ng6-o2-chart Chart Library for Angular6 by TypeScript2

(LICENSE)

ng6-o2-chart is a chart library using d3.js (version 4) for Angular6 written by TypeScript2.

Test Project for This Library,
https://github.com/Ohtsu/Ng6O2ChartTest/ (https://github.com/Ohtsu/Ng6O2ChartTest/)

Sample Program for setting config data,
<>

Video Explanation (English),
<>

Video Explanation (Japanese),
<>

Overview

- *ng6-o2-chart* is a wrapper library of d3.js (version 4) for Angular6
- 12 main charts are supported

```
(Line,Bar,Pie,ScatterPlot,Histogram,Stack Bar, Geo Map, Geo Orthographic, Tree, Pack Layout, Choropleth,Force)
```

- Axis

```
You can include axis automatically by the configuration file.
```

- Legend

```
You can include legend automatically by the configuration file.
```

- Animation

```
You can animate such charts as Bar, Pie, Histogram, Stack Bar,Geo Orthographic and Pack Layout charts by the configuration file.
```

Prerequisite

- node.js
- Typescript2
- Angular6

Installation

To install this consumer project, run simply:

```
$ npm install
```

Start project

If you start local server as follows, you can get many kinds of charts in your browser by accessing **http://localhost:4200**.

```
$ ng serve
```

Version

- ng6-o2-chart-test : 0.1
- ng6-o2-chart : 0.1.
- Angular6 : 6.0.0
- TypeScript : 2.7.2
- d3.js : 4.3.0

Reference

- "Angular6 Custom Library: The definitive, step-by-step guide",
https://www.udemy.com/draft/1461368/learn/v4/content (https://www.udemy.com/draft/1461368/learn/v4/content)
- "Angular6用 カスタムライブラリの作成",
https://www.udemy.com/draft/1450138/learn/v4/content (https://www.udemy.com/draft/1450138/learn/v4/content)
- "データビジュアライゼーションのためのD3.js徹底入門 Webで魅せるグラフ&チャートの作り方",2014/6/6,by 古籏 一浩,
http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%3Daps&field-keywords=ISBN978-4-7973-6886-4&rh=i%3Aaps%2Ck%3AISBN978-4-7973-6886-4 (http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%253Daps&field-keywords=ISBN978-4-7973-6886-4&rh=i%253Aaps%252Ck%253AISBN978-4-7973-6886-4)
- "D3.js by Example",2015/12/29,by Michael Heydt
http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%3Daps&field-keywords=ISBN978-1-78528-008-5&rh=i%3Aaps%2Ck%3AISBN978-1-78528-008-5 (http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%253Daps&field-keywords=ISBN978-1-78528-008-5&rh=i%253Aaps%252Ck%253AISBN978-1-78528-008-5)
- "Mastering D3.js",2014/8/25,by Pablo Navarro,
http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%3Daps&field-keywords=ISBN978-1-78328-627-0&rh=i%3Aaps%2Ck%3AISBN978-1-78328-627-0 (http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%253Daps&field-keywords=ISBN978-1-78328-627-0&rh=i%253Aaps%252Ck%253AISBN978-1-78328-627-0)
- "Data Visualization With D3 and Angularjs",2015/4/27,by Christoph Korner,
http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%3Daps&field-keywords=ISBN978-1-78439-848-4&rh=i%3Aaps%2Ck%3AISBN978-1-78439-848-4 (http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%253Daps&field-keywords=ISBN978-1-78439-848-4&rh=i%253Aaps%252Ck%253AISBN978-1-78439-848-4)
- "Mastering TypeScript",2015/4/23,by Nathan Rozentals,
http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%3Daps&field-keywords=ISBN978-1-78439-966-5&rh=i%3Aaps%2Ck%3AISBN978-1-78439-966-5 (http://www.amazon.co.jp/s/ref=nb_sb_noss?__mk_ja_JP=%E3%82%AB%E3%82%BF%E3%82%AB%E3%83%8A&url=search-alias%253Daps&field-keywords=ISBN978-1-78439-966-5&rh=i%253Aaps%252Ck%253AISBN978-1-78439-966-5)
- "D3 Tips and Tricks v4.x",by Malcolm Maclean,Leanpub,
https://leanpub.com/d3-t-and-t-v4/read (https://leanpub.com/d3-t-and-t-v4/read)

Change Log

- 2018.6.13 version 1.0 uploaded

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Step by Step Intallation of *ng6-o2-chart*

Video,
https://youtu.be/fRQ0qrNm-To (https://youtu.be/fRQ0qrNm-To)

Install @angular/cli

```
$ npm install -g @angular/cli
```

Create New Project

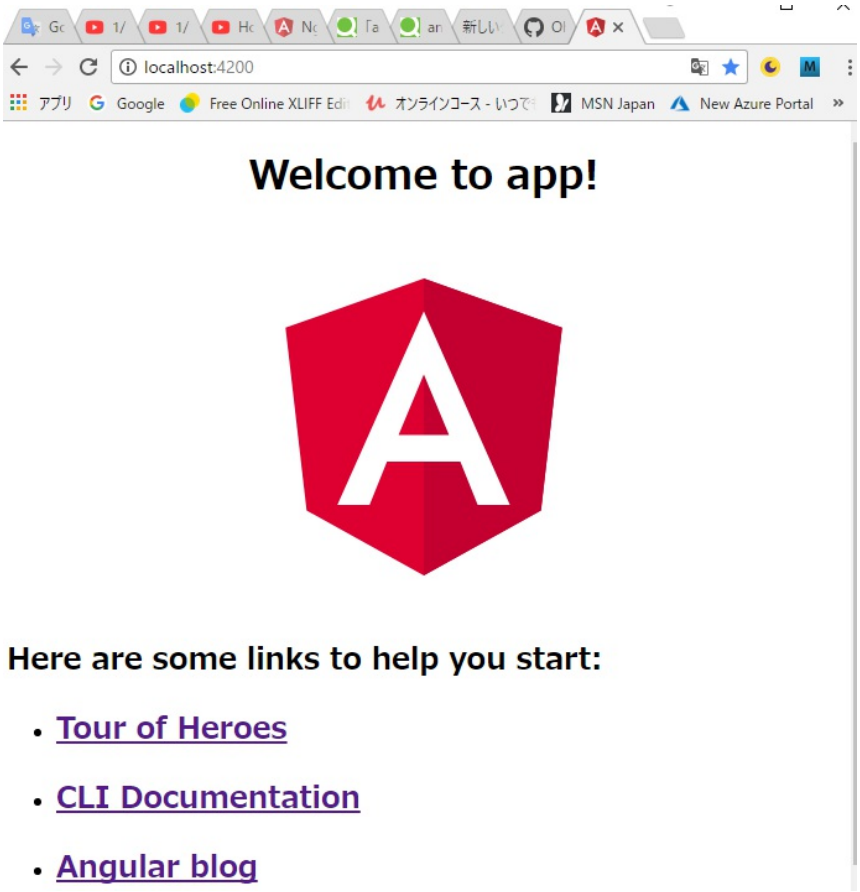
```
$ ng new sample-chart (Your project name)
$ cd sample-chart
```

Check Your Program

If you start local server as follows, you can get the first page in your browser by accessing **http://localhost:4200**.

```
$ ng serve
```

- ***First Page***



Stop Local Server

Input **Ctrl+C** and **y+Return** to stop the local server.

Install ng6-o2-chart

```
$ npm install d3@4.3.0 --save
$ npm install ng6-o2-chart --save
```

Modify app.module.ts

```
$ cd src/app
```

Change directory to "src/app", you will find **app.module.ts**.
Modify this file as follows.

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';
import { Ng6O2ChartModule } from 'ng6-o2-chart';  // <= Add

@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule,
    Ng6O2ChartModule   // <= Add
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

Modify app.component.ts

In the same directory, modify **app.component.ts** as follows.

```
import { Ng6O2ChartModule } from 'ng6-o2-chart';
import { Component } from '@angular/core';

import * as  ChartConst from 'ng6-o2-chart';

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})

export class AppComponent {
  title = 'app';

  // Add Start -------------------------------------------


  chartType:string;
  configData:any;
  barDataJson:any;

  geoMapDataJson:any;
  geoOrthographicDataJson:any;
  choroplethDataJson:any;
  scatterPlotDataJson:any;
  lineDataJson:any;
  histogramDataJson:any;
  pieDataJson:any;
  packLayoutDataJson:any;
  treeMapDataJson:any;
  stackBarDataJson:any;
  treeDataJson:any;
  forceDataJson:any;
  DataSetJson:string;

  lineTypeName:string;
  barTypeName: string;
  pieTypeName:string;
  scatterPlotTypeName:string;
  histogramTypeName:string;
  stackBarTypeName:string;
  geoMapTypeName:string;
  geoOrthographicTypeName:string;
  treeMapTypeName:string;
  packLayoutTypeName:string;
  choroplethTypeName:string;
  treeTypeName:string;
  forceTypeName:string;

  constructor() {
    this.barTypeName       = ChartConst.LINE_CHART_TYPE_NAME;
    this.lineTypeName       = ChartConst.LINE_CHART_TYPE_NAME;
    this.barTypeName        = ChartConst.BAR_CHART_TYPE_NAME;
    this.pieTypeName        = ChartConst.PIE_CHART_TYPE_NAME;
    this.scatterPlotTypeName    = ChartConst.SCATTER_PLOT_CHART_TYPE_NAME;
    this.histogramTypeName     = ChartConst.HISTOGRAM_CHART_TYPE_NAME;
    this.stackBarTypeName     = ChartConst.STACK_BAR_CHART_TYPE_NAME;
    this.geoMapTypeName     = ChartConst.GEO_MAP_CHART_TYPE_NAME;
    this.geoOrthographicTypeName= ChartConst.GEO_ORTHOGRAPHIC_CHART_TYPE_NAME;
    this.treeMapTypeName     = ChartConst.TREE_MAP_CHART_TYPE_NAME;
    this.packLayoutTypeName     = ChartConst.PACK_LAYOUT_CHART_TYPE_NAME;
    this.choroplethTypeName     = ChartConst.CHOROPLETH_CHART_TYPE_NAME;
    this.treeTypeName       = ChartConst.TREE_CHART_TYPE_NAME;
    this.forceTypeName      = ChartConst.FORCE_CHART_TYPE_NAME;

    this.initilizeData();
  }


  private initilizeData() {
    // ConfigData = this.httpClient.get('assets/json/ConfigData.json');
    this.configData = {
      // tslint:disable-next-line:quotemark
      "className": {
        'axis': 'axis',
        'axisXBorder': 'axis_x',
        'axisXText': 'axis-x-text',
```

```
  'bar': 'bar',
  'barValue': 'bar-value',
  'line': 'line',
  'multiLinePrefix': 'line-',
  'grid': 'grid',
  'pie': 'pie',
  'pieInnerTitle': 'pie-inner-title',
  'pieInnerRadius': 'total',
  'histogram': 'histogram',
  'histogramBar': 'histogram-bar',
  'treemap': 'treemap',
  'treemapLabel': 'treemap-label',
  'packlayout': 'packlayout',
  'packlayoutLabel': 'packlayout-label',
},
'label': {
    'display': true,
},
'title': {
  'display': true,
  'name': 'Title',
  'className': 'chart-title',
  'height': 30,
  'leftMargin': -20,
  'bottomMargin': 10
},
'maxValue': {
  'auto': true,
  'x': 100,
  'y': 100,
},
'legend': {
  'display': true,
  'position':          'right',
  'totalWidth': 80,
  'initXPos': 5,
  'initYPos': 10,
  'rectWidth': 10,
  'rectHeight': 10,
  'xSpacing': 2,
  'ySpacing': 2
},
'color': {
  'auto': true, //
  'defaultColorNumber': 10,
  'opacity': 1.0,
  'userColors': [
    'blue',
    'red',
    'green',
    'yellow',
    'PaleGoldenrod',
    'Khaki',
    'DarkKhaki',
    'Gold',
    'Cornsilk',
    'BlanchedAlmond',
    'Bisque',
    'NavajoWhite',
    'Wheat',
    'BurlyWood',
    'Tan',
    'RosyBrown',
    'SandyBrown',
    'Goldenrod',
    'DarkGoldenrod',
    'Peru',
    'Chocolate'
  ],
  'focusColor': 'red',
},
'pie': {
  'innerRadius': {
    'percent': 20,
    'title': 'Total'
  },
  'value': {
    'display': true,
  },
  'percent':{
    'display': false,
  }
},
'line': {
  'legend': 'lineEnd',
  'interpolate' : 'linear',
},
'grid': {
  'x': {
    'display': true,
  },
  'y':{
    'display': true,
  },
},
'margin': {
  'top': 30,
  'left': 30,
  'right': 10,
  'bottom': 20,
  'between': 5
},
'axis': {
  'rotation': 0,
```

```
    'borderLineWidth': 1,
    'xLabel': {
      'leftMargin': 0,
      'bottomMargin': 5
    },
    'yLabel':{
      'leftMargin': 0,
      'bottomMargin': 0
    },
  },
  'animation':{
    'enable':true,
    'duration':4000,
  },
};

this.barDataJson =
{
  'series':[
    'English',
    'Math'
  ],
  'data':[
    {
      'x': 'suzuki',
      'y': [92,73],
    },
    {
      'x': 'inoue',
      'y': [69,45],
    },
    {
      'x': 'sato',
      'y': [70,100],
    },
    {
      'x': 'tanaka',
      'y': [43,66],
    },
    {
      'x': 'ida',
      'y': [60,70],
    },
    {
      'x': 'kato',
      'y': [55,63],
    },
  ],
};

this.lineDataJson = {
  'series':[
    'year',
    'sell',
  ],
  'data':[
    {
      'name': 'software',
      'value':[
        {
          'x':'2010',
          'y':18
        },
        {
          'x':'2011',
          'y':22
        },
        {
          'x':'2012',
          'y':30
        },
        {
          'x':'2013',
          'y':31
        },
      ]
    },
    {
      'name': 'hardware',
      'value':[
        {
          'x':'2010',
          'y':15
        },
        {
          'x':'2011',
          'y':16
        },
        {
          'x':'2012',
          'y':10
        },
        {
          'x':'2013',
          'y':21
        },
      ]
    },
    {
      'name': 'device',
      'value':[
        {
          'x':'2010',
          'y':25
```

```
        },
        {
          'x':'2011',
          'y':26
        },
        {
          'x':'2012',
          'y':30
        },
        {
          'x':'2013',
          'y':31
        },
      ]
    },
    {
      'name': 'others',
      'value':[
        {
          'x':'2010',
          'y':100
        },
        {
          'x':'2011',
          'y':16
        },
        {
          'x':'2012',
          'y':20
        },
        {
          'x':'2013',
          'y':41
        },
      ]
    },
  ],
};


this.geoOrthographicDataJson =
{
'map':{
      'baseGeoDataUrl': 'https://raw.githubusercontent.com/Ohtsu/data/master/o2-chart/world.geojson',
      'keyDataName':'features',
      'targetPropertyName':'properties.name',
      'scale':160,
      'colorNumber':10,
      'rotate':{
        'horizontal':210,
        'vertical':5
      },
      'clipAngle':90,
      'oceanColor':'navy',
      'antarcticaColor':'white',
    },
    'data':[
    {
      'name':'Australia',
      'color':'red'
    },
    {
      'name':'Antarctica',
      'color':'white'
    },
    {
      'name':'Japan',
      'color':'teal'
    },
    ]
}

this.geoMapDataJson =
{
    'map':{
      'baseGeoDataUrl':'https://raw.githubusercontent.com/Ohtsu/data/master/o2-chart/world.geojson',
      'scale':75,
      'keyDataName':'features',
      'targetPropertyName':'properties.name',
    },
    'data':[
    {
      'name':'Australia',
      'color':'red'
    },
    {
      'name':'Antarctica',
      'color':'white'
    },
    {
      'name':'Japan',
      'color':'blue'
    },
    ],
};


this.stackBarDataJson =
{
    'config':{
    'timeFormat':'%Y',
    },
    'series':[
    'year',
```

```
    'sell',
    ],
    'data':[
    {
      'name': 'software',
      'value':[
        {
          'x':'2010',
          'y':18
        },
        {
          'x':'2011',
          'y':22
        },
        {
          'x':'2012',
          'y':30
        },
        {
          'x':'2013',
          'y':31
        },
      ]
    },
    {
      'name': 'hardware',
      'value':[
        {
          'x':'2010',
          'y':15
        },
        {
          'x':'2011',
          'y':16
        },
        {
          'x':'2012',
          'y':10
        },
        {
          'x':'2013',
          'y':21
        },
      ]
    },
    {
      'name': 'device',
      'value':[
        {
          'x':'2010',
          'y':25
        },
        {
          'x':'2011',
          'y':26
        },
        {
          'x':'2012',
          'y':30
        },
        {
          'x':'2013',
          'y':31
        },
      ]
    },
    {
      'name': 'others',
      'value':[
        {
          'x':'2010',
          'y':5
        },
        {
          'x':'2011',
          'y':16
        },
        {
          'x':'2012',
          'y':20
        },
        {
          'x':'2013',
          'y':41
        },
      ]
    },
    ],
};



this.scatterPlotDataJson =
{
    'series':[
    'seriesA',
    'seriesB',
    'seriesC'
    ],
    'data':[
    {
      'name': 'suzuki',
      'value':[
        {'x':30,'y':40,'r':5},
```

```
        {'x':120,'y':115,'r':10},
        {'x':125,'y':90,'r':2},
        {'x':150,'y':160,'r':1},
        {'x':150,'y':160,'r':3},
        {'x':128,'y':215,'r':5},
        {'x':130,'y':40,'r':15},
        {'x':220,'y':115,'r':25},
      ]
    },
    {
      'name': 'inoue',
      'value':[
        {'x':130,'y':140,'r':5},
        {'x':20,'y':15,'r':10},
        {'x':25,'y':190,'r':2},
        {'x':250,'y':60,'r':1},
        {'x':50,'y':60,'r':3},
        {'x':28,'y':15,'r':5},
        {'x':230,'y':140,'r':15},
        {'x':20,'y':215,'r':25},
      ]
    },
    ],
};

this.histogramDataJson =
{
    'range':[0,100],
    'bins': [0,10,20,30,40,50,60,70,80,90,100],
    'data':[
    50,95,60,44,60,50,35,20,10,8,
    56,70,65,42,22,33,40,53,52,89,
    90,55,50,55,65,72,45,35,15,45,
    50,95,60,44,60,50,35,20,10,8,
    56,70,65,42,22,33,40,53,52,89,
    90,55,50,55,65,72,45,35,15,45,
    50,95,60,44,60,50,35,20,10,8,
    56,70,65,42,22,33,40,53,52,89,
    90,55,50,55,65,72,45,35,15,45,
    ],
};


this.packLayoutDataJson = {
    'name':'United States', 'value' :281421906,
    'children' : [
    {'name':'California', 'value' :33871648},
    {'name':'Texas', 'value' :20851820},
    {'name':'New York', 'value' :18976457},
    {'name':'Florida', 'value' :15982378},
    {'name':'Illinois', 'value' :12419293},
    {'name':'Pennsylvania', 'value' :12281054},
    {'name':'Ohio', 'value' :11353140},
    ]
}

    this.treeDataJson =
    {
        'name': 'Eve',
        'children': [
            { 'name': 'Cain'
            },
            {
                'name': 'Seth',
                'children': [
                    { 'name': 'Enos' },
                    { 'name': 'Noam' }
                ]
            },
            { 'name': 'Abel'
            },
            {
                'name': 'Awan',
                'children': [
                    { 'name': 'Enoch' }
                ]
            },
            { 'name': 'Azura'
            },
        ]
    };


this.treeMapDataJson = {
    'name': 'Root',
    'children': [
    { 'name': 'Dir1', 'children': [
        { 'name': 'Dir2', 'children': [
            { 'name': 'FileA', value: 5000 },
            { 'name': 'FileB', value: 3000 },
            { 'name': 'Dir3', 'children': [
                { 'name': 'FileC', value: 2000 },
                { 'name': 'Dir4', 'children': [
                    { 'name': 'FileD', value: 1000 },
                    { 'name': 'FileE', value: 1500 }
                  ]
                }
              ]
            }
          ]
        }
      ]
    }
    ]
```

```
}


this.choroplethDataJson = {
    'map':{
    'baseGeoDataUrl':'https://raw.githubusercontent.com/Ohtsu/data/master/o2-chart/japan.geojson',
    'scale':900,
    'center':[137.571,37.500],
    'startColor':'blue',
    'endColor':'red',
    'colorNumber':10,
    'keyDataName':'features',
    'targetPropertyName':'properties.id'
    },

    'data':
    [
    {
      'id':1,
      'value':7.12
    },
    {
      'id':2,
      'value':8.97
    },
    {
      'id':3,
      'value':7.07
    },
    {
      'id':4,
      'value':7.78
    },
    {
      'id':5,
      'value':6.97
    },
    {
      'id':6,
      'value':5.79
    },
    {
      'id':7,
      'value':7.14
    },
    {
      'id':8,
      'value':6.68
    },
    {
      'id':9,
      'value':6.28
    },
    {
      'id':10,
      'value':6.32
    },
    {
      'id':11,
      'value':6.29
    },
    {
      'id':12,
      'value':6.14
    },
    {
      'id':13,
      'value':5.87
    },
    {
      'id':14,
      'value':5.75
    },
    {
      'id':15,
      'value':5.50
    },
    {
      'id':16,
      'value':5.21
    },
    {
      'id':17,
      'value':5.37
    },
    {
      'id':18,
      'value':5.23
    },
    {
      'id':19,
      'value':6.18
    },
    {
      'id':20,
      'value':5.44
    },
    {
      'id':21,
      'value':5.57
    },
    {
      'id':22,
      'value':5.81
```

```
    },
    {
      'id':23,
      'value':5.09
    },
    {
      'id':24,
      'value':5.08
    },
    {
      'id':25,
      'value':5.07
    },
    {
      'id':26,
      'value':6.21
    },
    {
      'id':27,
      'value':7.97
    },
    {
      'id':28,
      'value':6.54
    },
    {
      'id':29,
      'value':7.41
    },
    {
      'id':30,
      'value':6.74
    },
    {
      'id':31,
      'value':5.90
    },
    {
      'id':32,
      'value':4.55
    },
    {
      'id':33,
      'value':7.24
    },
    {
      'id':34,
      'value':5.35
    },
    {
      'id':35,
      'value':5.93
    },
    {
      'id':36,
      'value':7.62
    },
    {
      'id':37,
      'value':6.25
    },
    {
      'id':38,
      'value':7.26
    },
    {
      'id':39,
      'value':7.70
    },
    {
      'id':40,
      'value':7.84
    },
    {
      'id':41,
      'value':6.32
    },
    {
      'id':42,
      'value':6.64
    },
    {
      'id':43,
      'value':6.67
    },
    {
      'id':44,
      'value':7.07
    },
    {
      'id':45,
      'value':7.01
    },
    {
      'id':46,
      'value':6.84
    },
    {
      'id':47,
      'value':11.0
    }
    ]
};
```

```
this.pieDataJson =
{
    'data':[
    {
      'name': 'software',
      'value':30,
    },
    {
      'name': 'hardware',
      'value':25
    },
    {
      'name': 'device',
      'value':16
    },
    {
      'name': 'others',
      'value':4
    },
    ],
};


this.forceDataJson =
{
    'groups': [
    {'id': 1, 'name': 'Hokkaido'},
    {'id': 2, 'name': 'Tohoku'},
    {'id': 3, 'name': 'Kanto'},
    {'id': 4, 'name': 'Chubu'},
    {'id': 5, 'name': 'kinki'},
    {'id': 6, 'name': 'Chugoku'},
    {'id': 7, 'name': 'Shikoku'},
    {'id': 8, 'name': 'Kyushu'},
    ],
    'nodes': [
    {'id': 'Sapporo', 'group': 1},
    {'id': 'Sendai', 'group': 2},
    {'id': 'Morioka', 'group': 2},
    {'id': 'Akita', 'group': 2},
    {'id': 'Fukushima', 'group': 2},
    {'id': 'Mito', 'group': 3},
    {'id': 'Utsunomiya', 'group': 3},
    {'id': 'Saitama', 'group': 3},
    {'id': 'Chiba', 'group': 3},
    {'id': 'Tokyo', 'group': 3},
    {'id': 'Kofu', 'group': 4},
    {'id': 'Nagano', 'group': 4},
    {'id': 'Niigata', 'group': 4},
    {'id': 'Toyama', 'group': 4},
    {'id': 'Kanazawa', 'group': 4},
    {'id': 'Fukui', 'group': 4},
    {'id': 'Shizuoka', 'group': 4},
    {'id': 'Nagoya', 'group': 4},
    {'id': 'Gifu', 'group': 4},
    {'id': 'Otsu', 'group': 5},
    {'id': 'Kyoto', 'group': 5},
    {'id': 'Osaka', 'group': 5},
    {'id': 'Kobe', 'group': 5},
    {'id': 'Nara', 'group': 5},
    {'id': 'Kyoto', 'group': 5},
    {'id': 'Tottori', 'group': 6},
    {'id': 'Hiroshima', 'group': 6},
    {'id': 'Matsue', 'group': 6},
    {'id': 'Matsuyama', 'group': 7},
    {'id': 'Tokushima', 'group': 7},
    {'id': 'Kochi', 'group': 7},
    {'id': 'Fukuoka', 'group': 8},
    {'id': 'Nagasaki', 'group': 8},
    {'id': 'Kumamoto', 'group': 8},
    {'id': 'Naha', 'group': 8},
    ],
    'links': [
        {'source': 'Sendai', 'target': 'Sapporo', 'value': 1},
        {'source': 'Morioka', 'target': 'Sapporo', 'value': 1},
        {'source': 'Akita', 'target': 'Sapporo', 'value': 1},
        {'source': 'Fukushima', 'target': 'Sapporo', 'value': 1},
        {'source': 'Morioka', 'target': 'Sendai', 'value': 10},
        {'source': 'Akita', 'target': 'Sendai', 'value': 10},
        {'source': 'Fukushima', 'target': 'Sendai', 'value': 10},
        {'source': 'Chiba', 'target': 'Tokyo', 'value': 20},
        {'source': 'Utsunomiya', 'target': 'Tokyo', 'value': 20},
        {'source': 'Mito', 'target': 'Tokyo', 'value': 20},
        {'source': 'Saitama', 'target': 'Tokyo', 'value': 30},
        {'source': 'Kofu', 'target': 'Tokyo', 'value': 30},
        {'source': 'Nagano', 'target': 'Tokyo', 'value': 30},
        {'source': 'Naha', 'target': 'Tokyo', 'value': 30},
        {'source': 'Osaka', 'target': 'Tokyo', 'value': 40},
        {'source': 'Sendai', 'target': 'Tokyo', 'value': 40},
        {'source': 'Hiroshima', 'target': 'Tokyo', 'value': 20},
        {'source': 'Shizuoka', 'target': 'Nagoya', 'value': 10},
        {'source': 'Tokyo', 'target': 'Nagoya', 'value': 40},
        {'source': 'Osaka', 'target': 'Nagoya', 'value': 40},
        {'source': 'Kyoto', 'target': 'Nagoya', 'value': 40},
        {'source': 'Kyoto', 'target': 'Osaka', 'value': 30},
        {'source': 'Hiroshima', 'target': 'Osaka', 'value': 20},
        {'source': 'Toyama', 'target': 'Kanazawa', 'value': 10},
        {'source': 'Fukui', 'target': 'Kanazawa', 'value': 10},
        {'source': 'Niigata', 'target': 'Kanazawa', 'value': 10},
        {'source': 'Tottori', 'target': 'Kobe', 'value': 10},
        {'source': 'Tottori', 'target': 'Hiroshima', 'value': 10},
        {'source': 'Matsue', 'target': 'Hiroshima', 'value': 10},
        {'source': 'Matsuyama', 'target': 'Hiroshima', 'value': 10},
        {'source': 'Tokushima', 'target': 'Kochi', 'value': 10},
```

```
            {'source': 'Matsuyama', 'target': 'Kochi', 'value': 10},
            {'source': 'Nagasaki', 'target': 'Fukuoka', 'value': 10},
            {'source': 'Kumamoto', 'target': 'Fukuoka', 'value': 10},
            {'source': 'Naha', 'target': 'Fukuoka', 'value': 10},
               ]
        };

  }


}
```