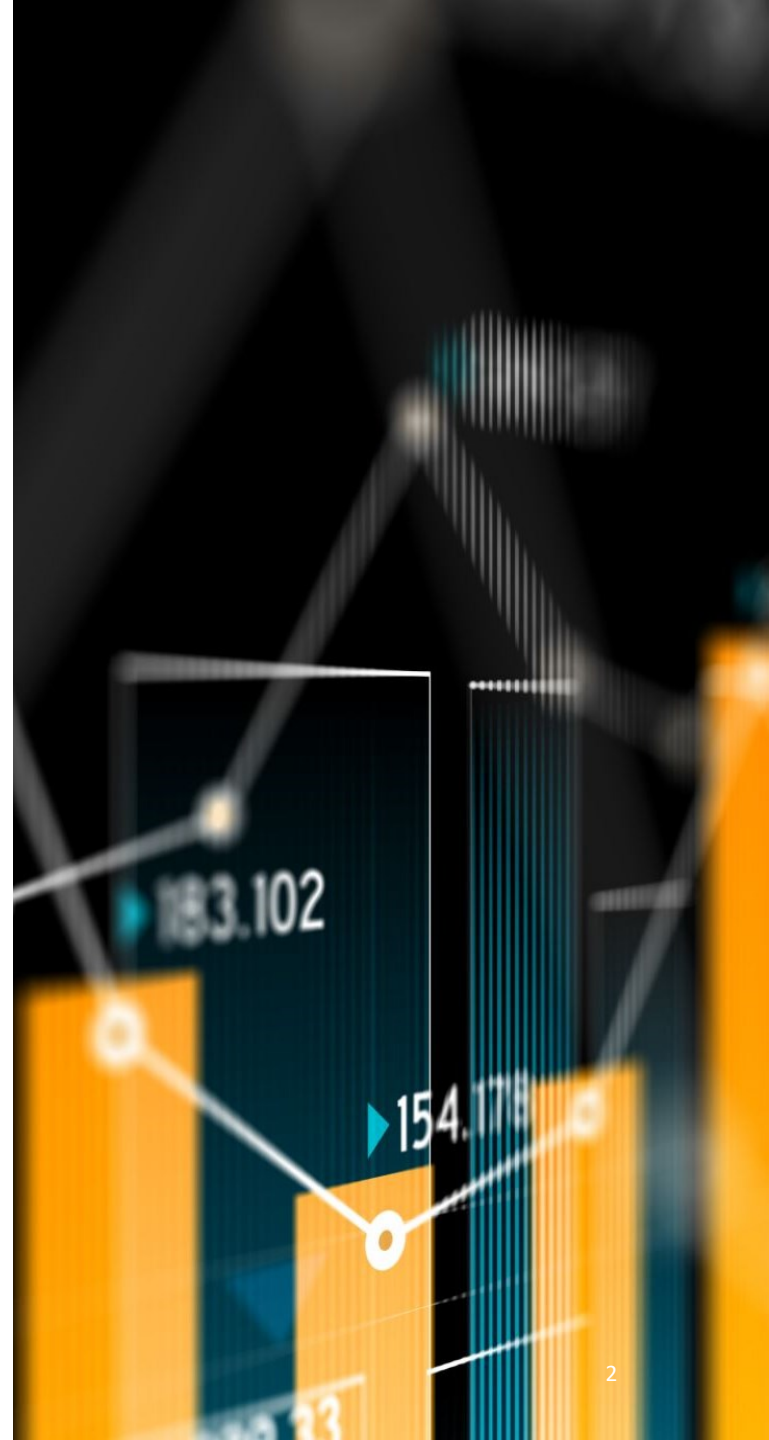# Introductory Engineering Computer Programming ENGR 1412

Lecture 2

Lutz Pluemer

Schedule for Today

- Types in Excel, Date and Time

- Tables and Sorting

- Direct and Indirect Referencing (Currencies as Example)

- Charts
  - Line Charts
  - Histograms
  - Clustered Bar
  - Pies

- Administrative

Administrative

- How to Use the Server, Upload and Download

- How to arrange the Groups in the Classroom

- How to arrange and rearrange the Tables

Group Arrangement

Platform					
Group 1	Group 7				Group 12
Group 2	Group 8				Group 13
Group 3	Group 9				Group 14
Group 4	Group 10				Group 15
Group 5	Group 11				Group 16
Group 6					

Numbers and Dates – Interactive Work (Later)

- Enter three different integers and reals, such as **1 , 2, 3 and 1.01, 2.02 and 3.05**

- Copy these items several times and change the styles, increase and decrease decimal places, etc

- Enter the Current Date and the Current time

- Enter the Start time of todays lecture

- Calculate the Difference between Current Time and Start Time, find appropriate Style

- Use the Functions **now()** and **today()**

- Calculate the **difference**, starting with now()
  What happens, if you do it the other way round?

- Input your **date of birth**, and calculate the difference between it and today. What does that mean? How to calculate your **age** (no of years) from that?

Interactive Work

Based on your Date of Birth and =today(), calculate the days of your life and your age. Extend the table of your group members (homework 2) by these attributes

Direct and Indirect References - Flight Prices

- We talked about Referencing on Tuesday

- Such as **C4** or in a Formula **=B4*C4**

- This is called **relative Referencing**

- Another Option is **absolute Referencing**

- Such as **=B4*C4**

- Relative Referencing refers to the current Position of the Cell and is changed when copying

- Absolute Referencing is independent from the Current Position of the Cell

- Take the Currency Exchange of Flight Prices as Example

- **Interactive Work**

Currencies – Flight Expenses

Homework 1

- Suppose you want to make a long flight trip on June 1
  either to **London** or **Frankfurt** or **Oklahoma**

- The Prices are 454 € for Frankfurt, 487 British Pound for London and 1240 US $ for Oklahoma

- Calculate the Prices in CNY Renminbi

Tables, Sorting, Formatting

- Excel is often used to organize Lists of Items

- Rows are Items, Columns are Attributes

- You often Start with some form of Id

- Give the Table a Name for Referencing

- Define this List as Table

- Sort along Different Attributes

- Use Weather and Pollution in Chengdu as Example

- Change the Appearance by

    - Resizing the Rows and Columns

    - Changing the Font and the Size of the Font

    - Group Cells by Merging

Weather and Pollution in Chengdu - Excel

Interactive Work Later

Travel Budget and Travel Expenses

My Travel Budget

Destination: **London, UK**   Departure: 02/20/2020   Trip Length: 7   Number of People: 1

Budget Overview	Breakdown By Expense Type

Budget Overview

Total Budget（£）

3000

Est Cost

3450

Difference

-450

Cost Per Day

492,8571429

Cost Per Person

3450

Breakdown By Expense Type
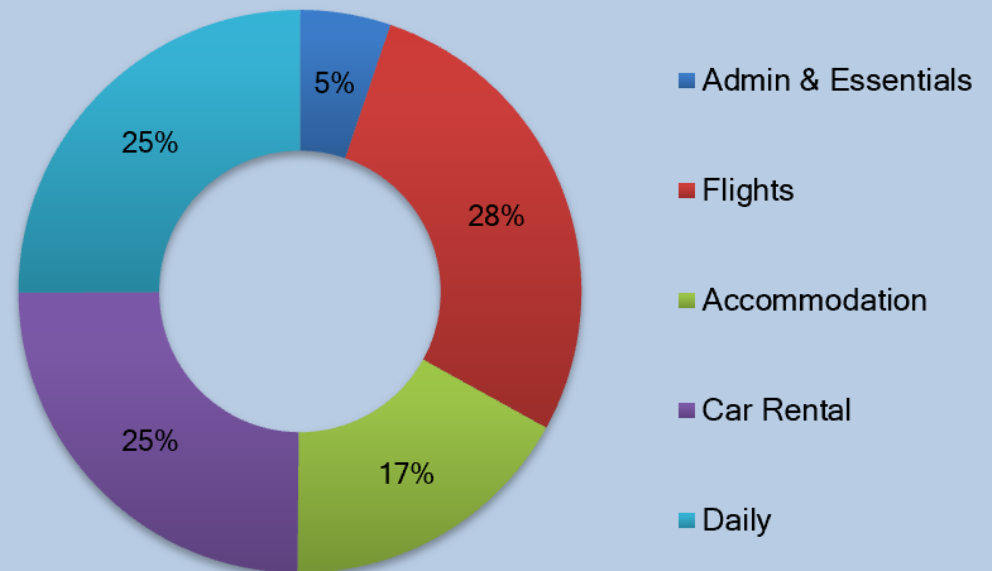
- 5% Admin & Essentials
- 28% Flights
- 17% Accommodation
- 25% Car Rental
- 25% Daily

My Travel Budget

Destination: London, UK   **Departure:** 02/20/2020   **Trip Length:** 7   **Number of People:** 1

Budget Overview			Breakdown By Expense Type	
Expenses				
Description	Notes	Qty	Cost (£)	Total (£)
Admin & Essentials				
Passport / Renewal		1	40	40
Visa		1	40	40
Travel Insurance		2	50	100
				180
Flights				
Flights		2	400	800
Internal Flights		2	80	160
				960
Accommodation				
Accommodation #1		2	70	140
Accommodation #2		5	90	450
				590
Car Rental				
Car Rental		5	130	650
Extras		1	20	20
Cross Border Fee		1	25	25
Fuel		7	20	140
Parking		1	20	20
				855
Daily				

Interactive Work:

Adapt the Expenses to the Budget of 3.000 British Pound

Charts

- Charts **visualize** Data and provide convincing Insights

- *"One Picture says more than 1000 Words"*

- We will discuss four different types of Charts

- **Line** Charts

- **Clustered Bar** Charts

- **Pie** Charts

- **Histograms**

Global Warming - Let the Data speak for themselves

Temperature anomalies represent the difference from an average or baseline temperature. Negative means colder, Positive means warmer.
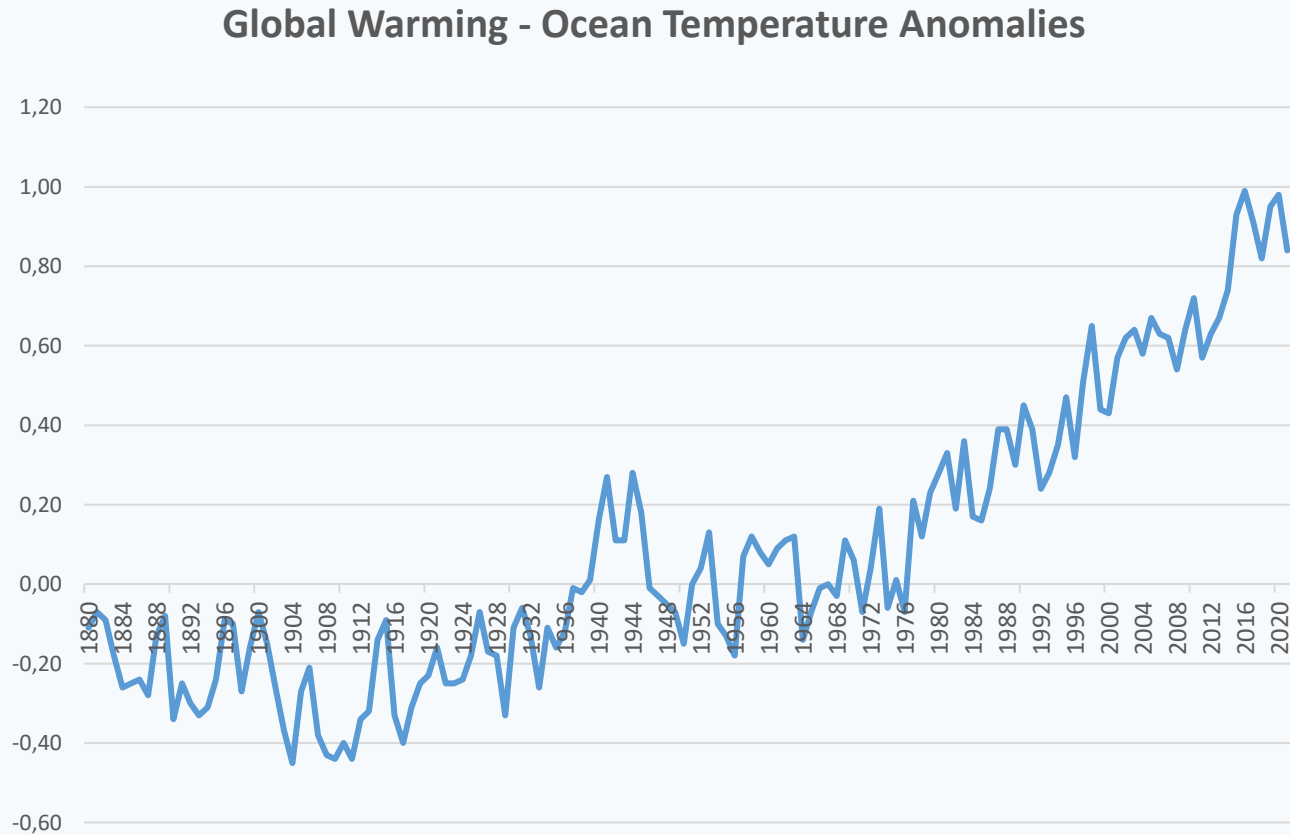
Year	Anomaly	Year	Anomaly	Year	Anomaly
1880	-0,11	1921	-0,16	2000	0,43
1881	-0,07	1922	-0,25	2001	0,57
1882	-0,09	1923	-0,25	2002	0,62
1883	-0,18	1924	-0,24	2003	0,64
1884	-0,26	1925	-0,18	2004	0,58
1885	-0,25	1926	-0,07	2005	0,67
1886	-0,24	1927	-0,17	2006	0,63
1887	-0,28	1928	-0,18	2007	0,62
1888	-0,13	1929	-0,33	2008	0,54
1889	-0,08	1930	-0,11	2009	0,64
1890	-0,34	1931	-0,06	2010	0,72
1891	-0,25	1932	-0,13	2011	0,57
1892	-0,30	1933	-0,26	2012	0,63
1893	-0,33	1934	-0,11	2013	0,67
1894	-0,31	1935	-0,16	2014	0,74
1895	-0,24	1936	-0,12	2015	0,93
1896	-0,09	1937	-0,01	2016	0,99
1897	-0,10	1938	-0,02	2017	0,91
1898	-0,27	1939	0,01	2018	0,82
1899	-0,16	1940	0,16	2019	0,95
1900	-0,07	1941	0,27	2020	0,98
1901	-0,15	1942	0,11	2021	0,84
1902	-0,26				

Global Warming - Let the Data speak for themselves

Temperature anomalies represent the difference from an average or baseline temperature. Negative means colder, Positive means warmer.

Global Warming - Ocean Temperature Anomalies
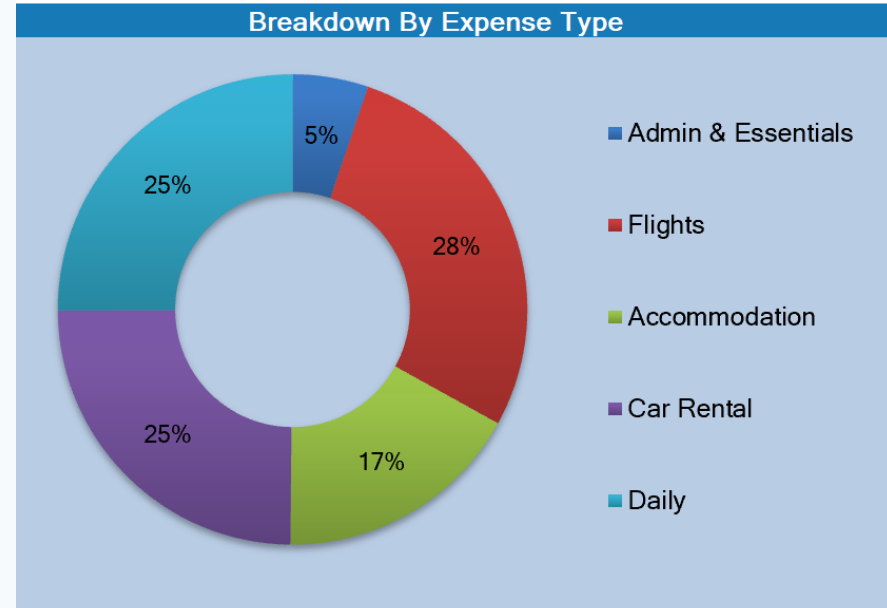
Line Charts

- The line charts are often used to see trends over time.

- Each data point is connected with a line that gives us the look of the trend. The y-axis represents the magnitude, where x-represents time interval (most of the time).

Interactive Work

Derive the Line Chart for Ocean Temperature Anomalies for yourself

Pie Charts

- Chris Travel Budget already gave us a nice Pie Cart

- Use a pie chart when you need to show **composition** or **part** to **whole** data. It is best used to show percentages

- Percentages should sum up to **100 %**. If not, Pie Charts are not appropriate

Breakdown By Expense Type

- 5%
- 25%
- 28%
- 25%
- 17%

Legend:
- Admin & Essentials
- Flights
- Accommodation
- Car Rental
- Daily

Interactive Work

Derive the Pie Chart for Expense Types

Clustered Bar

- Pie Charts only make sense if you do not have (much) more than **8 parts**

- If you have **more**, or if your parts do **not sum up to 100%,** it is better to use **Clustered Bar** Charts
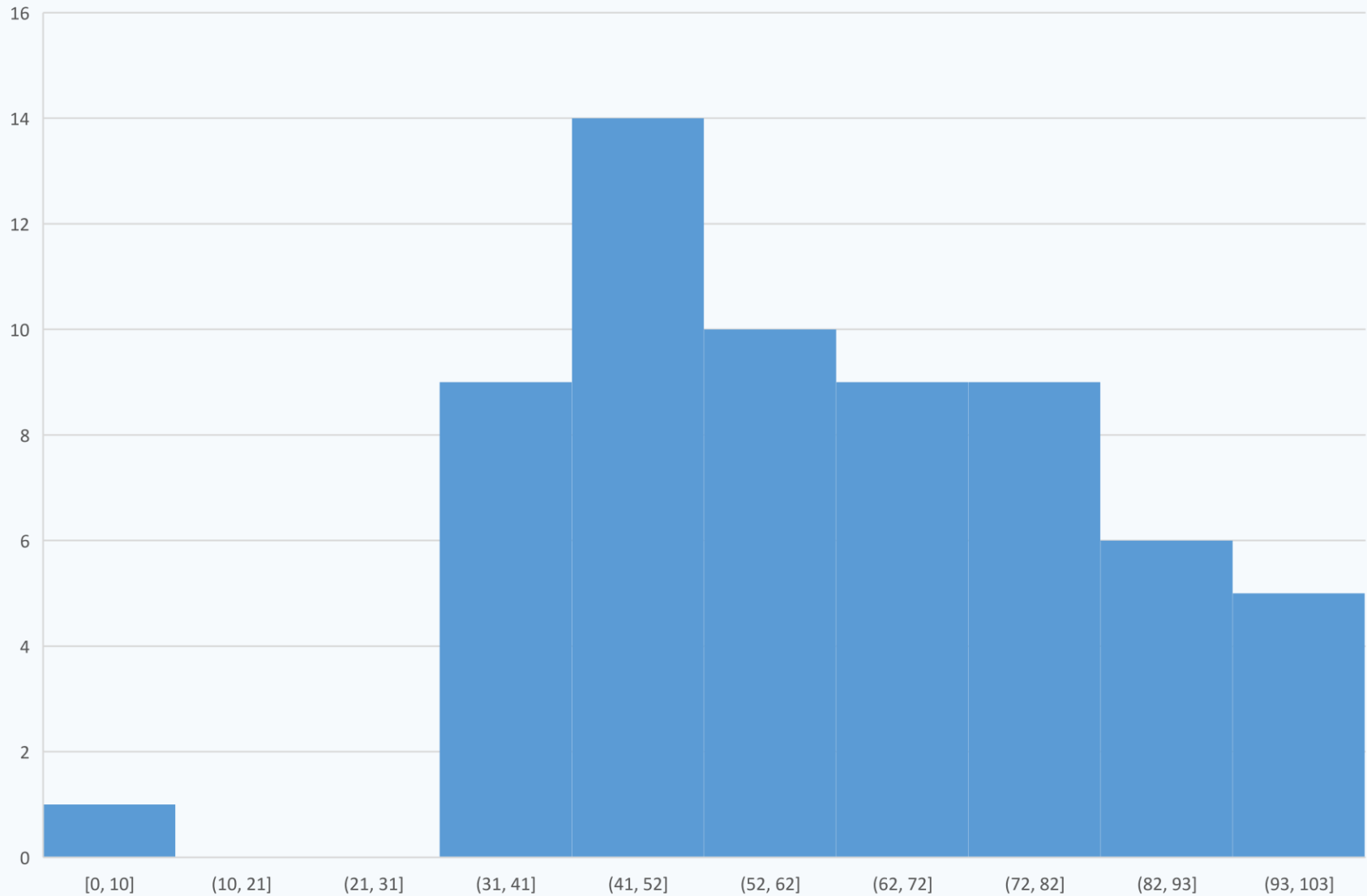
Population of Chinese Provinces
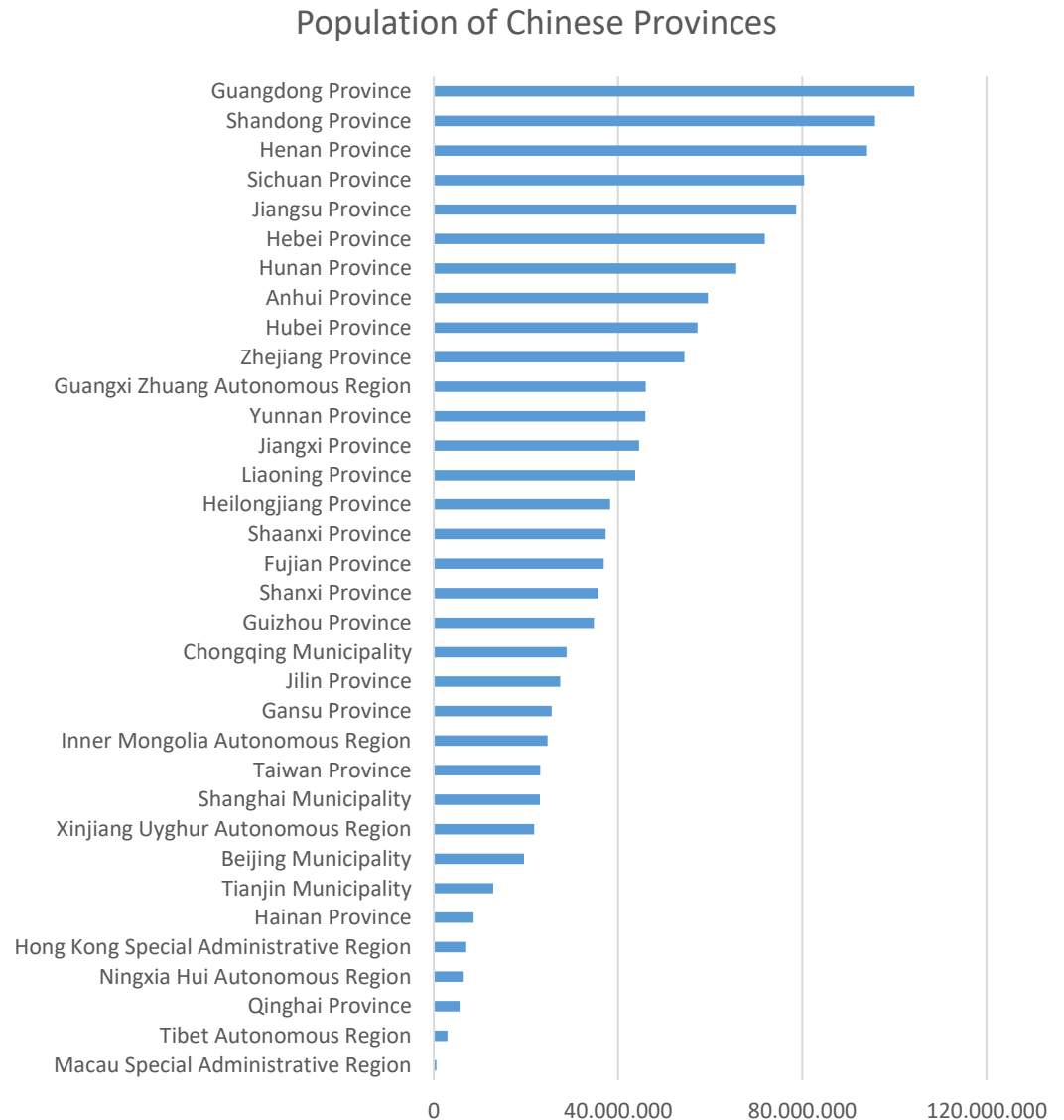
Interactive Work

Derive the Line Chart for Area and Population Density

Histograms

- A histogram is a graphical representation of a frequency distribution of items with continuous or integral values such as population, temperature, …

Air Pollution in Chengdu 2018 - 2022 per Month Average

Interactive Work

Derive the Histograms for Temperature with Bin width of 2