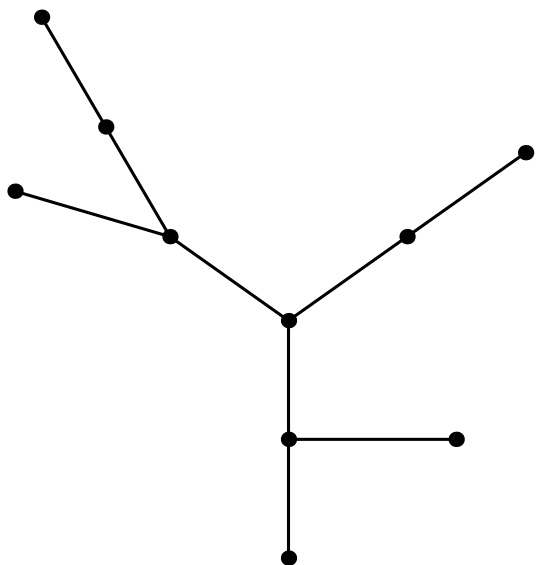


```
g = RandomTree[10]
-Graph:<9, 10, Undirected>-
ShowGraph[g]
```



- Graphics -

■ Testing Vertex Options

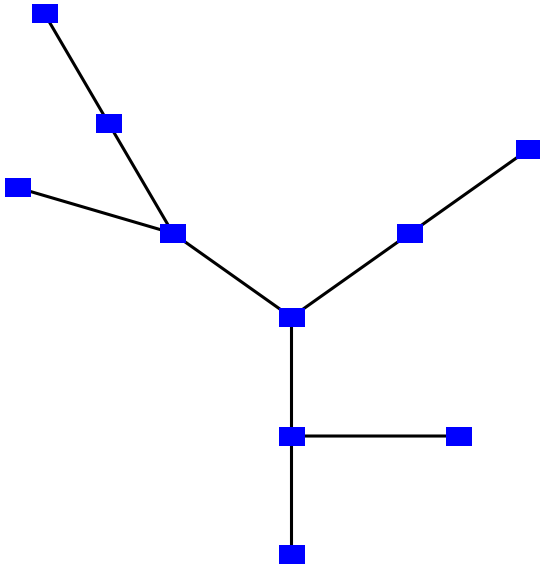
The option `VertexStyle` can take on values of the form

`Shape[Size]`

where `Shape` can be `Disk` or `Box` and `Size` can be `Normal`, `Large`, or `Small`. In addition, `Size` can be any real number and that will be treated as the diameter of the shape.

The default for `VertexStyle` is `Disk[Normal]`.

```
ShowGraph[g, VertexColor → Blue, VertexStyle → Box[Normal]]
```



- Graphics -

? VertexColor

VertexColor is an option that allows the user to associate colors with vertices. Black is the default color. VertexColor can be set as part of the graph data structure and it can be used in ShowGraph. [Help Browser](#)

? VertexStyle

VertexStyle is an option that allows the user to associate different sizes and shapes to vertices. A disk is the default shape. VertexStyle can be set as part of the graph data structure and it can be used in ShowGraph. [Help Browser](#)

? Box

Box is a value that the option VertexStyle, used in ShowGraph, can be set to. [Help Browser](#)

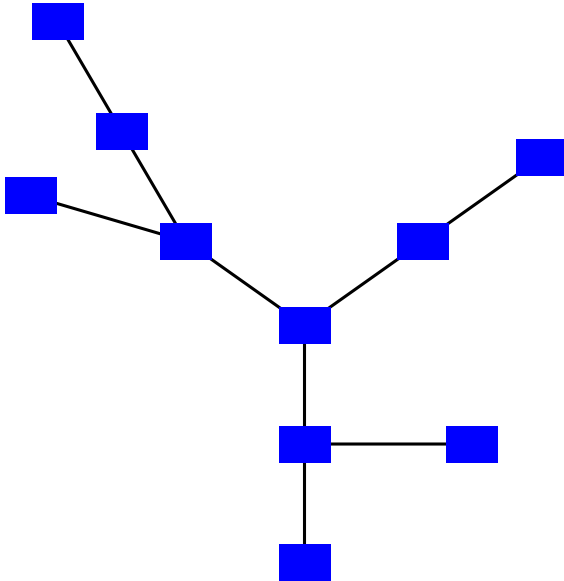
? Disk

Disk[{x, y}, r] is a two-dimensional graphics primitive that represents a filled disk of radius r centered at the point x, y. Disk[{x, y}, {rx, ry}] yields an elliptical disk with semi-axes rx and ry. Disk[{x, y}, r, {theta1, theta2}] represents a segment of a disk. Disk is also a value that the VertexStyle option in ShowGraph can take. [Help Browser](#)

? Normal

Normal is a value that options VertexStyle, EdgeStyle, and PlotRange can take on in ShowGraph. [Help Browser](#)

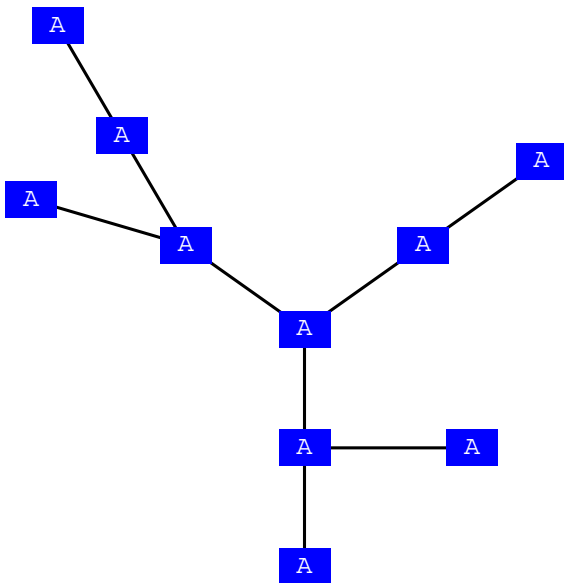
```
ShowGraph[g, VertexColor → Blue, VertexStyle → Box[0.05]]
```



- Graphics -

The option `VertexLabel` can be anything. The value "Off" is used to represent no label and this is the default. Any other value is treated as a label and will be displayed. `VertexLabelPosition` can take on values `LowerLeft`, `LowerRight`, `UpperLeft`, `UpperRight`, and `Center`. In addition, `VertexLabelPosition` can take on a value `{x, y}`, where `{x, y}` is treated as the offset of the label from the vertex.

```
ShowGraph[g, VertexColor → Blue, VertexStyle → Box[0.05],  
VertexLabel → "A", VertexLabelColor → White, VertexLabelPosition → Center]
```



- Graphics -

?VertexLabel

VertexLabel is an option that allows the user to set and display vertex labels. By default, there are no vertex labels. VertexLabel can be set as part of the graph data structure or in ShowGraph. Help Browser

?VertexLabelColor

VertexLabelColor is an option that allows the user to associate different colors to vertex labels. Black is the default color. VertexLabelColor can be set as part of the graph data structure or in ShowGraph. Help Browser

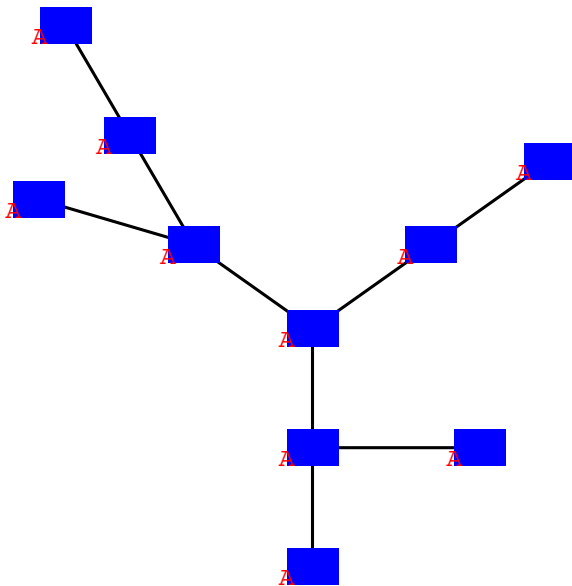
?VertexLabelPosition

VertexLabelPosition is an option that allows the user to place a vertex label in a certain position relative to the vertex. The default position is upper right. VertexLabelPosition can be set as part of the graph data structure or in ShowGraph. Help Browser

?Center

Center is a value that options VertexNumberPosition, VertexLabelPosition, and EdgeLabelPosition can take on in ShowGraph. Help Browser

```
ShowGraph[g, VertexColor → Blue, VertexStyle → Box[0.05],
VertexLabel → "A", VertexLabelColor → Red, VertexLabelPosition → LowerLeft]
```



- Graphics -

?LowerLeft

LowerLeft is a value that options VertexNumberPosition, VertexLabelPosition, and EdgeLabelPosition can take on in ShowGraph. Help Browser

?LowerRight

LowerRight is a value that options VertexNumberPosition, VertexLabelPosition, and EdgeLabelPosition can take on in ShowGraph. Help Browser

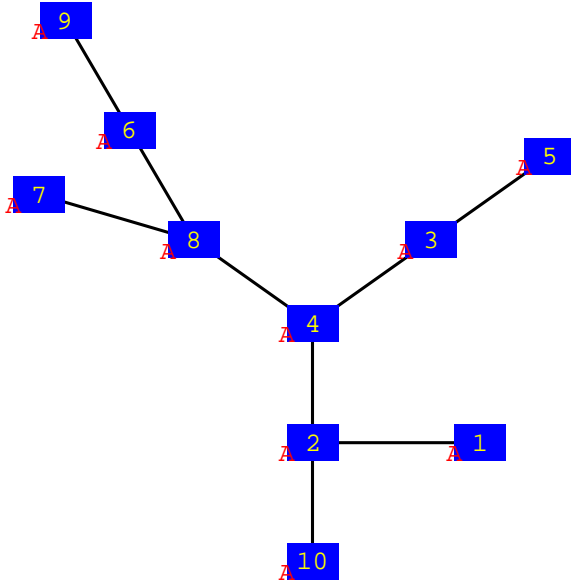
?UpperLeft

UpperLeft is a value that options VertexNumberPosition, VertexLabelPosition, and EdgeLabelPosition can take on in ShowGraph. Help Browser

? UpperRight

UpperRight is a value that options VertexNumberPosition, VertexLabelPosition, and EdgeLabelPosition can take on in ShowGraph. Help Browser

```
ShowGraph[g, VertexColor → Blue, VertexStyle → Box[0.05],
VertexLabel → "A", VertexLabelColor → Red, VertexLabelPosition → LowerLeft,
VertexNumber → On, VertexNumberPosition → Center, VertexNumberColor → Yellow]
```



- Graphics -

? On

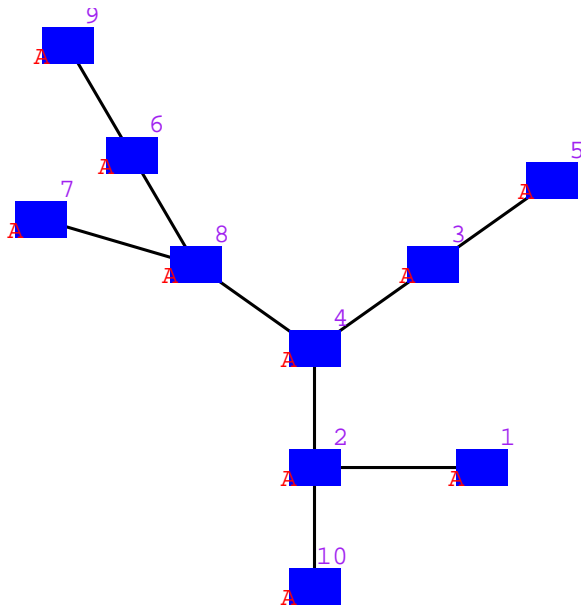
On is a value that the options VertexNumber and EdgeDirection can take on in the graph data structure or in ShowGraph. Help Browser

? Off

Off is a value that the options VertexNumber, VertexLabel, and EdgeDirection can take on in the graph data structure or in ShowGraph. Help Browser

The example below shows all 8 vertex options.

```
ShowGraph[g, VertexColor -> Blue, VertexStyle -> Box[0.05], VertexLabel -> "A",
VertexLabelColor -> Red, VertexLabelPosition -> LowerLeft, VertexNumber -> On,
VertexNumberPosition -> {0.05, 0.05}, VertexNumberColor -> Purple]
```



- Graphics -

? VertexNumber

VertexNumber is an option that can be used in ShowGraph to display or suppress vertex numbers. By default, the vertex numbers are hidden. VertexNumber can be set as part of the graph data structure or in ShowGraph. [Help Browser](#)

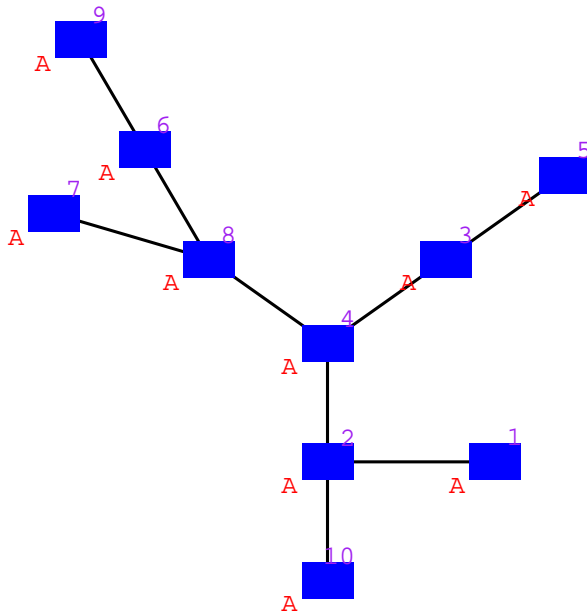
? VertexNumberPosition

VertexNumberPosition is an option that can be used in ShowGraph to display a vertex number in a certain position relative to the vertex. By default, vertex numbers are positioned to the lower left of vertices. VertexNumberPosition can be set as part of the graph data structure or in ShowGraph. [Help Browser](#)

? VertexNumberColor

VertexNumberColor is an option that can be used in ShowGraph to associate different colors to vertex numbers. Black is the default color. VertexNumberColor can be set as part of the graph data structure or in ShowGraph. [Help Browser](#)

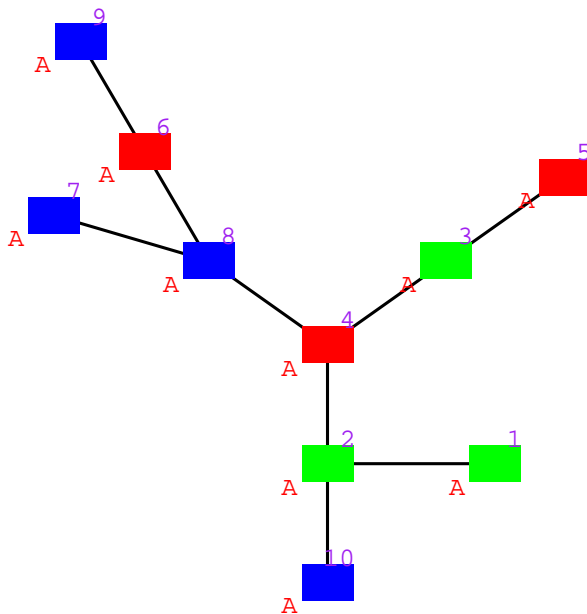
```
ShowGraph[g, VertexColor -> Blue, VertexStyle -> Box[0.05], VertexLabel -> "A",
VertexLabelColor -> Red, VertexLabelPosition -> {-0.04, -0.04}, VertexNumber -> On,
VertexNumberPosition -> {0.04, 0.04}, VertexNumberColor -> Purple]
```



- Graphics -

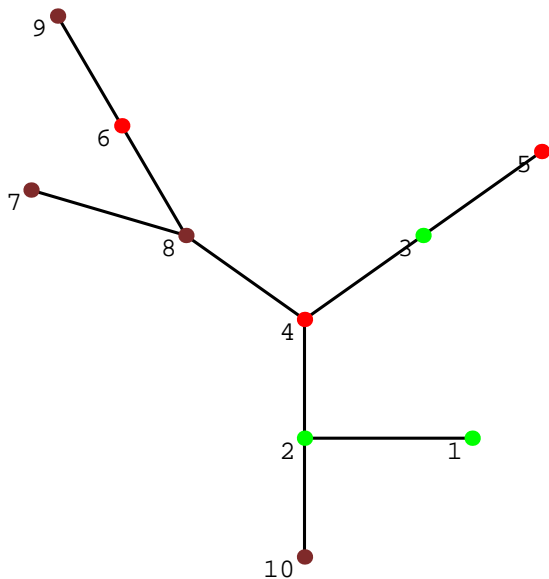
Here options are also set locally. Vertices 1, 2, and 3 are colored Green, 4, 5, and 6 are colored Red, etc.

```
ShowGraph[g, {{1, 2, 3, VertexColor -> Green}, {4, 5, 6, VertexColor -> Red}},
VertexColor -> Blue, VertexStyle -> Box[0.05], VertexLabel -> "A",
VertexLabelColor -> Red, VertexLabelPosition -> {-0.04, -0.04}, VertexNumber -> On,
VertexNumberPosition -> {0.04, 0.04}, VertexNumberColor -> Purple]
```



- Graphics -

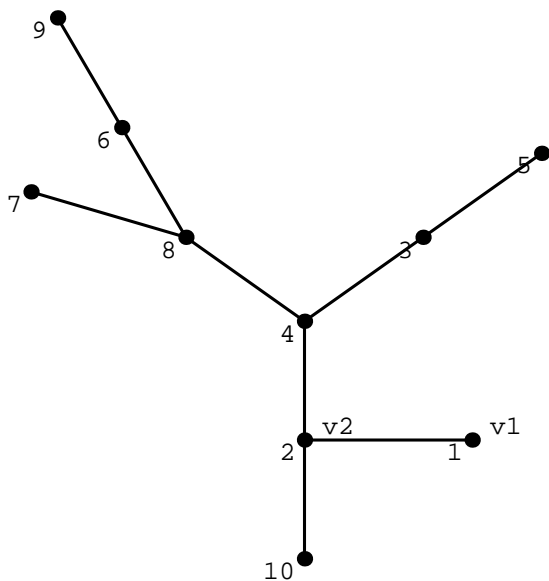
```
ShowGraph[g, {{1, 2, 3, VertexColor -> Green}, {4, 5, 6, VertexColor -> Red},
  {7, 8, 9, 10, VertexColor -> Brown}}, VertexNumber -> On]
```



- Graphics -

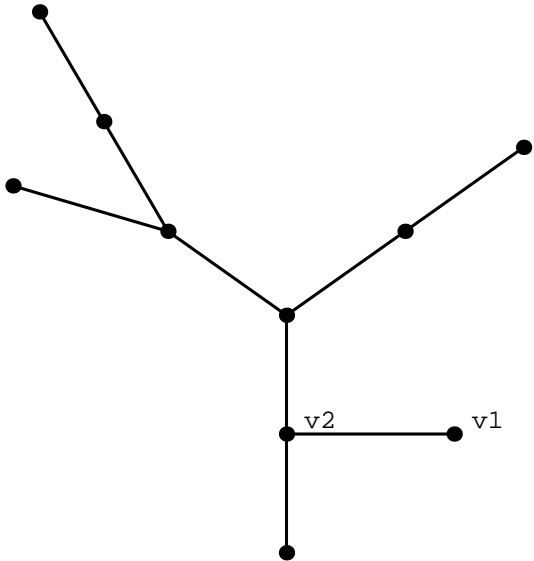
Label "v3" is missing below because it falls outside plot range.

```
ShowGraph[g, {{1, VertexLabel -> "v1"},
  {2, VertexLabel -> "v2"}, {VertexLabel -> "v3"}}, VertexNumber -> On]
```



- Graphics -

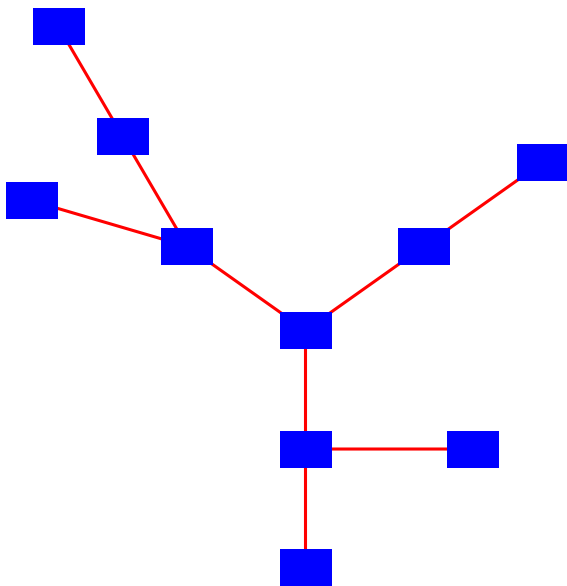

```
ShowGraph[g, {{1, VertexLabel -> "v1"}, {2, VertexLabel -> "v2"}, {VertexLabel -> "v3"}}]
```



- Graphics -

■ Testing Edge Options

```
ShowGraph[g, VertexColor -> Blue, EdgeColor -> Red, VertexStyle -> Box[0.05]]
```

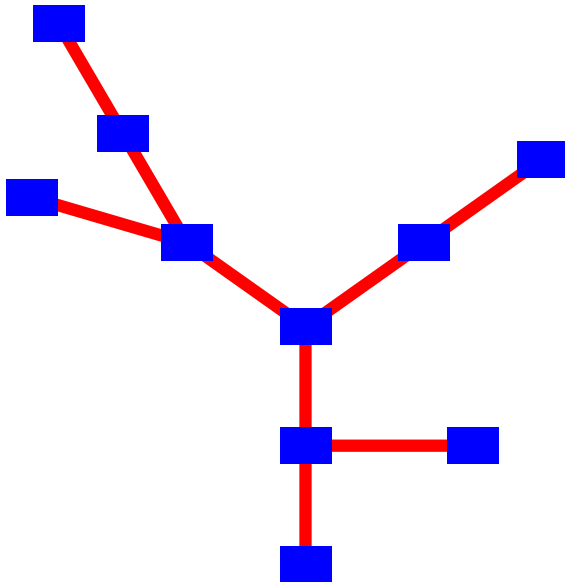


- Graphics -

? EdgeColor

EdgeColor is an option that allows the user to associate colors with edges. Black is the default color. EdgeColor can be set as part of the graph data structure or in ShowGraph. Help Browser

```
ShowGraph[g, VertexColor → Blue,  
EdgeColor → Red, EdgeStyle → Thick, VertexStyle → Box[0.05]]
```



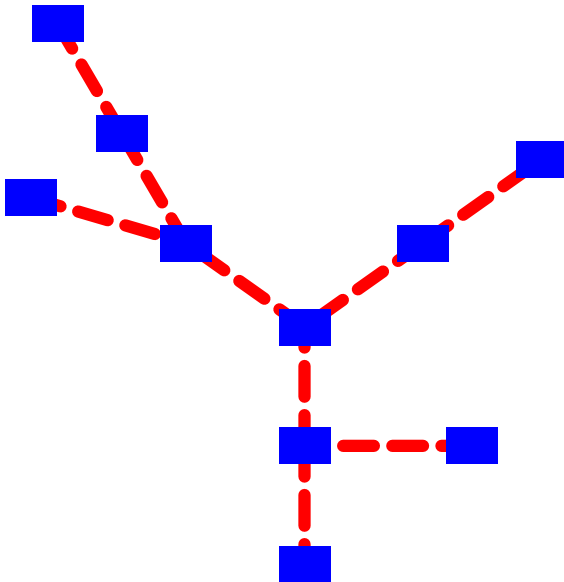
- Graphics -

? EdgeStyle

EdgeStyle is a an option that allows the user to associate different sizes and shapes to edges. A line segment is the default edge. EdgeStyle can be set as part of the graph data structure or in ShowGraph. Help Browser

The option EdgeStyle can take on the values Thick, Normal, Thin, ThickDashed, NormalDashed, and ThinDashed.

```
ShowGraph[g, VertexColor → Blue, EdgeColor → Red,  
EdgeStyle → ThickDashed, VertexStyle → Box[0.05]]
```



- Graphics -

? Thick

Thick is a value that the option EdgeStyle can take on in the graph data structure or in ShowGraph. [Help Browser](#)

? Thin

Thin is a value that the option EdgeStyle can take on in the graph data structure or in ShowGraph. [Help Browser](#)

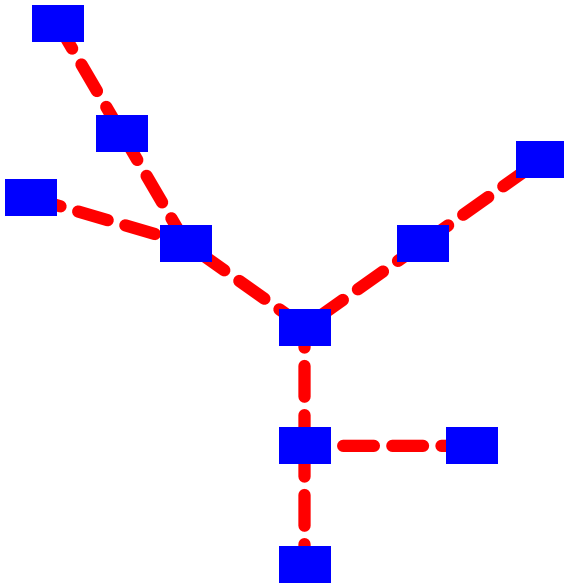
? ThickDashed

ThickDashed is a value that the option EdgeStyle can take on in the graph data structure or in ShowGraph. [Help Browser](#)

? ThinDashed

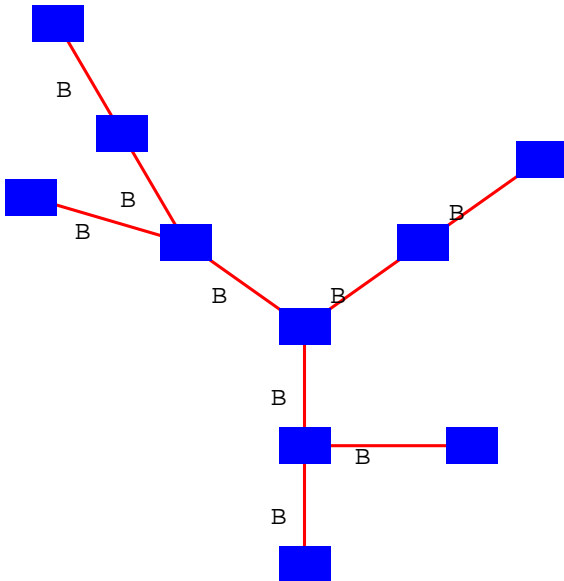
ThinDashed is a value that the option EdgeStyle can take on in the graph data structure or in ShowGraph. [Help Browser](#)

```
ShowGraph[g, {{1, 9}, {4, 9}, EdgeColor -> Black}}, VertexColor -> Blue,
EdgeColor -> Red, EdgeStyle -> ThickDashed, VertexStyle -> Box[0.05]]
```



- Graphics -

```
ShowGraph[g, VertexColor -> Blue,
EdgeColor -> Red, VertexStyle -> Box[0.05], EdgeLabel -> "B"]
```



- Graphics -

? EdgeLabel

EdgeLabel is an option that allows the user to associate labels to edges. By default, there are no edge labels. The EdgeLabel option can be set as part of the graph data structure or in ShowGraph. [Help Browser](#)

? EdgeLabelPosition

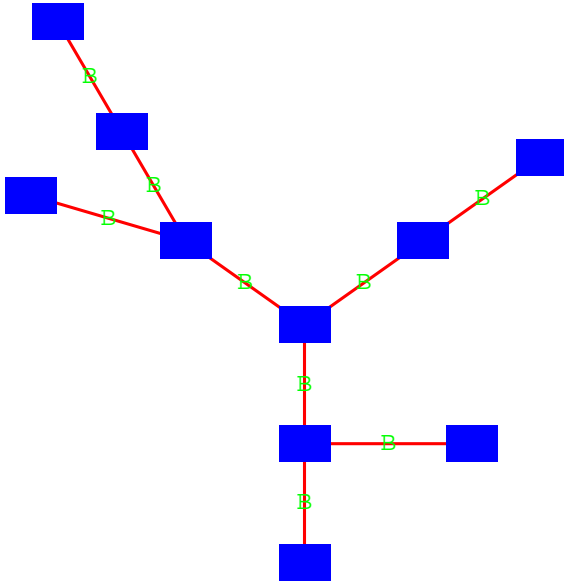
EdgeLabelPosition is an option that allows the user to place an edge label in a certain position relative to the midpoint of the edge. LowerLeft is the default value of this option. EdgeLabelPosition can be set as part of the graph data structure or in ShowGraph. Help Browser

? EdgeLabelColor

EdgeLabelColor is an option that allows the user to associate different colors to edge labels. Black is the default color. EdgeLabelColor can be set as part of the graph data structure or in ShowGraph. Help Browser

The option EdgeLabel is like the option VertexLabel. The option EdgeLabelPosition takes on the same values as the option VertexLabelPosition. The edge label is positioned relative to the midpoint of the edge. The default for EdgeLabelPosition is LowerLeft.

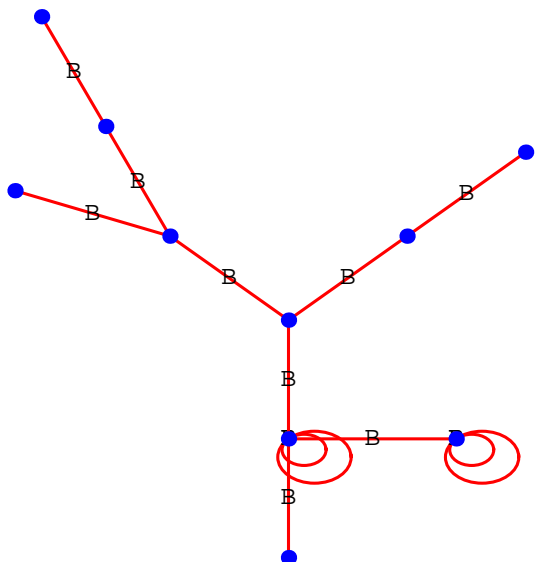
```
ShowGraph[g, VertexColor -> Blue, EdgeColor -> Red, VertexStyle -> Box[0.05],
EdgeLabel -> "B", EdgeLabelColor -> Green, EdgeLabelPosition -> Center]
```



- Graphics -

Self-loops are shown as circles passing through vertices. This example, shows that the bad positioning of edge labels of self-loops. This might be fixed in the future. This example also shows that multiple self-loops through the same vertex are handled reasonably. The option LoopPosition can take the values LowerRight, LowerLeft, UpperRight, and UpperLeft.

```
ShowGraph[AddEdges[g, {{1, 1}, {1, 1}, {2, 2}, {2, 2}}], VertexColor -> Blue,  
EdgeColor -> Red, EdgeLabel -> "B", EdgeLabelPosition -> Center, LoopPosition -> LowerRight]
```



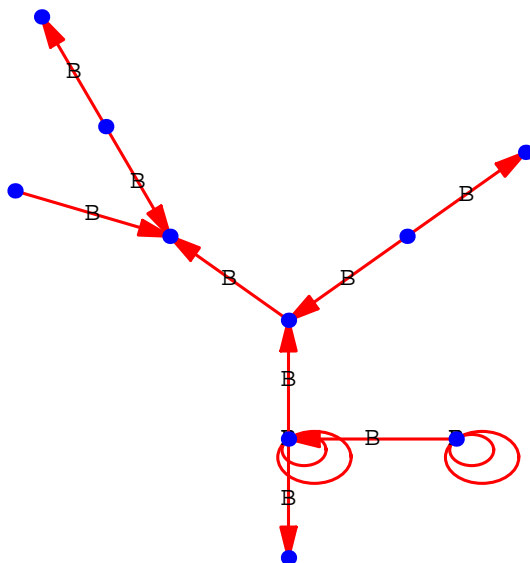
- Graphics -

?LoopPosition

LoopPosition is an option to ShowGraph whose values tell ShowGraph where to position a loop around a vertex. This option can take on values UpperLeft, UpperRight, LowerLeft, and LowerRight. [Help Browser](#)

Even though edge direction is typically set inside the graph data structure, it can be set in ShowGraph via the option EdgeDirection. The loops do not need arrows and so no arrows appear there.

```
ShowGraph[AddEdges[g, {{1, 1}, {1, 1}, {2, 2}, {2, 2}}],  
VertexColor → Blue, EdgeColor → Red, EdgeLabel → "B",  
EdgeLabelPosition → Center, LoopPosition → LowerRight, EdgeDirection → On]
```

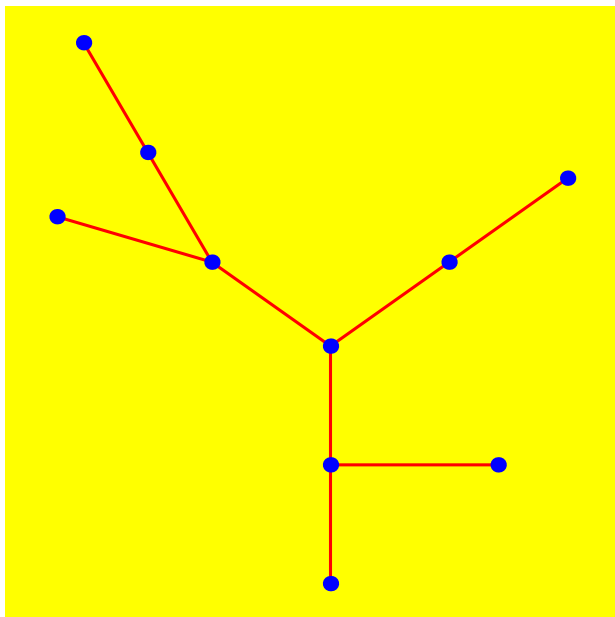


- Graphics -

■ Other Options

All options that can be used in Plot can be used in ShowGraph as well. Similarly, all options that can be used for Arrows can be used in ShowGraph.

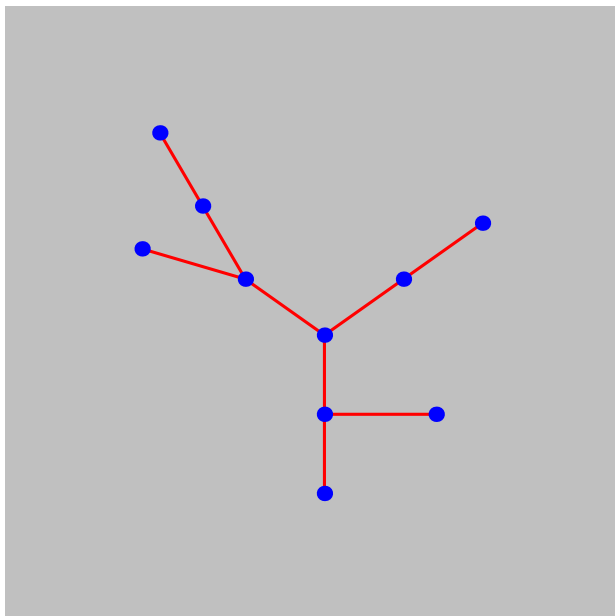
```
ShowGraph[g, VertexColor → Blue, EdgeColor → Red,  
LoopPosition → LowerRight, Background → Yellow]
```



- Graphics -

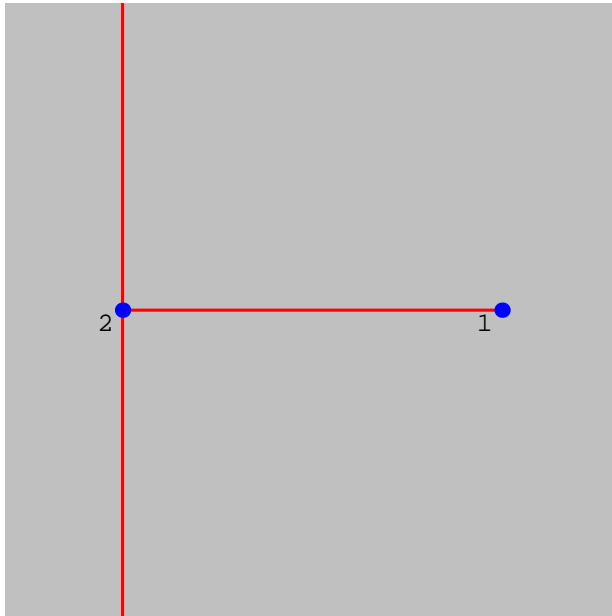
When `PlotRange` takes on a real value a , a is used as the factor by which the default plot range is expanded. If the default plot range is r , it becomes $r(1+a)$. The default value of `PlotRange` is `Normal` and this corresponds to calculating a range in which all the vertices can fit.

```
ShowGraph[g, VertexColor → Blue, EdgeColor → Red,  
LoopPosition → LowerRight, Background → Gray, PlotRange → 0.5]
```



- Graphics -


```
ShowGraph[g, VertexColor → Blue, EdgeColor → Red, LoopPosition → LowerRight,  
Background → Gray, PlotRange → Zoom[{1, 2}], VertexNumber → On]
```



- Graphics -

? Zoom

Zoom[{i, j, k, ...}] is a value that the PlotRange option can take on in ShowGraph. Setting PlotRange to this value zooms the display on to the specified subset of vertices, i, j, k, [Help Browser](#)

? GraphOptions

GraphOptions[g] returns the display options associated with g. GraphOptions[g, v] returns the display options associated with vertex v in g. GraphOptions[g, {u, v}] returns the display options associated with edge {u, v} in g [Help Browser](#)