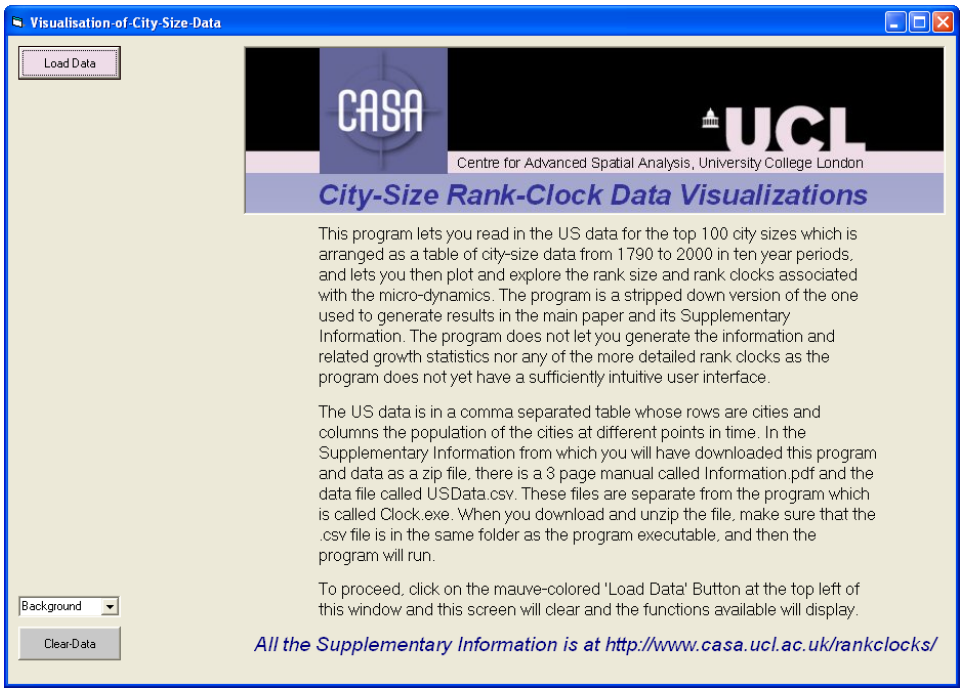
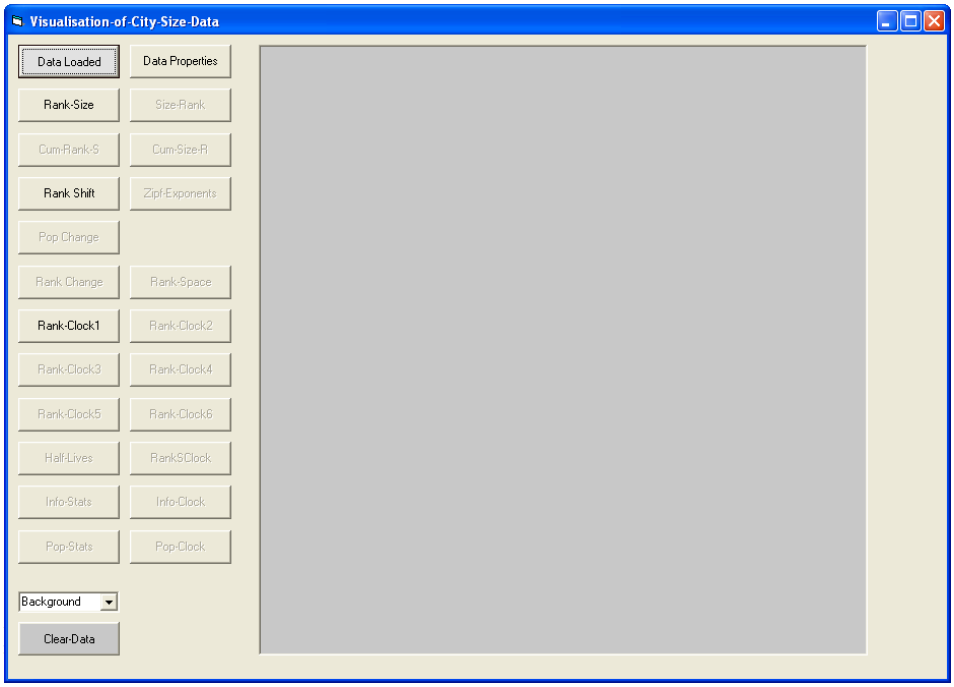
Rank Clocks: Explanatory Notes on the Program

After you unzip the files, make sure that you have the data file **USData.csv** file in the same folder as the executable file **Clock.exe**. When you run **Clock.exe** by clicking on the icon, then you will see the following screen:

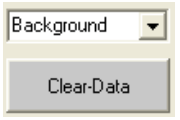


Click on the **Load Data** button to the top left and you will see a new screen with a series of functions, many of which are greyed out. The data is now loaded and the screen will look like this:



You now have the following options: to click on any of the following buttons:

Clicking on this will display the total urban population – i.e. the sum of the city populations for all cities at each time period – and plot its graph. To get back to the set of functions if you do load the **Data Properties** first, you will need to click the **Clear-Data** button at the bottom left of the screen.

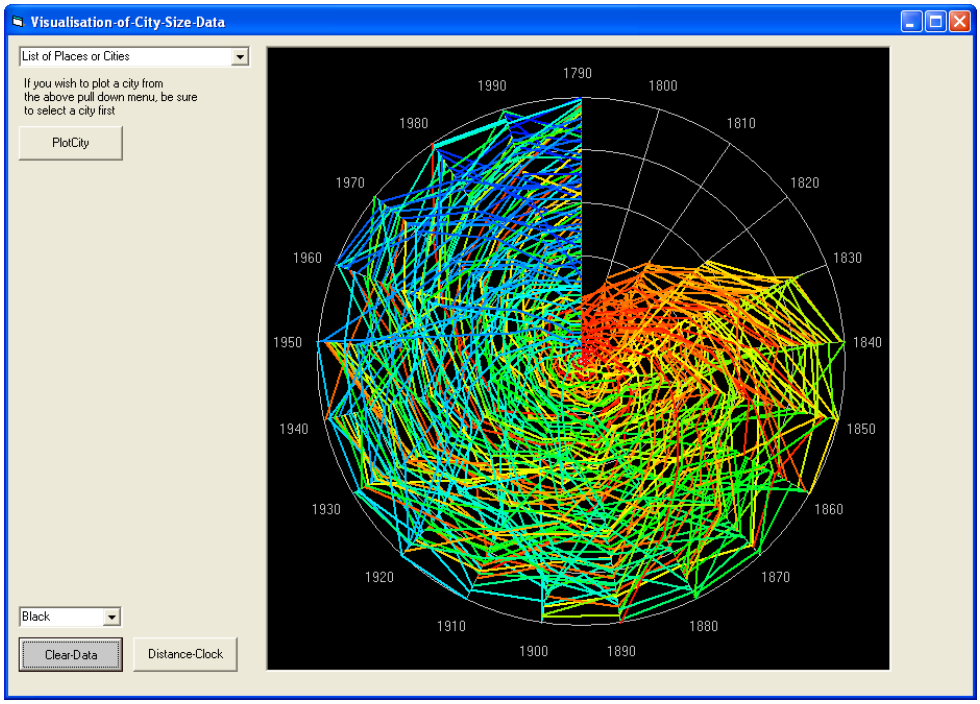


These buttons enable you to clear the screen and change the background colour from grey/white to black at any time. Black is good for giving the greatest contrast while white is best if you then go on to plot any individual trajectories of cities.

This button plots all 22 rank size distributions – log of population on the Y axis and log of rank on the X axis, from 1790 to 2000.

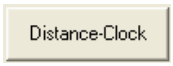
This button does the same as **Rank-Size** while also plotting the shift in ranks and populations between 1950 and 2000 in red

This button launches a more complex set of functions and clicking it will show the rank clock. The times from 1790 to 2000 are arrayed around the circumference of the clock in clockwise direction. The ranks of each city are plotted on this clock where rank 1 is at the centre and rank 100 is on the circumference. The cities are coloured according to the time they enter the top 100 starting from red into yellow into green into blue. The cities are arranged so that the ones with the greatest overall change in rank are plotted over those with lesser overall change. With 266 cities, the picture is complex and thus it is possible to select individual cities from the list and plot these. There are two functions – **PlotCity** and **Distance Clock** – that can now be activated. Here is the screen which is launched.



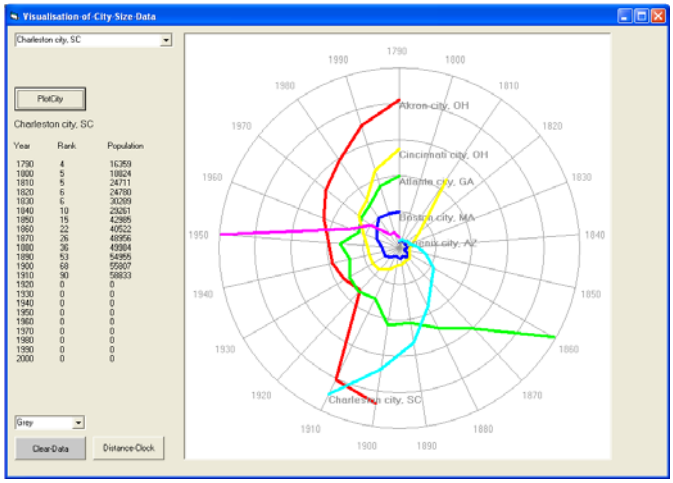
If you click on **PlotCity**, it is absolutely essential that you select a city from the pull down menu item

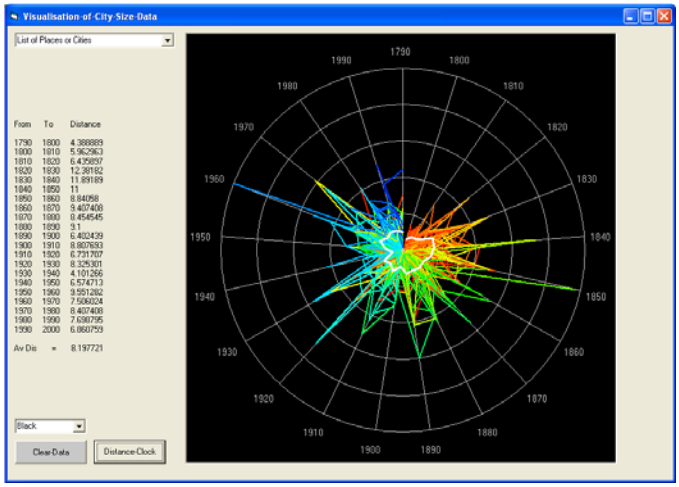
If you don't, the error checking will simply return you to a blank clock and the program will not plot a city until you do select one. When you do select one, the city rank and population from 1790 to 2000 will be displayed as a list and the city will be plotted on the clear clock. After you have plotted some 7 cities, then the colour will not change and this is a signal that more than 7 cities on the clock can get confusing. To plot more cities, simply save the screen and relaunch the plot.



Click on **Distance Clock** and this will launch using the same colour spectrum as the rank clock. The distances are from one rank to another and thus they begin at 1800, not 1790. The average distance for each time period is printed in a list and also plotted in either white or black depending upon what colour background you have selected. The overall average distance is also printed.

Typical screens for the **PlotCity** and **Distance Clock** Functions are shown below.





That's it. Any reader/user that has a problem, let me know at m.batty@ucl.ac.uk