udm-chart Chart Library for Angular6 by TypeScript2

(LICENSE)

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

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

Video Explanation (English),
https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/ (https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/)

Video Explanation (Japanese),
https://www.udemy.com/angular5-l/ (https://www.udemy.com/angular5-l/)

Overview

- *udm-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.

```
$ ng serve -o
```

Version

- udm-chart-test : 0.3
- ng6-udm-chart : 0.2.
- Angular6 : 6.0.0
- TypeScript : 2.7.2
- d3.js : 4.3.0

Reference

- "Angular 5, Angular 6 Custom Library: Step-by-step guide",
https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/ (https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/)
- "Discount Coupon Code (until 2018.7.12)",
https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/?couponCode=CUSTLIB-EN-20180713 (https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/?couponCode=CUSTLIB-EN-20180713)
- "Angular 5, Angular 6用 カスタムライブラリの作成: 完全ステップ・バイ・ステップ・ガイド",
https://www.udemy.com/angular5-l/ (https://www.udemy.com/angular5-l/)
- "ディスカウント・クーポン(2018.7.12まで)",
https://www.udemy.com/angular5-l/?couponCode=NG5-CUSLIB-JA-0712 (https://www.udemy.com/angular5-l/?couponCode=NG5-CUSLIB-JA-0712)
- "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

- 2018.6.20 version 0.3 uploaded

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Step by Step Intallation of *udm-chart*

Video Explanation (English),
https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/ (https://www.udemy.com/angular5-custom-library-the-definitive-step-by-step-guide/)

Video Explanation (Japanese),
https://www.udemy.com/angular5-l/ (https://www.udemy.com/angular5-l/)

Install @angular/cli

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

Create New Project

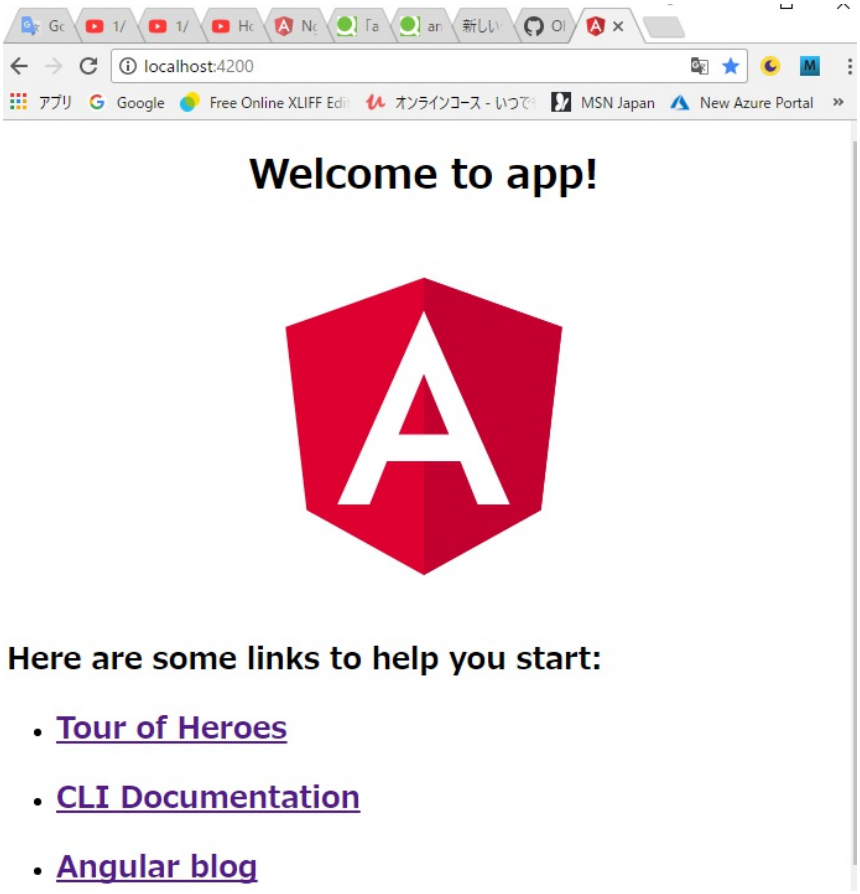
```
$ ng new sample-chart (Your project name)
$ cd sample-chart
```

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 -o
```

- ***First Page***



Stop Local Server

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

Install d3.js and ng6-udm-chart

```
$ npm install d3@4.3.0 --save
$ npm install ng6-udm-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 { Ng6UdmChartModule } from 'ng6-udm-chart';  // <= Add

@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule,
    Ng6UdmChartModule   // <= Add
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

Modify app.component.ts

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

```
import { Ng6UdmChartModule } from 'ng6-udm-chart';
import { Component } from '@angular/core';

import * as  ChartConst from 'ng6-udm-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},
               ]
        };

  }


  // Add End -------------------------------------------

}
```

Modify app.component.html

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

```
<div style="text-align:center">
  <hr>
  <h2>GeoOrthographic</h2>
  <lib-Ng6UdmChart [chartType]="geoOrthographicTypeName" [configData]="configData"  [graphData]="geoOrthographicDataJson" [svgWidth]="'600'"
[svgHeight]="'400'"></lib-Ng6UdmChart>
  <hr>
  <h2>Bar</h2>
  <lib-Ng6UdmChart [chartType]="barTypeName" [configData]="configData"  [graphData]="barDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-Ng6UdmChart>
  <hr>
  <h2>Pie</h2>
  <lib-Ng6UdmChart [chartType]="pieTypeName" [configData]="configData"  [graphData]="pieDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-Ng6UdmChart>
  <hr>
  <h2>ScatterPlot</h2>
  <lib-Ng6UdmChart [chartType]="scatterPlotTypeName" [configData]="configData"  [graphData]="scatterPlotDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>Histogram</h2>
  <lib-Ng6UdmChart [chartType]="histogramTypeName" [configData]="configData"  [graphData]="histogramDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>PackLayout</h2>
  <lib-Ng6UdmChart [chartType]="packLayoutTypeName" [configData]="configData"  [graphData]="packLayoutDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>Tree</h2>
  <lib-Ng6UdmChart [chartType]="treeTypeName" [configData]="configData"  [graphData]="treeDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-Ng6UdmChart>
  <hr>

  <h2>Line</h2>
  <lib-Ng6UdmChart [chartType]="lineTypeName" [configData]="configData"  [graphData]="lineDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-Ng6UdmChart>
  <hr>
  <h2>GeoMap</h2>
  <lib-Ng6UdmChart [chartType]="geoMapTypeName" [configData]="configData"  [graphData]="geoMapDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>StackBar</h2>
  <lib-Ng6UdmChart [chartType]="stackBarTypeName" [configData]="configData"  [graphData]="stackBarDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>Choropleth</h2>
  <lib-Ng6UdmChart [chartType]="choroplethTypeName" [configData]="configData"  [graphData]="choroplethDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-
Ng6UdmChart>
  <hr>
  <h2>Force</h2>
  <lib-Ng6UdmChart [chartType]="forceTypeName" [configData]="configData"  [graphData]="forceDataJson" [svgWidth]="'600'" [svgHeight]="'400'"></lib-Ng6UdmChart>
</div>
```

Modify styles.css

Change to the parent directory, you will find **styles.css**. Modify the file as follows.

```
$ cd ..
```

```
.line {fill:none; stroke:black;stroke-width: 1.5;}
.line-0 {fill:none; stroke:#1f77b4;stroke-width: 1.5;stroke-dasharray:4,10;}
.line-1 {fill:none; stroke:#ff7f0e;stroke-width: 1.5;stroke-dasharray:2,5.10;}
.line-2 {fill:none; stroke:#2ca02c;stroke-width: 1.5;}
.line-3 {fill:none; stroke:#d62728;stroke-width: 1.5;}
.line-4 {fill:none; stroke:#9467bd;stroke-width: 1.5;}
.line-5 {fill:none; stroke:#8c564b;stroke-width: 1.5;}
.line-6 {fill:none; stroke:#e377c2;stroke-width: 1.5;}
.line-7 {fill:none; stroke:#7f7f7f;stroke-width: 1.5;}
.line-8 {fill:none; stroke:#bcbd22;stroke-width: 1.5;}
.line-9 {fill:none; stroke:b#17becf;stroke-width: 1.5;}

.bar { fill:#aaa; stroke:white;stroke-width: 1;}
.bar-value { fill:black;font-size: 8pt;}
.name { font-size: 10pt;text-anchor: middle}
path {fill:white;stroke:black;stroke-width:0.5;}
.axis text {
    font-family: sans-serif;
    font-size: 11px;
}
.axis path,
.axis line {
    fill: none;
    stroke: black;
}
.axis_x line {
    fill: none;
    stroke: black;
}
.chart-title { fill:red;font-size: 18pt;text-anchor: middle;}
.histogram-bar{fill:blue; stroke:white;stroke-width: 1;}
.axis-x-text{ fill:blue;font-size: 12pt;}
.treemap { stroke:black;fill:#777}
.treemap-label { font-size: 10pt;text-anchor: middle}
.packlayout{ stroke:black;}
.packlayout-label{ font-size: 10pt;text-anchor: middle}
.pie-inner-title {font-size:9pt;text-anchor:middle;}
.pieNum {font-size:10pt;text-anchor:middle;}
.grid {stroke:gray;stroke-dasharray: 4,2;shape-rendering:crispEdges}

.tree-node circle {
    fill: #fff;
    stroke: steelblue;
    stroke-width: 3px;
}
.tree-node text {
    font: 12px sans-serif;
}
.tree-node-internal text {
    text-shadow: 0 1px 0 #fff, 0 -1px 0 #fff, 1px 0 0 #fff, -1px 0 0 #fff;
}
.tree-node-link {
    fill: none;
    stroke: #ccc;
    stroke-width: 2px;
}
.force-links line {
stroke: #999;
stroke-opacity: 0.6;
}

.force-nodes circle {
stroke: #fff;
stroke-width: 1.5px;
}
```

Restart local server

Restart the local server as follows.

```
$ ng serve -o
```

And you will get many charts in your browser.

- ***First Chart (GeoOrthographic)***

GeoOrthographic

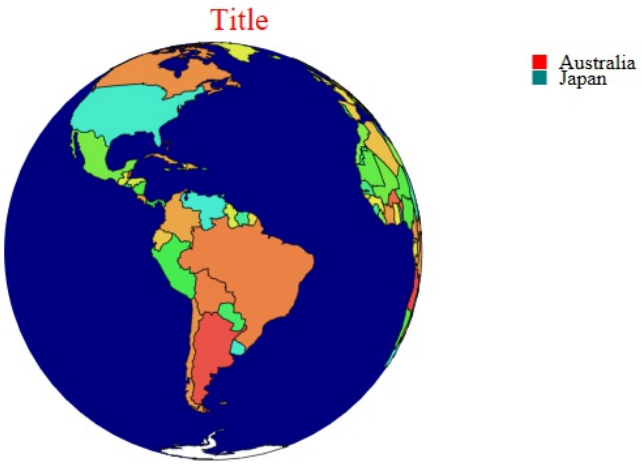


Chart Data

There are two types of data:**configData**,**graphData**.

- **configData**

This is a common setting data of all charts. In this file, you can set info as follows.

-Class name defined by "html" file

-Title Name

-Legend (display or not, position, size)

-Color (Auto color number: 10 or 20, Opacity)

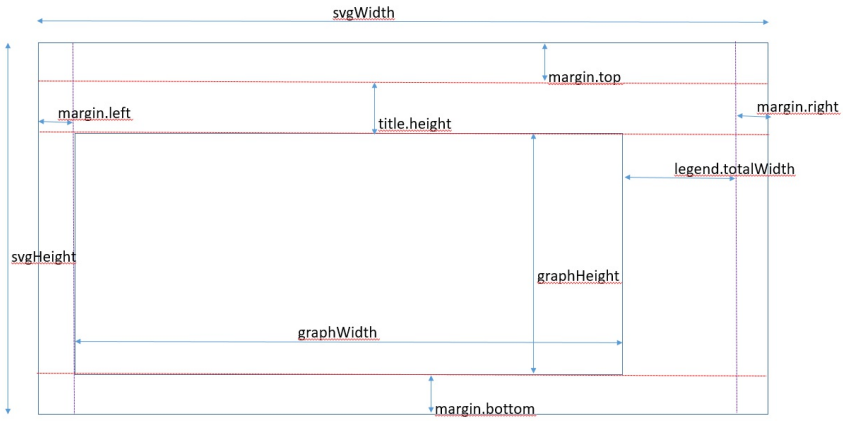
-Line (interpolate)

-Grid (display or not, position, size)

-Animation (enable or not, duration)

-Margin (top, left, right,bottom,between)

-Axis (left margin, bottom mergin)



- ***Sample configData***

```
configData ={
    "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,
        },
    };
```

- **graphData**

Each chart needs its own data in Json format.

- ***Sample GraphData for Line***

```
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
                },
            ]
        },
    ],
};
```

- ***Sample for Line***

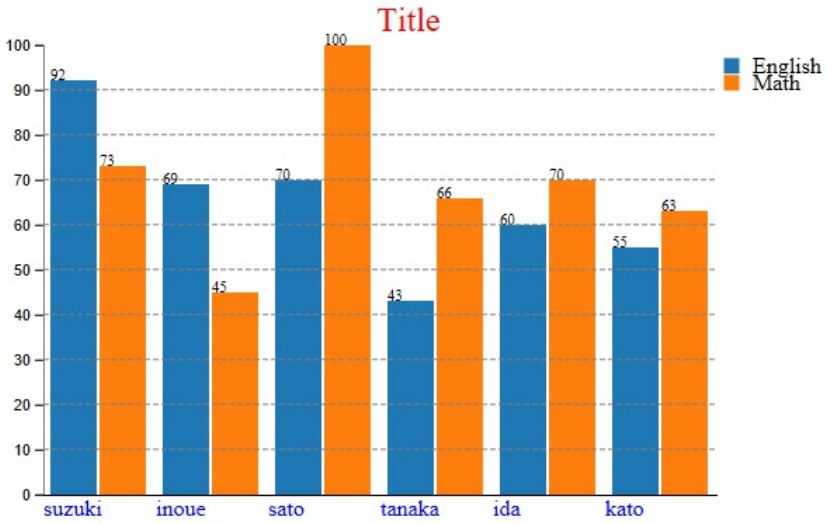
Line

- ***Sample GraphData for Bar***

```
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],
        },
    ],
};
```

- ***Sample for Bar***

Bar

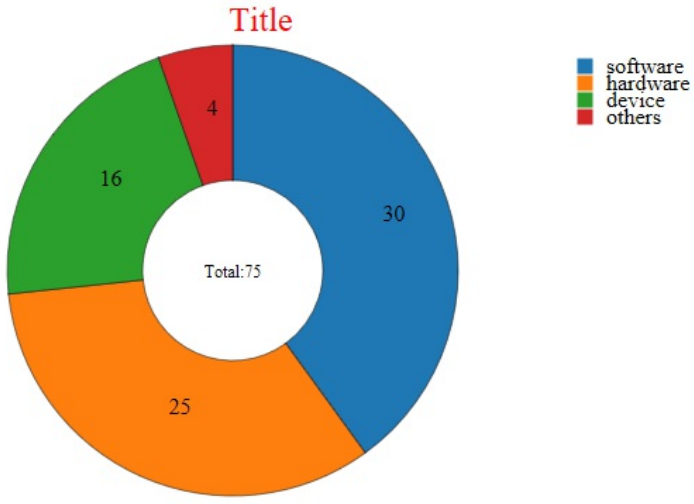


- ***Sample GraphData for Pie***

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

- ***Sample for Pie***

Pie

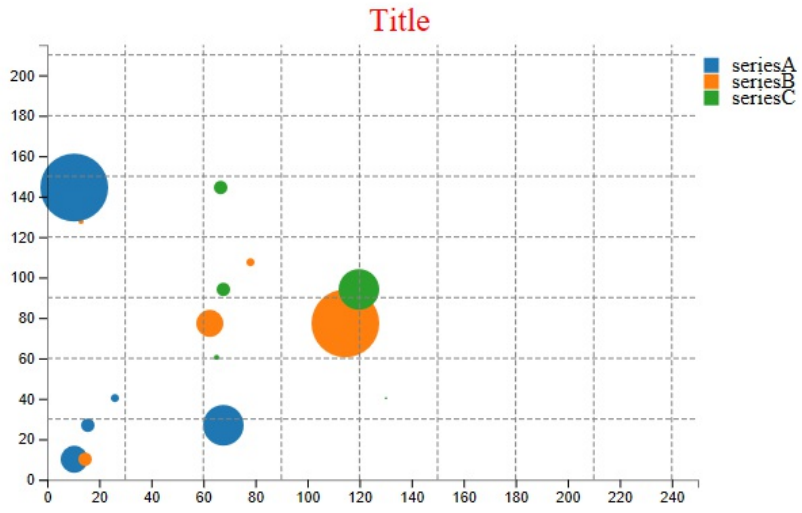


- ***Sample GraphData for ScatterPlot***

```
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},
            ]
        },
    ],
};
```

- ***Sample for ScatterPlot***

ScatterPlot

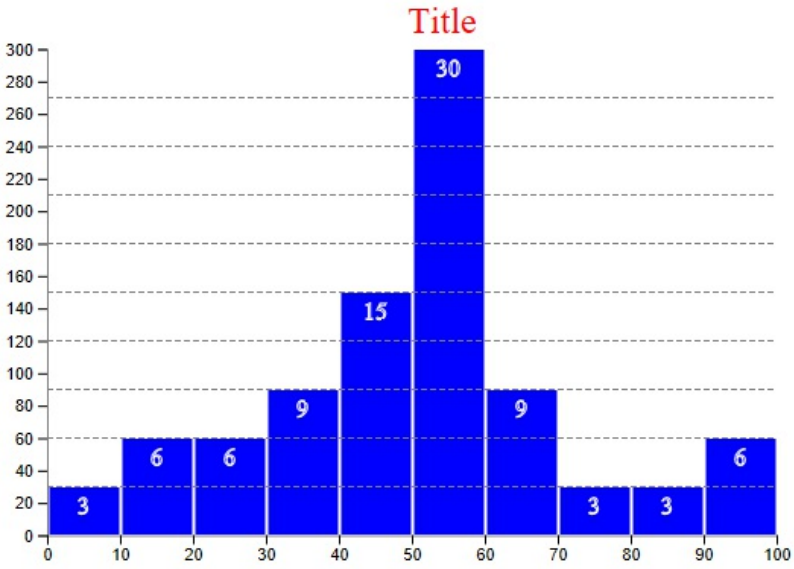


- ***Sample GraphData for Histogram***

```
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,
    ],
};
```

- ***Sample for Histogram***

Histogram

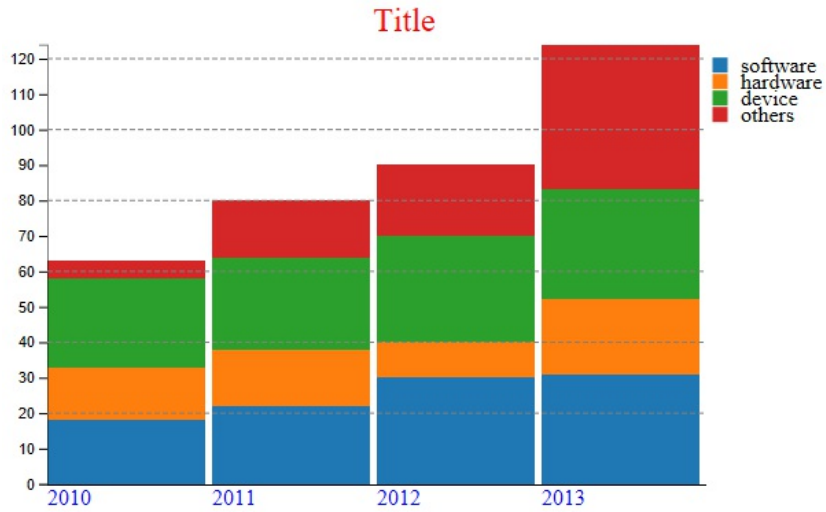


- *Sample GraphData for StackBar*

```
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
                },
            ]
        },
    ],
};
```

- ***Sample for StackBar***

StackBar

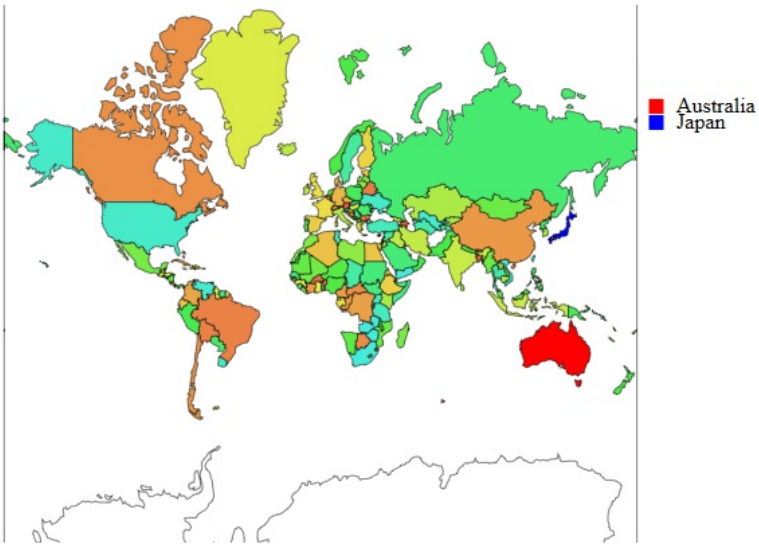


- ***Sample GraphData for GeoMap***

```
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"
        },
    ],
};
```

- ***Sample for GeoMap***

GeoMap

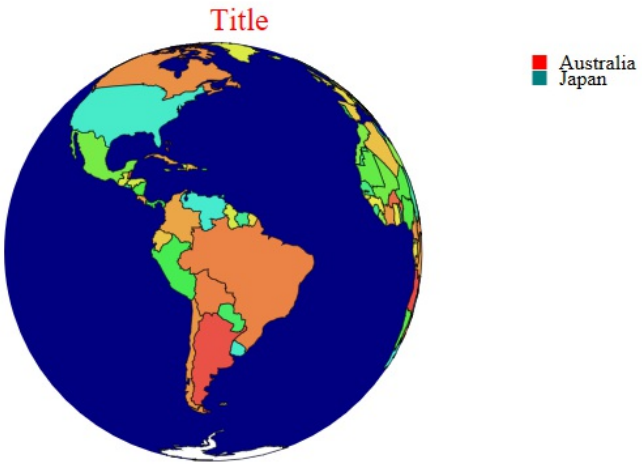


- ***Sample GraphData for GeoOrthographic***

```
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"
        },
    ]
}
```

- ***Sample for GeoOrthographic***

GeoOrthographic

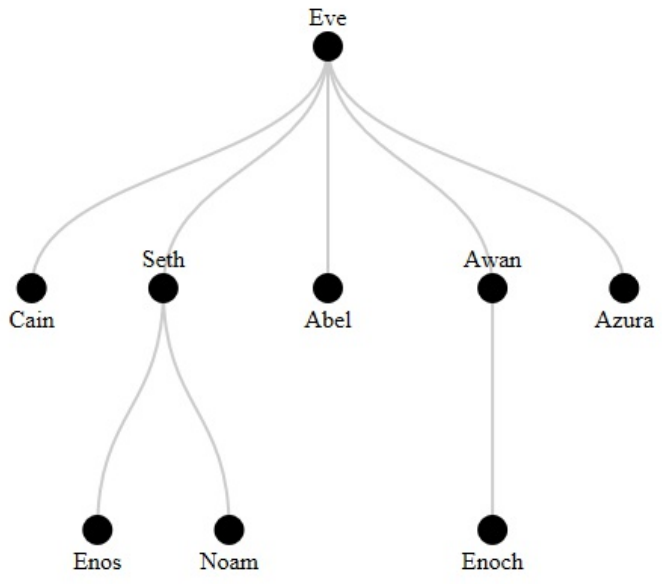


- ***Sample GraphData for Tree***

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

- ***Sample for Tree***

Tree

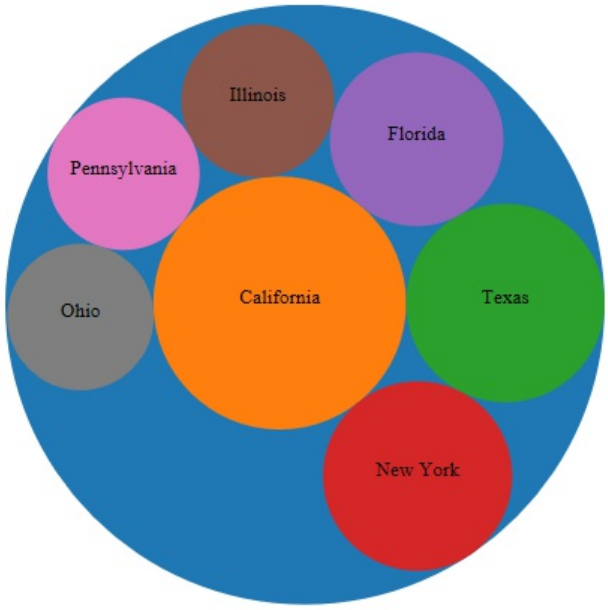


- ***Sample GraphData for PackLayout***

```
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},
        ]
}
```

- ***Sample for PackLayout***

PackLayout



- ***Sample GraphData for Choropleth***

```
choroplethDataJson = {
    "map":{
        "baseGeoDataUrl":"https://raw.githubusercontent.com/Ohtsu/data/master/o2-chart/japan.geojson",
        "scale":900,
        "center":[137.571,37.500],
        "startColor":"blue",
```

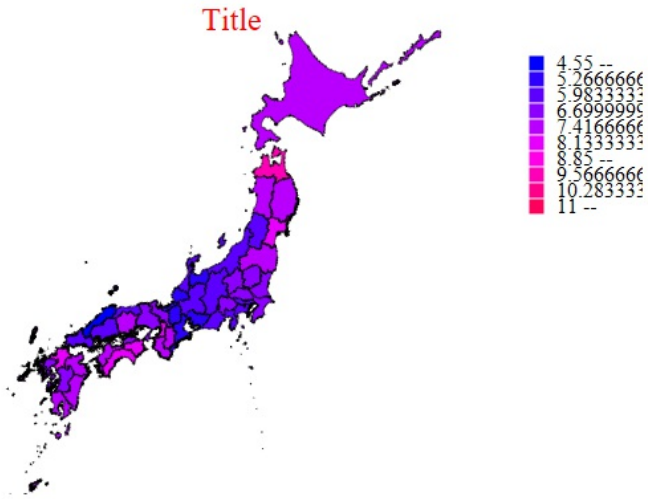
```
    "endColor":"red",
    "colorNumber":10,
    "keyDataName":"features",
    "targetPropertyName":"properties.id"
},

"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
            }
        ]
    };
```

- ***Sample for Choropleth***

Choropleth



- ***Sample GraphData for Force***

```
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},
          ]
    };
```

- ***Sample for Force***

Force