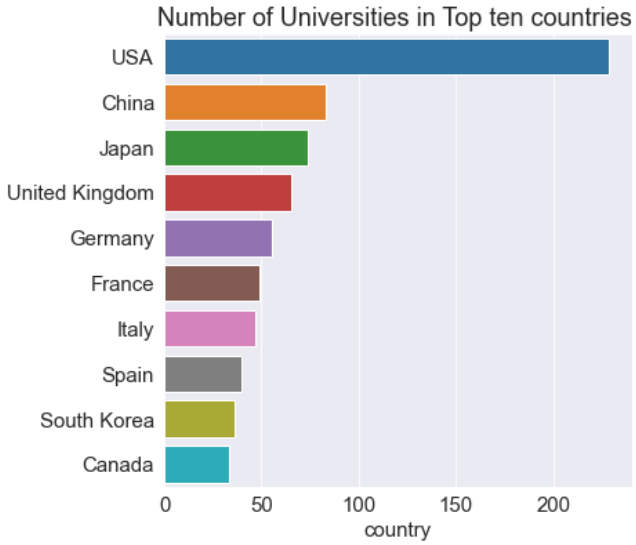
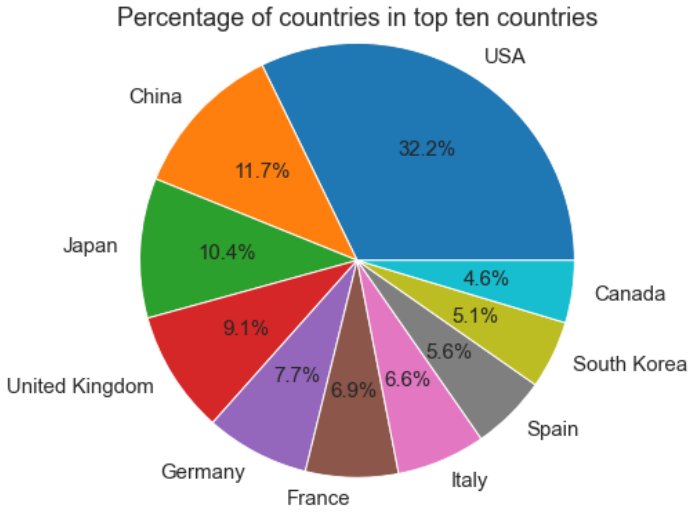
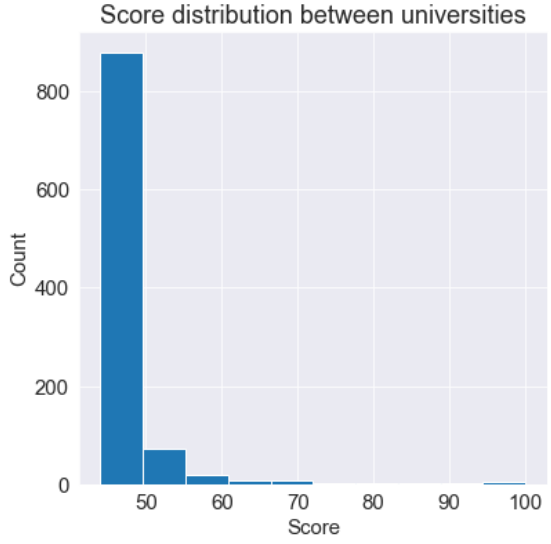
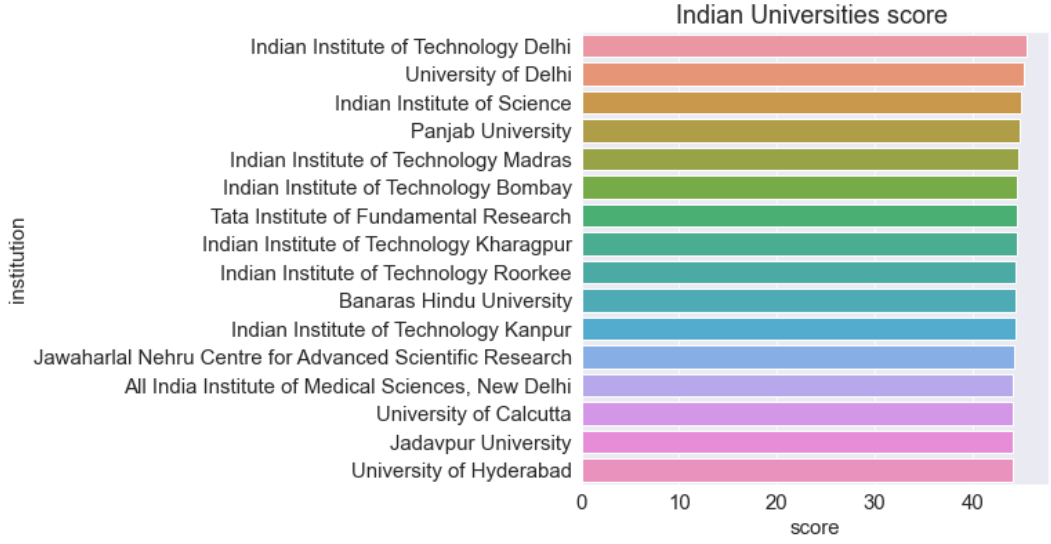
World Universities Ranking - A Case Study

Analyzing responses from the survey of world universites









In this project, we will be analysing a dataset that belong to a survey of worlds universities. In the data set on the basis of lot of parameters rank of universities is decided

The main objective of this project is to use the dataset to extract some informations about the universities.

Downloading the Dataset

We are downloading data from kaggle website

In [ ]:
```
pip install opendatasets --upgrade --quiet
```

In [1]:
```
import opendatasets as od
```

Let's begin by downloading the data, and listing the files within the dataset.

In [2]:
```
dataset_url1 = 'https://www.kaggle.com/mylesoneill/world-university-rankings'
```

In [4]:
```
od.download(dataset_url1)
```

```
Please provide your Kaggle credentials to download this dataset. Learn more: http://bit.ly/kaggle-creds
Your Kaggle username: shivanshchoudhary
Your Kaggle Key: ........
100%|██████████| 1.41M/1.41M [00:00<00:00, 45.7MB/s]
Downloading world-university-rankings.zip to ./world-university-rankings
```

In [5]:
```
# Change this
data_dir = './world-university-rankings'
```

In [6]:
```
import os
os.listdir(data_dir)
```

Out[6]:
```
['school_and_country_table.csv',
 'education_expenditure_supplementary_data.csv',
 'cwurData.csv',
 'educational_attainment_supplementary_data.csv',
 'timesData.csv',
 'shanghaiData.csv']
```

Let us save and upload our work to Jovian before continuing.

In [7]:
```
project_name = "world-universities-ranking"
```

Data Preparation and Cleaning

Let's prepare our data for analysis

So first import some python libraries to read and process our data

In [8]:
```
import pandas as pd
import numpy as np
```

Let's read our csv file which contain lots of data to analyze using pandas `read_csv` method

In [9]:
```
survey_raw_df=pd.read_csv(data_dir+'/'+'cwurData.csv',index_col=False)
survey_raw_df.head()
```

Out[9]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
0	1	Harvard University	USA	1	7	9	1	1	1	1
1	2	Massachusetts Institute of Technology	USA	2	9	17	3	12	4	4
2	3	Stanford University	USA	3	17	11	5	4	2	2
3	4	University of Cambridge	United Kingdom	1	10	24	4	16	16	11
4	5	California Institute of Technology	USA	4	2	29	7	37	22	22

let's figure out what are the columns in our dataframe

In [10]:
```
survey_columns=survey_raw_df.columns
```

```
survey_columns
```

Out[10]:
```
Index(['world_rank', 'institution', 'country', 'national_rank',
       'quality_of_education', 'alumni_employment', 'quality_of_faculty',
       'publications', 'influence', 'citations', 'broad_impact', 'patents',
       'score', 'year'],
      dtype='object')
```

In [11]:
```
survey_shape=survey_raw_df.shape
survey_shape
```

Out[11]:
```
(2200, 14)
```

In [12]:
```
print("Its mean is that there are {} columns and {} rows".format(survey_shape[1],survey_shape[0]))
```

```
Its mean is that there are 14 columns and 2200 rows
```

In [13]:
```
survey_raw_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2200 entries, 0 to 2199
Data columns (total 14 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   world_rank            2200 non-null   int64  
 1   institution           2200 non-null   object 
 2   country               2200 non-null   object 
 3   national_rank         2200 non-null   int64  
 4   quality_of_education  2200 non-null   int64  
 5   alumni_employment     2200 non-null   int64  
 6   quality_of_faculty    2200 non-null   int64  
 7   publications          2200 non-null   int64  
 8   influence             2200 non-null   int64  
 9   citations             2200 non-null   int64  
 10  broad_impact          2000 non-null   float64
 11  patents               2200 non-null   int64  
 12  score                 2200 non-null   float64
 13  year                  2200 non-null   int64  
dtypes: float64(2), int64(10), object(2)
memory usage: 240.8+ KB
```

In [14]:
```
survey_raw_df.isna().sum()
```

```
world_rank               0
```

Out[14]:
```
institution               0
country                   0
national_rank             0
quality_of_education      0
alumni_employment         0
quality_of_faculty        0
publications              0
influence                 0
citations                 0
broad_impact            200
patents                   0
score                     0
year                      0
dtype: int64
```

The code of above two cells is showing that except `broad_impact` column there is no column which has `null values`

In [15]:
```
survey_raw_df.describe()
```

Out[15]:

	world_rank	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations	broad_impac
count	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2200.000000	2000.00000
mean	459.590909	40.278182	275.100455	357.116818	178.888182	459.908636	459.797727	413.417273	496.69950
std	304.320363	51.740870	121.935100	186.779252	64.050885	303.760352	303.331822	264.366549	286.91975
min	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.00000
25%	175.750000	6.000000	175.750000	175.750000	175.750000	175.750000	175.750000	161.000000	250.50000
50%	450.500000	21.000000	355.000000	450.500000	210.000000	450.500000	450.500000	406.000000	496.00000
75%	725.250000	49.000000	367.000000	478.000000	218.000000	725.000000	725.250000	645.000000	741.00000
max	1000.000000	229.000000	367.000000	567.000000	218.000000	1000.000000	991.000000	812.000000	1000.00000

In [16]:
```
survey_raw_df.nunique()
```

Out[16]:
```
world_rank              1000
institution             1024
country                   59
national_rank            229
quality_of_education     367
```

```
alumni_employment        565
quality_of_faculty       199
publications             987
influence                944
citations                135
broad_impact             343
patents                  738
score                    764
year                       4
dtype: int64
```

In [17]:
```
survey_raw_df.year.unique()
```

Out[17]:
```
array([2012, 2013, 2014, 2015])
```

It is showing that this `survey_raw_df` include survey of four different years let's separate it by there year

In [18]:
```
survey_2012_df=survey_raw_df[survey_raw_df.year==2012]
survey_2013_df=survey_raw_df[survey_raw_df.year==2013]
survey_2014_df=survey_raw_df[survey_raw_df.year==2014]
survey_2015_df=survey_raw_df[survey_raw_df.year==2015]
```

In [19]:
```
survey_2012_df.shape
```

Out[19]:
```
(100, 14)
```

In [20]:
```
survey_2013_df.shape
```

Out[20]:
```
(100, 14)
```

In [21]:
```
survey_2014_df.shape
```

Out[21]:
```
(1000, 14)
```

In [22]:
```
survey_2015_df.shape
```

Out[22]:
```
(1000, 14)
```

Since in only two surveys of year 2014 and 2015 we have sufficient amount of data to visulize so we are going to go throw `survey_2015_df`

In [23]:
```
# Now lets figure out nunique values
survey_2015_df.nunique()
```

Out[23]:
```
world_rank             1000
institution            1000
country                  59
national_rank           229
quality_of_education    367
alumni_employment       564
quality_of_faculty      176
publications            924
influence               915
citations                61
broad_impact            211
patents                 736
score                   416
year                      1
dtype: int64
```

Now there is no duplicate of world ranking

In [24]:
```
survey_2015_df.head()
```

Out[24]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citatio
1200	1	Harvard University	USA	1	1	1	1	1	1	
1201	2	Stanford University	USA	2	9	2	4	5	3	
1202	3	Massachusetts Institute of Technology	USA	3	3	11	2	15	2	
1203	4	University of Cambridge	United Kingdom	1	2	10	5	11	6	
1204	5	University of Oxford	United Kingdom	2	7	13	10	7	12	

Exploratory Analysis and Visualization

Let's explore ourdata set and do something interesting

So first begin by importing `matplotlib.pyplot` and `seaborn` .

In [25]:
```
import seaborn as sns
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline

sns.set_style('darkgrid')
matplotlib.rcParams['font.size'] = 14
matplotlib.rcParams['figure.figsize'] = (9, 5)
matplotlib.rcParams['figure.facecolor'] = '#00000000'
```

In [26]:
```
survey_df=survey_2015_df.copy()
# Lets change name of our dataframe
survey_df.head()
```

Out[26]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citatio
1200	1	Harvard University	USA	1	1	1	1	1	1	
1201	2	Stanford University	USA	2	9	2	4	5	3	
1202	3	Massachusetts Institute of Technology	USA	3	3	11	2	15	2	
1203	4	University of Cambridge	United Kingdom	1	2	10	5	11	6	
1204	5	University of Oxford	United Kingdom	2	7	13	10	7	12	

In [27]:
```
# # let's drop index column,there is no need of it
survey_df.reset_index(drop=True,inplace=True)

survey_df.head()
```

Out[27]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
0	1	Harvard University	USA	1	1	1	1	1	1	1
1	2	Stanford University	USA	2	9	2	4	5	3	3
2	3	Massachusetts Institute of Technology	USA	3	3	11	2	15	2	2
3	4	University of Cambridge	United Kingdom	1	2	10	5	11	6	12
4	5	University of Oxford	United Kingdom	2	7	13	10	7	12	7

Country

Let's look at the number of countries from which there are universities in the survey and plot the ten countries with the highest number of universities in the survey

In [28]:
```
survey_df.country.nunique()
```

Out[28]:
```
59
```

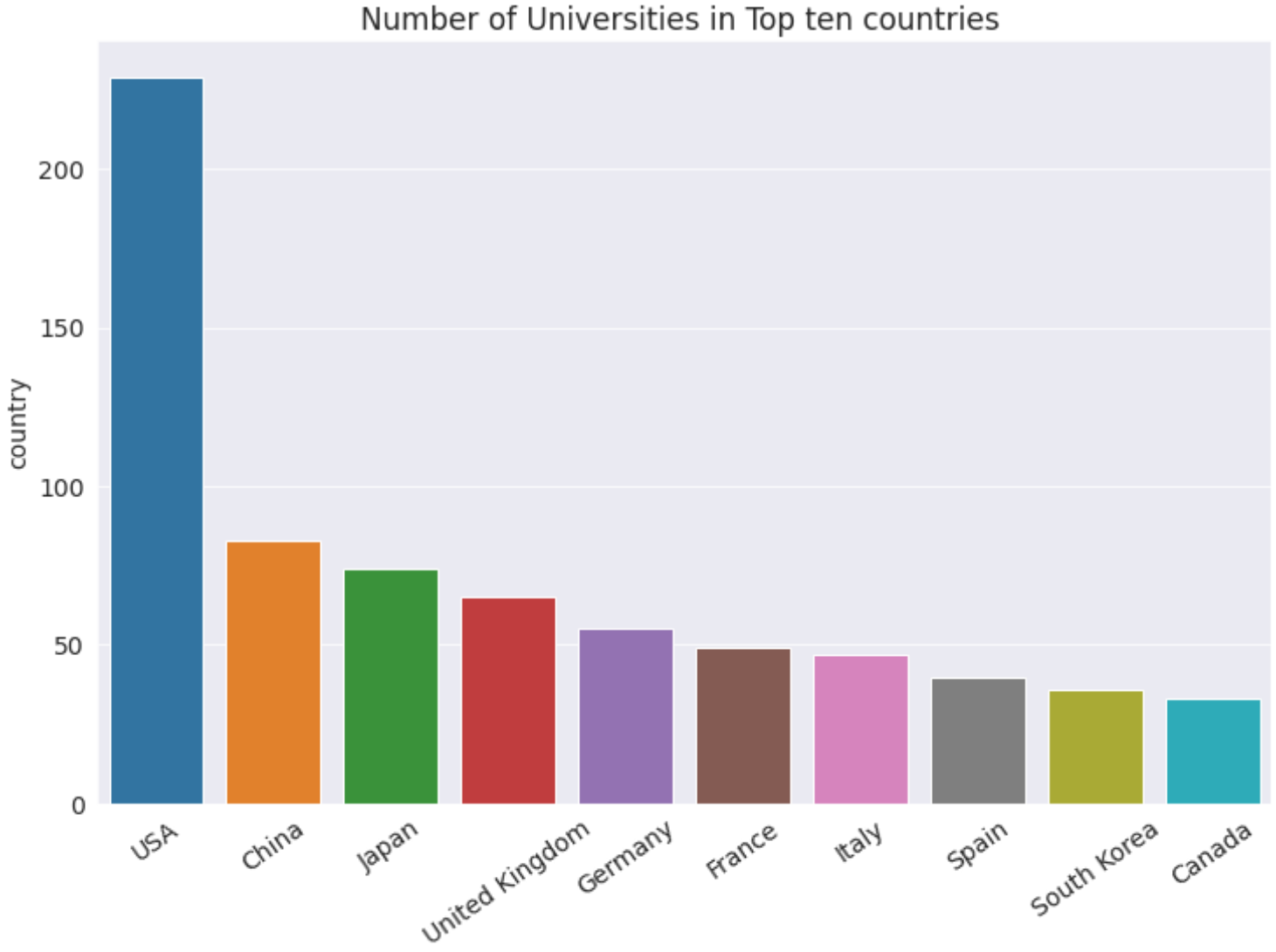
Its mean there are 59 countries which participated in this survey

In [29]:
```
top_countries=survey_df.country.value_counts().head(10)
top_countries
```

Out[29]:
```
USA               229
China              83
Japan              74
United Kingdom     65
Germany            55
France             49
Italy              47
Spain              40
South Korea        36
```

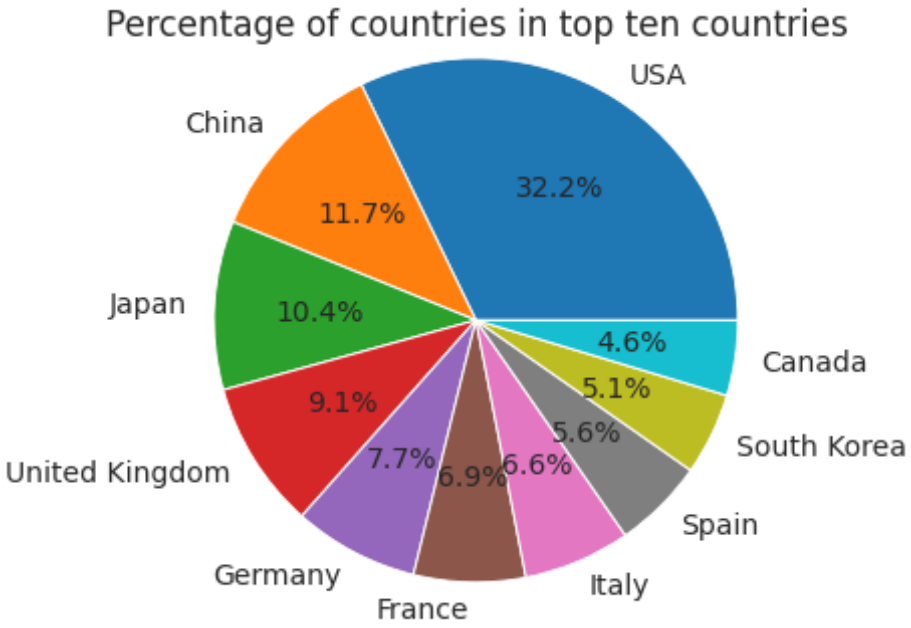
```
Canada              33
Name: country, dtype: int64
```

In [30]:
```
plt.figure(figsize=(12,8))
plt.xticks(rotation=35)
plt.title('Number of Universities in Top ten countries ')
sns.barplot(x=top_countries.index,y=top_countries);
```



It appears that highest number of universities are from the `USA` number is `229` amongs `1000` universities from all across 59 countries of the world. On number `2` there is `China` with 83 and then `Japan` on number `3` with 74. Disappointmentily India is not in top 10

In [31]:
```
# Now we can see it using pie chart also
top_countries=survey_df.country.value_counts().head(10)
top_countries.values/top_countries.sum()*100
plt.title('Percentage of countries in top ten countries')
plt.pie(top_countries,labels=top_countries.index,radius=1.2,autopct='%1.1f%%');
```



Score

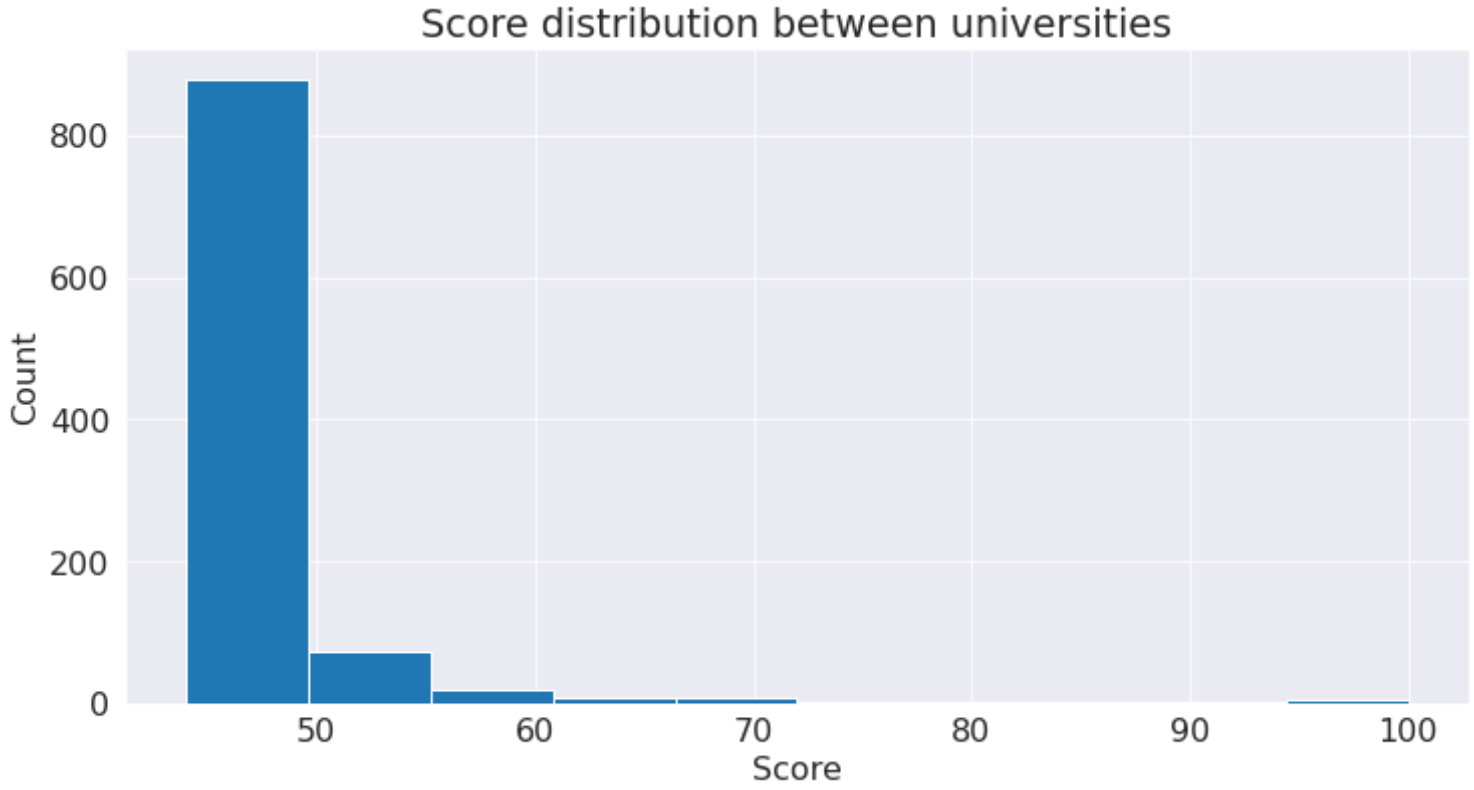
we are going visulize and analyze score of the countries using graph

lets found min and max score

In [32]:
```
min_score=survey_df.score.min()
max_score=survey_df.score.max()
ave_score=survey_df.score.mean()
print('minimum score is {}, maximum score is {} and average is {} of universities'.format(min_score,max_score,ave_sc
```

```
minimum score is 44.02, maximum score is 100.0 and average is 46.863850000000006 of universities
```

In [33]:
```
%matplotlib inline
plt.figure(figsize=(12, 6))
matplotlib.rcParams['font.size']=16
plt.xlabel('Score')
plt.ylabel('Count')
plt.title('Score distribution between universities')
plt.hist(survey_df.score);
```



Score distribution graph is showing that most of countries score lie between 44 to 50, only few universities have score above 70, number of such universities is too small let's count it

In [34]:
```
score_70=survey_df[survey_df.score>=70]
score_70
```

Out[34]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
0	1	Harvard University	USA	1	1	1	1	1	1	
1	2	Stanford University	USA	2	9	2	4	5	3	
2	3	Massachusetts Institute of Technology	USA	3	3	11	2	15	2	
3	4	University of Cambridge	United Kingdom	1	2	10	5	11	6	
4	5	University of Oxford	United Kingdom	2	7	13	10	7	12	
5	6	Columbia University	USA	4	13	6	9	13	13	
6	7	University of California, Berkeley	USA	5	5	21	6	10	4	
7	8	University of Chicago	USA	6	11	14	8	17	16	
8	9	Princeton University	USA	7	4	15	3	72	25	
9	10	Cornell University	USA	8	12	18	14	24	15	
10	11	Yale University	USA	9	10	26	11	18	8	
11	12	California Institute of Technology	USA	10	6	328	7	53	9	
12	13	University of Tokyo	Japan	1	16	3	38	14	19	
13	14	University of Pennsylvania	USA	11	20	4	28	8	18	
14	15	University of California, Los Angeles	USA	12	28	27	13	6	14	

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
15	16	Johns Hopkins University	USA	13	18	84	16	4	11	

Only Top 16 universities have score greater than equal to 70

Indian Universities

let's analysize and visulize what is indian universities situation in this survey

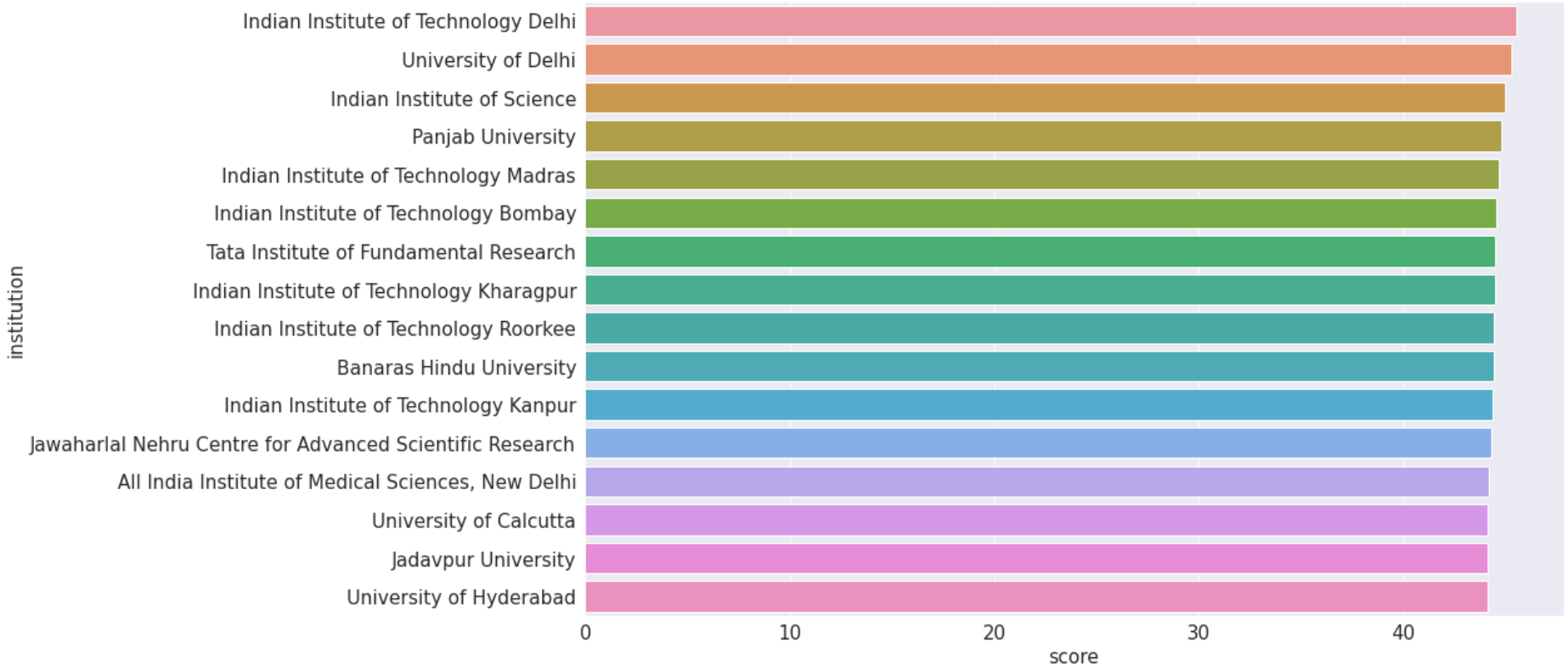
In [35]:
```
survey_india_df=survey_df[survey_df.country=='India']
survey_india_df
```

Out[35]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
340	341	Indian Institute of Technology Delhi	India	1	367	59	218	635	943	812
378	379	University of Delhi	India	2	240	72	218	703	763	812
447	448	Indian Institute of Science	India	3	367	332	218	315	537	511
490	491	Panjab University	India	4	333	167	218	720	786	368
533	534	Indian Institute of Technology Madras	India	5	367	147	218	523	943	812
595	596	Indian Institute of Technology Bombay	India	6	367	507	218	521	815	645

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations
600	601	Tata Institute of Fundamental Research	India	7	367	567	218	468	450	368
613	614	Indian Institute of Technology Kharagpur	India	8	367	242	218	500	974	812
637	638	Indian Institute of Technology Roorkee	India	9	367	395	218	839	931	428
678	679	Banaras Hindu University	India	10	243	260	218	754	904	511
713	714	Indian Institute of Technology Kanpur	India	11	174	503	218	561	848	645
776	777	Jawaharlal Nehru Centre for Advanced Scientifi...	India	12	367	567	218	868	650	645
850	851	All India Institute of Medical Sciences, New D...	India	13	367	567	218	887	886	645
890	891	University of Calcutta	India	14	140	346	209	964	900	645
922	923	Jadavpur University	India	15	367	515	218	849	991	428
924	925	University of Hyderabad	India	16	367	567	218	879	910	812

In [36]:
```
%matplotlib inline
matplotlib.rcParams['font.size']=15
matplotlib.rcParams['figure.figsize']=(14,9)
sns.barplot(y=survey_india_df.institution,x=survey_india_df.score);
```



So graph is indicating that Indian Universities score is between 40 and 50. So Indian need to improove their universities

Patent

let's visulize top ten universities ranking on bases of patents

In [37]:
```
on_the_base_of_patents=survey_df.sort_values('patents')
on_the_base_of_patents=on_the_base_of_patents[['world_rank','institution','country','patents','score']].copy().head(1

on_the_base_of_patents
```

Out[37]:

	world_rank	institution	country	patents	score
2	3	Massachusetts Institute of Technology	USA	1	97.54
15	16	Johns Hopkins University	USA	2	71.60
0	1	Harvard University	USA	3	100.00
5	6	Columbia University	USA	4	96.14
59	60	University of Florida	USA	5	54.18
23	24	Seoul National University	South Korea	6	64.82
12	13	University of Tokyo	Japan	7	78.23
143	144	Korea Advanced Institute of Science and Techno...	South Korea	8	48.95
14	15	University of California, Los Angeles	USA	9	76.91
1	2	Stanford University	USA	10	98.66

So on the bases of patents `MIT` is number in the world. Overall rank 1 `Harvard University` rank is 3. We can see that some universities overall rank is not too good but on the basis of patents they are int top 10

Alumini employment

Analyzing universities according to their performance in alumini employment which is also a big factor

In [38]:
```
base_of_alumini_employment=survey_df.sort_values('alumni_employment')[['world_rank','institution','country','alumni_e
base_of_alumini_employment
```

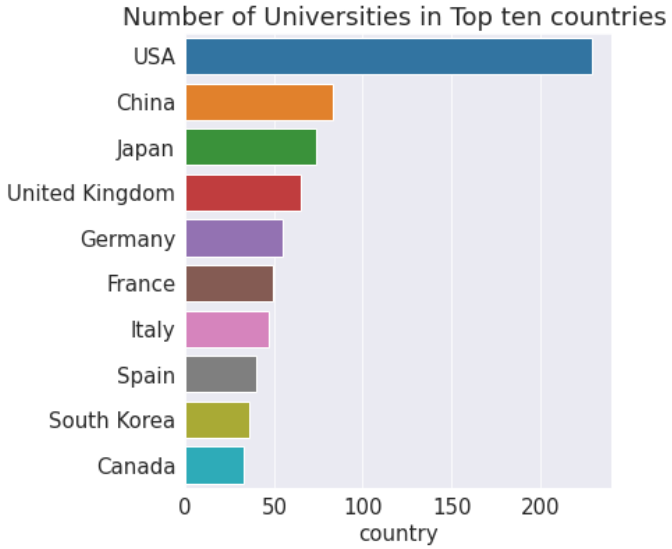
Out[38]:

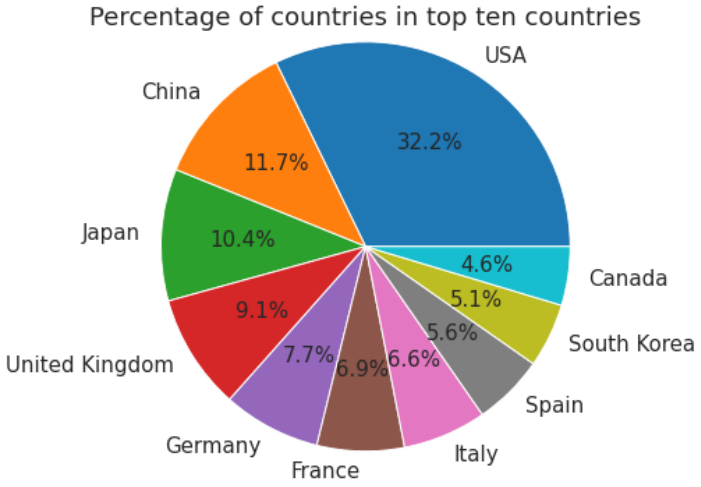
	world_rank	institution	country	alumni_employment	score
0	1	Harvard University	USA	1	100.00
1	2	Stanford University	USA	2	98.66
12	13	University of Tokyo	Japan	3	78.23
13	14	University of Pennsylvania	USA	4	77.60
33	34	Keio University	Japan	5	59.84
5	6	Columbia University	USA	6	96.14

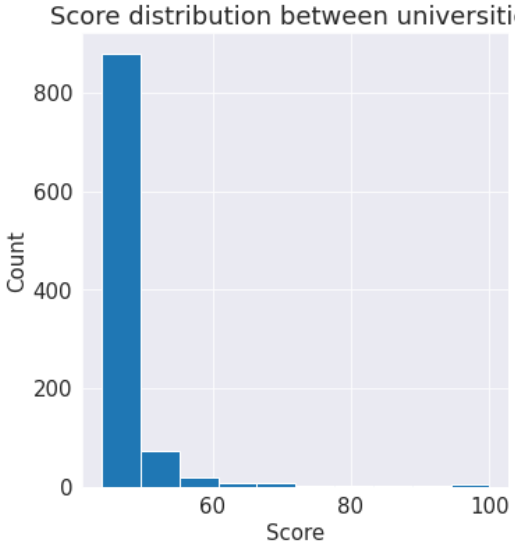
	world_rank	institution	country	alumni_employment	score
35	36	École Polytechnique	France	7	59.20
37	38	Waseda University	Japan	8	58.17
23	24	Seoul National University	South Korea	9	64.82
3	4	University of Cambridge	United Kingdom	10	96.81

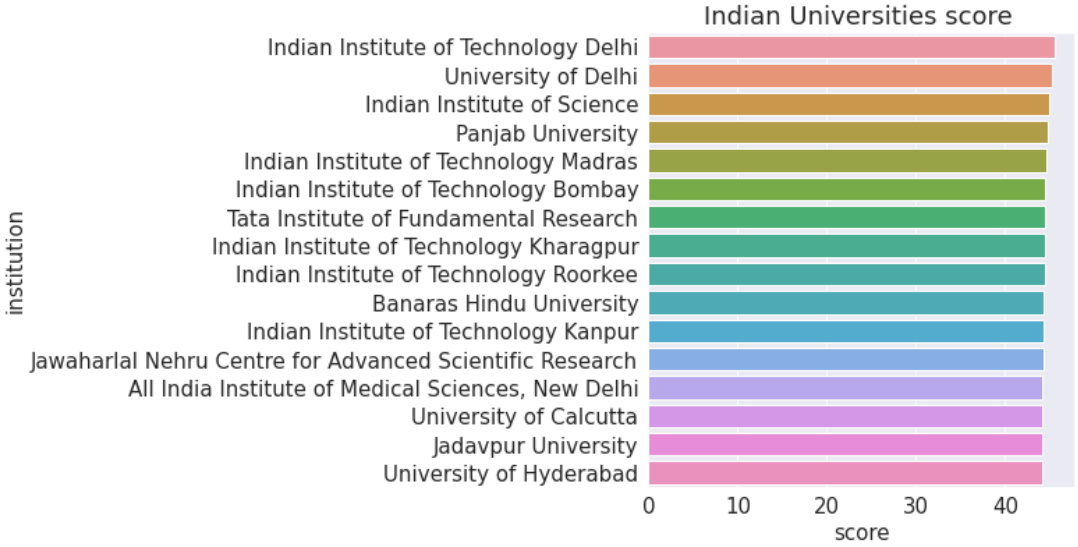
Complete visulization in one chart

In [39]:
```
fig, axes = plt.subplots(2, 2, figsize=(18,12))

# Use the axes for plotting

axes[0,0].set_title('Number of Universities in Top ten countries ')
sns.barplot(y=top_countries.index,x=top_countries,ax=axes[0,0]);


# Pass the axes into seaborn
axes[0,1].set_title('Percentage of countries in top ten countries')
axes[0,1].pie(top_countries,labels=top_countries.index,radius=1.2,autopct='%1.1f%%');

# Pass the axes into seaborn
axes[1,0].set_title('Score distribution between universities')
axes[1,0].set_xlabel('Score')
axes[1,0].set_ylabel('Count')
axes[1,0].hist(survey_df.score);
# Pass the axes into seaborn
axes[1,1].set_title('Indian Universities score ')
sns.barplot(y=survey_india_df.institution,x=survey_india_df.score);

plt.tight_layout(pad=2);
```









Asking and Answering Questions

We've already gained several insights about universities ranking by exploring individual columns of the dataset. Let's ask some specific questions and try to answer them using data frame operations and visualizations.

Q1: Which Indian university have most number of patent and alumini employment and what is top rank of Indian University

In [40]:
```
top_indian_university=survey_india_df[survey_india_df.national_rank==1][['institution','world_rank']]
top_indian_university
```

Out[40]:

	institution	world_rank
340	Indian Institute of Technology Delhi	341

Its mean `Indian Institute of Technology Delhi` is number one university of India with world rank `341`

In [41]:
```
top_rank_on_the_base_of_patent=survey_india_df.sort_values('patents',ascending=True)[['patents','institution']]
print(top_rank_on_the_base_of_patent.iloc[0]['patents'],top_rank_on_the_base_of_patent.iloc[0]['institution'])
```

```
176 Indian Institute of Technology Bombay
```

Its mean `Indian Institute of Technology Bombay` has rank `176` on the basis of patents, maximum among indian univeresities

In [42]:
```
top_rank_on_the_base_of_patent=survey_india_df.sort_values('alumni_employment',ascending=True)[['alumni_employment',
print(top_rank_on_the_base_of_patent.iloc[0]['alumni_employment'],top_rank_on_the_base_of_patent.iloc[0]['institutior
```

```
59 Indian Institute of Technology Delhi
```

Its mean `Indian Institute of Technology Delhi` has rank `56` on the basis of alumini_employment, maximum among indian univeresities, and it is good rank also

Q2: How many USA Universities are there in list

In [43]:
```
print(top_countries.values[0],
top_countries.index[0])
```

```
229 USA
```

Its mean there are `229` universities of `USA` in the survey and here is list of American Universities

In [44]:
```
list(survey_df[survey_df.country=='USA']['institution'])
```

Out[44]:
```
['Harvard University',
 'Stanford University',
 'Massachusetts Institute of Technology',
 'Columbia University',
 'University of California, Berkeley',
```

```
'University of Chicago',
'Princeton University',
'Cornell University',
'Yale University',
'California Institute of Technology',
'University of Pennsylvania',
'University of California, Los Angeles',
'Johns Hopkins University',
'New York University',
'University of Michigan, Ann Arbor',
'University of California, San Diego',
'Northwestern University',
'University of Wisconsin–Madison',
'University of California, San Francisco',
'Duke University',
'Rockefeller University',
'University of Texas at Austin',
'University of Washington - Seattle',
'University of Illinois at Urbana–Champaign',
'University of North Carolina at Chapel Hill',
'University of Virginia',
'Purdue University, West Lafayette',
'Dartmouth College',
'University of Pittsburgh - Pittsburgh Campus',
'Pennsylvania State University, University Park',
'University of Minnesota, Twin Cities',
'Ohio State University, Columbus',
'Rutgers University-New Brunswick',
'University of Southern California',
'Washington University in St. Louis',
'University of California, Davis',
'University of Colorado Boulder',
'University of Florida',
'Carnegie Mellon University',
'University of California, Santa Barbara',
'Boston University',
'University of Arizona',
'Vanderbilt University',
'University of Utah',
'University of Maryland, College Park',
'University of Texas Southwestern Medical Center',
'University of Notre Dame',
'Georgia Institute of Technology',
'University of Rochester',
'Brown University',
```

```
'Emory University',
'University of California, Irvine',
'University of Texas MD Anderson Cancer Center',
'Tufts University',
'Arizona State University',
'Texas A&M University, College Station',
'Case Western Reserve University',
'Indiana University - Bloomington',
'Georgetown University',
'Michigan State University',
'Rice University',
'Baylor College of Medicine',
'University of Colorado Denver',
'University of Miami',
'Stony Brook University',
'University of Texas at Dallas',
'University of Iowa',
'Southern Methodist University',
'Icahn School of Medicine at Mount Sinai',
'University of Alabama at Birmingham',
'University of California, Santa Cruz',
'University of Cincinnati',
'Wake Forest University',
'Indiana University-Purdue University Indianapolis',
'Oregon Health & Science University',
'Yeshiva University',
'University of Maryland, Baltimore',
'University of New Mexico',
'University of Massachusetts Medical School',
'University of Houston',
'Iowa State University',
'Wayne State University',
'University of South Florida - Tampa',
'University of Missouri–Columbia',
'University of Kansas',
'University of Georgia',
'George Washington University',
'University of Illinois at Chicago',
'University of California, Riverside',
'University of Connecticut',
'University of Massachusetts Amherst',
'University of Tennessee, Knoxville',
'North Carolina State University',
'University of Texas Health Science Center at San Antonio',
'University of Texas Health Science Center at Houston',
```

```
'Florida State University',
'Thomas Jefferson University',
'Virginia Polytechnic Institute and State University',
'Drexel University',
'Virginia Commonwealth University',
'Oregon State University',
'Lehigh University',
'University of Kentucky',
'Colorado State University - Fort Collins',
'Tulane University',
'University at Buffalo, The State University of New York',
'Brandeis University',
'Northeastern University',
'University of Delaware',
'Rensselaer Polytechnic Institute',
'City College of New York',
'University of Texas at San Antonio',
'Medical College of Wisconsin',
'University of Louisville',
'University of South Carolina - Columbia',
'Medical University of South Carolina',
'University of Nebraska–Lincoln',
'Rush University',
'University of Vermont',
'Boston College',
'Louisiana State University - Baton Rouge',
'University of Oregon',
'University of Oklahoma - Norman Campus',
'Wesleyan University',
'Kansas State University',
'University of New Hampshire',
'College of William and Mary',
'San Diego State University',
'Saint Louis University',
'Colorado School of Mines',
'University of Texas Medical Branch at Galveston',
'Washington State University, Pullman',
'Temple University',
'University at Albany, SUNY',
'University of Central Florida',
'University of Nebraska Medical Center',
'Brigham Young University',
'University of Alabama - Tuscaloosa',
'Oklahoma State University–Stillwater',
'George Mason University',
```

```
'Georgia Regents University',
'University of Denver',
'University of Arkansas for Medical Sciences',
'Loyola University Chicago',
'West Virginia University',
'Miami University',
'University of Dayton',
'University of Nevada, Reno',
'Ohio University',
'Syracuse University',
'University of Wyoming',
'Texas Tech University (TTU)',
'University of Oklahoma Health Sciences Center',
'Illinois Institute of Technology',
'Clemson University',
'University of Hawaii at Manoa',
'University of Nebraska Omaha',
'University of Maryland, Baltimore County',
'Creighton University',
'Georgia State University',
'University of Wisconsin–Milwaukee',
'SUNY Downstate Medical Center',
'New Mexico State University',
'University of Mississippi - Oxford Campus',
'University of Akron',
'New York Medical College',
'Auburn University',
'University of Arkansas - Fayetteville',
'University of Missouri–Kansas City',
'Montana State University - Bozeman',
'Utah State University',
'Baylor University',
'Kent State University',
'University of Montana - Missoula',
'Southern Illinois University Carbondale',
'University of Alaska Fairbanks',
'University of Toledo',
'LSU Health Sciences Center New Orleans',
'Florida International University',
'University of Rhode Island',
'Mississippi State University',
'University of New Orleans',
'Texas A&M Health Science Center',
'Louisiana Tech University',
'University of Texas at Arlington',
```

```
'State University of New York Upstate Medical University',
'Northern Illinois University',
'Binghamton University',
'Albany Medical College',
'University of Idaho',
'Old Dominion University',
'Portland State University',
'Loma Linda University',
'University of Maine, Orono',
'University of Nevada, Las Vegas',
'Rochester Institute of Technology',
'San Francisco State University',
'Marquette University',
'Missouri University of Science and Technology',
'Howard University',
'Rutgers, The State University of New Jersey - Newark',
'University of Memphis',
'University of Missouri–St. Louis',
'University of Alabama in Huntsville',
'University of Mississippi Medical Center',
'New Jersey Institute of Technology',
'East Carolina University',
'Northern Arizona University',
'University of North Texas, Denton',
'Michigan Technological University',
'North Dakota State University - Main Campus',
'University of North Carolina at Charlotte',
'Bowling Green State University',
'Florida Institute of Technology',
'University of Massachusetts Boston',
'The Catholic University of America',
'Wright State University - Dayton',
'Clarkson University',
'University of South Alabama',
'Hunter College',
'Florida Atlantic University',
'University of Massachusetts Lowell',
'Queens College, City University of New York',
'University of North Carolina at Greensboro',
'University of Southern Mississippi',
'Oakland University',
'University of North Dakota',
'University of Texas at El Paso',
'University of California, Merced']
```

Q3: Which is world's number 1 university

In [45]:
```
world_top=survey_df[survey_df.world_rank==1]
world_top
```

Out[45]:

	world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications	influence	citations	brc
0	1	Harvard University	USA	1	1	1	1	1	1	1	

So Harvard University is world's number one university as expected. It is number one in every field except one field which is patents.Harvard University score is 100 out of 100 that's amazing.

Q4: Which unversities is number 1 on the basic of quality_of_education

In [46]:
```
survey_df[survey_df.quality_of_education==1][['institution','country']]
```

Out[46]:

	institution	country
0	Harvard University	USA

It is also Harvard University which is world's best university

Q5: Which are top 10 universities that have most influence

In [47]:
```
most_influence=survey_df.sort_values('influence').copy().head(10)
most_influence=most_influence[['world_rank','institution','country','influence','score']]
most_influence
```

Out[47]:

	world_rank	institution	country	influence	score
0	1	Harvard University	USA	1	100.00
2	3	Massachusetts Institute of Technology	USA	2	97.54
1	2	Stanford University	USA	3	98.66
6	7	University of California, Berkeley	USA	4	92.25
20	21	University of California, San Diego	USA	5	66.59

	world_rank	institution	country	influence	score
3	4	University of Cambridge	United Kingdom	6	96.81
25	26	University of California, San Francisco	USA	7	63.69
10	11	Yale University	USA	8	86.61
11	12	California Institute of Technology	USA	9	84.40
30	31	University of Washington - Seattle	USA	10	60.61

these are top ten universities which are most influenceable in the world. As expect `9 out of 10 are from USA` . I think this is reason why america is so influenceable, powerfull and rich.

Inferences and Conclusion

We worked on a dataset that belong to a survey of worlds universities.In this survey on the basis of lot of parameters rank of universities is decided
The main objective of this project is to use the dataset to extract some informations about the universities.

We've drawn many inferences from the survey. Here's a summary of a few of them:

- Harvard University is worlds top university.
- Harvard University score is 100 out of 100 that's amazing.
- There are 59 countries which participated in this survey.
- It appears that highest number of universities are from the USA, number is 229 amongs 1000 universities from all across 59 countries of the world. On number 2 there is China with 83 and then Japan on number 3 with 74. Disappointmentily India is not in top 10
- minimum score is 44.02, maximum score is 100.0 and average is 46.86385 of universities
- Score distribution graph is showing that most of countries score lie between 44 to 50, only few universities have score above 70, number of such universities is too small.
    - Only Top 16 universities have score greater than equal to 70

- Only 16 universities are from India
- Indian Universities score is between 40 and 50. So Indian need to improove their universities
- So on the bases of patents MIT is number in the world. Overall rank 1 Harvard University rank is 3 on the basis of patents.
- Indian Institute of Technology Delhi is number one university of India with world rank 341
- Its mean Indian Institute of Technology Bombay has rank 176 on the basis of patents, maximum among indian univeresities

References and Future Work

This is list of some refrences

- World University Rankings: https://www.kaggle.com/mylesoneill/world-university-rankings
- Pandas user guide: https://pandas.pydata.org/docs/user_guide/index.html
- Matplotlib user guide: https://matplotlib.org/3.3.1/users/index.html
- Seaborn user guide & tutorial: https://seaborn.pydata.org/tutorial.html
- `opendatasets` Python library: https://github.com/JovianML/opendatasets