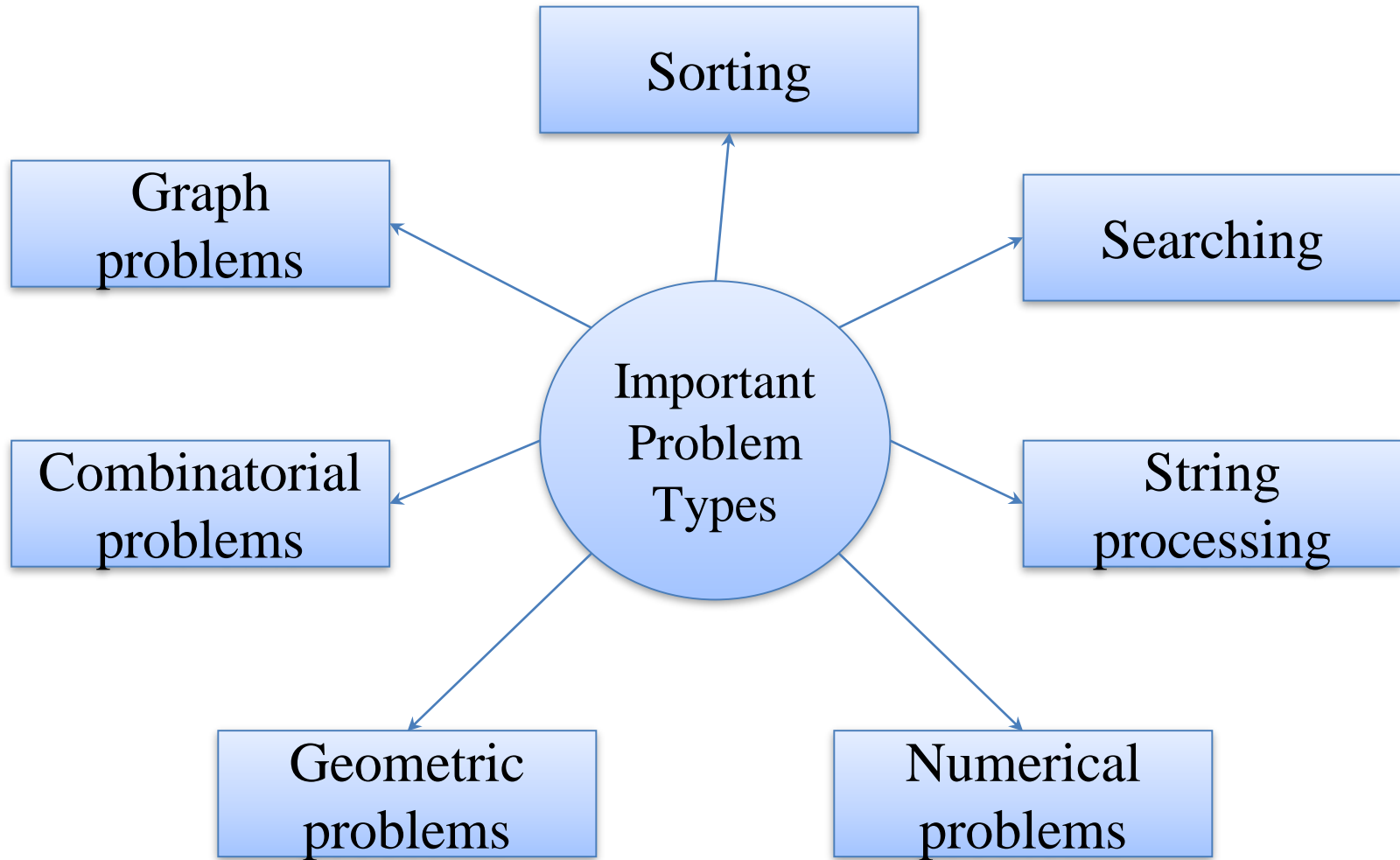


PROBLEM TYPES



IMPORTANT PROBLEM TYPES

- *Sorting*
 - Key
 - Colleges, hospitals, office
 - Ease of search - dictionaries, telephone books, class list
 - Several algorithm – not good for all the situations
 - Searching is made easier
 - Properties of sorting algorithm
 - Stable
 - In place

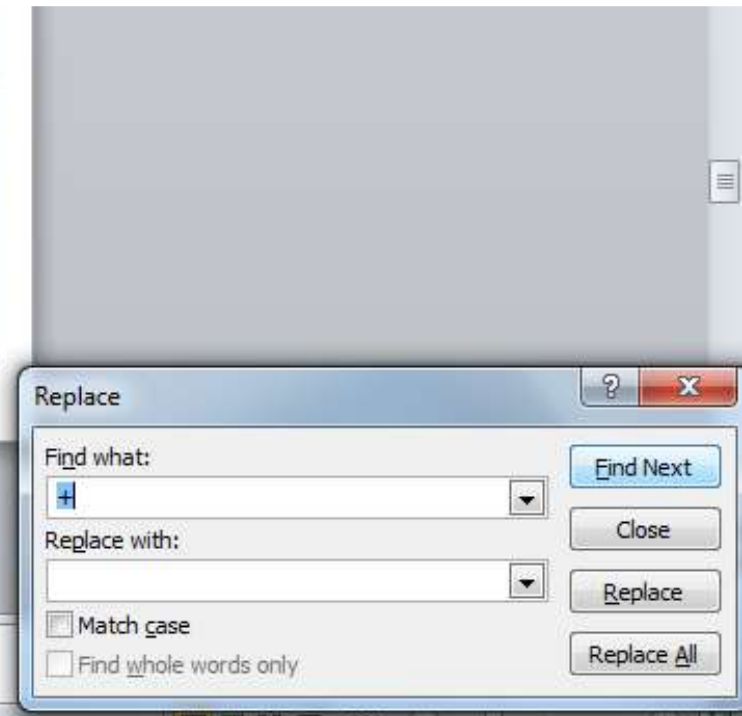


IMPORTANT PROBLEM TYPES

- **Searching**
 - Search key
 - Several algorithm
- **String processing**
 - String – string matching

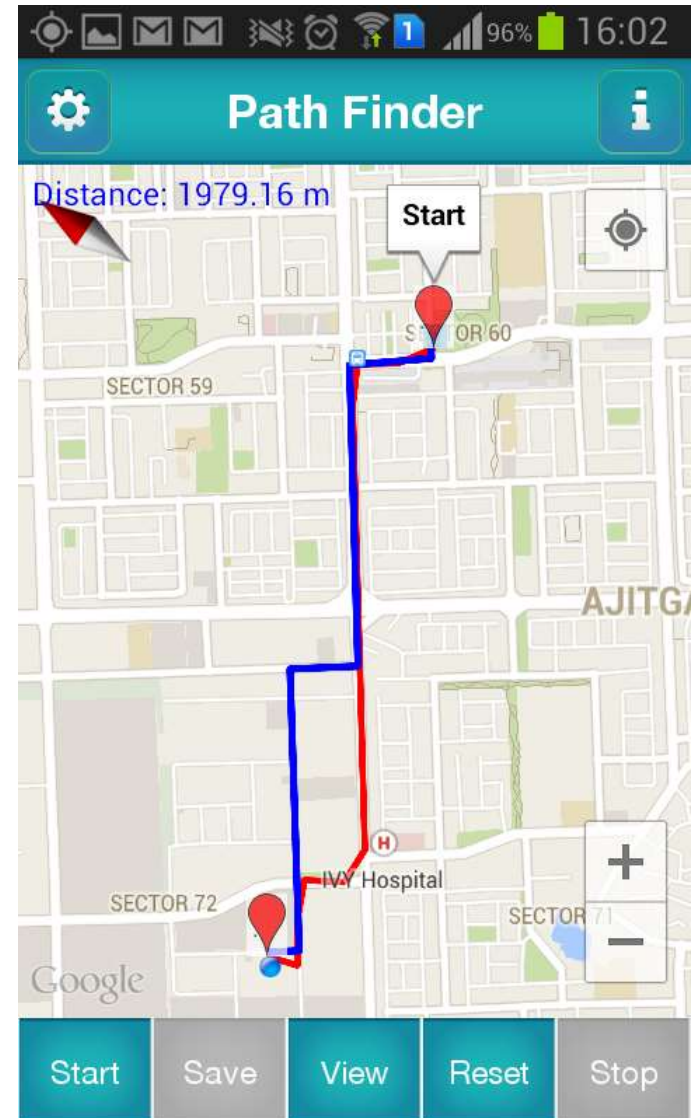
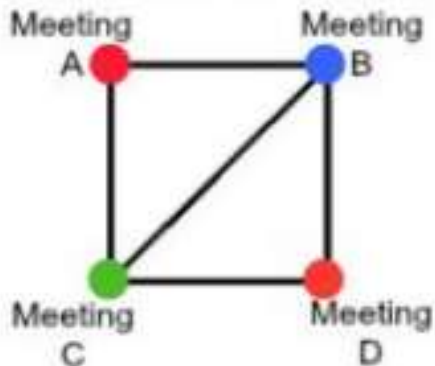


- **Methods to specifying an algorithm**
 - Natural language
 - Pseudo code (Natural language + programming constructs)
 - Flowchart



IMPORTANT PROBLEM TYPES

- *Graph problems*
 - Vertices, edges
 - Graph traversal, shortest path
 - Flight network, Google map – shortest path
 - Ex: travelling salesman problem,
 - Graph coloring – event scheduling



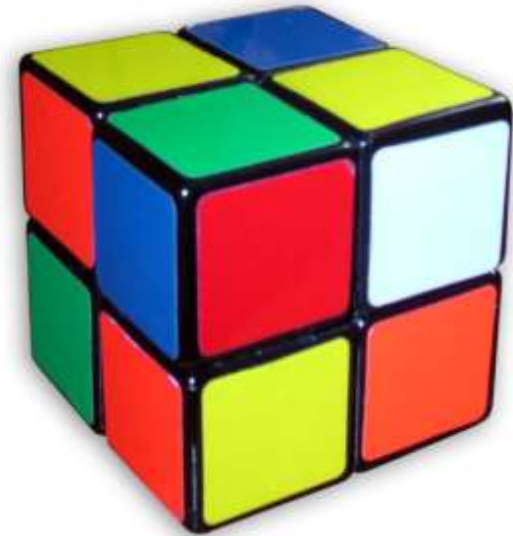
IMPORTANT PROBLEM TYPES

- *Combinatorial problems*

- Finding optimal object from a finite set of objects (permutation, combination, subset from a finite set)

- *Example:*

- How many ways are there to make a 2-letter word
- How many ways are there to select 5 integers from $\{1, 2, \dots, 20\}$

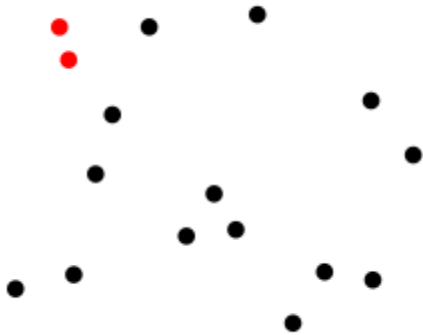


IMPORTANT PROBLEM TYPES

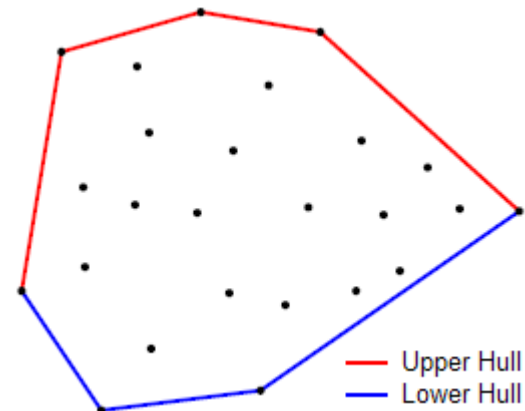
- *Geometric Problems*

- Points, lines, polygons
- Computer graphics (circle,smiley)
- Example

Closest pair problem



Convex hull problem



Real-time application

Nuclear/chemical leak Evacuation
Tracking Disease epidemic

IMPORTANT PROBLEM TYPES

- *Numerical Problems*
 - Integrals, functions
 - Approximate
 - Real numbers