

# Advanced Visualization with TikZ

Interactive Graphics in Academic Presentations

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# Outline

Graph Theory with TikZ

Algorithm Visualization

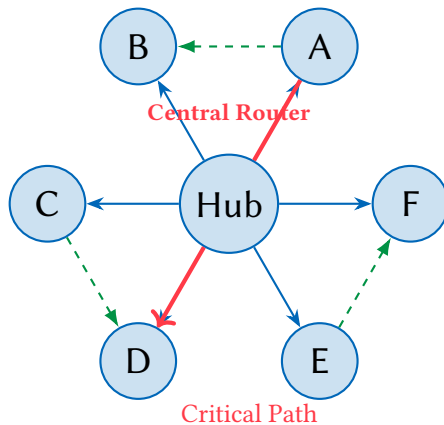
Data Visualization

Conceptual Diagrams

Advanced Features

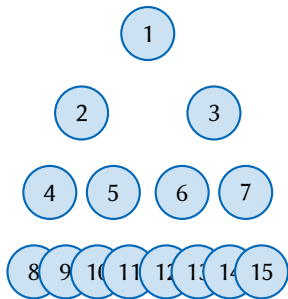
Conclusion

# Network Topology



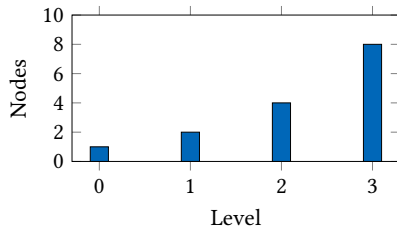
## Graph Properties

# Binary Tree Structure

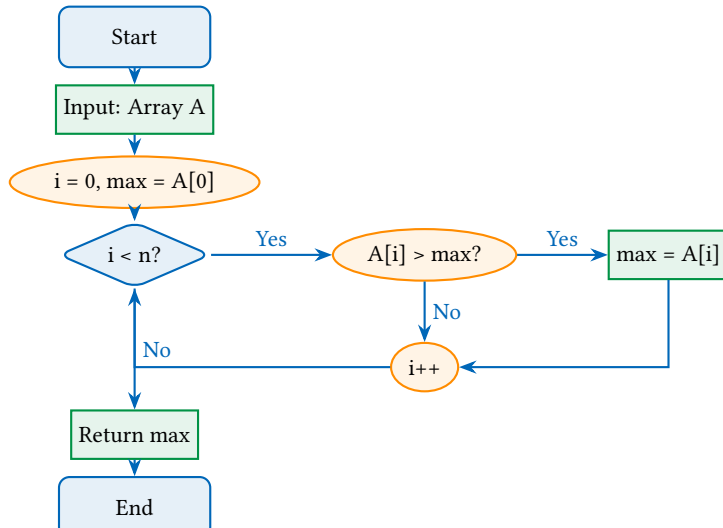


## Tree Properties:

- ▶ Height: 3
- ▶ Nodes: 15
- ▶ Complete binary tree

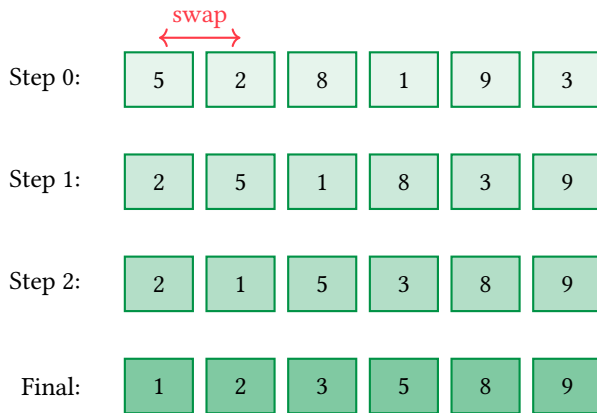


# Algorithm Flowchart



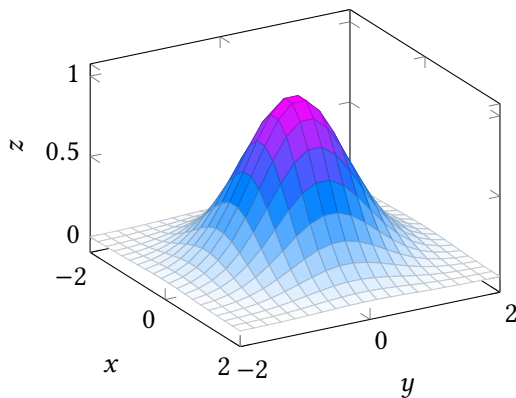
# Sorting Algorithm Visualization

## Bubble Sort Steps

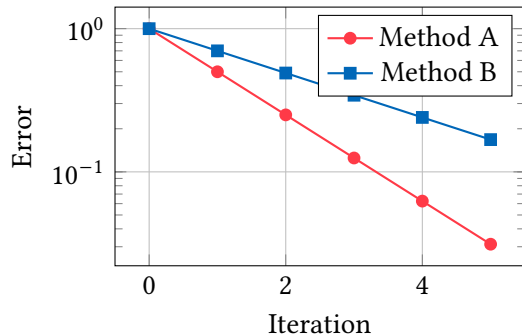


$O(n^2)$

## 3D Visualization

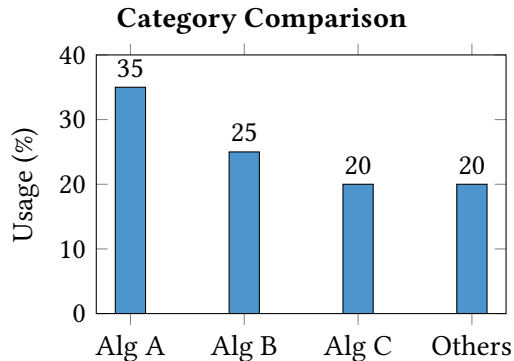
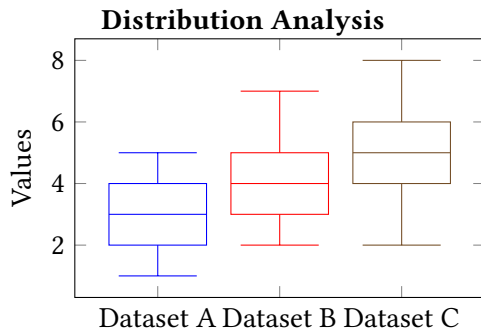


Gaussian Distribution



Convergence Analysis

# Statistical Charts

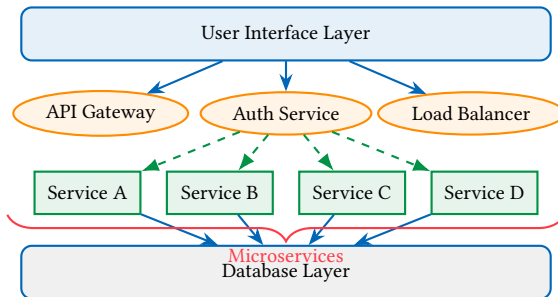




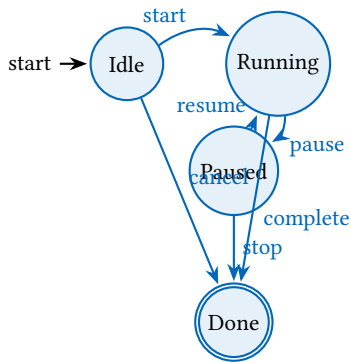
# Mind Map



# System Architecture



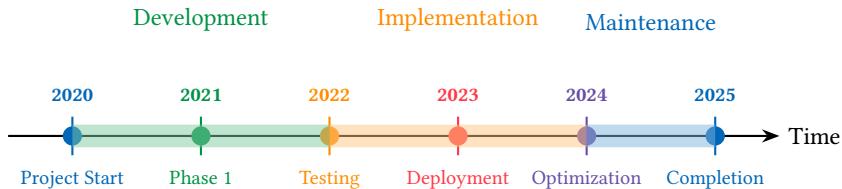
# State Machine



## State Transitions

Total states: 4, Total transitions: 6, Terminal state: Done

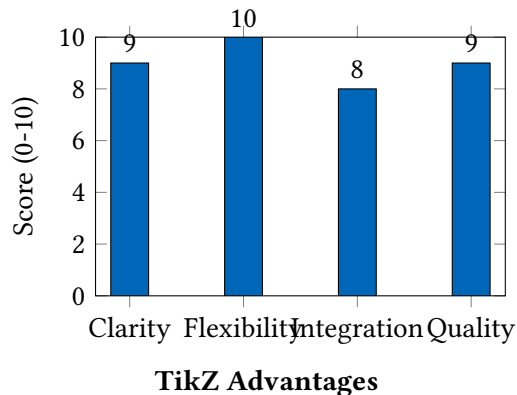
# Timeline Visualization



# Summary

## TikZ Capabilities Demonstrated:

- ▶ Graph and tree structures
- ▶ Flowcharts and algorithms
- ▶ 3D visualizations
- ▶ Statistical charts
- ▶ Mind maps
- ▶ State machines
- ▶ Timeline graphics



**Thank you for your attention!**