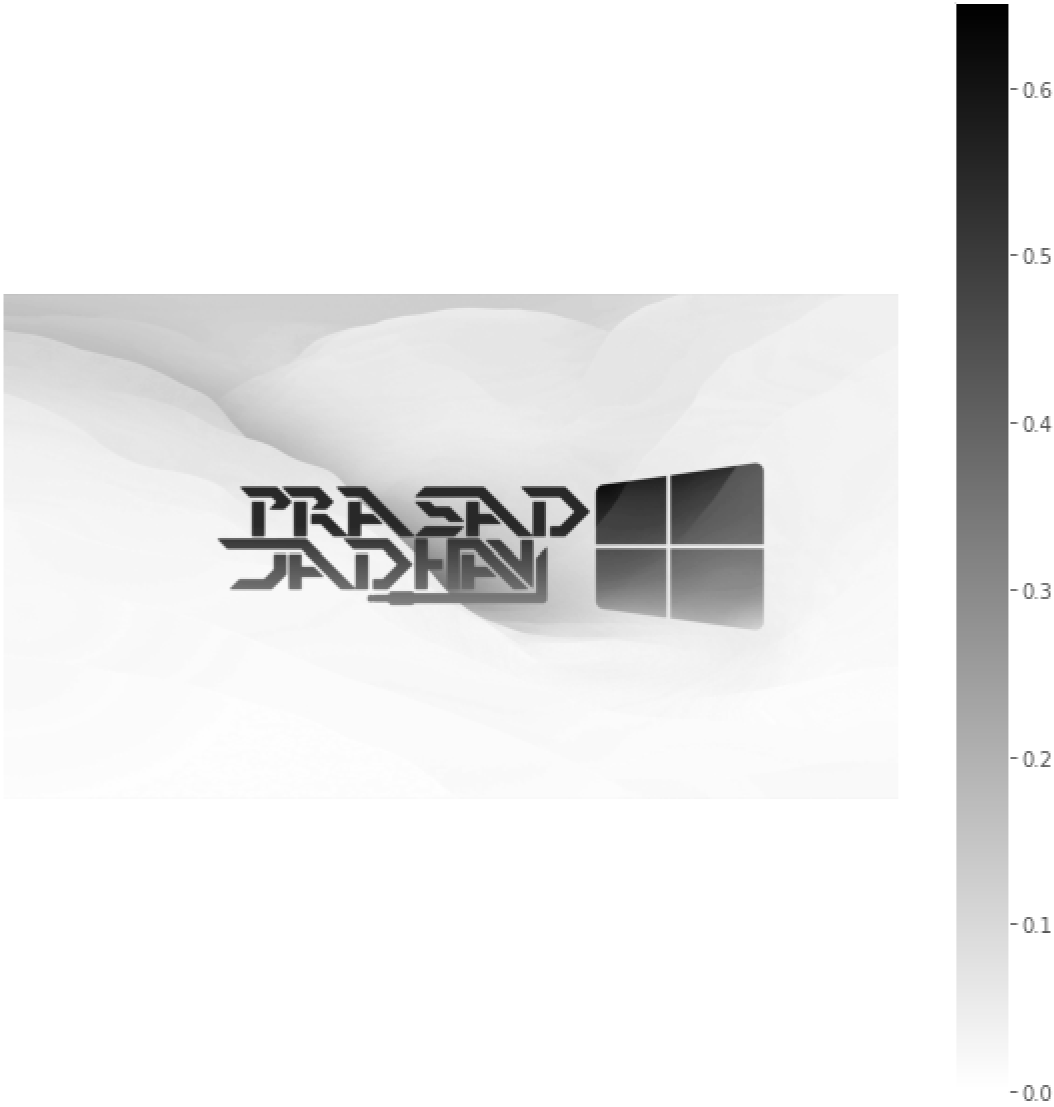
```
(1836, 3264, 4)
```

In [67]:

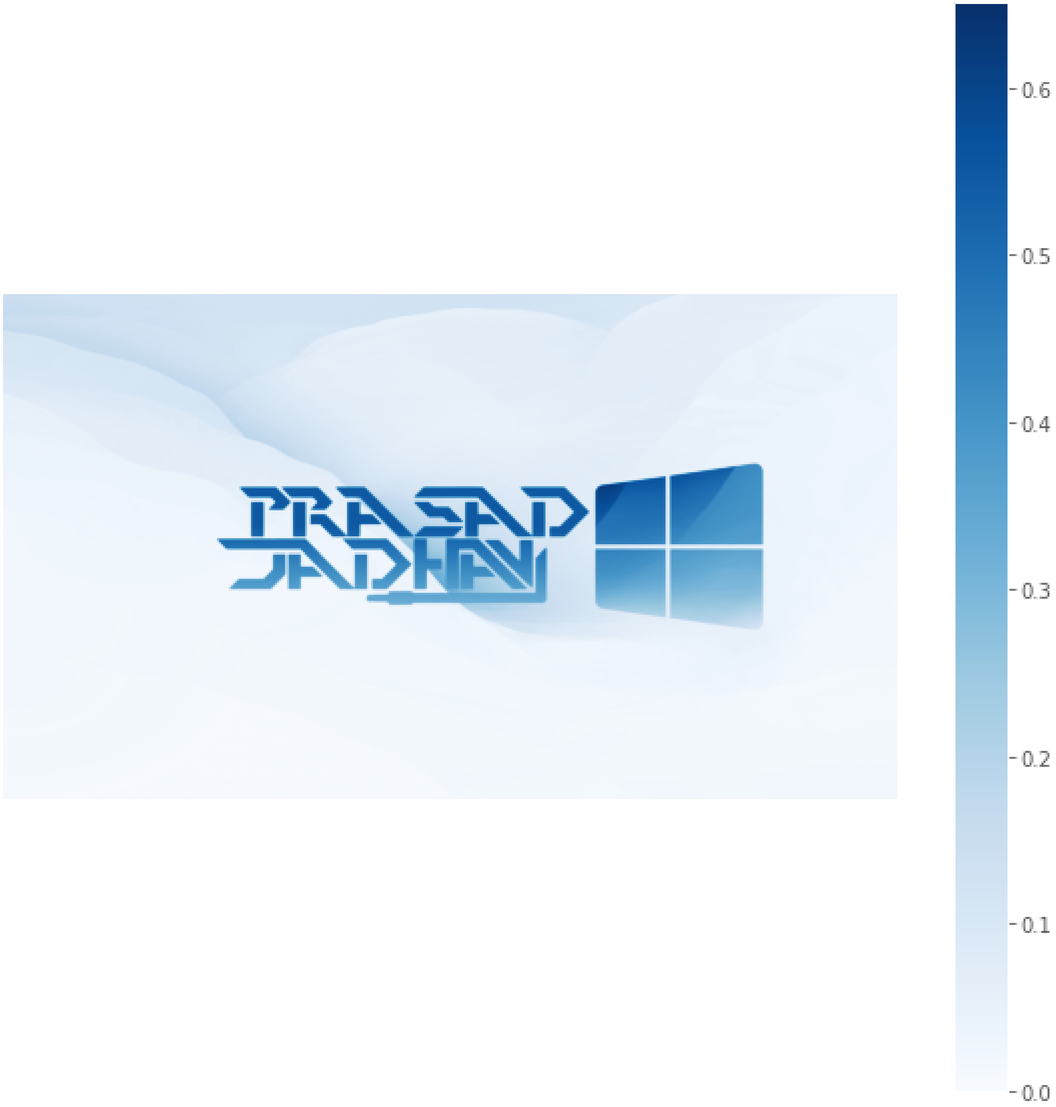
```
img.ndim
```

Out[67]:
```
3
```

In [68]:
```
single_channel = img[:,:,1]
plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel, cmap = "binary")
plt.colorbar()
plt.show()
```

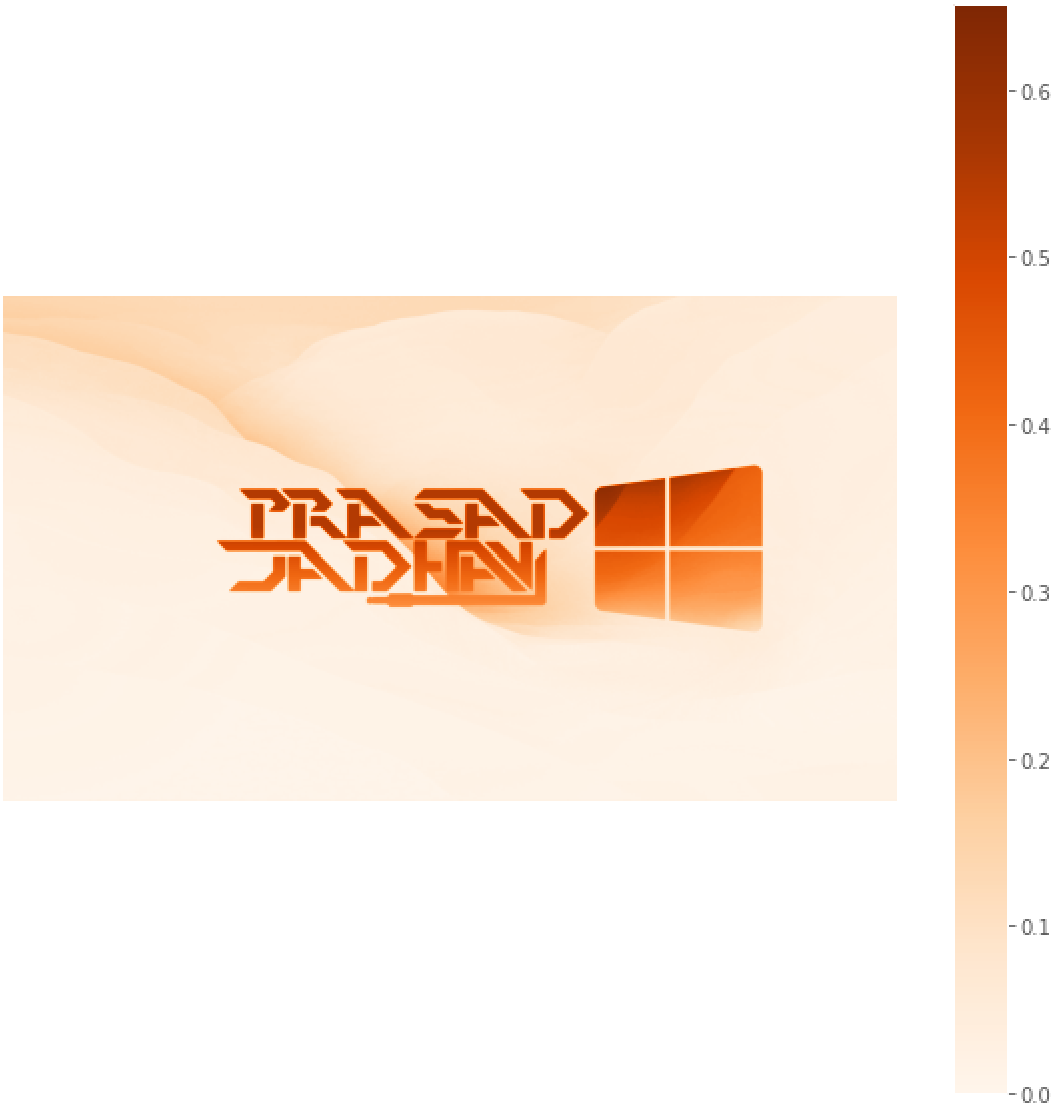


In [69]:
```
single_channel1 = img[:,:,1]
plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel1, cmap = "Blues")
plt.colorbar()
plt.show()
```



In [70]:

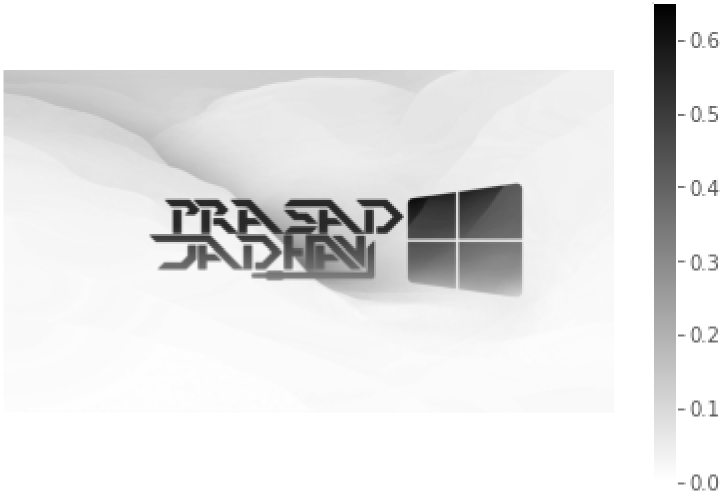
```
single_channel2 = img[:,:,1]
plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel2, cmap = "Oranges")
plt.colorbar()
plt.show()
```

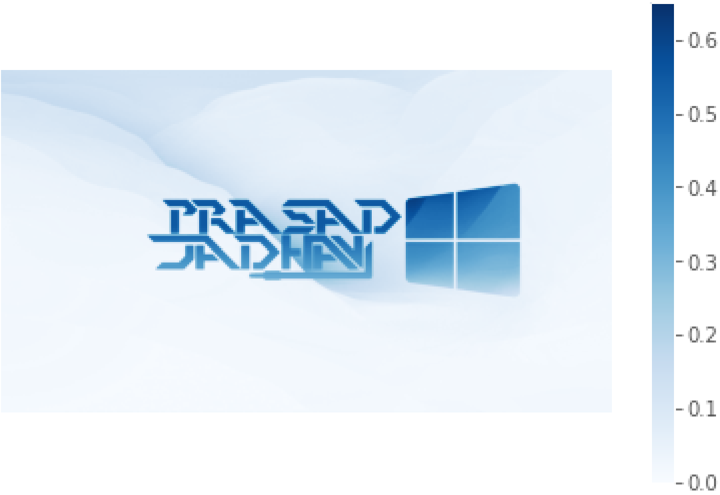


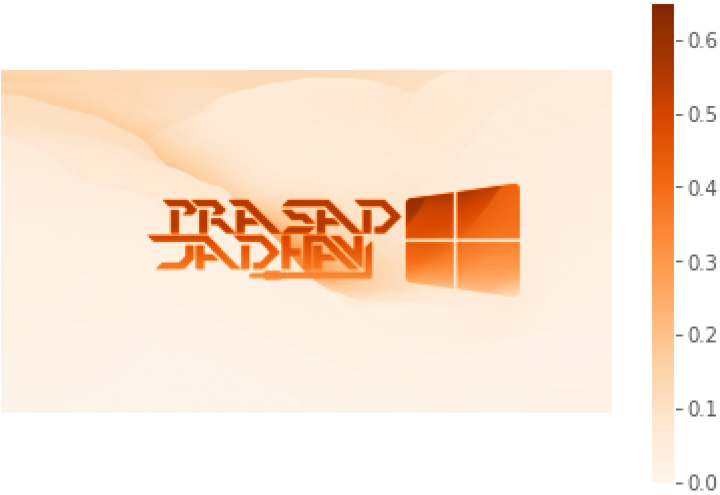
In [71]:

```
plt.figure(figsize = (15,15))
plt.subplot(321)
img = mpimg.imread("pjofficial_windows11.png")
img
single_channel = img[:,:,1]
#plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel, cmap = "binary")
plt.colorbar()
plt.show()

plt.figure(figsize = (15,15))
plt.subplot(322)
img1 = mpimg.imread("pjofficial_windows11.png")
img1
single_channel1 = img[:,:,1]
#plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel1, cmap = "Blues")
plt.colorbar()
plt.show()

plt.figure(figsize = (15,15))
plt.subplot(323)
```

```
img2 = mpimg.imread("pjofficial_windows11.png")
img2
single_channel2 = img[:,:,1]
#plt.figure(figsize = (10,10))
plt.axis("off")
plt.imshow(single_channel2, cmap = "Oranges")
plt.colorbar()
plt.show()

plt.show()
```







CampusX

In [72]:

```python
import matplotlib.pyplot as plt
# from matplotlib import style
%matplotlib inline
```

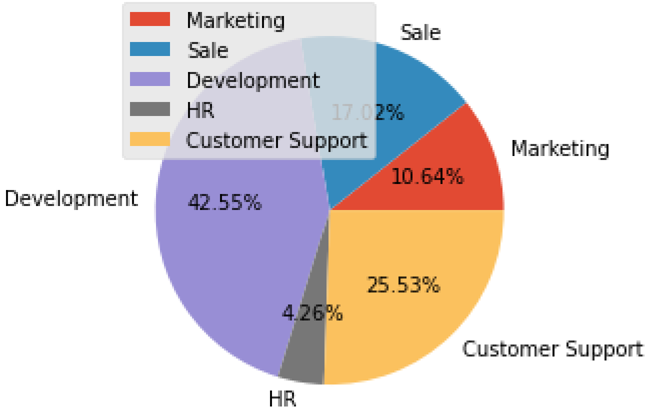
Pie Chart

In [73]:

```python
areas = ['Marketing','Sale','Development','HR','Customer Support']
budget = [2.5,4,10,1,6]
```

In [74]:

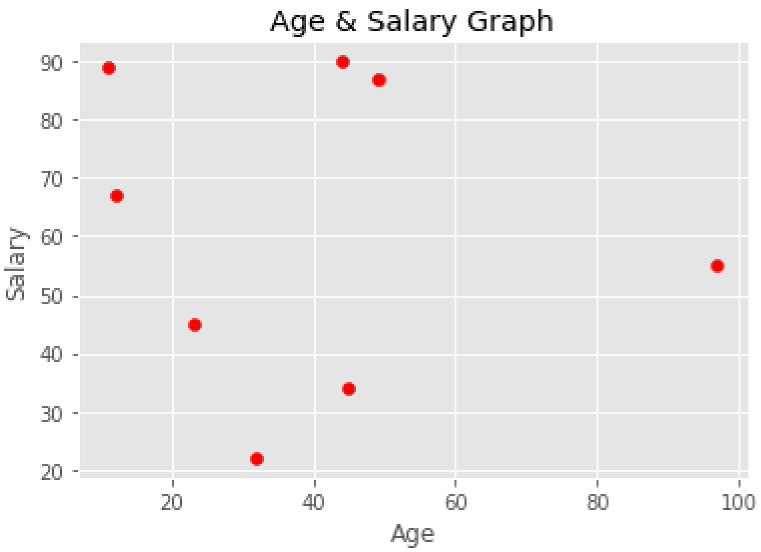
```python
plt.pie(budget,labels = areas,autopct = '%0.2f%%')
plt.legend(loc = 2)
plt.show()
```



Scatter Plot

In [75]:

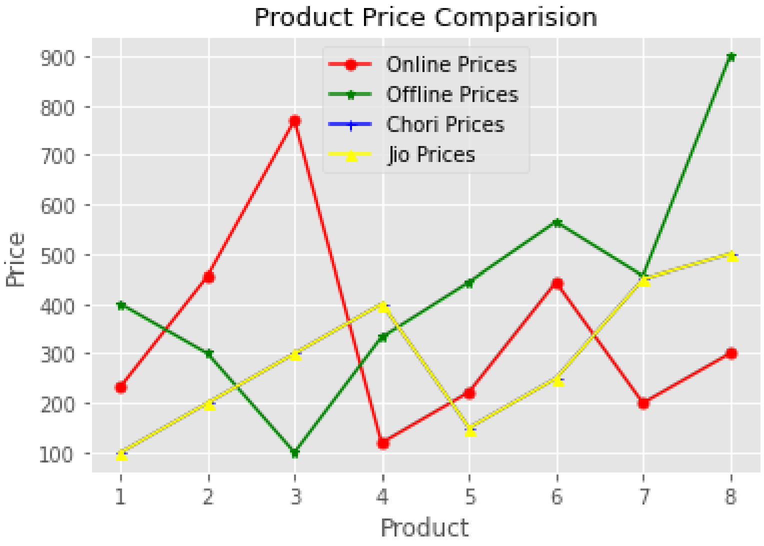
```python
x = [23,45,12,49,97,32,11,44]
y = [45,34,67,87,55,22,89,90]

plt.scatter(x,y,color = 'r')
plt.title('Age & Salary Graph')
plt.xlabel('Age')
plt.ylabel('Salary')
plt.show()
```



2D Plot

In [76]:
```
product_id = [1,2,3,4,5,6,7,8]
online_price = [233,456,770,120,222,444,200,300]
offline_price = [400,300,100,333,444,565,456,899]
chor_bazaar = [100,200,300,400,150,250,450,500]
jio_mart = [100,198,225,319,429,99,25,11]
```

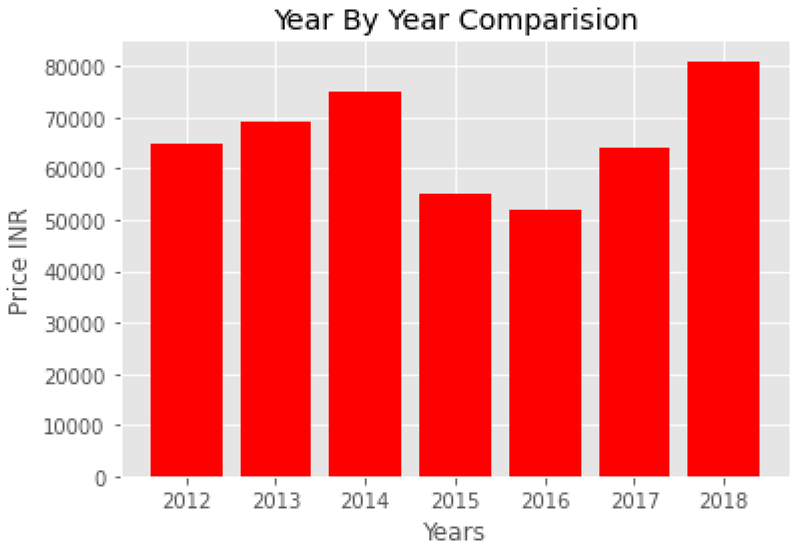
In [77]:
```
plt.plot(product_id,online_price,color = 'red',marker = 'o',markersize = 5,labe
plt.plot(product_id,offline_price,color = 'green',marker = '*',markersize = 5,l
plt.plot(product_id,chor_bazaar,color = 'blue',marker = '+',markersize = 5,labe
plt.plot(product_id,chor_bazaar,color = 'yellow',marker = '^',markersize = 5,la

plt.title('Product Price Comparision',fontsize = 13)
plt.xlabel('Product')
plt.ylabel('Price')
plt.legend(loc = 0)
plt.show()
```



Bar Graph

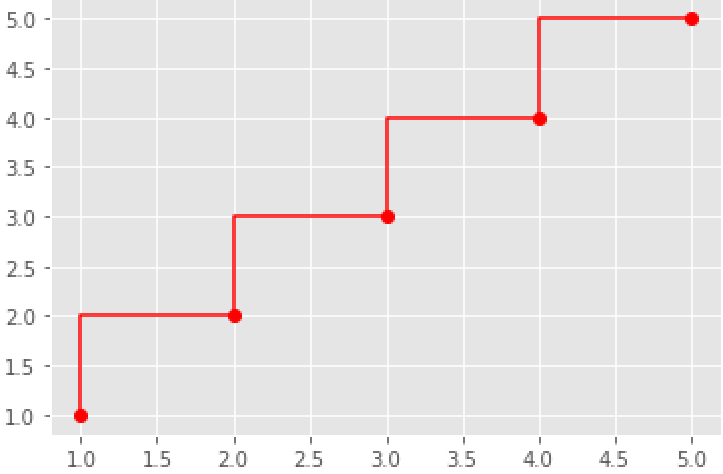
In [78]:
```
year = [2012,2013,2014,2015,2016,2017,2018]
```

```
price = [65000,69000,75000,55000,52000,64000,81000]

plt.bar(year,price,color = 'red')
plt.title('Year By Year Comparision')
plt.xlabel('Years')
plt.ylabel('Price INR')
plt.show()
```



Step Plot

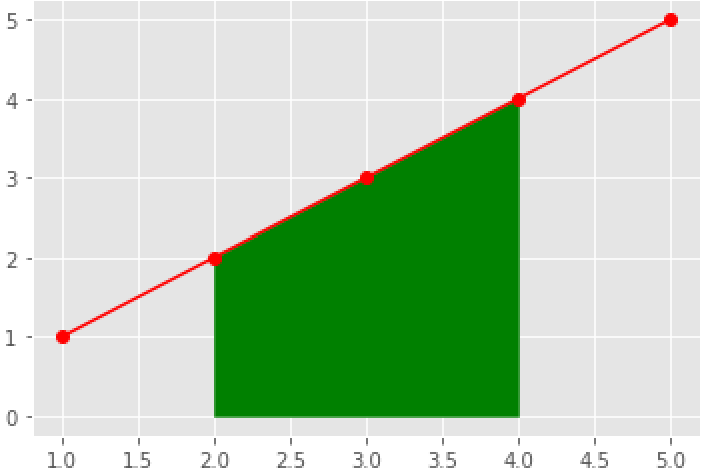
In [79]:
```
x = [1,2,3,4,5]
y = [1,2,3,4,5]

plt.step(x,y,color = 'red',marker = 'o')

plt.show()
```



Fill Between

In [80]:
```
import numpy as np

x = np.array([1,2,3,4,5])
y = np.array([1,2,3,4,5])
```

```
plt.plot(x,y,color = 'red',marker = 'o')

plt.fill_between(x,y,color = 'green',where = (x>=2) & (x<=4))

plt.show()
```



3D Plot

In [1]:

```
import ipywidgets as widgets
from mpl_toolkits import mplot3d
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:

```
def theta(t):
    fig = plt.figure(figsize = (10,15))
    ax = plt.axes(projection = '3d')
    z = np.linspace(0,t,500)
    x = np.sin(z)
    y = np.cos(z)
    ax.plot3D(x,y,z,color = 'red')
    plt.show()
widgets.interact(theta,t = widgets.Play(min = 0,max = 15))
plt.show()
```

```
interactive(children=(Play(value=0, description='t', max=15), Output()), _dom_
classes=('widget-interact',))
```

Thank You

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