

## Appendix 1 - Tongue Twister Configuration

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```
{
  "Tree": "(LanguageA,(LanguageB,(LanguageC,LanguageD)))";
  "NumberOfStates": 17,
  "McmcSettings": {
    "OnlyCompleteWords": "No",
    "Model": "Custom",
    "CalcMarginal": "No",
    "UseEigenSystem": "No",
    "NumCycles": 100000,
    "PrintFreq": 10,
    "SampleFreq": 100,
    "TreeLengthPriorVal": 0.15
  },
  "Taxa": ["LanguageA", "LanguageB", "LanguageC", "LanguageD"],
  "PriorFrequencies": [3.125000,7.432432,5.743243,7.770270,5.743243,7.601351,3.716216,
4.729730,7.263514,5.658784,6.587838,7.263514,5.067568,3.716216,8.108108,5.152027,5.320946],
  "PartitionSets": [{ "Name": "e", "Set": [15] }, { "Name": "i", "Set": [3] }, { "Name": "a", "Set": [8] },
, { "Name": "u", "Set": [1] }, { "Name": "o", "Set": [12] }, { "Name": "Nasal Consonant", "Set": [10, 14,
16] }, { "Name": "Non Syllabic Sonorant", "Set": [4, 6] }, { "Name": "Consonant", "Set": [0, 2, 5, 7, 9,
11, 13] },
  "Words": [
    { "Name": "Fish-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [0, 1, 2, 3, 4] },
      { "Taxon": "LanguageB", "Segments": [1, 2, 3, 4, -1] },
      { "Taxon": "LanguageC", "Segments": [5, 1, 6, 3, 4] },
      { "Taxon": "LanguageD", "Segments": [5, 1, 4, 3, 4] }
    ] },
    { "Name": "Water-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [3, 7, 8, 6, 8] },
      { "Taxon": "LanguageB", "Segments": [3, 8, 6, 8, -1] },
      { "Taxon": "LanguageC", "Segments": [3, 9, 8, 6, 8] },
      { "Taxon": "LanguageD", "Segments": [3, 9, 8, 4, 8] }
    ] },
    { "Name": "Earth-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [10, 8, 0] },
      { "Taxon": "LanguageB", "Segments": [10, 8, -1] },
      { "Taxon": "LanguageC", "Segments": [10, 8, 5] },
      { "Taxon": "LanguageD", "Segments": [10, 8, 5] }
    ] },
    { "Name": "Rain-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [11, 12, 11, 8, 2] },
      { "Taxon": "LanguageB", "Segments": [13, 12, 13, 8, 0] },
      { "Taxon": "LanguageC", "Segments": [11, 12, 11, 8, 2] },
      { "Taxon": "LanguageD", "Segments": [11, 12, 11, 8, 2] }
    ] },
    { "Name": "Cloud-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [1, 6, 1, 0] },
      { "Taxon": "LanguageB", "Segments": [1, 6, 1, -1] },
      { "Taxon": "LanguageC", "Segments": [1, 6, 1, -1] },
      { "Taxon": "LanguageD", "Segments": [1, 4, 1, -1] }
    ] },
    { "Name": "Wind-Primary", "Data": [
      { "Taxon": "LanguageA", "Segments": [7, 3, 2, 1] },
      { "Taxon": "LanguageB", "Segments": [3, 2, 1, -1] },
      { "Taxon": "LanguageC", "Segments": [9, 3, 6, 1] },
      { "Taxon": "LanguageD", "Segments": [9, 3, 4, 1] }
    ] }
  ]
}
```

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}},
{"Name": "Man-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [4, 8, 14, 3]},
  {"Taxon": "LanguageB", "Segments": [4, 8, 14, 3]},
  {"Taxon": "LanguageC", "Segments": [4, 8, 14, 3]},
  {"Taxon": "LanguageD", "Segments": [4, 8, 14, 3]}
]},
{"Name": "Woman-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [10, 8, 6, 3, 2]},
  {"Taxon": "LanguageB", "Segments": [10, 8, 6, 3, 0]},
  {"Taxon": "LanguageC", "Segments": [10, 8, 6, 3, 2]},
  {"Taxon": "LanguageD", "Segments": [10, 8, 4, 3, 2]}
]},
{"Name": "Child-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [7, 15, 4, 1]},
  {"Taxon": "LanguageB", "Segments": [15, 4, 1, -1]},
  {"Taxon": "LanguageC", "Segments": [7, 15, 4, 1]},
  {"Taxon": "LanguageD", "Segments": [7, 15, 4, 1]}
]},
{"Name": "House-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [14, 1, 14, 8, 16]},
  {"Taxon": "LanguageB", "Segments": [14, 1, 14, 8, 16]},
  {"Taxon": "LanguageC", "Segments": [14, 1, 14, 8, 16]},
  {"Taxon": "LanguageD", "Segments": [14, 1, 14, 8, 16]}
]},
{"Name": "Forest-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [8, 4, 8, 7]},
  {"Taxon": "LanguageB", "Segments": [8, 4, 8, -1]},
  {"Taxon": "LanguageC", "Segments": [8, 4, 8, 9]},
  {"Taxon": "LanguageD", "Segments": [8, 4, 8, 9]}
]},
{"Name": "Walk-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [7, 1, 2, 1, 11]},
  {"Taxon": "LanguageB", "Segments": [1, 2, 1, 0, -1]},
  {"Taxon": "LanguageC", "Segments": [9, 1, 6, 1, 11]},
  {"Taxon": "LanguageD", "Segments": [9, 1, 4, 1, 11]}
]},
{"Name": "Speak-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [6, 1, 14, 1, 10]},
  {"Taxon": "LanguageB", "Segments": [6, 1, 14, 1, 16]},
  {"Taxon": "LanguageC", "Segments": [6, 1, 14, 1, 10]},
  {"Taxon": "LanguageD", "Segments": [4, 1, 14, 1, 10]}
]},
{"Name": "Sleep-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [0, 1, 6, 12, 14]},
  {"Taxon": "LanguageB", "Segments": [1, 6, 12, 16, -1]},
  {"Taxon": "LanguageC", "Segments": [5, 1, 6, 12, 14]},
  {"Taxon": "LanguageD", "Segments": [5, 1, 4, 12, 14]}
]},
{"Name": "Bathe-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [8, 2, 8, 6]},
  {"Taxon": "LanguageB", "Segments": [8, 2, 8, 6]},
  {"Taxon": "LanguageC", "Segments": [8, 6, 8, 6]},
  {"Taxon": "LanguageD", "Segments": [8, 4, 8, 4]}
]},
{"Name": "Black-Primary", "Data": [
```

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```
{
  "Taxon": "LanguageA", "Segments": [0, 8, 0, 1]},
  {"Taxon": "LanguageB", "Segments": [8, 1, -1, -1]},
  {"Taxon": "LanguageC", "Segments": [8, 5, 1, -1]},
  {"Taxon": "LanguageD", "Segments": [8, 5, 1, -1]}
}],
{"Name": "White-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [2, 3, 0, 8, 10]},
  {"Taxon": "LanguageB", "Segments": [2, 3, 8, 16, -1]},
  {"Taxon": "LanguageC", "Segments": [2, 3, 8, 10, -1]},
  {"Taxon": "LanguageD", "Segments": [2, 3, 8, 10, -1]}
]},
{"Name": "Red-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [2, 15, 2, 1]},
  {"Taxon": "LanguageB", "Segments": [2, 15, 2, 1]},
  {"Taxon": "LanguageC", "Segments": [2, 15, 6, 1]},
  {"Taxon": "LanguageD", "Segments": [2, 15, 4, 1]}
]},
{"Name": "Green-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [4, 8, 7, 3, 0]},
  {"Taxon": "LanguageB", "Segments": [4, 8, 3, -1, -1]},
  {"Taxon": "LanguageC", "Segments": [4, 8, 7, 3, 5]},
  {"Taxon": "LanguageD", "Segments": [4, 8, 7, 3, 5]}
]},
{"Name": "Grass-Primary", "Data": [
  {"Taxon": "LanguageA", "Segments": [7, 8, 11, 3, 0]},
  {"Taxon": "LanguageB", "Segments": [8, 13, 3, -1, -1]},
  {"Taxon": "LanguageC", "Segments": [9, 8, 11, 3, -1]},
  {"Taxon": "LanguageD", "Segments": [9, 8, 11, 3, -1]}
]}
]
```