Setup libraries

```
In [2]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import plotly.plotly as pl
        import plotly.offline as of
        import cufflinks as cf
        import datetime as dt
        %matplotlib inline
```

```
In [3]: of.init_notebook_mode(connected = True)
        cf.go_offline()
```

Load Datafiles

```
In [4]: donations = pd.read_csv('Donations.csv')
```

```
In [5]: donors = pd.read_csv('Donors.csv')
```

```
/anaconda3/lib/python3.7/site-packages/IPython/core/interactiveshell.py:3049: DtypeWarning:

Columns (4) have mixed types. Specify dtype option on import or set low_memory=False.
```

```
In [6]: projects = pd.read_csv('Projects.csv')
```

```
In [7]: resources = pd.read_csv('Resources.csv')
```

```
In [8]: schools = pd.read_csv('Schools.csv')
```

```
In [9]: teachers = pd.read_csv('Teachers.csv')
```

Describe and show data for column ideas

```
In [10]: print('Shape of donations dataframe is:' , donations.shape)
         print('Shape of donors dataframe is:' , donors.shape)
         print('Shape of projects dataframe is:' , projects.shape)
         print('Shape of resources dataframe is:' , resources.shape)
         print('Shape of schools dataframe is:' , schools.shape)
         print('Shape of teachers dataframe is:' , teachers.shape)
```

```
Shape of donations dataframe is: (4687884, 7)
Shape of donors dataframe is: (2122640, 5)
Shape of projects dataframe is: (1110017, 18)
Shape of resources dataframe is: (7210448, 5)
Shape of schools dataframe is: (72993, 9)
Shape of teachers dataframe is: (402900, 3)
```

```
In [11]: donations.head()
```

Out[11]:

	Project ID	Donation ID	Donor ID	Donation Included Optional Donation	Donation Amount	Donor Cart Sequence	Donation Received Date
0	000009891526c0ade7180f8423792063	688729120858666221208529ee3fc18e	1f4b5b6e68445c6c4a0509b3aca93f38	No	178.37	11	2016-08-23 13:15:57
1	000009891526c0ade7180f8423792063	dcf1071da3aa3561f91ac689d1f73dee	4aaab6d244bf3599682239ed5591af8a	Yes	25.00	2	2016-06-06 20:05:23
2	000009891526c0ade7180f8423792063	18a234b9d1e538c431761d521ea7799d	0b0765dc9c759adc48a07688ba25e94e	Yes	20.00	3	2016-06-06 14:08:46
3	000009891526c0ade7180f8423792063	38d2744bf9138b0b57ed581c76c0e2da	377944ad61f72d800b25ec1862aec363	Yes	25.00	1	2016-05-15 10:23:04
4	000009891526c0ade7180f8423792063	5a032791e31167a70206bfb86fb60035	6d5b22d39e68c656071a842732c63a0c	Yes	25.00	2	2016-05-17 01:23:38

In [12]:
```
donors.head()
```

Out[12]:

	Donor ID	Donor City	Donor State	Donor Is Teacher	Donor Zip
0	00000ce845c00cbf0686c992fc369df4	Evanston	Illinois	No	602
1	00002783bc5d108510f3f9666c8b1edd	Appomattox	other	No	245
2	00002d44003ed46b066607c5455a999a	Winton	California	Yes	953
3	00002eb25d60a09c318efbd0797bffb5	Indianapolis	Indiana	No	462
4	0000300773fe015f870914b42528541b	Paterson	New Jersey	No	075

In [13]:
```
projects.head()
```

Out[13]:

	Project ID	School ID	Teacher ID	Teacher Project Posted Sequence	Project Type	Project Title	Project Essay	Desc
0	7685f0265a19d7b52a470ee4bac883ba	e180c7424cb9c68cb49f141b092a988f	4ee5200e89d9e2998ec8baad8a3c5968	25	Teacher-Led	Stand Up to Bullying: Together We Can!	Did you know that 1-7 students in grades K-12 ...	know 7 s in gra
1	f9f4af7099061fb4bf44642a03e5c331	08b20f1e2125103ed7aa17e8d76c71d4	cca2d1d277fb4adb50147b49cdc3b156	3	Teacher-Led	Learning in Color!	Help us have a fun, interactive listening cent...	hav inte li
2	afd99a01739ad5557b51b1ba0174e832	1287f5128b1f36bf8434e5705a7cc04d	6c5bd0d4f20547a001628aefd71de89e	1	Teacher-Led	Help Second Grade ESL Students Develop Languag...	Visiting or moving to a new place can be very ...	Vis mov ne can
3	c614a38bb1a5e68e2ae6ad9d94bb2492	900fec9cd7a3188acbc90586a09584ef	8ed6f8181d092a8f4c008b18d18e54ad	40	Teacher-Led	Help Bilingual Students Strengthen Reading Com...	Students at our school are still working hard ...	Stuc our
4	ec82a697fab916c0db0cdad746338df9	3b200e7fe3e6dde3c169c02e5fb5ae86	893173d62775f8be7c30bf4220ad0c33	2	Teacher-Led	Help Us Make Each Minute Count!	"Idle hands" were something that Issac Watts s...	"Idle sor tha W

In [14]:
```
resources.head()
```

Out[14]:

	Project ID	Resource Item Name	Resource Quantity	Resource Unit Price	Resource Vendor Name
0	000009891526c0ade7180f8423792063	chair move and store cart	1.0	350.00	NaN
1	00000ce845c00cbf0686c992fc369df4	sony mdr zx100 blk headphones	40.0	12.86	CDW-G
2	00002d44003ed46b066607c5455a999a	gaiam kids stay-n-play balance ball, grey	4.0	19.00	Amazon Business
3	00002d44003ed46b066607c5455a999a	cf520x - giant comfy pillows - set of 4	1.0	269.00	Lakeshore Learning Materials
4	00002d44003ed46b066607c5455a999a	serta lounger, mini, sky blue	1.0	131.85	Amazon Business

In [15]:
```
schools.head()
```

Out[15]:

	School ID	School Name	School Metro Type	School Percentage Free Lunch	School State	School Zip	School City	School County	School District
0	00003e0fdd601b8ea0a6eb44057b9c5e	Capon Bridge Middle School	rural	56.0	West Virginia	26711	Capon Bridge	Hampshire	Hampshire Co School District
1	00004e32a448b4832e1b993500bf0731	The Woodlands College Park High School	urban	41.0	Texas	77384	The Woodlands	Montgomery	Conroe Ind School District
2	0002021bb799f28de224f1acc1ff08c4	Samantha Smith Elementary School	suburban	2.0	Washington	98074	Sammamish	King	Lake Washington Sch Dist 414
3	0004604f675212a8cac1161338265196	Kingsbury Country Day School	unknown	76.0	Michigan	48370	Oxford	Oakland	Michigan Dept Of Education
4	0004c9d50bcf0cea990f844e58b5e2c3	Redwater Elementary School	rural	50.0	Texas	75573	Redwater	Bowie	Redwater Ind Sch District

In [16]:

```
teachers.head()
```

Out[16]:

	Teacher ID	Teacher Prefix	Teacher First Project Posted Date
0	00000f7264c27ba6fea0c837ed6aa0aa	Mrs.	2013-08-21
1	00002d44003ed46b066607c5455a999a	Mrs.	2016-10-23
2	00006084c3d92d904a22e0a70f5c119a	Mr.	2016-09-08
3	0000a9af8b6b9cc9e41f53322a8b8cf1	Ms.	2015-10-25
4	0000d4777d14b33a1406dd6c9019fe89	Ms.	2017-02-10

In [17]:

```
donations.describe()
```

Out[17]:

	Donation Amount	Donor Cart Sequence
count	4.687884e+06	4.687884e+06
mean	6.066879e+01	1.430545e+02
std	1.668996e+02	8.723086e+02
min	1.000000e-02	1.000000e+00
25%	1.482000e+01	1.000000e+00
50%	2.500000e+01	2.000000e+00
75%	5.000000e+01	1.200000e+01
max	6.000000e+04	1.811600e+04

In [18]:

```
donors.describe()
```

Out[18]:

	Donor ID	Donor City	Donor State	Donor Is Teacher	Donor Zip
count	2122640	1909543	2122640	2122640	1942580
unique	2122640	15204	52	2	1934
top	b3cef1ca2a1ebf1cacabe0ed8fe24d2c	Chicago	California	No	606
freq	1	34352	294695	1910355	34628

In [19]:

```
projects.describe()
```

Out[19]:

	Teacher Project Posted Sequence	Project Cost
count	1.110017e+06	1.110017e+06
mean	1.124050e+01	7.415240e+02
std	2.595475e+01	1.083256e+03
min	1.000000e+00	3.529000e+01
25%	1.000000e+00	3.351200e+02
50%	3.000000e+00	5.153500e+02
75%	9.000000e+00	8.675200e+02
max	4.970000e+02	2.557377e+05

In [20]:

```
resources.describe()
```

Out[20]:

	Resource Quantity	Resource Unit Price
count	7.186149e+06	7.186138e+06
mean	2.816518e+00	5.341337e+01
std	8.866547e+00	1.863248e+02
min	0.000000e+00	0.000000e+00
25%	1.000000e+00	7.260000e+00
50%	1.000000e+00	1.439000e+01
75%	2.000000e+00	3.640000e+01
max	4.125000e+03	9.708550e+04

```
In [21]: schools.describe()
```

Out[21]:

	School Percentage Free Lunch	School Zip
count	71852.000000	72993.000000
mean	58.556115	53382.093406
std	25.508378	29131.096568
min	0.000000	705.000000
25%	40.000000	29554.000000
50%	61.000000	53095.000000
75%	80.000000	78572.000000
max	100.000000	99950.000000

```
In [22]: teachers.describe()
```

Out[22]:

	Teacher ID	Teacher Prefix	Teacher First Project Posted Date
count	402900	402872	402900
unique	402900	6	4699
top	9f53c298ed4059df5d3fa609d4a6b384	Mrs.	2015-09-13
freq	1	202142	2067

Create new data by using the datasets

```
In [23]: data = pd.merge(donations , projects , how='inner' , on = 'Project ID')
```

```
In [24]: data2 = pd.merge(data , donors , how='inner' , on='Donor ID')
```

```
In [32]: data3 = pd.merge(data2 , schools , how='inner' , on='School ID')
```

```
In [27]: data4 = pd.merge(data3, teachers , how='inner' , on='Teacher ID')
```

```
In [28]: data4.head()
```

Out[28]:

	Project ID	Donation ID	Donor ID	Donation Included Optional Donation	Donation Amount	Donor Cart Sequence	Donation Received Date	
0	000009891526c0ade7180f8423792063	688729120858666221208529ee3fc18e	1f4b5b6e68445c6c4a0509b3aca93f38	No	178.37	11	2016-08-23 13:15:57	5aa86a
1	3cd4f1c5cfa0d495dadfead3153c936d	21aaadfba0becc3f052decf88cd31a75	1f4b5b6e68445c6c4a0509b3aca93f38	No	148.29	25	2017-03-30 01:34:18	5aa86a
2	8d9e1ec79b729185b7c61c6b57710b0d	1e20c3d1bce4a3def3a454868d29af30	1f4b5b6e68445c6c4a0509b3aca93f38	No	88.28	46	2017-10-19 17:59:52	5aa86a
3	9c5e7c5dd9a279e24147f101588c30fa	a2f24f363db1c03284a08ec1a863e467	1f4b5b6e68445c6c4a0509b3aca93f38	No	305.69	71	2018-01-25 17:01:41	5aa86a
4	b27c621c6cf61afa61e3a612193a11b2	821c83c092f4a97e416ced7747dde16c	1f4b5b6e68445c6c4a0509b3aca93f38	No	290.33	22	2016-12-22 15:51:26	5aa86a

5 rows × 38 columns

In [29]:

```
a = data4.columns.values.tolist()
a
```

Out[29]:

```
['Project ID',
 'Donation ID',
 'Donor ID',
 'Donation Included Optional Donation',
 'Donation Amount',
 'Donor Cart Sequence',
 'Donation Received Date',
 'School ID',
 'Teacher ID',
 'Teacher Project Posted Sequence',
 'Project Type',
 'Project Title',
 'Project Essay',
 'Project Short Description',
 'Project Need Statement',
 'Project Subject Category Tree',
 'Project Subject Subcategory Tree',
 'Project Grade Level Category',
 'Project Resource Category',
 'Project Cost',
 'Project Posted Date',
 'Project Expiration Date',
 'Project Current Status',
 'Project Fully Funded Date',
 'Donor City',
 'Donor State',
 'Donor Is Teacher',
 'Donor Zip',
 'School Name',
 'School Metro Type',
 'School Percentage Free Lunch',
 'School State',
 'School Zip',
 'School City',
 'School County',
 'School District',
 'Teacher Prefix',
 'Teacher First Project Posted Date']
```

Which 10 states have the most number of schools that opened projects to gather donations ? Plot the data using bar plot.

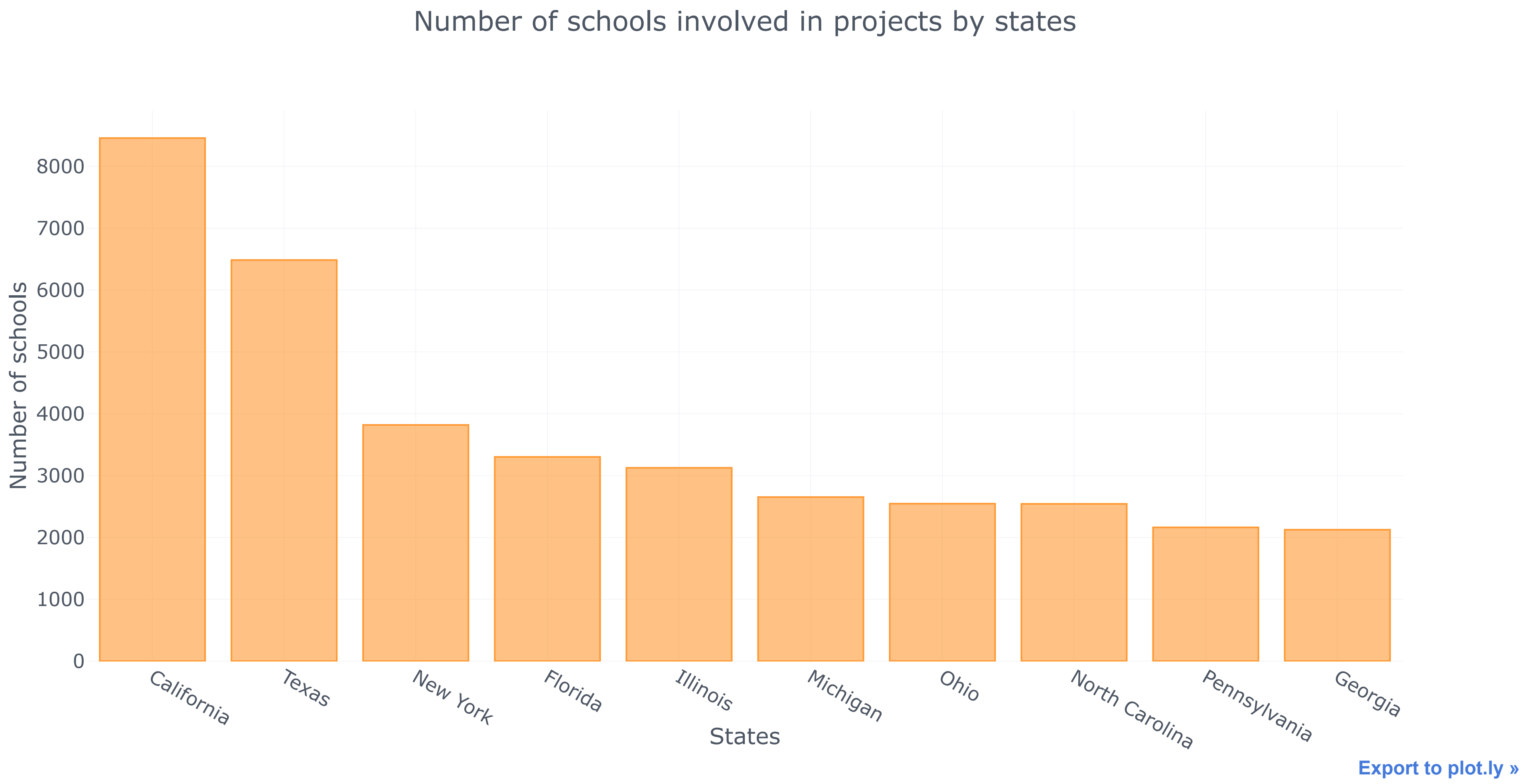
In [30]:

```
s = schools['School State'].value_counts().sort_values(ascending = False).head(10)
s
```

Out[30]:

```
California        8457
Texas             6485
New York          3819
Florida           3302
Illinois          3126
Michigan          2653
Ohio              2546
North Carolina    2543
Pennsylvania      2163
Georgia           2125
Name: School State, dtype: int64
```

```
In [31]: s.iplot(kind='bar' , xTitle='States' , yTitle='Number of schools' , title='Number of schools involved in projects by states')
```

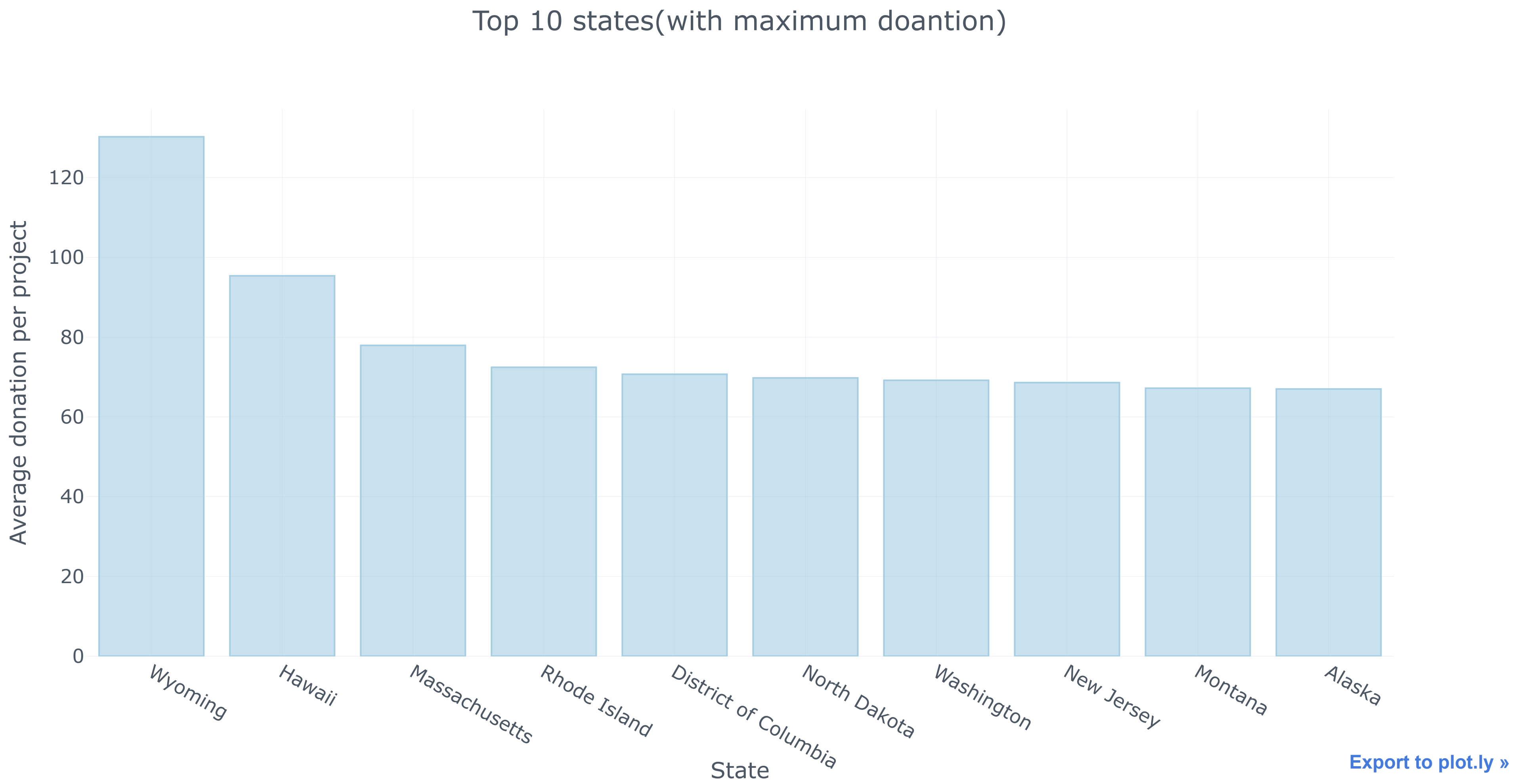


What are the top 10 states in which schools gathered most amount of AVERAGE donations for their projects ?

```
In [33]: s2 = data4.groupby('School State')['Donation Amount'].mean().sort_values(ascending=False).head(10)
         s2
```

```
Out[33]: School State
         Wyoming                 130.232248
         Hawaii                   95.364167
         Massachusetts            77.926463
         Rhode Island             72.429974
         District of Columbia     70.693202
         North Dakota             69.777091
         Washington               69.161616
         New Jersey               68.586876
         Montana                  67.186760
         Alaska                   66.990084
         Name: Donation Amount, dtype: float64
```

```
In [34]: s2.iplot(kind='bar' , xTitle='State' , yTitle='Average donation per project'
                 , title='Top 10 states(with maximum doantion)' , colorscale='paired' )
```



Analyse the Maximum , minimum , mean ,meadian and 25 and 75% percentiles of Donations?

In [35]:

```
mean = np.mean(data4['Donation Amount'].dropna())
median = np.median(data4['Donation Amount'].dropna())
percentiles = np.percentile(data4['Donation Amount'].dropna() ,[25,75])
minimum = data4['Donation Amount'].dropna().min()
maximum = data4['Donation Amount'].dropna().max()

print('mean donation amount is:' ,np.round(mean,2))
print('median donation amount is:' ,median)
print('25% and 75% donation amount is:' ,percentiles)
print('minimum donation amount is:' ,minimum)
print('maximum donation amount is:' ,maximum)
```

```
mean donation amount is: 61.03
median donation amount is: 25.0
25% and 75% donation amount is: [15. 50.]
minimum donation amount is: 0.01
maximum donation amount is: 60000.0
```

We can immediately observe from above statistics that our Donations Amount column have lots of outliers since mean is 60 whereas median is 25 which shows that there are plenty of outliers causing mean to rise, second indicator is that we have 25th and 75th percentiles both below than mean. In other words although %75 percent of our data smaller than 50 we have a mean values which is 60.66 which is also a good indicator of outliers. Lastly we can easily say that maximum value is a huge outlier too.

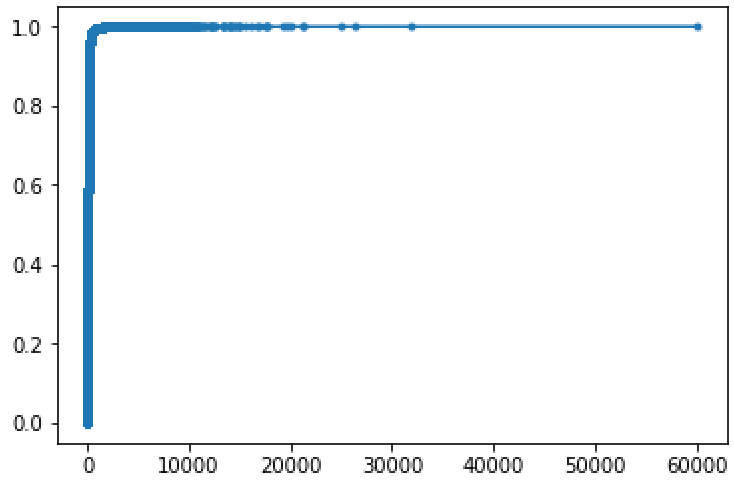
In which percent the data has points greater or smaller than the value shown in the x axis.

In [36]:

```
x = np.sort(data4["Donation Amount"].dropna())
y = np.arange(1,len(x)+1)/len(x)
plt.plot(x,y,marker = '.')
```

Out[36]:

```
[<matplotlib.lines.Line2D at 0x1c94bd8080>]
```



In which states there are more donations done by donors.

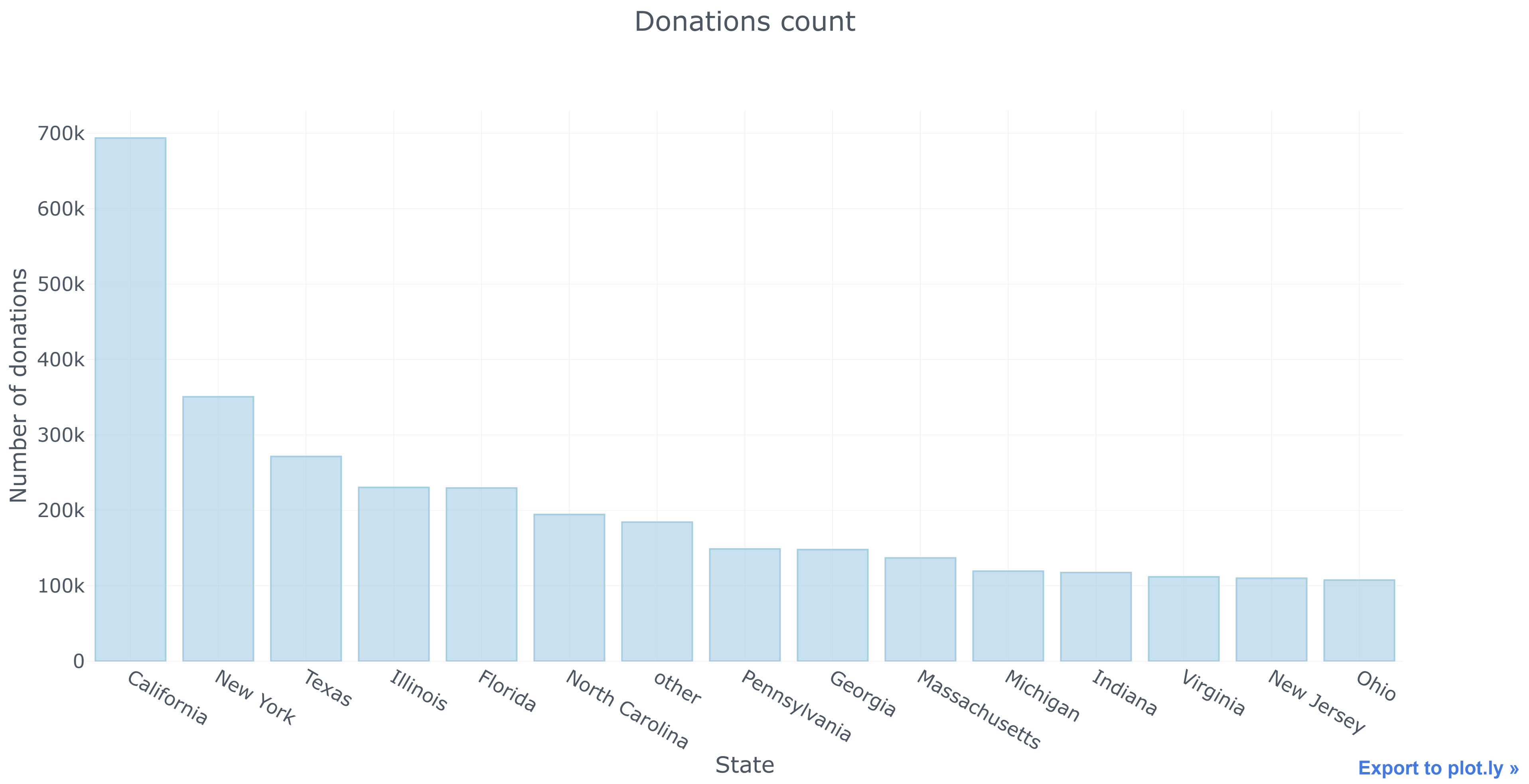
In [37]:

```
s3 = data4.groupby('Donor State')['Donation ID'].count().sort_values(ascending = False).head(15)
s3
```

Out[37]:

```
Donor State
California        693577
New York          350553
Texas             271348
Illinois          230350
Florida           229542
North Carolina    194465
other             184324
Pennsylvania      148752
Georgia           147897
Massachusetts     136845
Michigan          119337
Indiana           117470
Virginia          111740
New Jersey        109926
Ohio              107401
Name: Donation ID, dtype: int64
```

```
In [38]: s3.iplot(kind='bar' , xTitle='State',yTitle='Number of donations',title='Donations count',colorscale='paired')
```



Now, it is time for a more advanced question ? Is there a relationship between the number of projects offered and number of donations made by the donors. Which states performing better in this case ? How many of them responding project requests below average and which states are performing best in terms of donations per project ? In order to answer this question we must first get the number of projects per state and then number of donations made per state. Then we should merge this two and plot a scatter plot to visualize it . Lets do it !

```
In [39]: s4 = schools['School State'].value_counts()
         s5 = data4.groupby('Donor State')['Donation ID'].count()
         df = pd.concat([s4,s5],axis=1,keys=['Projects','Donations'])
```

```
/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:3: FutureWarning:

Sorting because non-concatenation axis is not aligned. A future version
of pandas will change to not sort by default.

To accept the future behavior, pass 'sort=False'.

To retain the current behavior and silence the warning, pass 'sort=True'.
```

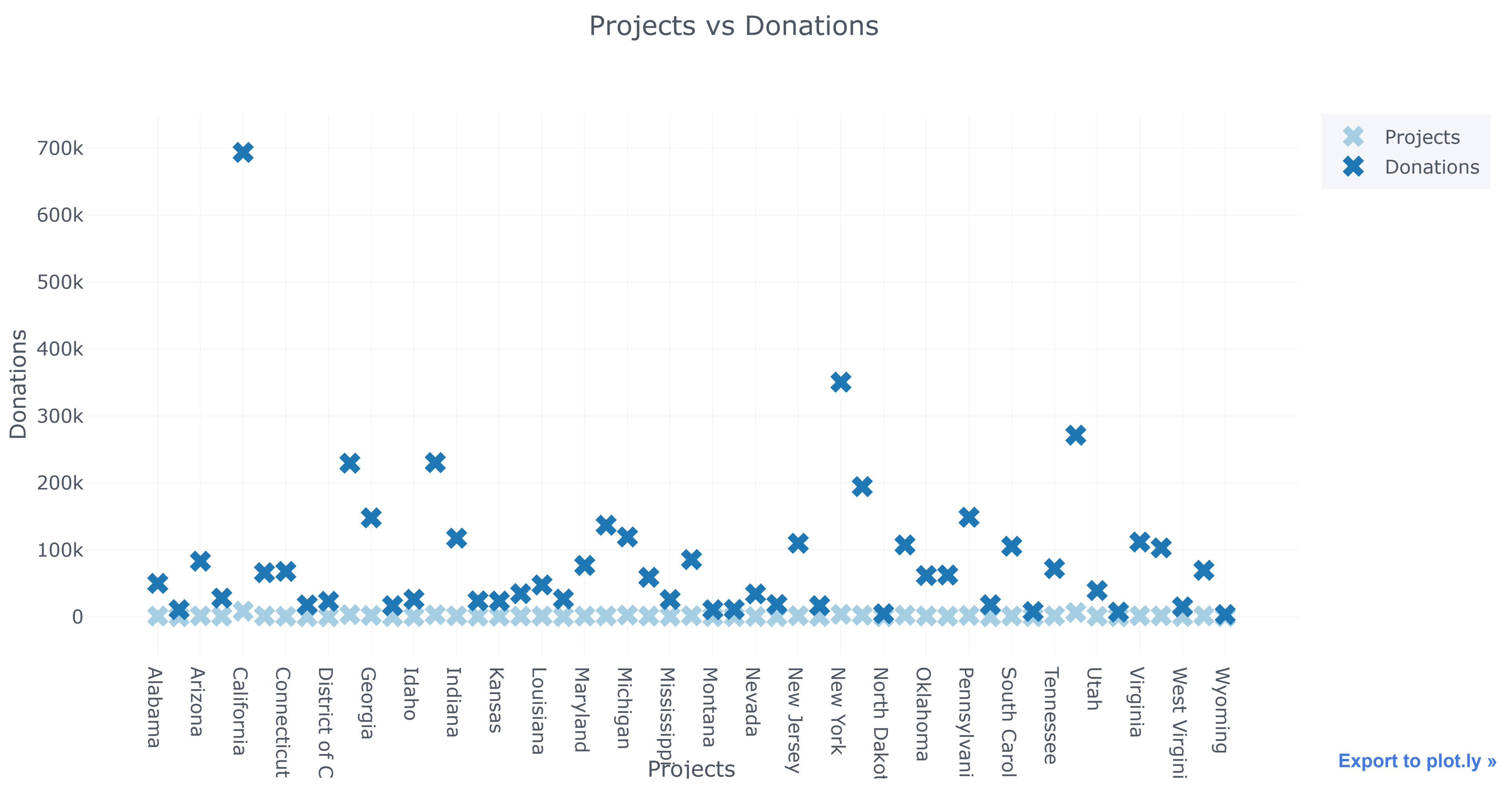
```
In [40]: df = df.dropna()
```

```
In [41]: df.head()
```

Out[41]:

	Projects	Donations
Alabama	1141.0	50002
Alaska	273.0	10729
Arizona	1529.0	83092
Arkansas	923.0	28021
California	8457.0	693577

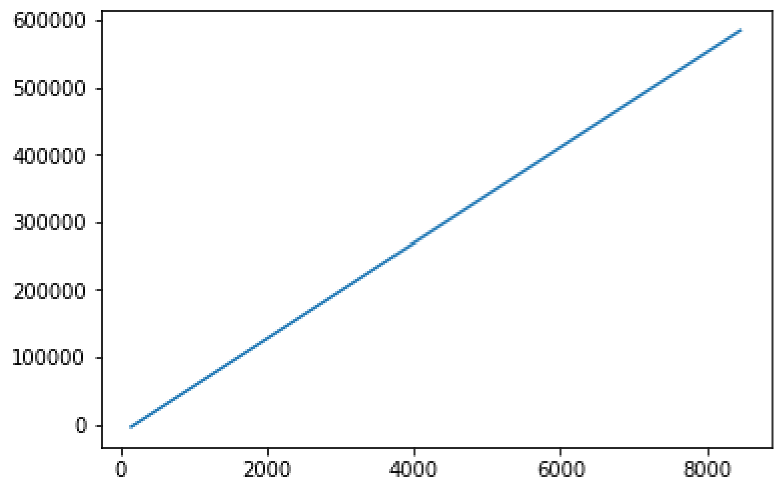
In [42]:
```
df.iplot(kind='scatter',xTitle='Projects',
         yTitle='Donations',title='Projects vs Donations',
         symbol='x',colorscale='paired',mode='markers')
```



fit a linear model which will basically indicate the relationship between projects and donations.

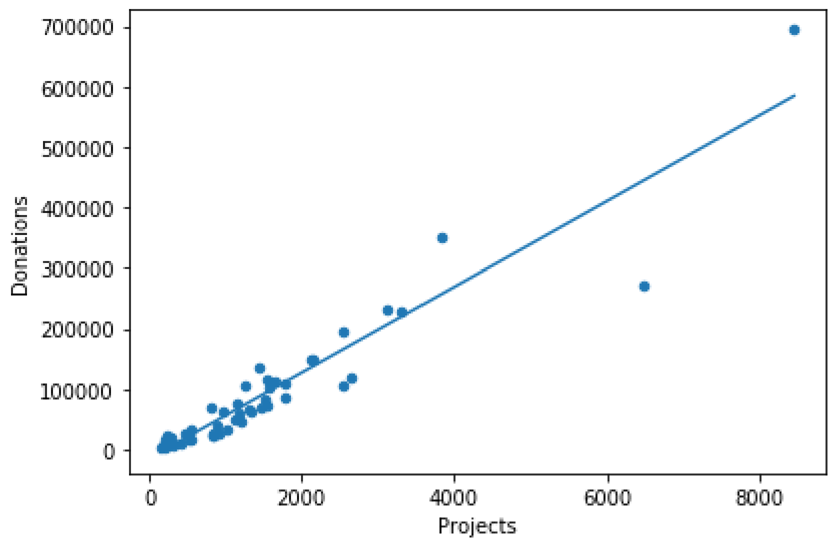
In [43]:
```
slope,intercept = np.polyfit(df.Projects,df.Donations,1)
x = np.array([df.Projects.min(),df.Projects.max()])
y = slope*x + intercept
plt.plot(x,y)
```

Out[43]:
```
[<matplotlib.lines.Line2D at 0x1c99f33b70>]
```



Combine the plots

In [44]:
```
df.plot.scatter(x='Projects' , y='Donations')
slope,intercept = np.polyfit(df.Projects,df.Donations,1)
x = np.array([df.Projects.min(),df.Projects.max()])
y = slope*x + intercept
plt.plot(x,y)
plt.tight_layout()
plt.margins(0.05)
```



How mant different project types exists ? What is the total donation amount for each of them ?

In [45]:
```
data4.head(2)
```

Out[45]:

	Project ID	Donation ID	Donor ID	Donation Included Optional Donation	Donation Amount	Donor Cart Sequence	Donation Received Date	
0	000009891526c0ade7180f8423792063	688729120858666221208529ee3fc18e	1f4b5b6e68445c6c4a0509b3aca93f38	No	178.37	11	2016-08-23 13:15:57	5aa86a:
1	3cd4f1c5cfa0d495dadfead3153c936d	21aaadfba0becc3f052decf88cd31a75	1f4b5b6e68445c6c4a0509b3aca93f38	No	148.29	25	2017-03-30 01:34:18	5aa86a:

2 rows × 38 columns

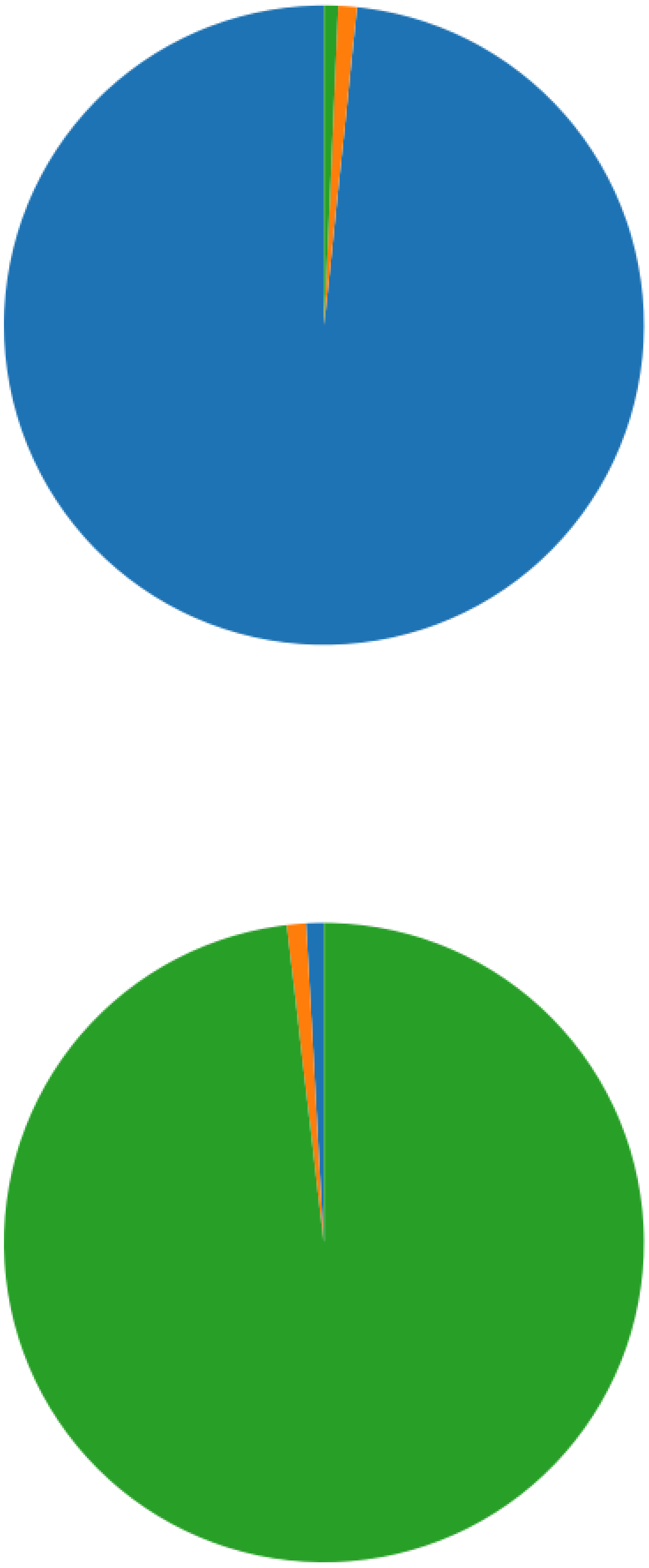
In [46]:
```
s6 = data4["Project Type"].value_counts()
s6
```

Out[46]:
```
Teacher-Led                 4532463
Professional Development      43217
Student-Led                   32400
Name: Project Type, dtype: int64
```

In [47]:
```
s7 = data4.groupby('Project Type')['Donation Amount'].sum().astype(int)
s7
```

Out[47]:
```
Project Type
Professional Development      2474442
Student-Led                   2711059
Teacher-Led                 276046772
Name: Donation Amount, dtype: int64
```

```
In [48]: plt.subplot(2,1,1)
         plt.pie(s6 , startangle=90)
         plt.subplot(2,1,2)
         plt.pie(s7 , startangle=90)
         plt.tight_layout()
         plt.margins(0.05)
         fig = plt.gcf()
         fig.set_size_inches(25,15)
```



How mant project subject category trees exists ? Which ones attracted the most donations ?

```
In [49]: data4['Project Subject Category Tree'].nunique()

Out[49]: 51
```

In [50]:

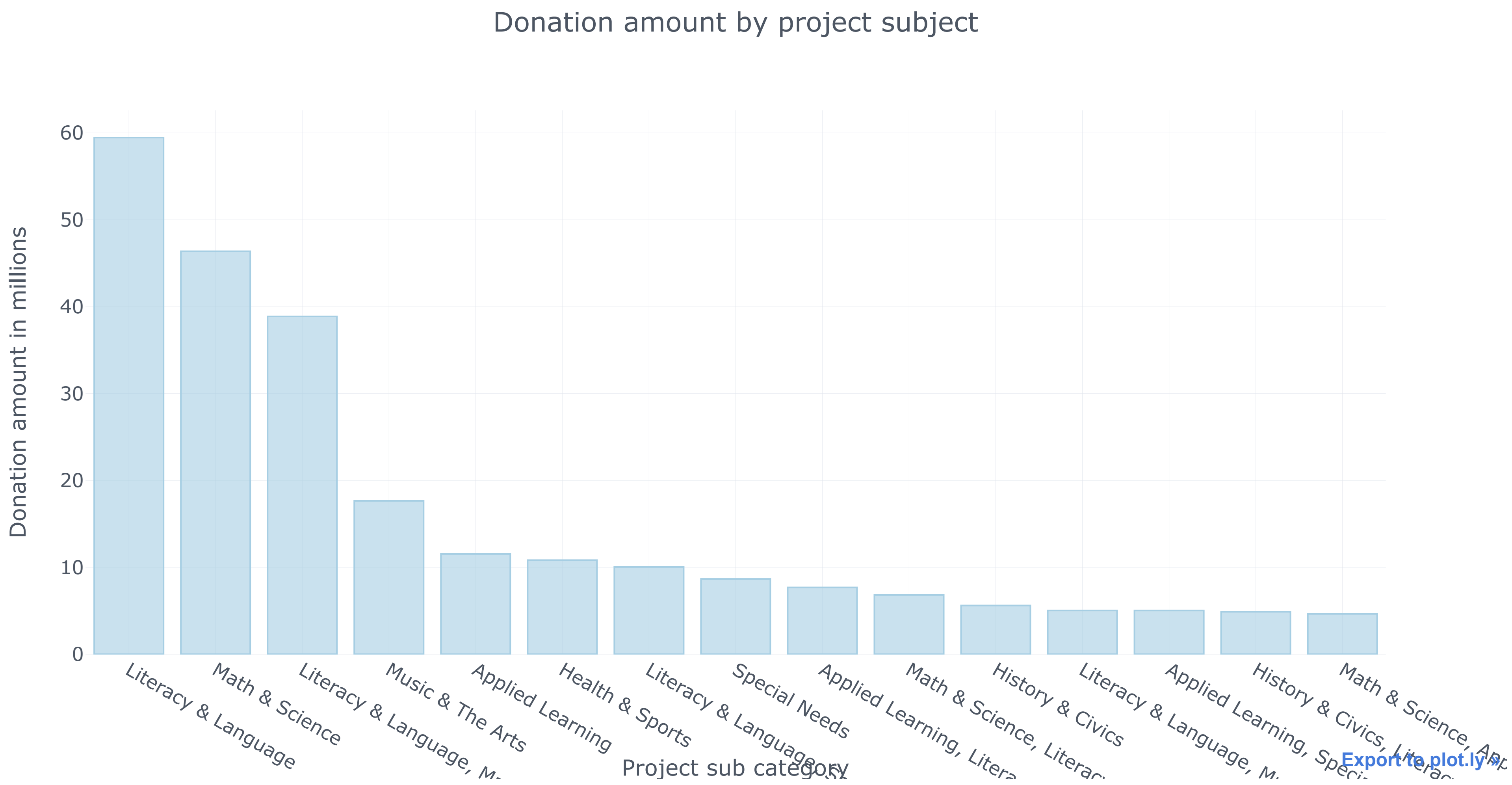
```
s8 = data4.groupby('Project Subject Category Tree')['Donation Amount'].sum().astype(int).sort_values(ascending = False).head(15)
s8
```

Out[50]:

```
Project Subject Category Tree
Literacy & Language                        59463406
Math & Science                             46378412
Literacy & Language, Math & Science        38882421
Music & The Arts                           17654172
Applied Learning                           11536010
Health & Sports                            10830324
Literacy & Language, Special Needs         10037973
Special Needs                               8669187
Applied Learning, Literacy & Language       7691442
Math & Science, Literacy & Language         6820461
History & Civics                            5612012
Literacy & Language, Music & The Arts       5038590
Applied Learning, Special Needs             5036123
History & Civics, Literacy & Language       4886560
Math & Science, Applied Learning            4645578
Name: Donation Amount, dtype: int64
```

In [51]:

```
s9 = s8/1000000
s9.iplot(kind="bar" , xTitle='Project sub category' , yTitle='Donation amount in millions',
        title='Donation amount by project subject' , colorscale='paired')
```



Lets move to the timings now

What is the mean time that takes a project to be fully funded after posted and how it varies between states ?

In [68]:

```
data4[['Project Posted Date' , 'Project Fully Funded Date']].isnull().sum()
```

Out[68]:

```
Project Posted Date              0
Project Fully Funded Date    437295
dtype: int64
```

In [69]:

```
data4[['Project Posted Date' , 'Project Fully Funded Date']].head()
```

Out[69]:

	Project Posted Date	Project Fully Funded Date
0	2016-05-13	2016-08-23
1	2017-03-18	2017-03-30
2	2017-10-18	2017-10-19
3	2017-11-27	2018-01-25
4	2016-09-05	2016-12-22

In [70]:

```
data4['Project Posted Date'] = pd.to_datetime(data4['Project Posted Date'])
```

In [72]:

```
data4['Project Fully Funded Date'] = pd.to_datetime(data4['Project Fully Funded Date'])
```

In [74]:

```
data4['Funding Time'] = data4['Project Fully Funded Date'] - data4['Project Posted Date']
data4[['Funding Time','Project Posted Date' , 'Project Fully Funded Date']].head()
```

Out[74]:

	Funding Time	Project Posted Date	Project Fully Funded Date
0	102 days	2016-05-13	2016-08-23
1	12 days	2017-03-18	2017-03-30
2	1 days	2017-10-18	2017-10-19
3	59 days	2017-11-27	2018-01-25
4	108 days	2016-09-05	2016-12-22

In [75]:

```
data4[['Funding Time','Project Posted Date' , 'Project Fully Funded Date']].isnull().sum()
```

Out[75]:

```
Funding Time                 437295
Project Posted Date               0
Project Fully Funded Date    437295
dtype: int64
```

In [82]:

```
data5 = data4[pd.notnull(data4['Funding Time'])]
data5[['Funding Time','Project Posted Date' , 'Project Fully Funded Date']].isnull().sum()
```

Out[82]:

```
Funding Time                 0
Project Posted Date          0
Project Fully Funded Date    0
dtype: int64
```

In [83]:

```
import datetime as dt
data5['Funding Time'] = data5['Funding Time'].dt.days
```

In [84]:

```
data5[['Funding Time','Project Posted Date' , 'Project Fully Funded Date']].head()
```

Out[84]:

	Funding Time	Project Posted Date	Project Fully Funded Date
0	102	2016-05-13	2016-08-23
1	12	2017-03-18	2017-03-30
2	1	2017-10-18	2017-10-19
3	59	2017-11-27	2018-01-25
4	108	2016-09-05	2016-12-22

In [91]:

```
wrong_overall_mean_time = data5['Funding Time'].mean()
wrong_overall_mean_time
```

Out[91]:

```
35.47807690878336
```

In [93]:

```
overall_mean_time = data5.groupby('Project ID')['Funding Time'].mean()
output = overall_mean_time.mean()
output
```

Out[93]:

```
32.171606457403584
```

```
In [94]: #Average funding time for each state

         state_project_funding_time = data5.groupby(['School State' , 'Project ID'])['Funding Time'].mean()
         state_project_funding_time
```

```
Out[94]: School State  Project ID
         Alabama       00002d44003ed46b066607c5455a999a     41
                       000e336c167aae4394ac037e002aa2b9     58
                       00105d1128dbbf4e0774804052b5bedb     27
                       0014d0f8aa7dbbd5705956d7458a0d9f     15
                       001a70c8fdb47880cbcde5675193b877     18
                       001cbe60d003ac7325bf3ca8cf67be0b     42
                       00252e58374c7d72f3267e4462d9a86c     27
                       003407c494db25253e492769b0e0ffc6     10
                       0034f3f70e960909e51126c9739c2de0     75
                       003961552639bbc3383ebdb6be4e51bb     59
                       003fc2aa7a6e054f2b72e7de63df1b5c     23
                       00456338662592a8b97a9981844ceb9d      0
                       00563bb84f4bfb6ce7a70ff4931a1bf2      5
                       005a4893b7cefbafee36c36ec34cc7e3     38
                       0063a1054836f65d6a153ef517edfeff     96
                       0064b528e0ca4bd10c15b31fe4e64e1c      1
                       00697de0926bf33acb393e68e30b1c55      9
                       006bfd0408d99c0c0caa7e5a6bdf2c34    107
                       007c0335560305015d4ed39008f3022f     55
                       007e2a1a47ce50ded4538692d0bf601b     27
                       00808bc28c27f6a3fb6a9d3797a662d9     22
                       0081de7e65bf42b30b9850fc4953e081      2
                       008ae5bc643f19e378cf1ffd13529acb     60
                       009b04ade4dcee424ee12bd2f381b0c1     14
                       009df62864367965fd4e74786270f28d      0
                       00afbed841b7a185f6118e001a08f4aa     51
                       00bcd4c2589c2efd43b77f03f74906dc     21
                       00c087c76557094e7bf71cd67b37bf15      6
                       00d95ffdaa204a079fa4fd130772ea20      9
                       00e4e5288c9f40b93c1b3bc892b68f06      2
                                                          ... 
         Wyoming       f5cee5f7de0ce54499a7635a7f99c94c     28
                       f6150d93f04d032cfd4207ed4446cace      3
                       f6671e6229191d98a200ee0532a6e559     19
                       f66965208fe061e84665aff5290f3de1     18
                       f69e791e5be65694d1b11495e1d94c24     30
                       f6ffe7f3ec4a7242e2f9bd5bda8897e9     67
                       f8bb2b054e18b7b001741624204083ec     15
                       f8dc18fecc3dfe098ca18e186b6fcef3    120
                       f96a5915fbada25996c7b1c6fb7246c4      5
                       f9e581e755cfa4f3956fed4810150fc7     98
                       faaf8ed3a6f62b02c449c54210c1da2d      3
                       fac04e7c091a28196a8f9f7eae3fa138      2
                       fae38152e398755da627ad2477356733     72
                       fb095a305f62e3298909d7fb4022209e      1
                       fb813da169eccb56b567ae1712dae31e     65
                       fbb13653d87fa1adc3d10db55f97f1e5      1
                       fc0d5c9c08c8a72bd36c72bf7a3e753d     79
                       fc8cb4a9326bf548a22dd6063712b856    119
                       fd0e26c548a7da4dd55200ffc38d909e      0
                       fdb8994e584089dc5c410d5e6ad91591     18
                       fdbc67f8b29777d8daeb87c70b6d7b93     19
                       fde4d7b3a47e3d66543dcd3d07284569     94
                       fde825ff46d699f3c5ec6dcd1c528a0c    105
                       fdf545b9c1e146a44ce0e1b49e61d4a9      0
                       fe089e917650af6a23d5aca59a39678f      6
                       fe83942b407a1f868cb48b2bbeab4988     23
                       febb789ba78badf633114020f1483392      2
                       ff1d119bac584ec35d3740f83f3daa7d    112
                       ff43f8665a9ed6a009f395b18d96734a     64
                       ffbcf2e301bd4b2e80dc9faea5b02a57    110
         Name: Funding Time, Length: 720847, dtype: int64
```

In [97]:

```
state_average_project_funding_time = state_project_funding_time.groupby('School State').mean()
state_average_project_funding_time.round(0)
```

Out[97]:

```
School State
Alabama                 36.0
Alaska                  34.0
Arizona                 35.0
Arkansas                35.0
California              32.0
Colorado                31.0
Connecticut             32.0
Delaware                33.0
District of Columbia    26.0
Florida                 31.0
Georgia                 35.0
Hawaii                  27.0
Idaho                   31.0
Illinois                30.0
Indiana                 32.0
Iowa                    37.0
Kansas                  31.0
Kentucky                33.0
Louisiana               36.0
Maine                   35.0
Maryland                32.0
Massachusetts           32.0
Michigan                32.0
Minnesota               31.0
Mississippi             37.0
Missouri                31.0
Montana                 31.0
Nebraska                36.0
Nevada                  35.0
New Hampshire           31.0
New Jersey              32.0
New Mexico              35.0
New York                33.0
North Carolina          32.0
North Dakota            35.0
Ohio                    32.0
Oklahoma                31.0
Oregon                  30.0
Pennsylvania            31.0
Rhode Island            34.0
South Carolina          35.0
South Dakota            33.0
Tennessee               33.0
Texas                   32.0
Utah                    36.0
Vermont                 30.0
Virginia                32.0
Washington              32.0
West Virginia           36.0
Wisconsin               31.0
Wyoming                 29.0
Name: Funding Time, dtype: float64
```

Which states are the best and which are the worst performing in terms of this criteria (mean project fully funded time) ??

In [108]:

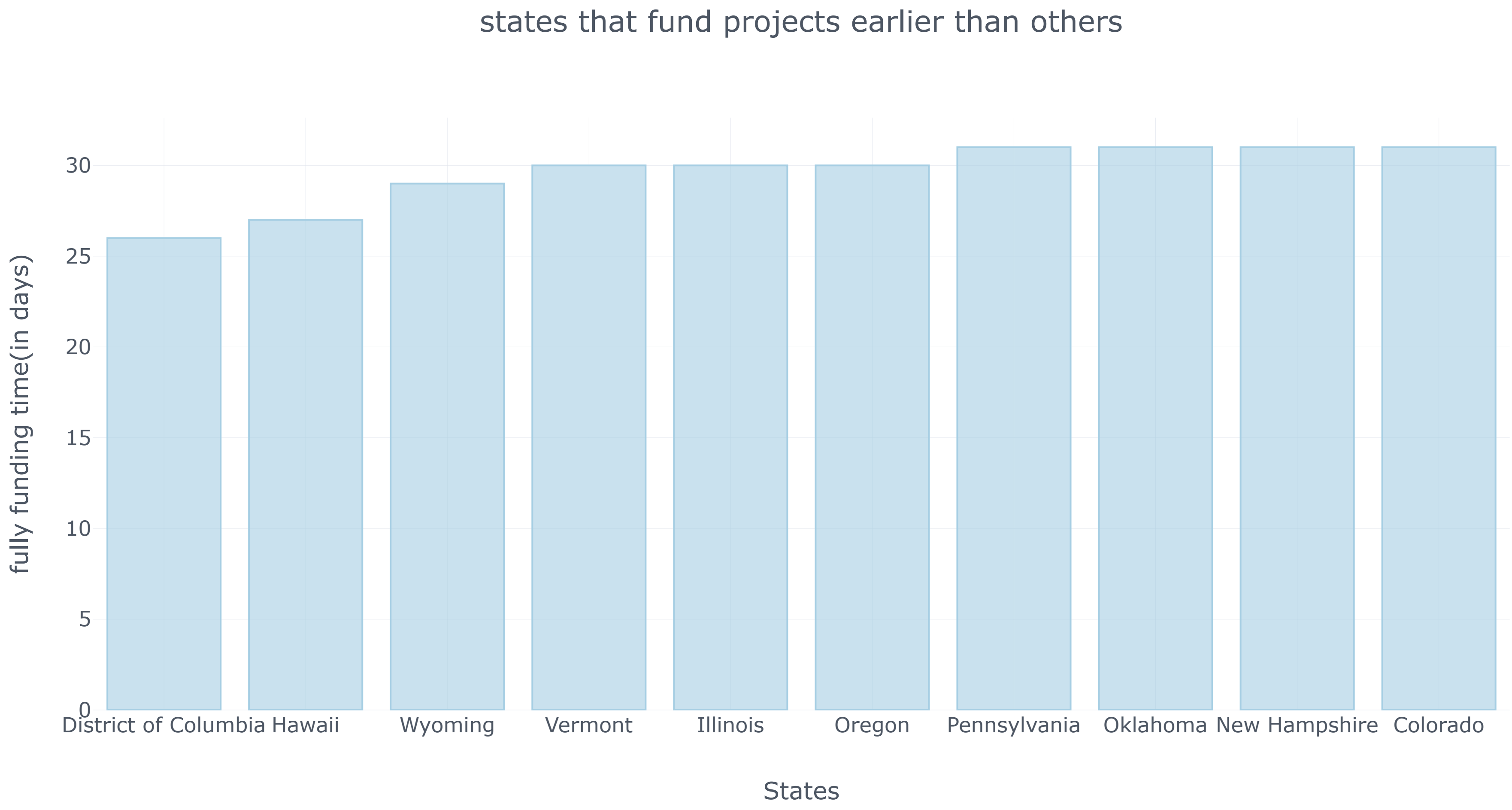
```
fast = state_average_project_funding_time.round(0)
fast[fast<32].sort_values().head(10)
```

Out[108]:

```
School State
District of Columbia    26.0
Hawaii                  27.0
Wyoming                 29.0
Vermont                 30.0
Illinois                30.0
Oregon                  30.0
Pennsylvania            31.0
Oklahoma                31.0
New Hampshire           31.0
Colorado                31.0
Name: Funding Time, dtype: float64
```

In [109]:

```
fast_funding = fast[fast<32].sort_values().head(10)
fast_funding.iplot(kind='bar' , xTitle='States' , yTitle='fully funding time(in days)',
                 title='states that fund projects earlier than others',
                 colorscale='paired')
```



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In [111]:

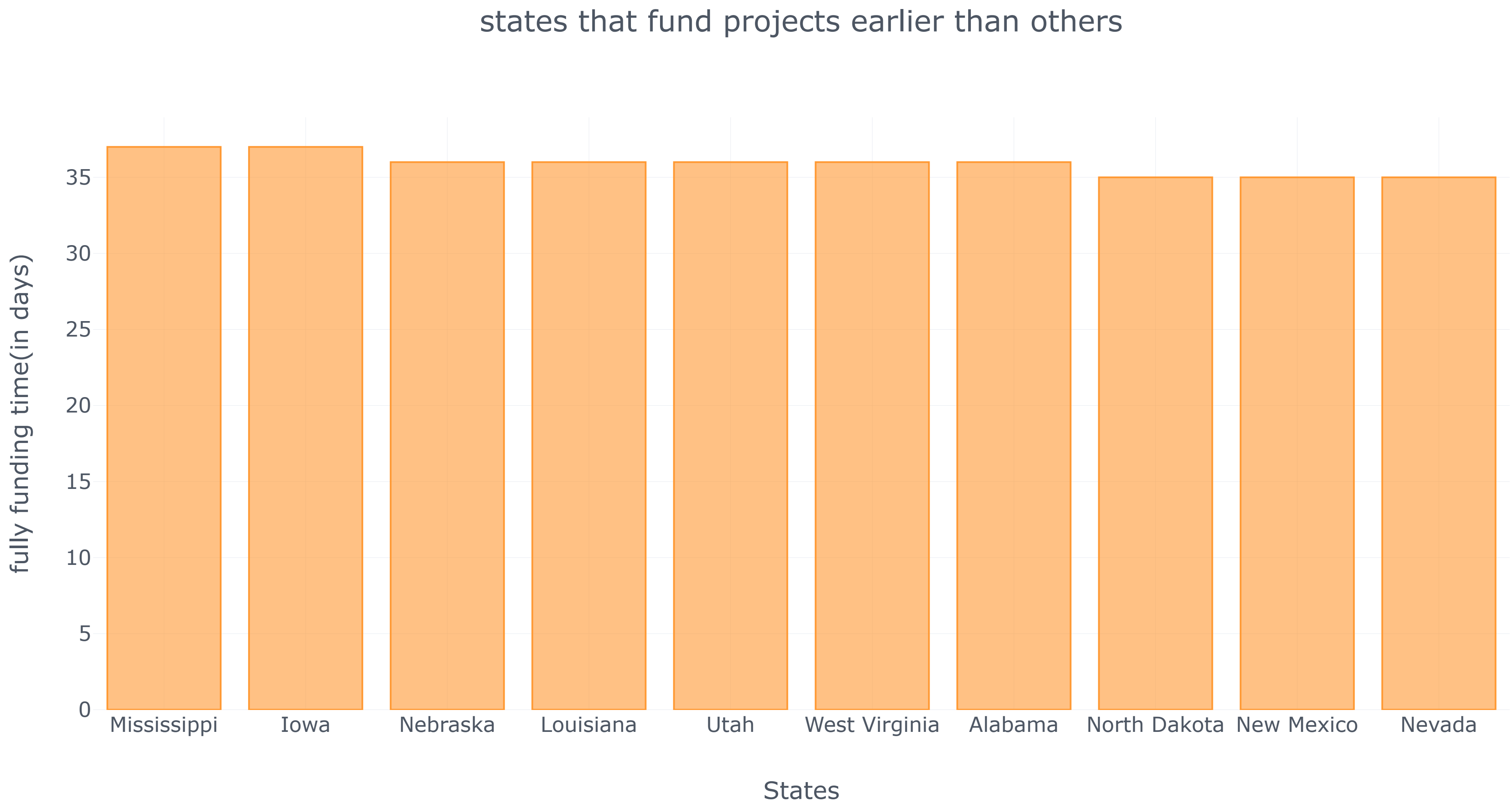
```
slow = state_average_project_funding_time.round(0)
slow[slow>32].sort_values(ascending = False).head(10)
```

Out[111]:

```
School State
Mississippi      37.0
Iowa             37.0
Nebraska         36.0
Louisiana        36.0
Utah             36.0
West Virginia    36.0
Alabama          36.0
North Dakota     35.0
New Mexico       35.0
Nevada           35.0
Name: Funding Time, dtype: float64
```

In [114]:

```
slow_funding = slow[slow>32].sort_values(ascending = False).head(10)
slow_funding.iplot(kind='bar' , xTitle='States' , yTitle='fully funding time(in days)',
                 title='states that fund projects earlier than others'
                 )
```



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End for now But you can do more , think over the limits ...by pugger