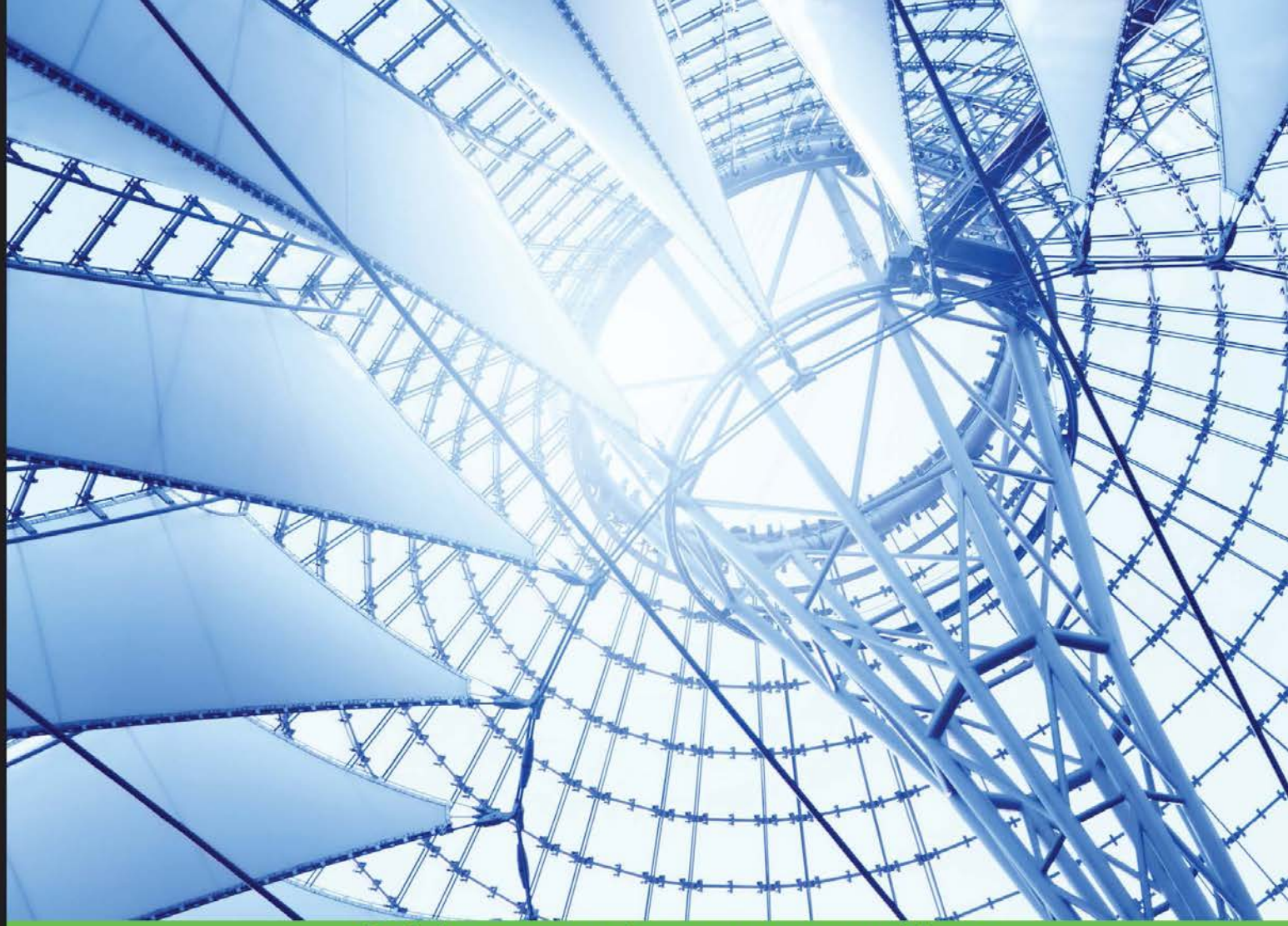


Quick answers to common problems

Gephi Cookbook

Over 90 hands-on recipes to master the art of network analysis and visualization with Gephi

Devangana Khokhar

[PACKT] open source* PUBLISHING
community experience distilled

Gephi Cookbook

Over 90 hands-on recipes to master the art of network analysis and visualization with Gephi

Devangana Khokhar

[PACKT] PUBLISHING open source community experience distilled

BIRMINGHAM - MUMBAI

Gephi Cookbook

Copyright © 2015 Packt Publishing

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, nor Packt Publishing, and its dealers and distributors will be held liable for any damages caused or alleged to be caused directly or indirectly by this book.

Packt Publishing has endeavored to provide trademark information about all of the companies and products mentioned in this book by the appropriate use of capitals. However, Packt Publishing cannot guarantee the accuracy of this information.

First published: May 2015

Production reference: 1220515

Published by Packt Publishing Ltd.
Livery Place
35 Livery Street
Birmingham B3 2PB, UK.

ISBN 978-1-78398-740-5

www.packtpub.com

Credits

Author

Devangana Khokhar

Reviewers

Palash Goyal

Kyunghoon Kim

Pablo Paredes Navarro

Doug Needham

Steven Paul Sanderson II

Commissioning Editor

Ashwin Nair

Acquisition Editors

Purav Motiwalla

Rebecca Youé

Content Development Editor

Kirti Patil

Technical Editor

Ankita Thakur

Copy Editors

Sonia Michelle Cheema

Stephen Copestake

Project Coordinator

Nidhi Joshi

Proofreaders

Stephen Copestake

Safis Editing

Indexer

Monica Ajmera Mehta

Graphics

Sheetal Aute

Production Coordinator

Arvindkumar Gupta

Cover Work

Arvindkumar Gupta

About the Author

Devangana Khokhar is a consultant at ThoughtWorks Inc., working on a range of exciting projects, primarily in the data science and analytics domain and is currently based out of Bengaluru. She has more than 4 years of experience in data analytics, social networks analysis, machine learning, and information retrieval. She is also the director of Women Who Code's Bangalore chapter, a nonprofit organization focused on bringing more women into the field of technology. She holds a master's degree in theoretical computer science and has specialized in social network analysis from PSG College of Technology, Coimbatore. During her postgraduate study, she was intrigued by social networks and machine learning, and she has been in love with data science and analytics since then. Devangana has also been one of the reviewers for *R Graphs Cookbook Second Edition*, *Jaynal Abedin* and *Hrishi V. Mittal*, *Packt Publishing*.

She is passionate about spreading the message of educational equality and is an advocate of women's right to education and equal stature in the tech industry. She also takes an interest in cooking and reading books, mostly in the realm of nonfiction. She is a Twitter addict and very often shares resources that she finds interesting or useful in her pursuit of getting better at data science. She tweets at `http://www.twitter.com/DevanganaK`. You can also get in touch with her on LinkedIn at `in.linkedin.com/in/devangana`.

Acknowledgments

Prima facie, I am extremely grateful to my parents for being so understanding and supportive of my passion. If it weren't for their constant words of encouragement and belief in me, my dream of authoring my first book would have never come true. This book is dedicated to them, whose patience, love, and support enabled every keystroke.

I wish to sincerely thank my colleagues and friends who've been with me as my pillars of strength all the time. Their unceasing support kept me motivated throughout this journey.

I would like to extend a big thank you to the reviewers of my book and the various editors from Packt Publishing whose tremendous support and suggestions helped me in getting this book in the best possible shape.

Let me put on record my sense of gratitude to one and all for directly or indirectly lending their support to this venture.

About the Reviewers

Palash Goyal graduated from IIT Guwahati and with a specialization in mathematics and computing. He is passionate about data science and its applications and spends most of his time researching on data science techniques. He has experience in digital marketing, web analytics, and mathematical finance. In his free time, he likes to travel, sketch, and follow blogs related to upcoming technologies and tech-products.

He is presently working with the data science team of MakeMyTrip Pvt. Ltd. and has experience working with start-ups in online marketing on Facebook and Google platforms as well as Oracle as an application developer. You can find his data science, neural networks, and artificial intelligence related tweets at `http://www.twitter.com/palgoyal1` and you can connect with him on LinkedIn at `in.linkedin.com/in/palashgoyal1`.

I would like to thank my parents, sisters, and friends for their continuous support and help while reviewing this book.

Kyunghoon Kim is the cofounder of the event explorer Core.Today and is a unified MS/PhD student in the Department of Mathematical Sciences at Ulsan National Institute of Science and Technology (UNIST). He is interested in the development of new algorithms that are inspired by nature. Currently, he is focused on researching mathematical programming for data mining, especially its complex network structure. He is also currently working on a long-term project to design the framework to realize the automated mathematician.

Kyunghoon is an avid Python programmer. He talked on NetworkX, a Python library to study networks and graphs, at PyCon, Korea, in 2014.

I would like to thank the Packt Publishing team for giving me the chance to review this book, and I am pleased that this opportunity came my way. I would also like to thank my professor, Bongsoo Jang, who introduced me to the world of applied mathematics and supported me in all my endeavors. I am also extremely grateful for the support extended by my family and friends, who mean the world to me.

Pablo Paredes Navarro has a bachelor in business administration degree from Adolfo Ibáñez University, Chile, and an MSc in science and technology studies from the University of Edinburgh, UK. He has participated in different research projects, focusing on social network analysis and digital development, and has also talked at length on these subjects at seminars conducted in Chile and the United Kingdom. His current interests are related to the use of SNA for digital networks, e-government, and ICT for development purposes in general.

Doug Needham has been building and managing data-focused enterprises for over 20 years. Distilling data down to a graph and providing various analysis results to be used in customer sites has been his most recent focus. Doug can be reached on Twitter `@dougneedham`.

Steven Paul Sanderson II is currently in the last year of his graduate program, after which he will obtain his master's degree in public health from the State University of New York at Stony Brook University School of Medicine. He has worked in a hospital setting for about 9 years in various departments. Steven is an active user of StackExchange sites and his aim is to self-learn several topics, most notably Stack Overflow, where he is working to gain an understanding and become a better user of SQL, R, VB, and Python.

He is currently employed as an EpicCare analyst for NYU Langone Medical Center, located in Manhattan, a large forward thinking academic medical center.

Steven has also worked on *Network Graph Analysis and Visualization with Gephi*, *Ken Cherven*, *Packt Publishing*, and has also coauthored a book with a former professor, Phillip Baldwin, called *The Pleistocene Re-Wilding of Johnny Paycheck*, which can be found as a self-published book at LULU.com: `http://www.lulu.com/shop/phillip-baldwin/the-pleistocene-re-wilding-of-johnny-paycheck/paperback/product-21204148.html`.

I would like to thank Christina for making me complete on March 14, 2014, and being kind enough to become my wife; I love you.

---

www.PacktPub.com

Support files, eBooks, discount offers, and more

For support files and downloads related to your book, please visit `www.PacktPub.com`.

Did you know that Packt offers eBook versions of every book published, with PDF and ePub files available? You can upgrade to the eBook version at `www.PacktPub.com` and as a print book customer, you are entitled to a discount on the eBook copy. Get in touch with us at `service@packtpub.com` for more details.

At `www.PacktPub.com`, you can also read a collection of free technical articles, sign up for a range of free newsletters and receive exclusive discounts and offers on Packt books and eBooks.

`https://www2.packtpub.com/books/subscription/packtlib`

Do you need instant solutions to your IT questions? PacktLib is Packt's online digital book library. Here, you can search, access, and read Packt's entire library of books.

Why Subscribe?

- Fully searchable across every book published by Packt
- Copy and paste, print, and bookmark content
- On demand and accessible via a web browser

Free Access for Packt account holders

If you have an account with Packt at `www.PacktPub.com`, you can use this to access PacktLib today and view 9 entirely free books. Simply use your login credentials for immediate access.

Table of Contents

Preface v

Chapter 1: Getting Started with Gephi 1

Introduction 1
Installing Gephi 2
Troubleshooting the Gephi installation 5
Exploring Gephi's graphical user interface 6
The basics of working in the Overview mode 9
The basics of working in the Data Laboratory mode 14
The basics of working in the Preview mode 15

Chapter 2: Basic Graph Manipulations 17

Introduction 18
Generating a random graph 18
Selecting and highlighting nodes in the graph 20
Coloring and sizing nodes in the graph 26
Adding nodes and edges to the graph 28
Editing node attributes in the graph 30
Finding out the shortest path in the graph 31
Setting the edge and label properties 33
Setting basic properties for graphs, nodes, edges, and labels 35
Changing the background color of the graph 37
Generating a heat map for the graph 37
Showing convex hulls for a graph where a hierarchy exists 39
Showing/hiding various parts of the graph 41
Reverting changes in the graph to the original presets 42
Creating a PNG file directly from the graph window in user-specified sizes 44

Chapter 3: Using Graph Layout Algorithms 47
Introduction 48
Using the Clockwise Rotate layout algorithm 48
Using the Counter-Clockwise Rotate layout algorithm 53
Using the Contraction layout algorithm 59
Using the Expansion layout algorithm 61
Using the Force Atlas layout algorithm 64
Using the Force Atlas 2 layout algorithm 70
Using the Fruchterman Reingold layout algorithm 73
Using the Label Adjust layout algorithm 75
Using the Random Layout algorithm 78
Using the Yifan Hu layout algorithm 80
Using the Yifan Hu Proportional layout algorithm 82
Using the Yifan Hu Multilevel layout algorithm 84

Chapter 4: Working with Partition and Ranking Algorithms 87
Introduction 87
Partitioning the graph based on node attributes 88
Partitioning the graph based on edge attributes 95
Configuring node colors in a graph by ranking nodes 97
Configuring node sizes in a graph by ranking nodes 101
Configuring node label colors in a graph by ranking nodes 104
Configuring node label sizes in a graph by ranking nodes 107
Configuring edge colors in a graph by ranking edges 109
Configuring the colors of edge labels in a graph by ranking edges 111
Configuring the size of edge labels in a graph by ranking edges 113

Chapter 5: Running Metrics, Filters, and Timelines 115
Introduction 116
Selecting a list of metrics for a graph 116
Finding the average degree and average weighted degree of a graph 118
Finding the network diameter 121
Finding graph density 125
Finding the HITS value for a graph 126
Finding a graph's modularity 130
Finding a graph's PageRank 132
Finding connected components in a graph 135
Getting a node overview of a graph 138
Getting an edge overview of a graph 141
Getting dynamic statistics for a graph 144
Applying individual filters on a graph 146

Applying a combination of filters on a graph 148
Filtering dynamic graphs based on time intervals 150

Chapter 6: Working in the Data Laboratory Mode 153
Introduction 153
Importing a spreadsheet 154
Adding and deleting nodes in a graph 159
Changing the attributes of an existing node in a graph 161
Adding and deleting edges in a graph 163
Changing the attributes of an existing edge in a graph 165
Adding/deleting columns 166
Merging columns 168
Copying data between columns 171
Filtering, searching, and modifying data based on particular attributes 173
Creating columns with dynamic regular expression filtering 174
Exporting a table 176

Chapter 7: Getting Graphs and Networks Ready for Preview 179
Introduction 180
Previewing and fine-tuning a graph in the Default mode 180
Previewing and fine-tuning a graph in the Default Curved mode 182
Previewing and fine-tuning a graph in the Default Straight mode 184
Previewing and fine-tuning a graph in the Text outline mode 186
Previewing and fine-tuning a graph in the Black Background mode 187
Previewing and fine-tuning a graph in the Edges Custom Color mode 189
Previewing and fine-tuning a graph in the Tag Cloud mode 192
Exporting a graph in the SVG, PNG, or PDF format 194

Chapter 8: Exploring Dynamic and Multilevel Graphs 199
Introduction 199
Building dynamic/temporal graphs in Gephi 200
Working with dynamic/temporal graphs 204
Working with multilevel graphs 209
Expanding and contracting subgraphs in metanodes 212
Clustering links and attributes 215

Chapter 9: Getting Real-world Graph Datasets 219
Introduction 219
Exploring the Web and Internet domain – EuroSiS Web mapping study 220
Exploring the Web and Internet domain – the Internet dataset 223
Exploring social networks – Zachary's karate club dataset 226
Exploring social networks – Twitter's mentions and retweets dataset 230
Exploring biological networks – the C. Elegans neural network dataset 232

Exploring biological networks – the yeast dataset 235
Exploring the infrastructure domain – the airlines dataset 238
Importing data from MySQL databases 242
Importing data from Neo4j databases 244
Importing data via NodeXL 247

Chapter 10: Exploring Some Useful Gephi Plugins 251

Introduction 251
Exporting networks on the Web using Seadragon 252
Exporting rich interactive visualizations using Sigma.js 256
Describing complex network structures using GEXF 260
Generating world maps 262
Performing social network analysis 265

Index 269

Preface

Gephi Cookbook is a guide to learn about interactive network exploration and visualization accompanied by the graph theory concepts that drive them. It helps you to understand about the nuances of network visualization, not only from a conceptual, but also from an implementation perspective. This book is an invaluable resource if you are looking forward to getting a deep-dive into the network analysis domain without having to learn how to code.

What this book covers

Chapter 1, *Getting Started with Gephi*, will take you through the process of installing Gephi on various platforms. It also gives you an overview of Gephi's GUI and basic understanding of various modes available in it.

Chapter 2, *Basic Graph Manipulations*, teaches you to perform basic graph manipulations such as adding and deleting nodes, editing node attributes, and applying filters on networks by exploiting the user friendly interface of Gephi.

Chapter 3, *Using Graph Layout Algorithms*, explores the basic default layout algorithms available in Gephi from both a conceptual as well as an implementation perspective.

Chapter 4, *Working with Partition and Ranking Algorithms*, will take you through the processes of the ranking and partitioning of graphs based on user-defined metrics and modifying the graph visualization based on various parameters.

Chapter 5, *Running Metrics, Filters, and Timelines*, will enable you to learn about the statistical properties of graphical networks and how they can exploit these properties with the help of Gephi.

Chapter 6, *Working in the Data Laboratory Mode*, thoroughly describes the Data Laboratory mode in Gephi, and explores a number of tasks that can be accomplished with the help of this mode.

Chapter 7, *Getting Graphs and Networks Ready for Preview*, covers the in-built rendering settings of Gephi and the process of exporting the final graph to multiple formats.

Chapter 8, *Exploring Dynamic and Multilevel Graphs*, focuses on two special kinds of graphs, dynamic graphs and multilevel graphs, and describes their working in detail.

Chapter 9, *Getting Real-world Graph Datasets*, explores various networks in Gephi. Also, it describes the art of fetching data from a number of different sources.

Chapter 10, *Exploring Some Useful Gephi Plugins*, describes a number of plugins that are extensively used by researchers and developers while working with Gephi.

What you need for this book

To run the various recipes in this book, Gephi version 0.8 is required. Unless otherwise mentioned, it is best to have the latest version of this software.

Who this book is for

If you want to learn network analysis and visualization along with graph concepts from scratch, then this book is for you. This is ideal for those of you with little or no understanding of Gephi and this domain, but will also be beneficial for those interested in expanding their knowledge and experience.

Sections

In this book, you will find several headings that appear frequently (Getting ready, How to do it, How it works, There's more, and See also).

To give clear instructions on how to complete a recipe, we use these sections as follows:

Getting ready

This section tells you what to expect in the recipe, and describes how to set up any software or any preliminary settings required for the recipe.

How to do it...

This section contains the steps required to follow the recipe.

How it works...

This section usually consists of a detailed explanation of what happened in the previous section.

There's more...

This section consists of additional information about the recipe in order to make the reader more knowledgeable about the recipe.

See also

This section provides helpful links to other useful information for the recipe.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "Open the `gephi.conf` file and, in the default options, change the `-J-Xmx512m` value to `-J-Xmx1024m`."

New terms and **important words** are shown in bold. Words that you see on the screen, for example, in menus or dialog boxes, appear in the text like this: "The upper-left corner on the screen has three tabs namely **Overview**, **Data Laboratory**, and **Preview**, which represent the three modes present in Gephi for network manipulation."

Warnings or important notes appear in a box like this.

Tips and tricks appear like this.

Reader feedback

Feedback from our readers is always welcome. Let us know what you think about this book—what you liked or disliked. Reader feedback is important for us as it helps us develop titles that you will really get the most out of.

To send us general feedback, simply e-mail `feedback@packtpub.com`, and mention the book's title in the subject of your message.

If there is a topic that you have expertise in and you are interested in either writing or contributing to a book, see our author guide at `www.packtpub.com/authors`.

Customer support

Now that you are the proud owner of a Packt book, we have a number of things to help you to get the most from your purchase.

Downloading the color images of this book

We also provide you with a PDF file that has color images of the screenshots/diagrams used in this book. The color images will help you better understand the changes in the output. You can download this file from `http://www.packtpub.com/sites/default/files/downloads/7405OS_ColorImages.pdf`.

Errata

Although we have taken every care to ensure the accuracy of our content, mistakes do happen. If you find a mistake in one of our books—maybe a mistake in the text or the code—we would be grateful if you could report this to us. By doing so, you can save other readers from frustration and help us improve subsequent versions of this book. If you find any errata, please report them by visiting `http://www.packtpub.com/submit-errata`, selecting your book, clicking on the **Errata Submission Form** link, and entering the details of your errata. Once your errata are verified, your submission will be accepted and the errata will be uploaded to our website or added to any list of existing errata under the Errata section of that title.

To view the previously submitted errata, go to `https://www.packtpub.com/books/content/support` and enter the name of the book in the search field. The required information will appear under the **Errata** section.

Piracy

Piracy of copyrighted material on the Internet is an ongoing problem across all media. At Packt, we take the protection of our copyright and licenses very seriously. If you come across any illegal copies of our works in any form on the Internet, please provide us with the location address or website name immediately so that we can pursue a remedy.

Please contact us at `copyright@packtpub.com` with a link to the suspected pirated material.

We appreciate your help in protecting our authors and our ability to bring you valuable content.

Questions

If you have a problem with any aspect of this book, you can contact us at `questions@packtpub.com`, and we will do our best to address the problem.

1
Getting Started with Gephi

In this chapter, we will cover the following recipes:

- Installing Gephi
- Troubleshooting the Gephi installation
- Exploring Gephi's graphical user interface
- The basics of working in the Overview mode
- The basics of working in the Data Laboratory mode
- The basics of working in the Preview mode

Introduction

Gephi is an interactive graph and network analysis and visualization tool that allows its users to study the properties of graphs and networks in detail, without having to write any code. Gephi supports almost all types of graphical networks including complex networks, hierarchical networks, dynamic networks, and temporal networks. Gephi has a lot of ready-to-use features that allow users to create stunning and informative visualizations. Graph analysis is one of the preliminary steps in the process of studying graphical systems and Gephi aids in that process by freeing the user from requiring knowledge of programming.

Gephi was developed in Java and, hence, is a cross-platform application, which means it can work on Windows, Linux, and Mac OS X. This chapter will take you through the step-by-step process involved in installing Gephi on different platforms. We will also discuss troubleshooting that might be required during the installation process.

This chapter also gives you an overview of Gephi's **graphical user interface** (**GUI**) and a basic understanding of various modes available in it.

Installing Gephi

This recipe discusses the minimum system configurations required in order to install Gephi and the installation process for different platforms.

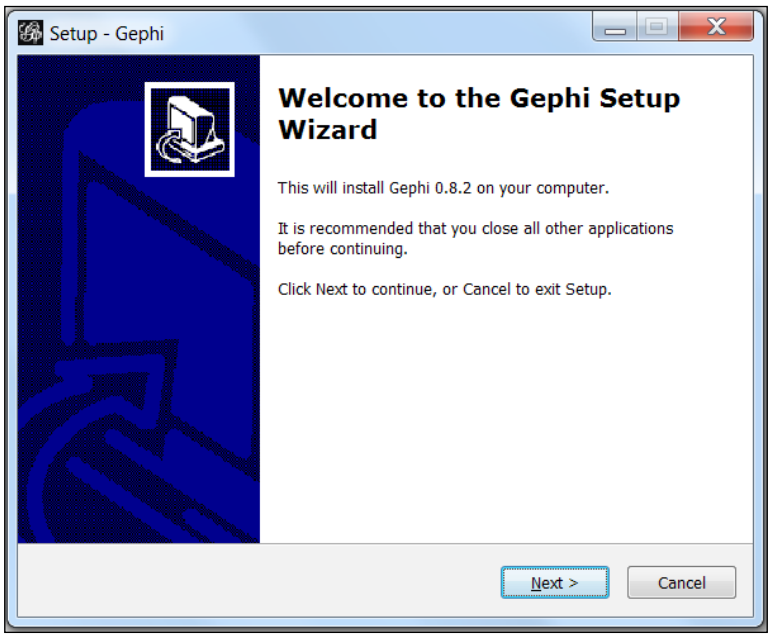
Getting ready

Gephi, being a network analysis and visualization tool, requires a compatible graphics card to be installed on your system. It uses a built-in OpenGL engine for fast processing when dealing with very large networks. Hence, it requires OpenGL 1.2 installed on your system. Gephi also requires Java 6 or later. Make sure you have these two programs installed on your system before you go ahead with the installation process.

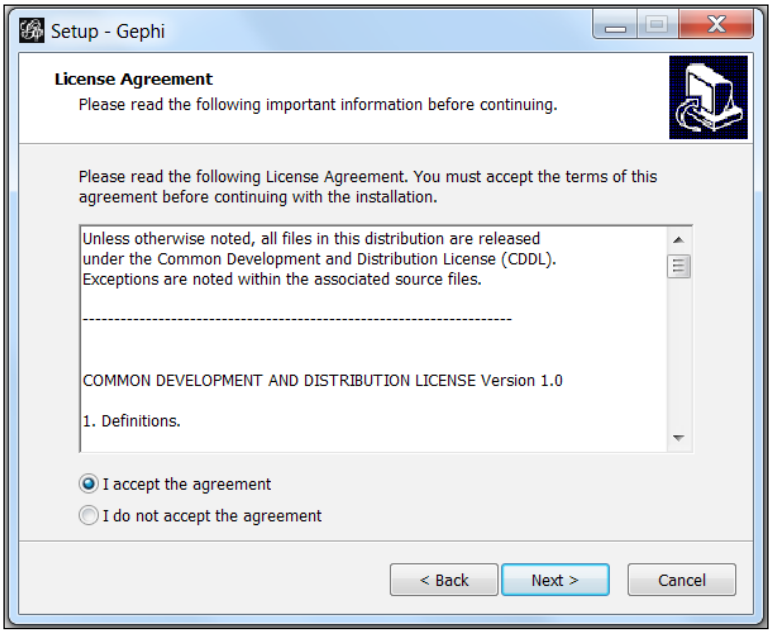
How to do it...

Follow these steps to install Gephi on Windows:

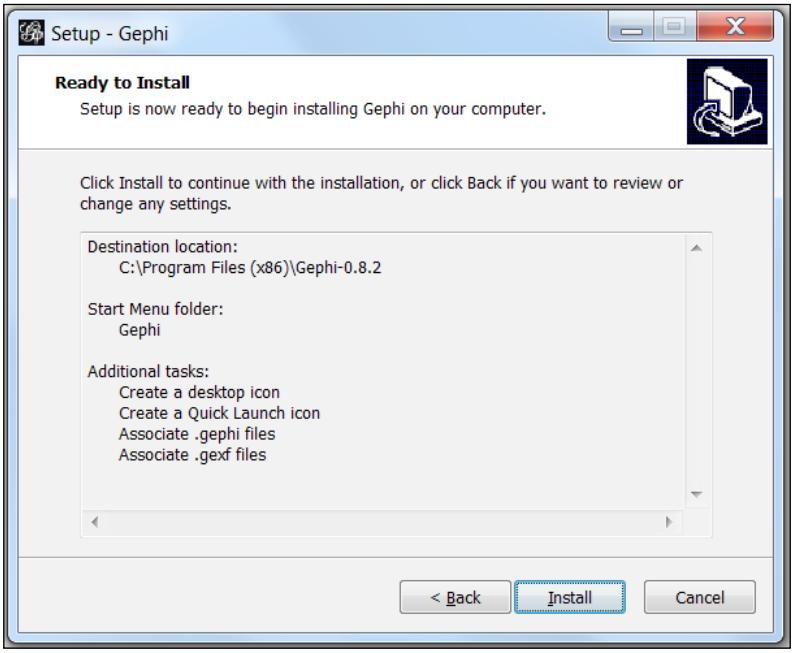
1. Download the Gephi installer from the official website: `https://gephi.github.io`.
2. Run the installer and hit **Next**:



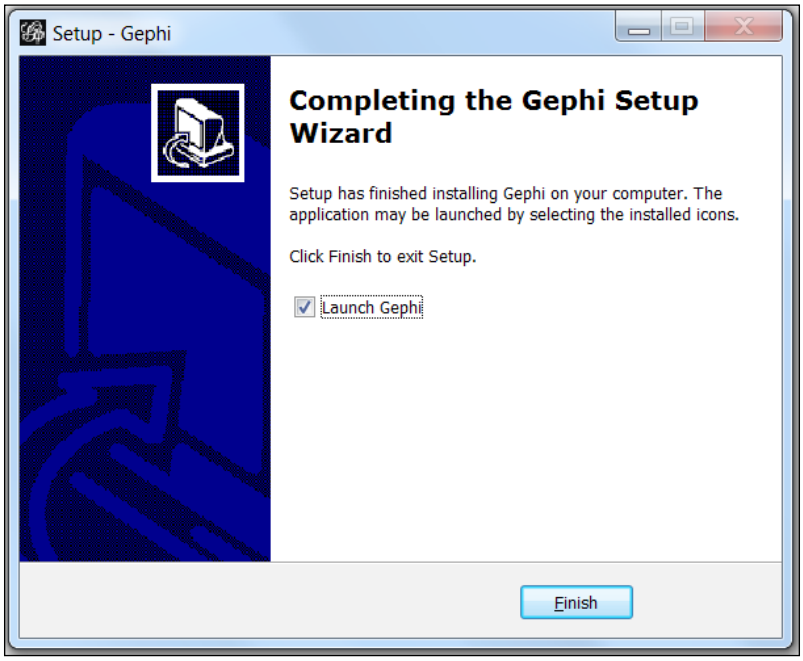
3. Accept the license agreement and hit **Next**:



4. Keep clicking on the **Next** button until you reach the following screen. Click on **Install**:



5. The installation will begin and once it's over, the following screen is displayed. Hit **Finish** to complete the setup:



To install Gephi on a Linux machine, follow these steps:

1. From Gephi's official website (`https://gephi.github.io`), download the TAR installer file.
2. Once the download has finished, untar the file and run Gephi by executing `./bin/gephi`.
3. Ubuntu users can make use of the daily build, available from Launchpad. First, run `sudo apt-add-repository ppa:rockclimb/gephi-daily` to your software sources.
4. Then, run `sudo apt-get update`, followed by `sudo apt-get install gephi`, in order to install Gephi on your box.

The installation process for Mac OS X is pretty simple and straightforward:

1. From Gephi's official website (`https://gephi.github.io`), download the installer.
2. Once the download has finished, double-click on the `DMG` file to run the installer.
3. Once the installation has finished, a new window will open. Double-click on the Gephi icon to run the application.

There's more...

As mentioned earlier, Gephi is a cross-platform tool and works on many more platforms than the ones described in this recipe. If the graphs on which you are going to work are very large, then a 64-bit version of Gephi will have to be installed if you are also using a 64-bit machine.

One might face some issues while installing Gephi, most of which are related to memory management in Java. To learn about fixing some of the most common ones, refer to the next recipe, *Troubleshooting the Gephi installation*.

See also

- `https://gephi.github.io/users/install/` for documentation on installing Gephi on other platforms

Troubleshooting the Gephi installation

While installing Gephi, there are a couple of problems that users encounter quite frequently, most of which are related to memory-specific requirements. Some of these issues are discussed in this recipe, along with the fixes that one can employ to resolve them.

How to do it...

If you encounter any memory- or JVM-related issues, try following these steps to check if the issue can be resolved:

1. If you are using Java 8, try downgrading to Java 7 and check whether the problem is resolved.
2. If you are using the latest version of Gephi, uninstall it and install an older version. If these two fixes do not resolve the problem, then you might need to do operating system-specific fixes, as listed in the following points:
    - For Windows systems, go to the Gephi folder in `Program Files` in `C:\` and then go to the `etc` folder. Open the `gephi.conf` file in Notepad. In the default options, change the `-J-Xmx512m` value to `-J-Xmx1024m`. This changes the maximum heap size allocated to Java to 1,024 MB. If you are using a 64-bit machine, the `gephi.conf` file will be located in the Gephi folder in `C:\Program Files(x86)`.

- For Linux systems, go to the `etc` folder in the Gephi application directory and open the `gephi.conf` file. Change the `-J-Xmx512m` value to `-J-Xmx1024m` to change the maximum heap size allocated to Java to 1,024 MB.
- For Mac OS X systems, go to **Show Package Contents** by right-clicking on the Gephi icon in the `Applications` folder. Inside the `Contents` folder, go to the `Resources/Gephi/etc` folder. Open the `gephi.conf` file and, in the default options, change the `-J-Xmx512m` value to `-J-Xmx1024m`. This changes the maximum heap size allocated to Java to 1,024 MB.

Unable to save the modified `gephi.conf` file? Open your text editor in administrator mode, navigate to the folder where the file is located, open the file, and then make the changes. Finally, hit **Save** to save the changes.

How it works...

Java Virtual Machine (**JVM**) is an abstract computing machine, otherwise known as a virtual machine. A virtual machine emulates a part of the computing system. JVM executes a Java program compiled into Java bytecode. Since Gephi runs on JVM, its functioning depends on the memory allocated in the system for Java. If very little memory has been allocated to Java, it won't have enough resources to load all the data and, hence, the application won't start. On the other hand, if too much memory has been allocated to Java, then the system won't let Java start and will throw the "JVM Creation failed" message.

See also

- `http://docs.oracle.com/cd/E13150_01/jrockit_jvm/jrockit/geninfo/diagnos/garbage_collect.html` to understand more about memory management in Java

Exploring Gephi's graphical user interface

Gephi offers a very user-friendly GUI to users, making it very easy for novices to explore and manipulate networks with just a few clicks of the mouse.

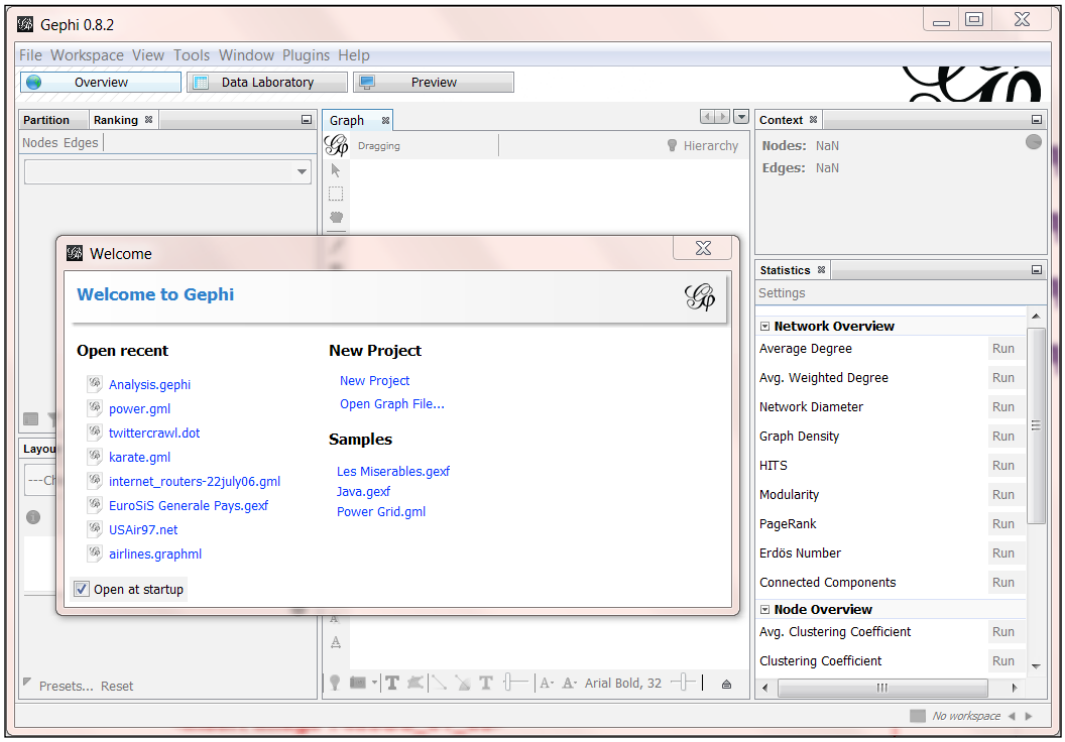
Getting ready

This recipe describes some of the main GUI components of Gephi and gives the user an overview of what can be achieved. For this, you need to make sure that you have Gephi installed on your system.

How to do it...

To explore Gephi's GUI, perform the following steps:

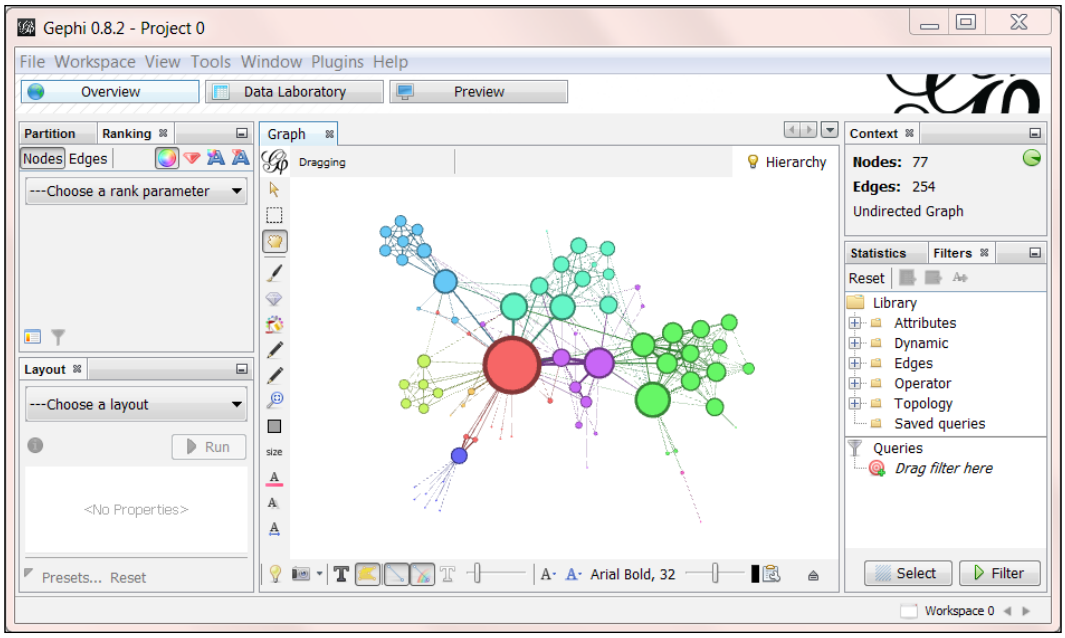
1. Run Gephi on your system. You'll be welcomed with a small screen, as shown in the following screenshot, that asks you to choose between loading a preexisting sample and creating a new project:



2. If it is your first time with Gephi, click on **Les Miserables.gexf** to load an existing network that was designed using the property of concurrence between the characters from the famous novel *Les Misérables* by Victor Hugo.

3. You will notice a prompt titled **Import report** asking you to set the properties for the graph. Just leave the pre-specified selections as they are and hit **OK** to load the graph.

   The following screenshot shows the first screen you will see once the graph has been loaded:



4. To reposition the graph on the screen, place the mouse pointer somewhere on the **Graph** panel situated in the center of the screen and, while holding the right mouse button, move around to the location you want the graph to be centered at.

There are two ways in which the graph can be zoomed-in and zoomed-out:

- Rotate the mouse wheel upwards to zoom-in and downwards to zoom-out with the mouse pointer located somewhere in the graph window.
- Click on the upward-pointing arrow on the right-bottom corner of the graph window to expand the **Settings** panel. Click on the **Global** tab and use the zoom slider to zoom-in and zoom-out on the graph.

How it works...

Gephi has a pretty simple and user-friendly GUI. The upper-left corner on the screen has three tabs namely **Overview**, **Data Laboratory**, and **Preview**, which represent the three modes present in Gephi for network manipulation. You can customize which panels appear in the application by selecting/deselecting specific panels from the **Window** option in the menu bar.

The basics of working in the Overview mode

This recipe will take you through the basics of various functionalities available in Gephi's Overview mode.

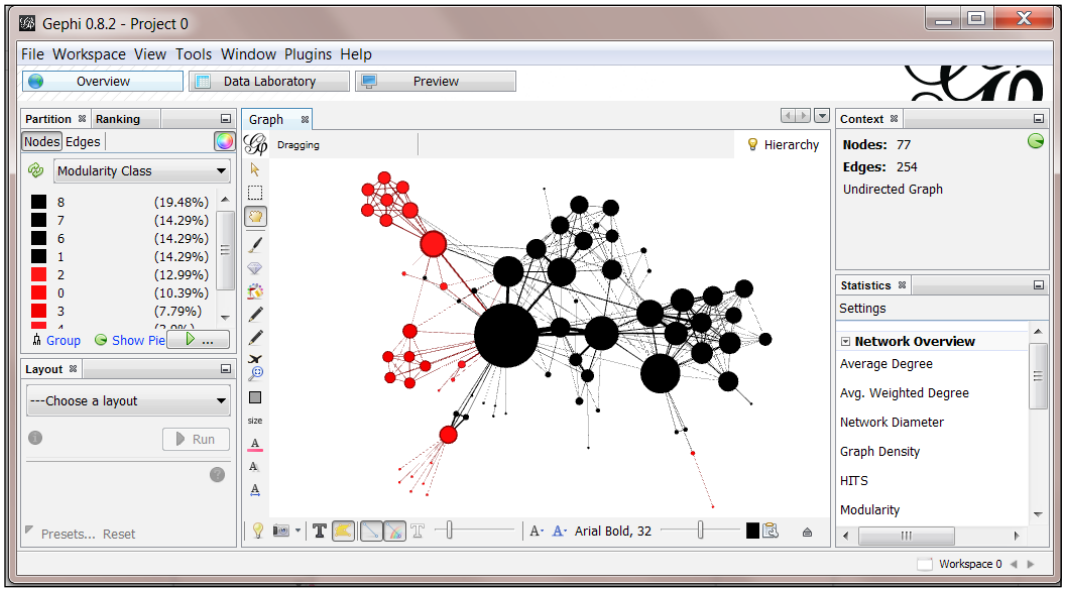
Getting ready

Run Gephi and load a preexisting network. The first screen that you see is the **Overview** mode, which is otherwise called the Graph Manipulation mode in Gephi. If you already have Gephi running, clicking on the **Overview** tab in the upper-left corner of the screen will take you to this mode.

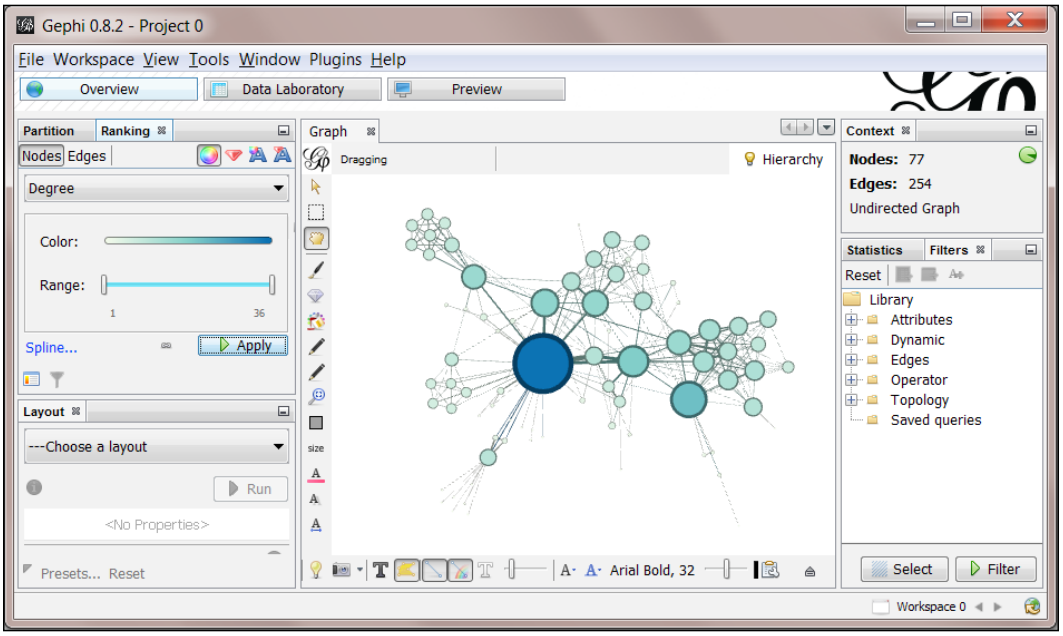
How to do it...

When in **Overview** mode, you'll able to perform a wide variety of manipulations on the graphs. These are categorized under the following subsections in the **Overview** mode, each located in a different part of the **Overview** screen:

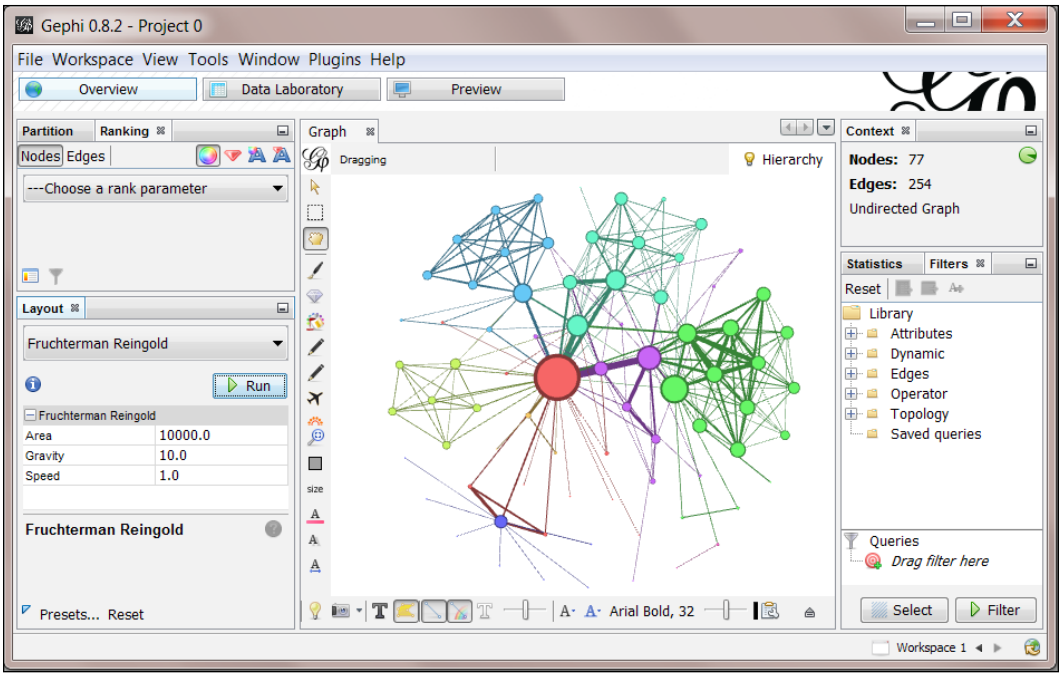
- **Partition**: This module lets you partition the graph into smaller components based on various node- and edge-specific properties, which are called **partitioning parameters**. One such example of partitioning parameters provided by Gephi is **Modularity Class**. The following screenshot shows the graph obtained after partitioning the Les Misérables graph on the basis of **Modularity Class** and then recoloring it:



- **Ranking**: This module lets you rank the nodes of the graph based on various criteria such as degree, modularity class, edge weight, and so on. The following screenshot shows the Les Misérables network after its nodes have been ranked, according to their degrees:



- **Layout**: In this module, one can obtain different visualizations of the same graph by using numerous graph layout algorithms that are provided in Gephi. Some of the most popularly used graph layout algorithms used in Gephi are Force Atlas, Fruchterman Reingold, and Yifan Hu. One such example is shown in the following screenshot, in which the Fruchterman Reingold layout algorithm has been applied to the Les Misérables graph:



- **Graph**: In this panel, you'll find a list of basic tools that you can use to perform basic manipulations on the graph such as resizing individual nodes, coloring components of the graph, coloring individual nodes, and modifying node labels. If you do not see this panel on your screen, click on **Window** in the menu bar and select **Graph** from there.
- **Context**: This part of the **Overview** screen gives information about the basic properties of the graph such as the number of edges, the number of nodes, and the type of graph.