

# Project 04 - Bayes Network

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## 1 Program usage

In the src folder, simply type  
python bayes\_network.py  
which results in the output

```
Node : x1    Parent of x1 : []
Node : x2    Parent of x2 : ['x1']
Node : x3    Parent of x3 : ['x2']
Node : Storms Parent of Storms : []
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
Node : Storms Parent of Storms : []
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
Node : Storms Parent of Storms : []
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
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Node : Thunder Parent of Thunder : ['Lightning']
Node : Storms Parent of Storms : []
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
Node : Storms Parent of Storms : []
```

```
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
Node : Storms Parent of Storms : []
Node : BusTourGroup Parent of BusTourGroup : []
Node : Lightning Parent of Lightning : ['Storms']
Node : Campfire Parent of Campfire : ['BusTourGroup']
Node : Thunder Parent of Thunder : ['Lightning']
percent correct: 99.3%
```

The first three lines give a test-network, followed by the parents of each node of the resulting DAG derived from 10-fold cross-validation on the forest fire data included in the data directory. The final accuracy is reported on the last line.

## 2 Data

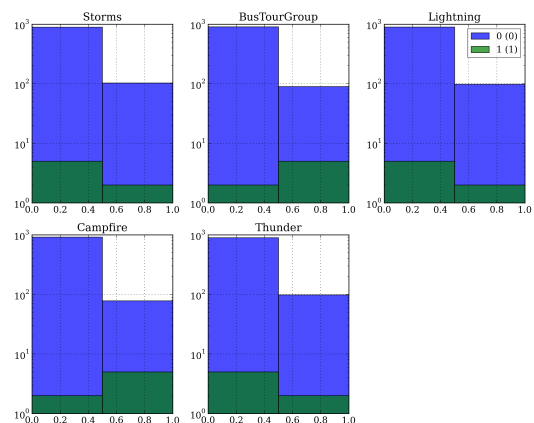


Figure 1: The data for the project, separated by dimension. Note that there are far more negative (0) entries than positive (1) in all dimensions.