



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



ASSIGNMENT 2

Graphics Primitives for Visualization

DUE 01/03/2018

ASSIGNMENT 2

Objectives

1. Implement some basic shapes using vector graphics components
2. Recreate some famous Visualizations

Specifications

- ✧ You may use any tool/programming language that you wish. The following are suggested:
 - ✧ Processing.org (or p5.js) : quick to learn
 - ✧ D3.js : more established standard in visualization
- ✧ This assignment is worth **30% of the module** and **due on 1st March 2019**
- ✧ Submission should be through `mymodule.tcd.ie`. Module code CS7DS4
- ✧ **Final submission is expected to be PDF of 2-3 pages (one page for the visualization each section + approx. and one page textual summary of Part 2)**

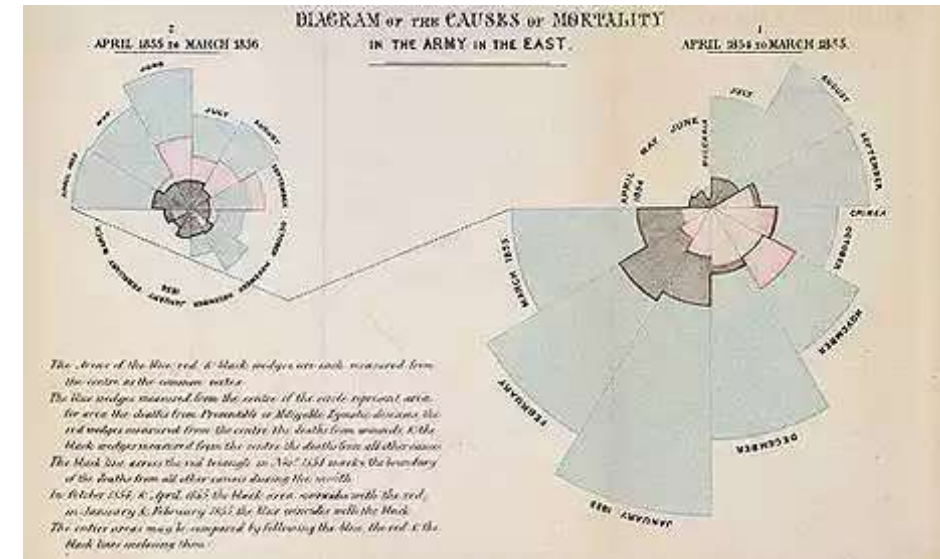
A. BASIC SHAPES AND COLOURS [40%]

In this part, you must demonstrate that you can...

- ✧ Draw some basic vector shapes
- ✧ Manipulate style parameters i.e. shape attributes (colour, line widths)
- ✧ Transform objects in 2D (position, rotate, resize)
- ✧ Save the output as a single PDF for submission

Specific task: You should replicate Florence Nightingale's visualization

- ✧ Described as a coxcomb chart, rose chart or POLAR AREA CHART. Read about the visualization here (this is the source for the dataset provided): <https://understandinguncertainty.org/node/214>
- ✧ You are not required to use all of the data and may just visualize a subset (e.g. 1 year of the data). You may even replace/make up the numbers (**we're only interested in if you can draw this type of shape**)
- ✧ You can change colours as you see fit but should demonstrate different colours and line styles.
- ✧ You must redraw it twice to demonstrate you can do transformations; the second copy should be zoomed, repositioned and rotated differently



Month	Average size of army	Deaths			Annual Rates of Mortality per 1000		
		Zymotic diseases	Wounds & injuries	All other causes	Zymotic diseases	Wounds & injuries	All other causes
Apr 1854	8571	1	0	5	1.4	0	7
May 1854	23333	12	0	9	6.2	0	4.6
Jun 1854	28333	11	0	6	4.7	0	2.5
Jul 1854	28722	359	0	23	150	0	9.6
Aug 1854	30246	828	1	30	328.5	0.4	11.9
Sep 1854	30290	788	81	70	312.2	32.1	27.7
Oct 1854	30643	503	132	128	197	51.7	50.1

Dec 1855	43217	91	18	28	25.3	5	7.8
Jan 1856	44212	42	2	48	11.4	0.5	13
Feb 1856	43485	24	0	19	6.6	0	5.2
Mar 1856	46140	15	0	35	3.9	0	9.1

N.B. ONLY PART OF THE DATA IS SHOWN DUE TO SPACE LIMITATIONS.

B. MINARD'S MAP [60%]

IMPORTANT NOTE: For this part you are required to use the actual historical data (unlike in part 1)

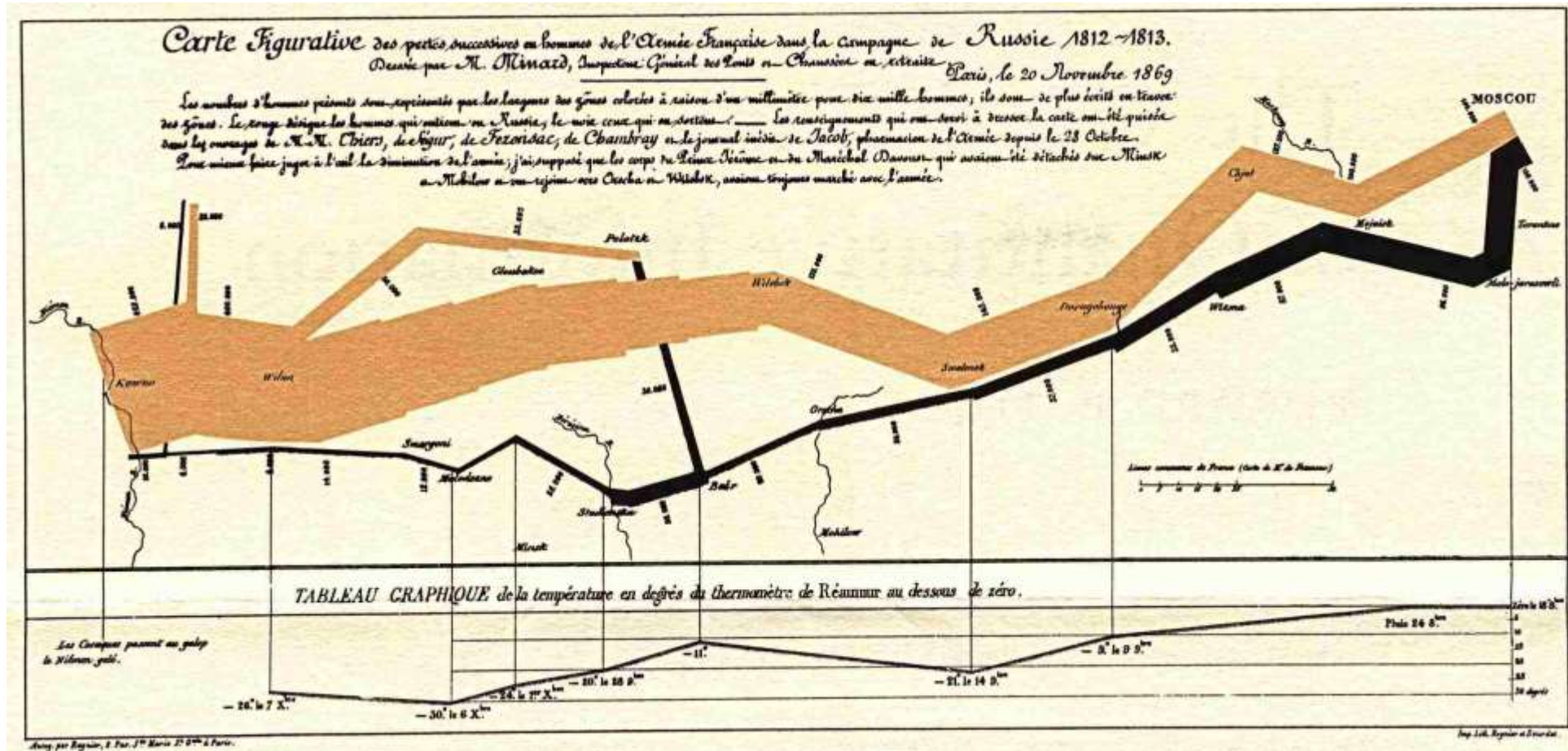
Recreate Minard's famous visualization of Napoleon's Russian Campaign

- ✧ An Excel version of the data is provided ([on mymodule.tcd.ie](https://mymodule.tcd.ie))
- ✧ You may retrieve the data from other sources e.g. the HistData package for R contains this .
- ✧ You may manually or otherwise simplify the spreadsheet (e.g. break it up, insert it into an array declaration etc.)
- ✧ You do not have to match Minard's exact look (this may be impossible without a lot of manual work)

Marking (for Part 2):

- ✧ 0-30 for depicting all of the elements of the data in some way,
- ✧ 0-30 qualitative (complexity, aesthetics, correctness, effort – judge's decision is final!)
- ✧ Submit the solution as a PDF file (ideally as a 2nd page)

CHARLES JOSEPH MINARD'S MAP OF NAPOLEON'S RUSSIA CAMPAIGN.



3 Elements you are expected to show: position of cities and path of army through them, survivors in the army along the path, temperature during retreat

MINARD DATA SET

This is provided as an excel sheet, modified from dataset available as the HistData package for R.

Essentially consists of 3 separate tables

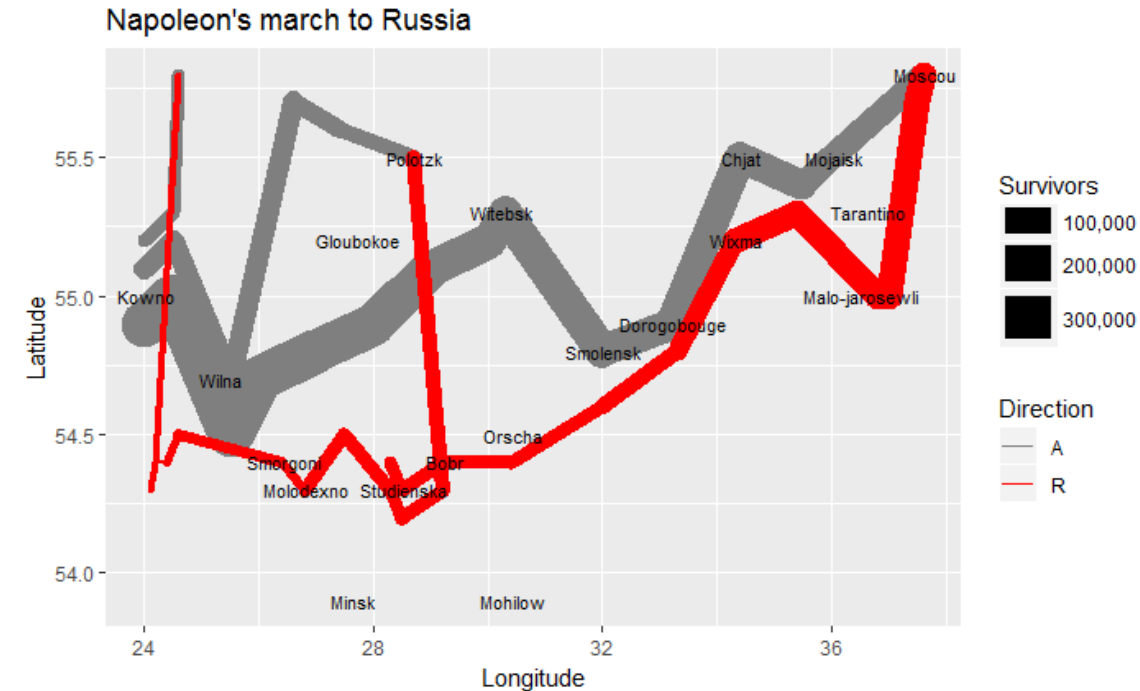
- Columns 1-3 are longitude, latitude and names of cities
- Columns 4-8: longitude, temperature, dates (during the march home only)
- Columns 9-14: longitude, latitude, number of survivors, direction of travel (A=towards the attack/R=return journey), division of army

N.B. SHOWN BELOW IS ONLY PART OF THE DATA SET DUE TO SPACE LIMITATIONS.. There are several more rows in the full data.

LONC	LATC	City	LONT	TEMP	DAYS	MON	DAY	LONP	LATP	SURV	DIR	DIV
24	55	Kowno	37.6	0	6	Oct	18	24	54.9	340000	A	1
25.3	54.7	Wilna	36	0	6	Oct	24	24.5	55	340000	A	1
26.4	54.4	Smorgoni	33.2	-9	16	Nov	9	25.5	54.5	340000	A	1
26.8	54.3	Molodexno	32	-21	5	Nov	14	26	54.7	320000	A	1
27.7	55.2	Gloubokoe	29.2	-11	10			27	54.8	300000	A	1
27.6	53.9	Minsk	28.5	-20	4	Nov	28	28	54.9	280000	A	1
28.5	54.3	Studienska	27.2	-24	3	Dec	1	28.5	55	240000	A	1
28.7	55.5	Polotzk	26.7	-30	5	Dec	6	29	55.1	210000	A	1
29.2	54.4	Bobr	25.3	-26	1	Dec	7	30	55.2	180000	A	1
30.2	55.3	Witebsk						30.3	55.3	175000	A	1
30.4	54.5	Orscha						32	54.8	145000	A	1
30.4	53.9	Mohilow						33.2	54.9	140000	A	1
...

SOME EXAMPLES (BUT NOT GOLD STANDARDS)

NOTE that you don't have to replicate Minard's Look exactly. Minard would have done it by hand which has benefits and disadvantages. You might even be able to improve upon it.



<http://benschmidt.org/D3-trail/minard.html>

http://www.rpubs.com/Minh_Bui/257561