# Data Visualization

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# IIT Bombay

AAKASH
tablet for every indian
NME-ICT(MHRD),AAKASH PROJECT, IIT BOMBAY

Indian Institute of Technology Bombay

The National Mission on Education through ICT (NME-ICT)

# Outline

❑What is Visualisation?

❑What is Data Visualisation?

❑Data Visualisation Techniques

❑HTML5 Canvas & SVG

❑Issues on Small Screen (Akash - tablet)

# **Visualization?**

Technique for creating
- ➢Images
- ➢Diagram
- ➢Animation



It Communicates a message.

# Information / Data Visualization?

| Variable | N | Mean | Std Dev |
|---|---|---|---|
| Goodnews | 173 | 2.84 | 0.72 |
| Badnews | 173 | 0.00 | 0.00 |
| Reorg | 173 | 0.00 | 0.00 |
| Debtdflt | 173 | 0.00 | 0.00 |
| Consloss | 173 | 0.01 | 0.15 |
| Zfcbstar | 173 | −0.24 | 0.84 |
| Working capital/total assets | 173 | 0.02 | 0.23 |
| Retained earn/total asset | 172 | 0.07 | 0.10 |
| Total debt/total assets | 173 | 0.88 | 0.14 |
| Cashflow | 173 | 73,184.51 | 136,157.57 |
| Net income before taxes | 173 | 33,933.65 | 48,229.53 |
| Net sales | 173 | 396,755.71 | 468,668.64 |
| Sales growth over five years | 168 | 14.39 | 30.51 |
| Receivables | 172 | 1,615,086.24 | 2,326,392.57 |
| Total current assets | 173 | 2,442,902.11 | 3,225,420.17 |
| Total assets | 173 | 2,994,958.51 | 3,548,659.40 |
| Total current liabilities | 173 | 2,325,991.45 | 2,953,376.32 |
| Total liabilities | 173 | 2,702,791.34 | 3,288,721.36 |
| Retained earnings | 172 | 162,379.85 | 232,889.74 |
| Shareholders' equity | 173 | 290,016.19 | 355,592.98 |

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# Information / Data Visualization?

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Visual Representations
of abstract data to facilitates
human interaction
for exploration and
understanding

# Conventional Representation

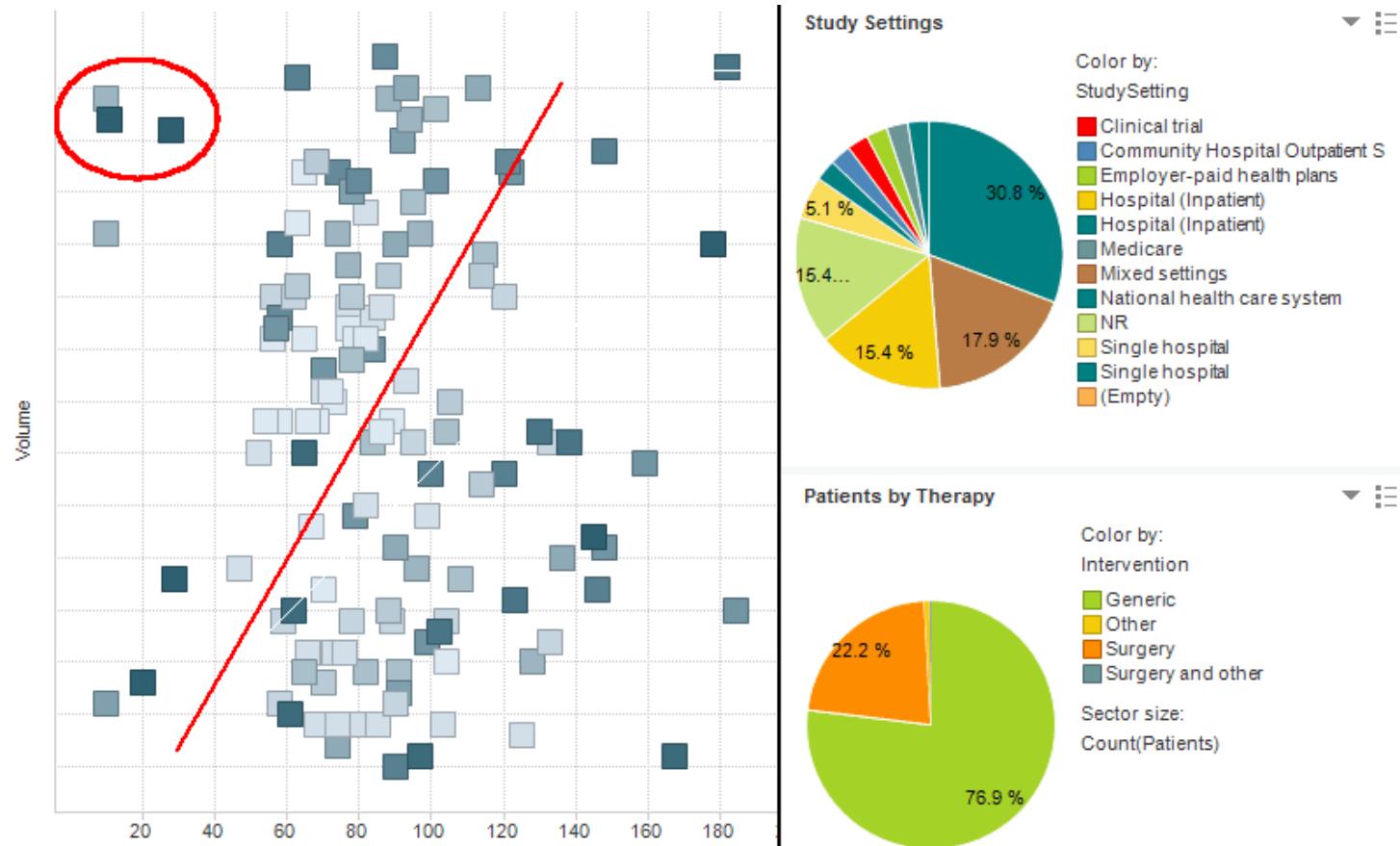| Categories | author | bookname | Price |
|---|---|---|---|
| History | Browning | Ordinary Men: Reserve Police Battalion | 90 |
| History | Bulliet | The Earth and It's People Vol II | 95 |
| History | Norton | A People & A Nation Vol II | 105 |
| History | Flink | The Automobile Age | 140 |
| History | Browning | US Diplomacy Since 1900 | 140 |
| History | Bulliet | 20th Century in Documents | 130 |
| History | Browning | American Diplomacy | 130 |
| Business Administration | Albrecht | Accounting Concepts | 155 |
| Business Administration | Stice | Intermediate Accounting | 130 |
| Business Administration | Marakas | Management Info Systems | 140 |
| Business Administration | Williams | Management | 155 |
| Business Administration | Stice | Marketing Research: A Practical Apprch | 130 |
| Business Administration | Stice | Business Ethics Custom Textbook | 155 |
| Business Administration | Stice | Strat & Policy Custom Textbook | 130 |
| Business Administration | Stice | Strat & Policy Custom Textbook | 155 |
| Business Administration | Stice | Understanding Modern Economics | 130 |
| Business Administration | Stice | Intro to Microeconomics | 155 |
| Business Administration | Stice | Intro to Microeconomics Study Guide | 130 |
| Business Administration | Stice | Fundamentals of Investments | 155 |

# Information/Data visualization
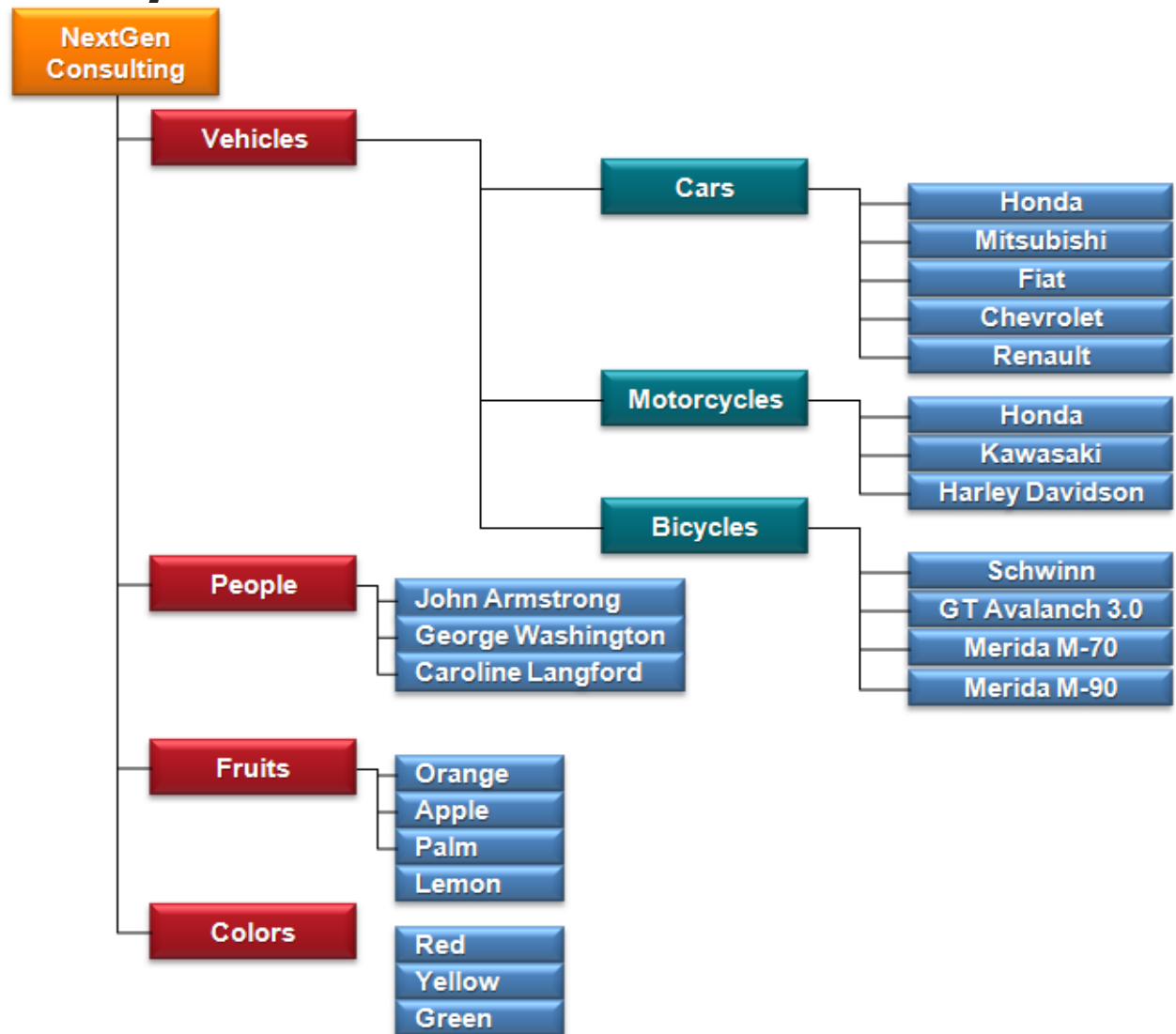
# Benefits

- Provides users a quick and better understanding of data
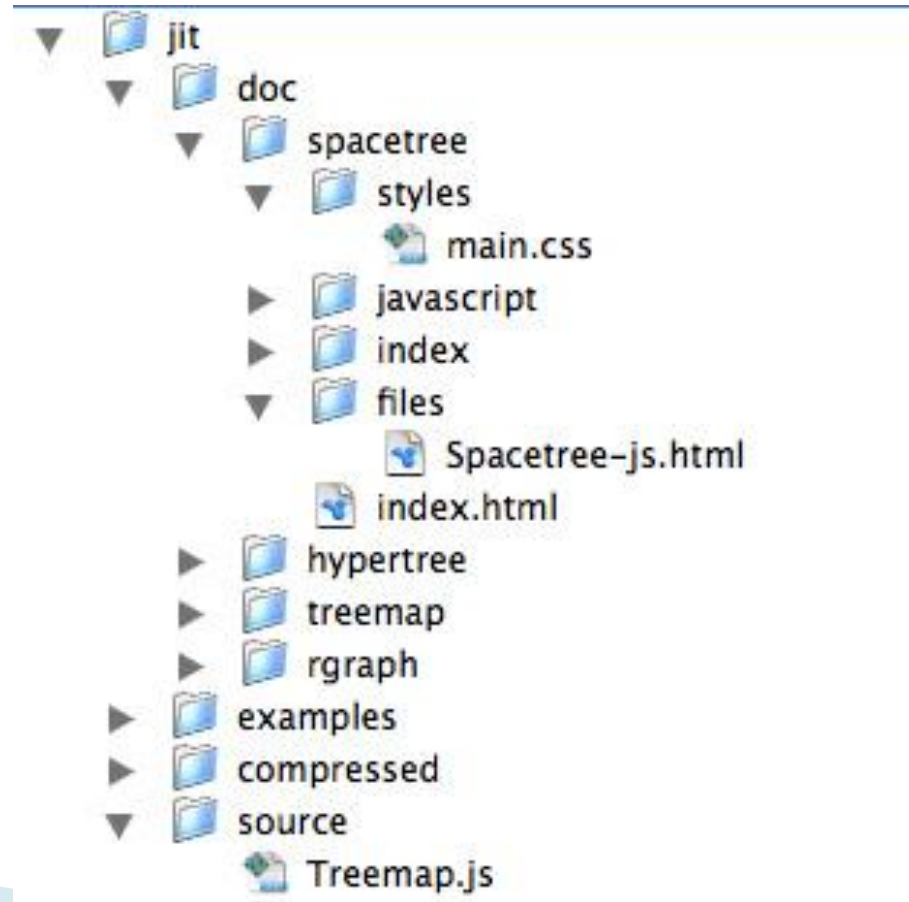
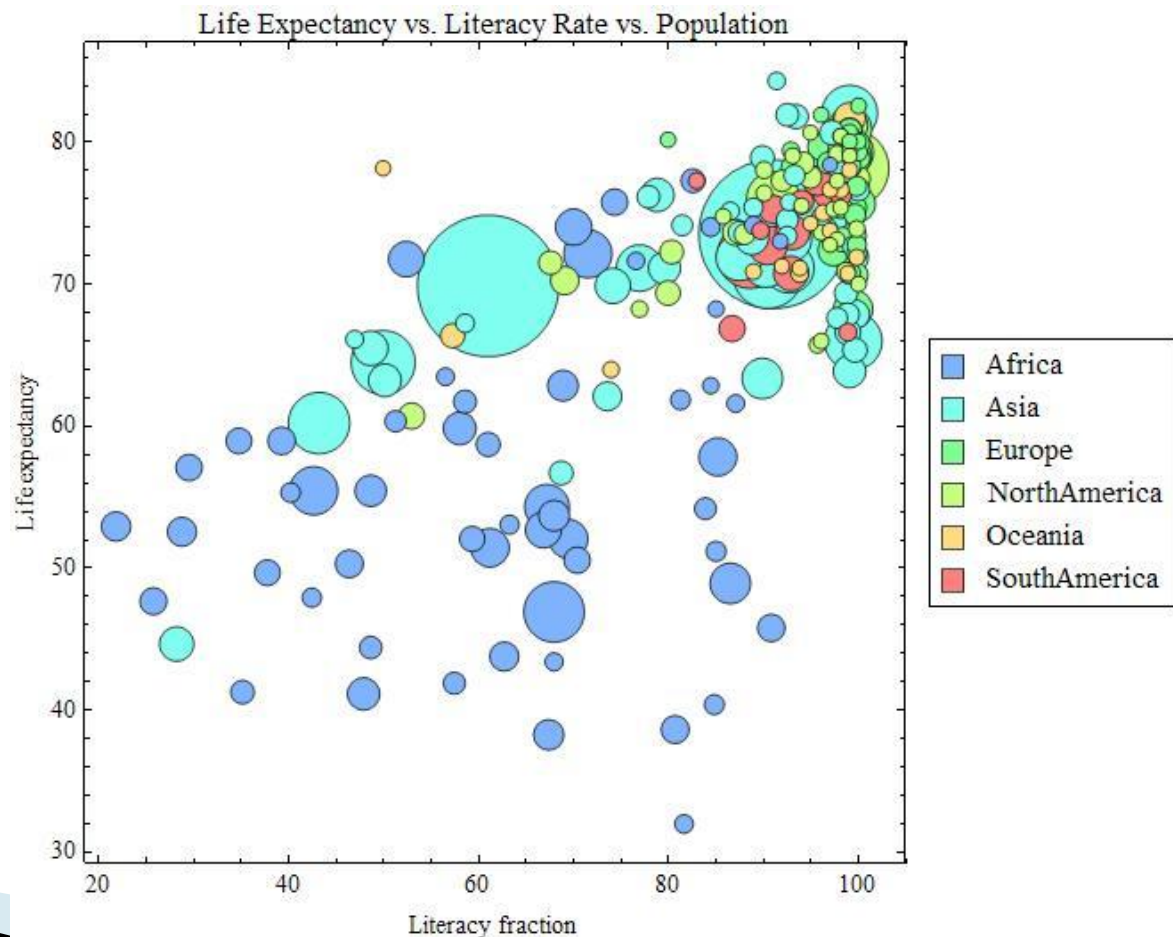# Benefits

- Helps to solve various tasks
- Helps to take better decisions

# Benefits

- Explains data
- Unveil patterns in the data



Life Expectancy vs. Literacy Rate vs. Population

Legend:
- Africa
- Asia
- Europe
- NorthAmerica
- Oceania
- SouthAmerica

(Y-axis: Life expectancy; X-axis: Literacy fraction)

# Hierarchal Data

| A | B | C | D | E |
|---|---|---|---|---|
| A | B |   | D |   |
| A | B | C |   |   |
| A |   |   | D | E |
| A | B | C | D |   |
| A | B |   | D | E |

# Hierarchal Data

| A | B | C | D | E |
|---|---|---|---|---|
| A | B |   | D |   |
| A | B | C |   |   |
| A |   |   | D | E |
| A | B | C | D |   |
| A | B |   | D | E |
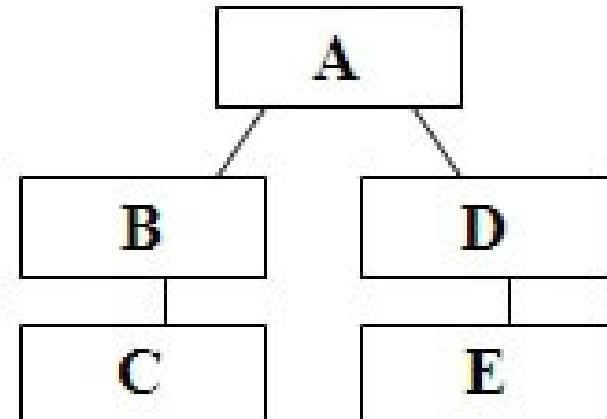
# Hierarchal Data

# Methods & Techniques for Representing Hierarchal Data

# Hierarchal Data

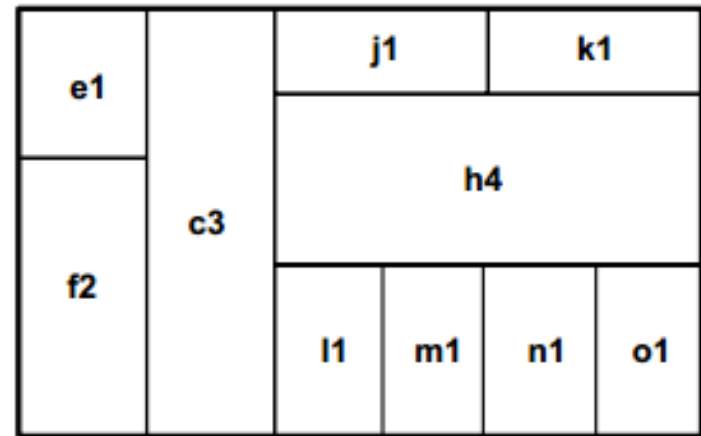# Hierarchal Data

**Connection/Node – Link**
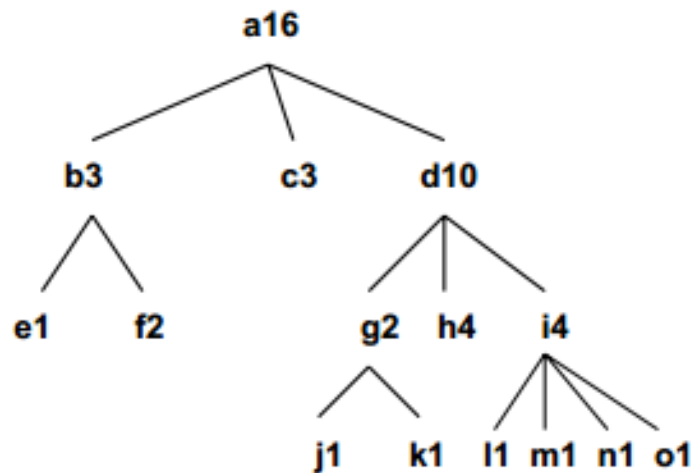


(a) Tree diagram

# Hierarchal Data

## Connection/Node – Link
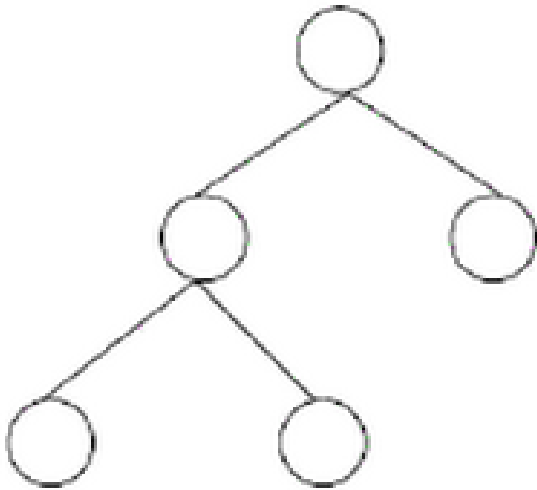
## Enclosure/Space Filling
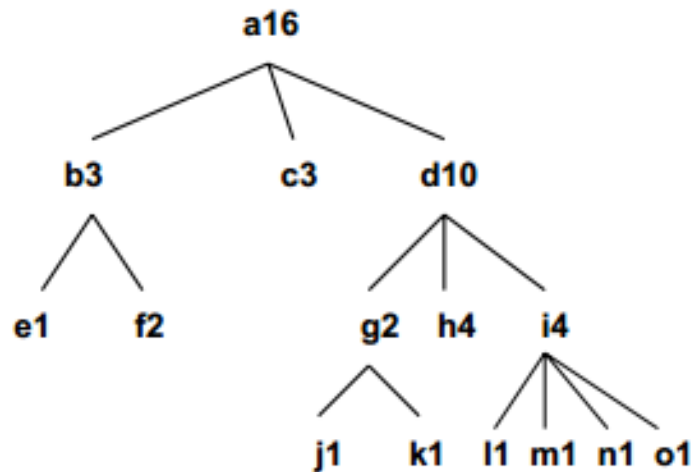


(a) Tree diagram

(b) Treemap
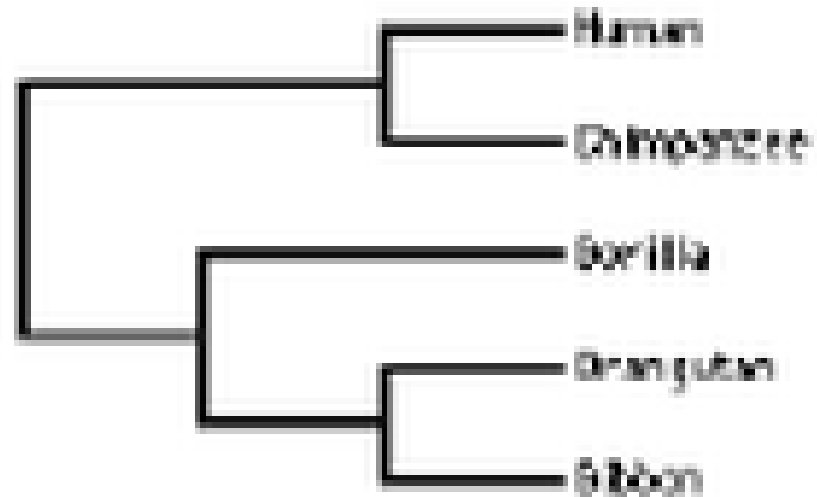
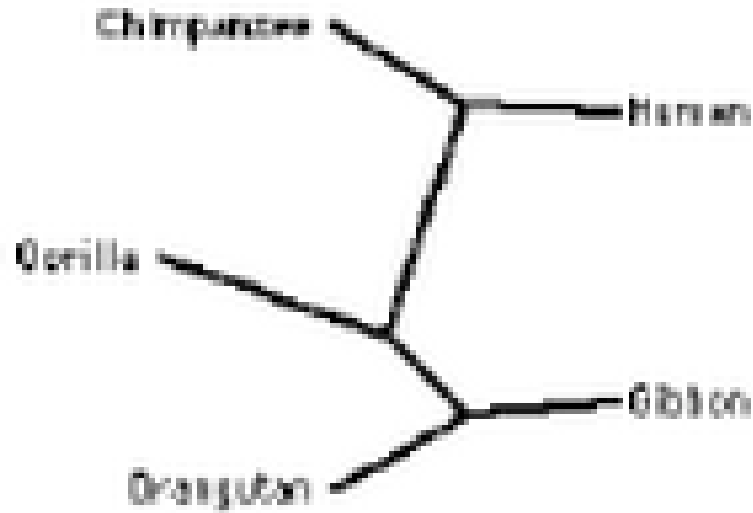# 1- Connection / Node – Link

# Connection / Node – Link

- Root at top,
- leaves at bottom
- very common

# Connection / Node – Link

## Rectangular:
Well suited for displaying labeled/scaled trees.

# Connection / Node – Link



Radial:
- Root is at the center
- Works well for visualizing **unrooted** trees

# Examples

# Space Tree