Graphviz

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Graphviz is a graph visualization software. You can find out more about this research project first initiated by AT&T Labs. It allows you to specify a graph including the nodes and the edges between nodes. The software produces image files drawing the graph, attempting to place the nodes in such a way that there is minimal edge crossings. You can also specify shapes of the nodes (circle, square, etc.) as well as color. Besides putting into the nodes, you can also label edges. This is probably among the most famous graph visualization software and is used by many computer scientists

To install the program on your fedora virtual machine do this (as root)

```
dnf -y install graphviz
```

This assumes that you're using fedora machine.

Here's an example on how to create a directed graph. Create a text file named `graph.dot` (or any name you choose) with the following contents:

```
digraph G
{
   a -> b;
   a -> c;
   a -> d;
   b -> e;
}
```

You are creating nodes a, b, c, d, e with a joined to b, etc.

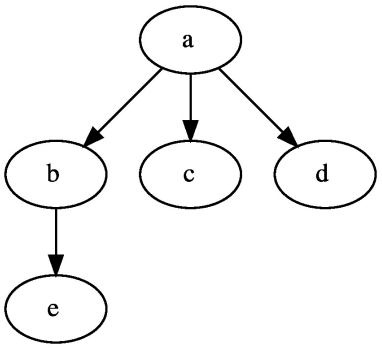
Run the following command from your shell:

```
dot -Tps graph.dot -o graph.ps
```

and you will get an image file `graph.ps` with the graph. Of course you can choose any other filename for your image file. This generates the image file as a postscript file. You can convert that to a JPG file doing this in linux:

```
convert graph.ps graph.jpg
```

Here's `graph.jpg`:



You can change the resolution if the output image is too grainy:

```
digraph G
{
    graph [ dpi = 300 ];
    a -> b;
    a -> c;
    a -> d;
    b -> e;
}
```

To draw an (undirected) graph change your file to this:

```
graph G
{
    graph [ dpi = 300 ];
    a -- b;
    a -- c;
    a -- d;
    b -- e;
}
```

You can change the label of a node and the shape like this:

```
digraph G
{
    graph [ dpi = 300 ];
    a -> b;
    a -> c;
    a -> d;
    b -> e;

    a [shape=box];
    b [label="hello\nworld"];
    c [shape=circle];
}
```

For more shapes goto https://graphviz.org/doc/info/shapes.html.

You can color the background of the node. Try this:

```
digraph G
{
    graph [ dpi = 300 ];
    a -> b
    a -> c;
    a -> d;
    b -> e;

    a [fillcolor=red, style=filled]
    b [fillcolor="#00ff00", style=filled]
    c [label="", fillcolor="#0000ff", style=filled]
}
```

Here are more color names: https://graphviz.org/doc/info/colors.html.

You can label the edges:

```
digraph G
{
    graph [ dpi = 300 ];

    a -> b [label="e1"]
    a -> c [label=" e2"];
    a -> d [label=" e3"];
    b -> e [label=" e4"];
}
```

You can find more about graphviz on the web.