# Cleaning a circuit

This is a demo of some of the lower level functions, which the program uses to implement higher level functionality. Only function that are available to the user are shown.

## 1. Clean

The clean function will attempt to clean up node labelling to avoid skips. Clean updates the appropriate elements and updates critical properties of the circuit, such as the netlist.

Here, an arbitrary circuit is constructed as specified by the netlist.

```
circuit = Circuit('circuits/nodal_gap.txt');
circuit.list
```

```
ans =
    'V1 1 0 DC 12
     R1 1 3 1000
     R2 3 0 1000
     R3 4 0 8000
     Ga 4 3 1 3 100
     '
```

The node labels range from 1 to 4 but skips 2 for some reason. This can cause problems for other functions, so we better clean up the labelling.

```
circuit.clean()
circuit.list
```

```
ans =
    'V1 1 0 DC 12
     R1 1 2 1000
     R2 2 0 1000
     R3 3 0 8000
     Ga 3 2 1 2 100
     '
```

Now, the labelling makes more sense. Many higher level functions will call clean on their own. For instance, shorting an element will result in one less node, and so calls for an update to the labels. Modelling a non-linear element may require adding many additional nodes and so also requires the clean function.