

## Homework 1

### Urban Scaling

1. Read the following article to understand the concept of Urban Scaling (<https://www.pnas.org/content/104/17/7301>)
2. For homework focus on the following major Five variables for all the Metropolitan Statistical Area (MSA) of USA
  - a. GDP by MSA for the year 2013-2015
  - b. Number of patents by MSA for the year 2013-2015
  - c. Crime by MSA for the year 2013-2015
  - d. Population by MSA for the year 2013-2015
  - e. Exports by MSA for the year 2013-2015

### 3. Data Sources

Type	Year	Link
GDP	2013	
GDP	2014	
GDP	2015	
Patents	2013	<a href="https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm">https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm</a>
Patents	2014	<a href="https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm">https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm</a>
Patents	2015	<a href="https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm">https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/allcbsa_gd.htm</a>
Crime	2013	<a href="https://ucr.fbi.gov/crime-in-the-u.s/2013/crime-in-the-u.s.-2013/tables/6tabledatadecpdf/table-6">https://ucr.fbi.gov/crime-in-the-u.s/2013/crime-in-the-u.s.-2013/tables/6tabledatadecpdf/table-6</a>
Crime	2014	<a href="https://ucr.fbi.gov/crime-in-the-u.s/2014/crime-in-the-u.s.-2014/tables/table-6">https://ucr.fbi.gov/crime-in-the-u.s/2014/crime-in-the-u.s.-2014/tables/table-6</a>
Crime	2015	<a href="https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/table-6">https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/table-6</a>
Exports	2013	<a href="http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart">http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart</a>
Exports	2014	<a href="http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart">http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart</a>
Exports	2015	<a href="http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart">http://tse.export.gov/metro/MetroChartDisplay.aspx?ReportID=1&amp;Referrer=SelectReports.aspx&amp;DataSource=Metro&amp;ReportOption=Chart</a>
Population	2013	<a href="https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk">https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk</a>
Population	2014	<a href="https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk">https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk</a>
Population	2015	<a href="https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk">https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk</a>

4. From the data sources above create the master table as follows (need not be exactly as follows. Think about additional variables)

MSA	GDP	No of Patents	Exports	Violent Crime	Murder	Rape	Robbery	Assault	property Crime	Burglary	Larceny	Motor vehicle	Total crime	Population
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5. Build Tableau visualizations on the above master data
6. The visualization must include multiple sheets and dashboards
7. Combine multiple dashboards to form a story board
8. The story board must address the following question
  - a. How do the variables change by geography?
  - b. How do the variables change by time?
  - c. How do the other variable scale with respect to the population? Read the article mentioned in point 1 to understand urban scaling
9. Please feel free to contact during office hours

The objective of the above homework is to get you started on Tableau based visualization. As time progresses the above homework can become a full-fledged dashboards with inclusion of many other variables. I hope you extend this homework in future and add it to your Github profile.