Visualization of relational data

Andrii Zakharchenko

April 27, 2020

1 Problem 1

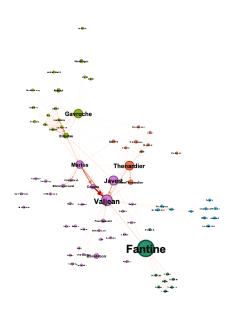


Figure 1

1.1 Které postavy spolu nejvíce interagují?

Number of interations are given by the weight of an edge, by these we can see the next most frequent interactions:

Valjain with Cosette, Marius, Javert, Fantine and Thenardiers. Marius with Cosette and Enjolras and Gillenormand. Enjolras with Bossuet, Courferac and Combeferre.

1.2 Které postavy interagují s nejvíce dalšími postavami?

Interactions are given by the degree of a node, from this we can see that characters with most interactions are:

Valjean, Fantine, Javert, Thenardier, Marius, Gavroche.

1.3 Jaká je největší interakční vzdálenost (počet hran) mezi dvěma postavami?

The diameter of the network is 5.

1.4 S jakými postavami nejvíce interaguje Valjan?

With Cosette, Marius, Javert, Fantine and Thenardiers.

1.5 Jaké postavy zprostředkovávají interakci mezi detekovanými oddíly (partition) grafu?

From the figure 1 we can see light green, purple, dark green, blue and orange partitions.

Purple to light green: Marius to Enjolras and Gavroche.

Purple to Orange: Valjean and Javert to Thenardier and Marius to Eponine.

Purple to dark green: Valjean to Fantine.

Purple to blue: Valjean to Myrel, Madam Magloire and Mademoiselle Baptistine.

Green to orange: Gavroche to multiple characters from orange partition.

2 Problem 2

2.1 Pokuste se najít co nejlepší layout grafu

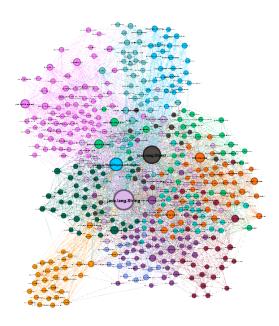


Figure 2

2.2 Detekujte oddíly (patrition) grafu a vizualizujte graf tak, že uzly budou mít přiřazenu barvu dle oddílu ve kterém se nacházejí. Je z vizualizace vidět nějaká souvislost mezi oddíly a strukturou tříd v Javě?

From the partitioning that we created we can say several things about structure of java classes. There are some groups of classes that can be well separated into communities, such classes usually belong to certain packages, as for example java.awt in figure 3 and java.nio in figure 4. We can even see that java.awt package is separated into separate different partitions, which show different functionalities in awt package. For example, pink partition contain classes from awt package that represent some component, cyan partition contain classes that responsible for text and geometry and blue partition contain java.awt.image package. However, different classes from basic java packages as java.util and java.lang can belong to different partitions, because they are so basic that they are used to implement other classes all over the place.

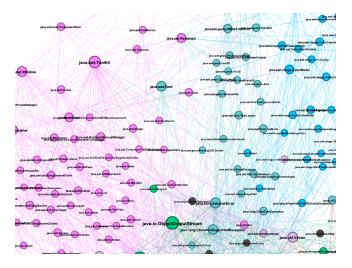


Figure 3

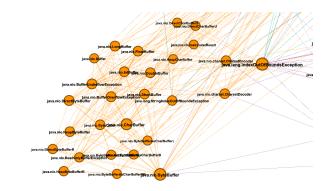


Figure 4

2.3 Vytvořte vizualizaci, na které je jasně vidět které třídy jsou používány v ostatních třídách nejčastěji. Chceme mít přehled i o kontextu (tedy ostatních uzlech).

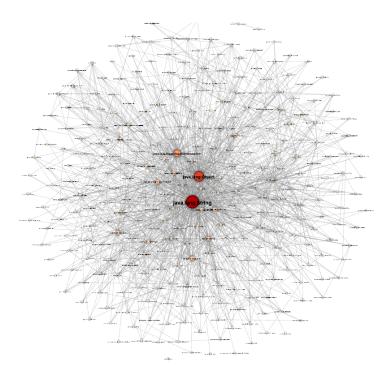


Figure 5

From the figure above we can see that 3 most used classes are String, Object and IllegalArgumentException.

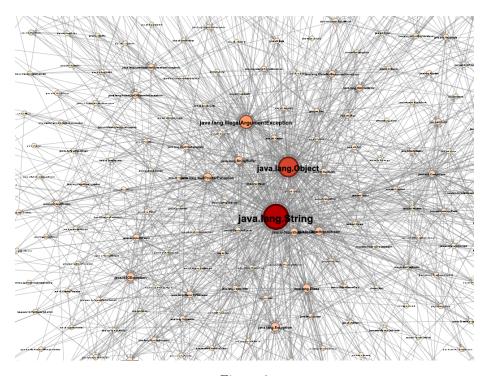


Figure 6

After we zoom in we can see that also frequently used classes are NullPointerException, IOException, Exception and several others.

2.4 Vytvořte vizualizaci, na které je jasně vidět které třídy používají nejvíce ostatních tříd. Opět chceme mít přehled i o kontextu (tedy ostatních uzlech).

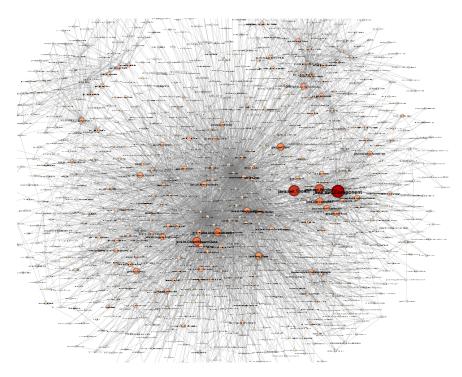


Figure 7

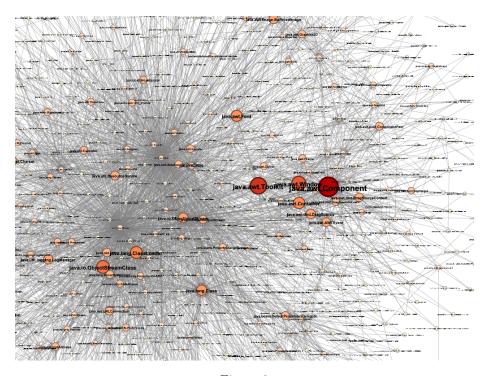


Figure 8

From the figures above we can see that classes that most use other classes are Component, Toolkit and Window from awt package.