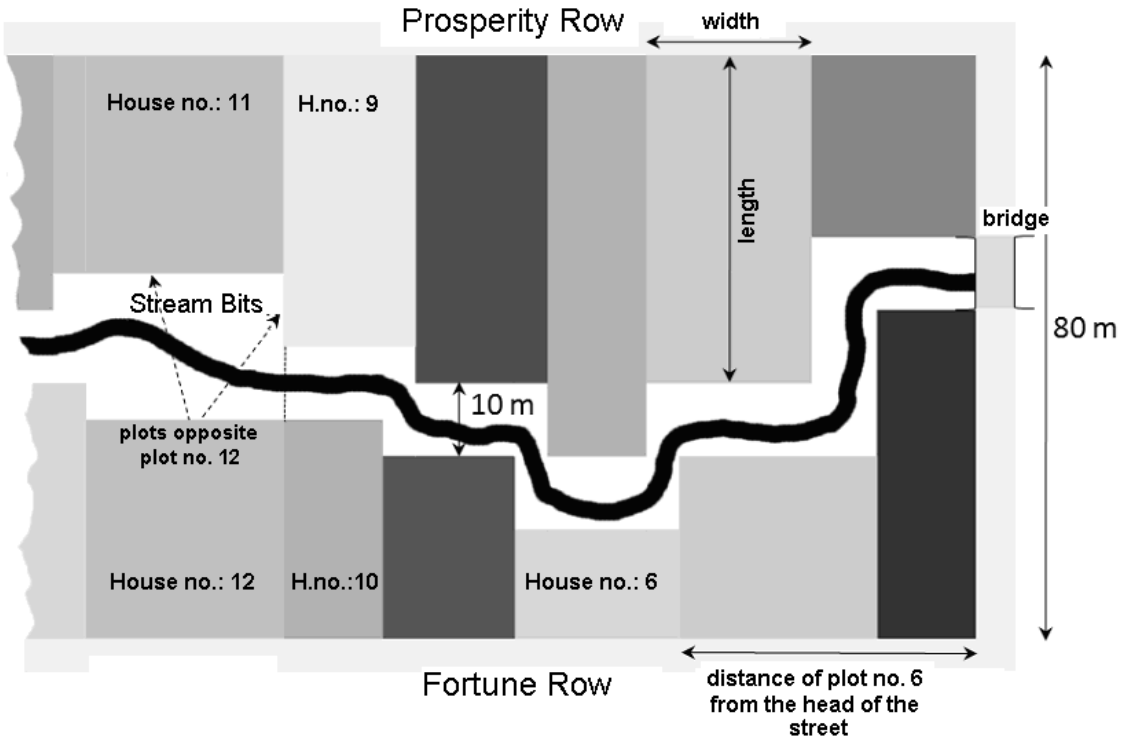
4. Plots

In Streamville the area at the end of the village that is yet unbuilt on is divided into two parts by the Stream Bits. The municipality decided to create residential area Brave Future by forming building plots. After the building two streets will be created in a rectangular area: Prosperity Row and Fortune Row. The inhabitants of the two rows are "foot-to-foot" neighbours, but their plots are separated from each other by the Stream Bits. The two streets are parallel, the distance between the street fronts is 80 metres. On each row the same number of rectangular plots were designated, at most 30 plots per row. On Prosperity Row only odd house numbers, on Fortune Row only even house numbers were issued (starting from 1 and 2, without any omissions). The width of a plot is at most 40 metres. At the ends of the streets the two banks of the stream are connected by bridges. Upon designating the plots the path of the water course was taken into account.



A registry of the designated plots has been created, it can be found in file `plots.txt`. The first line of the file contains the number of plots to be sold, the following lines contain the data of the plots one by one. The first data is the house number, the second is the width of the plot, and the third is the length, which is the dimension perpendicular to width. In the case of Prosperity Row every data is available, but in the case of Fortune Row there are zeros in the place of the length data. There is exactly one space between the data.

Create a program named `plots`, which solves the following exercises.

Before displaying the result of the exercise parts requiring output on the screen display the number of the exercise on the screen. (E.g. `Exercise 3:`)

1. Read the data from file `plots.txt` and solve the following exercises using them. If you cannot read the file, then enter the data of plots no. 1, 3, 5, 7 and 9 Prosperity Row and

2, 4, 6, 8 and 10 Fortune Row from the file into the program and solve the exercises using these data.

2. How many metres should one walk to walk round the two streets? Display the calculated distance on the screen.
3. The local authority prescribes that in the case of plots whose width is 20 metres or less complete street front building is required. Determine and display on the screen the number of plots affected by this regulation on Fortune Row.
4. How many houses are there between the plots with the largest and smallest area on Prosperity Row? Display on the screen the number of plots between the two plots, the house numbers and the corresponding areas of the largest and the smallest plots.
5. The local authority will impose a tax on the plots. The tax is calculated in Pinny-pennies. In the case of plots with area 700 square metres or less the tax is 51 Pinny-pennies per square metre, in the case of plots larger than this it is 51 Pinny-pennies per square metre for the first 700 square metres, above 700 square metres to 1000 square metres it is 39 Pinny-penny per square metre. For the part above 1000 square metres the tax is not calculated per square metre, it is a flat sum of 200 Pinny-pennies. The owners of plots whose width is 15 m or less or whose length is 25 m or less receive a 20% tax allowance. When determining the tax, it should be rounded to 100 Pinny-pennies (e.g. in the case of 6238 it is 6200, in the case of 6586 it is 6600). Determine the tax revenue of the local authority from Prosperity Row.
6. Which are the last 3 plots on Fortune Row? Display on the screen the house numbers and the distance of the plots from the head of Fortune Row according to house numbers in decreasing order.
7. Determine the length of the plots on Fortune Row. Take into consideration that the minimum distance between the borders of the opposite plots towards the stream is 10 metres measured in the direction perpendicular to the street front. The plots are considered to be opposite each other even if only some parts of their borders lie on the same line. (For example the plots opposite to plot number 10 are only plots number 9 and 11.) In your calculation designate the largest plots that satisfy this condition. Write the data of Fortune Row into file `fortunerow.csv`. Each line should contain a house number, a corresponding width and a length. The data should be separated from each other by exactly one semicolon.

45 marks