ASSIGNMENT 2

Graphics Primitives for Visualization

DUE 17/02/2018

ASSIGNMENT 2

Objectives

1. Implement some basic shapes using vector graphics components
2. Recreate Charles Minard's Visualization of Napoleon's March on Moscow

Specifications

- You may use any tool/programming language that you wish. The following are suggested:
  - Processing.org (or p5.js)
  - D3.js
- This lab is worth 17% of the module.

1. BASIC SHAPES [40%]

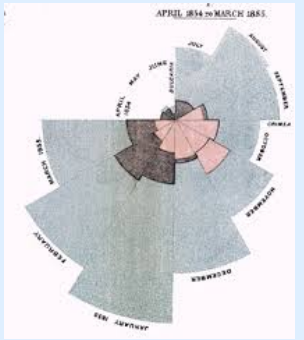
The main objective is to practice some basic visual output in preparation for later projects so the first part is deliberately simple.
Marking for part 1: full marks for demonstrating at least 3 basic shapes, with different style parameters and drawn at different positions, scales and rotations.

Demonstrate that you can

- Draw some basic vector shapes (at least 3 of the following: rectangles, arcs, circles, curves, lines)
- Manipulate style parameters i.e. shape attributes (colour, line widths)
- Position and transform objects in 2D
  - Show that you can rotate and scale the charts (repeat the shapes at least once in a different position/orientation)
- Save the output as a single PDF for submission

ALTERNATIVE: A suggested objective if you want a specific task is to Visualize Florence nightingale's dataset. See next slide for details.

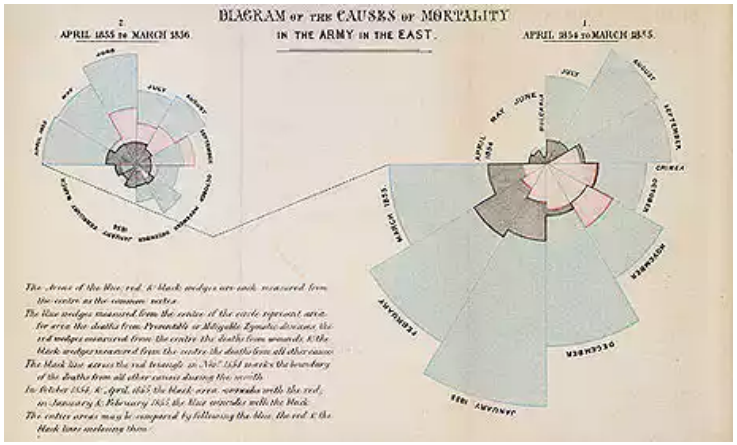
- PLEASE NOTE this part of the assignment is purely to practice the basic shape drawing functions above. You won't receive any special marks for matching Nightingale's original graph exactly so don't spend too much time trying to do this.
- I suggest you visualize it in two ways:
  - As a bar chart
  - As nightingale's original coxcombs chart



FLORENCE NIGHTINGALE DATASET

[NOTE THAT THIS IS AN OPTIONAL DETAIL. PART 1 IS INTENDED TO PRACTICE DRAWING BASIC SHAPES]

- Described as a coxcomb chart, a rose chart or a POLAR AREA CHART.
- Read about the visualization here (this is the source for the dataset provided): https://understandinguncertainty.org/node/214
- For the first part of the assignment, **you are not required to use all of the data**. You may just visualize a subset (e.g. 1 year of the data)



		Deaths			Annual Rates of Mortality per 1000		
Month	Average size of army	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
Nov 1854	29736	844	287	106	340.6	115.8	42.8
Dec 1854	32779	1725	114	131	631.5	41.7	48
Jan 1855	32393	2761	83	324	1022.8	30.7	120
Feb 1855	30919	2120	42	361	822.8	16.3	140.1
Mar 1855	30107	1205	32	172	480.3	12.8	68.6
Apr 1855	32252	477	48	57	177.5	17.9	21.2
May 1855	35473	508	49	37	171.8	16.6	12.5
Jun 1855	38863	802	209	31	247.6	64.5	9.6
Jul 1855	42647	382	134	33	107.5	37.7	9.3
Aug 1855	44614	483	164	25	129.9	44.1	6.7
Sep 1855	47751	189	276	20	47.5	69.4	5
Oct 1855	46852	128	53	18	32.8	13.6	4.6
Nov 1855	37853	178	33	32	56.4	10.5	10.1
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

2. MINARD'S MAP [60%]

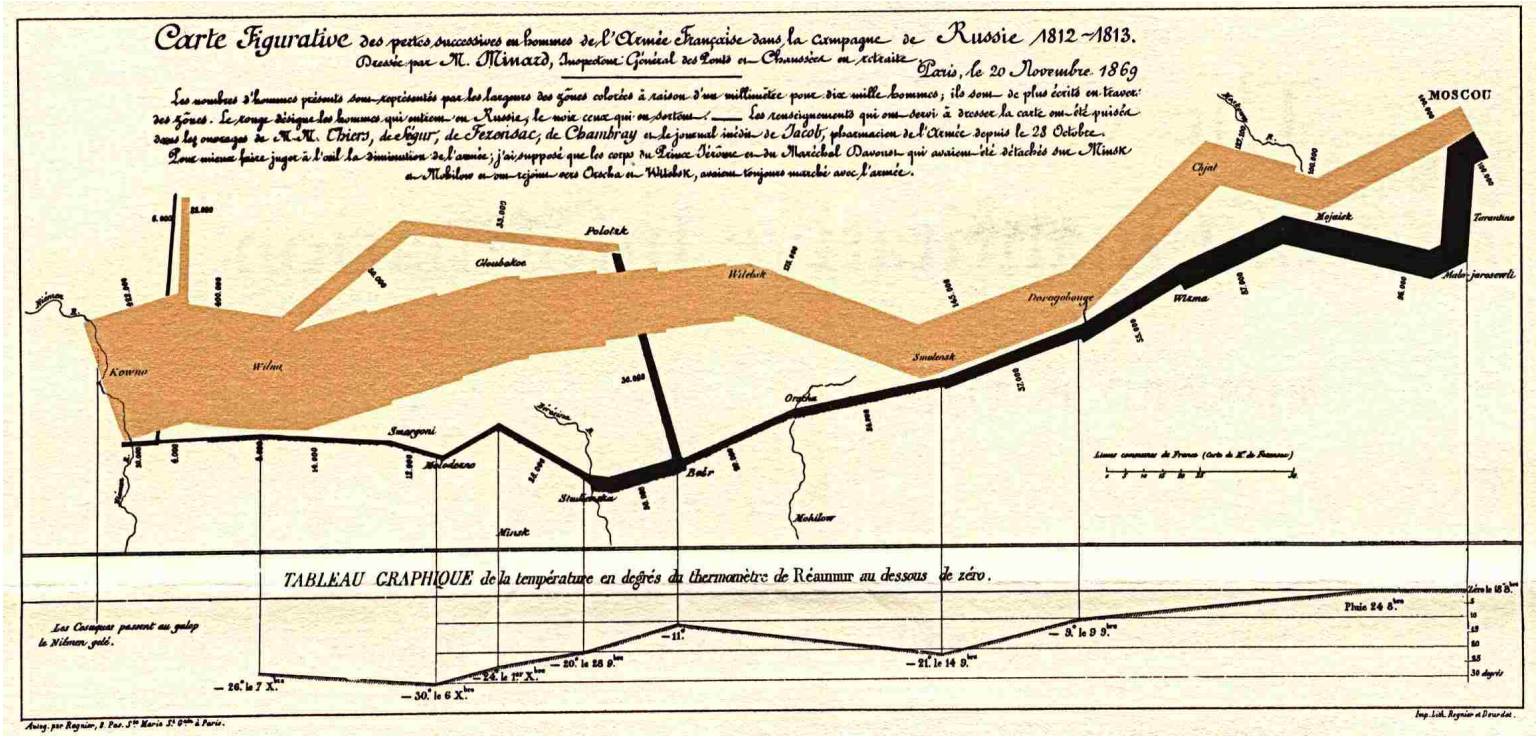
Recreate Minard's famous visualization of Napolean's Russian Campaign

- An Excel version of the data is provided **HERE**
- 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):

- 30% for simply showing all the data,
- 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

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

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

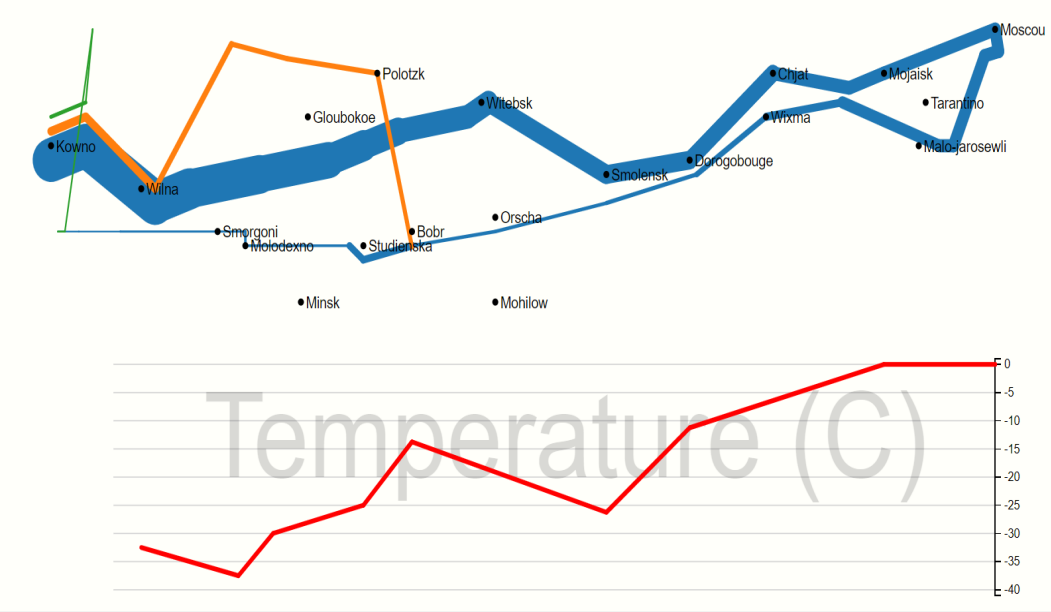
Essentially consists of 3 separate tables

- 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

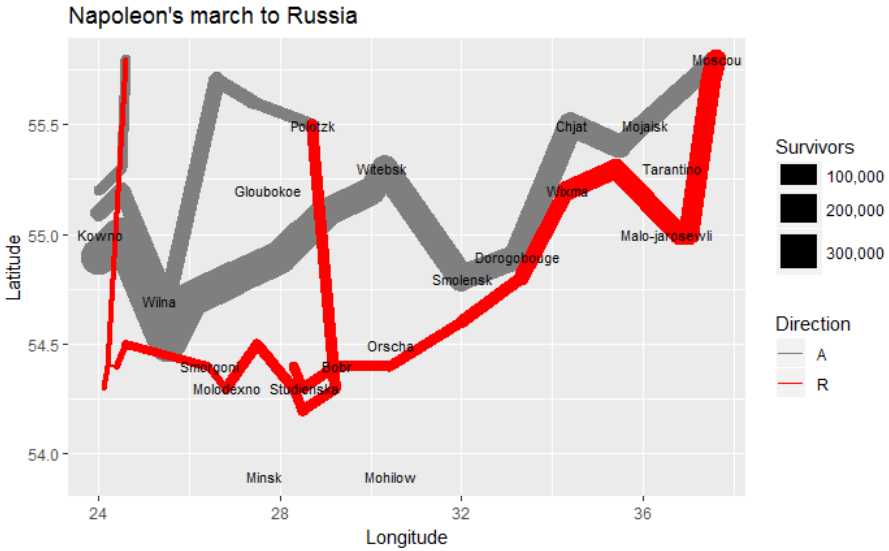
LONC	LATC	City	LONT	TEMP	DAYS	MON	DAY	LONP	LATP	SURV	DIR	DIV
24	55	Kowno	37.6	0	6	Oct	18	24	54.9	340000	A	1
25.3	54.7	Wilna	36	0	6	Oct	24	24.5	55	340000	A	1
26.4	54.4	Smorgoni	33.2	-9	16	Nov	9	25.5	54.5	340000	A	1
26.8	54.3	Molodexno	32	-21	5	Nov	14	26	54.7	320000	A	1
27.7	55.2	Gloubokoe	29.2	-11	10			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