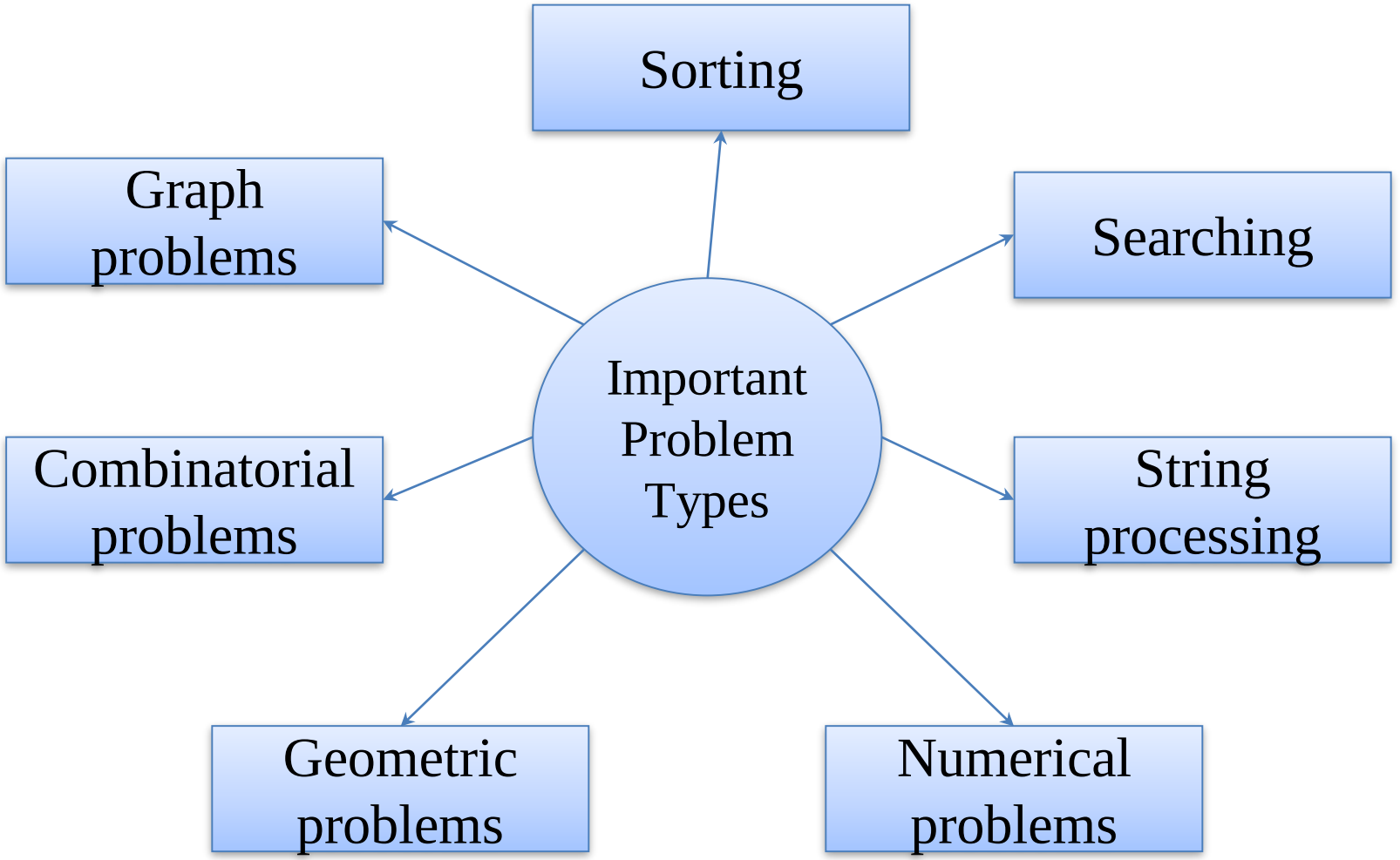
IMPORTANT PROBLEM TYPES

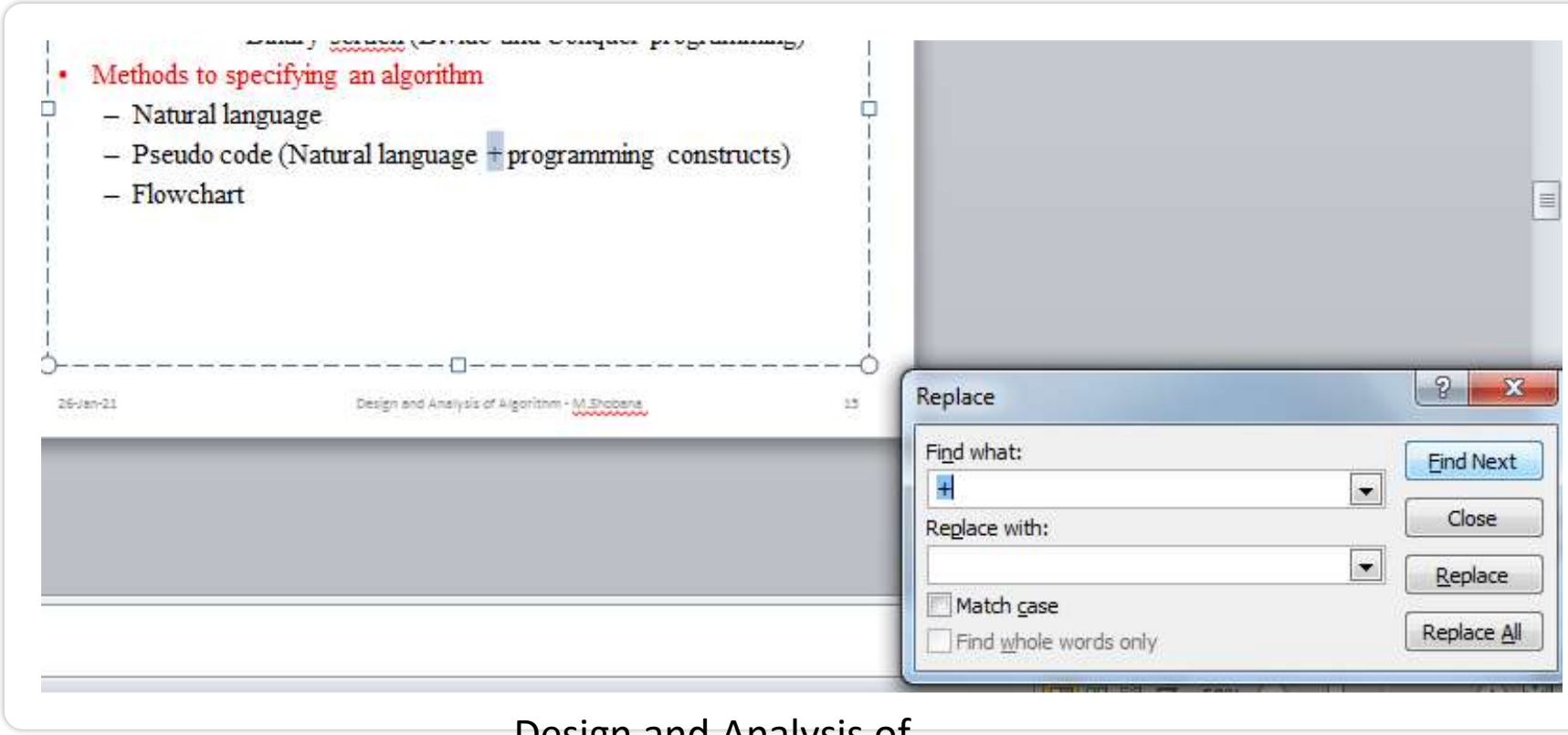


IMPORTANT PROBLEM TYPES

- ***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

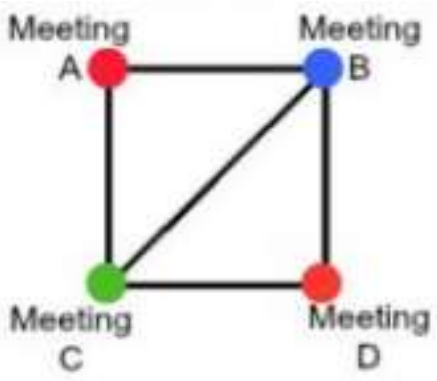
IMPORTANT PROBLEM TYPES

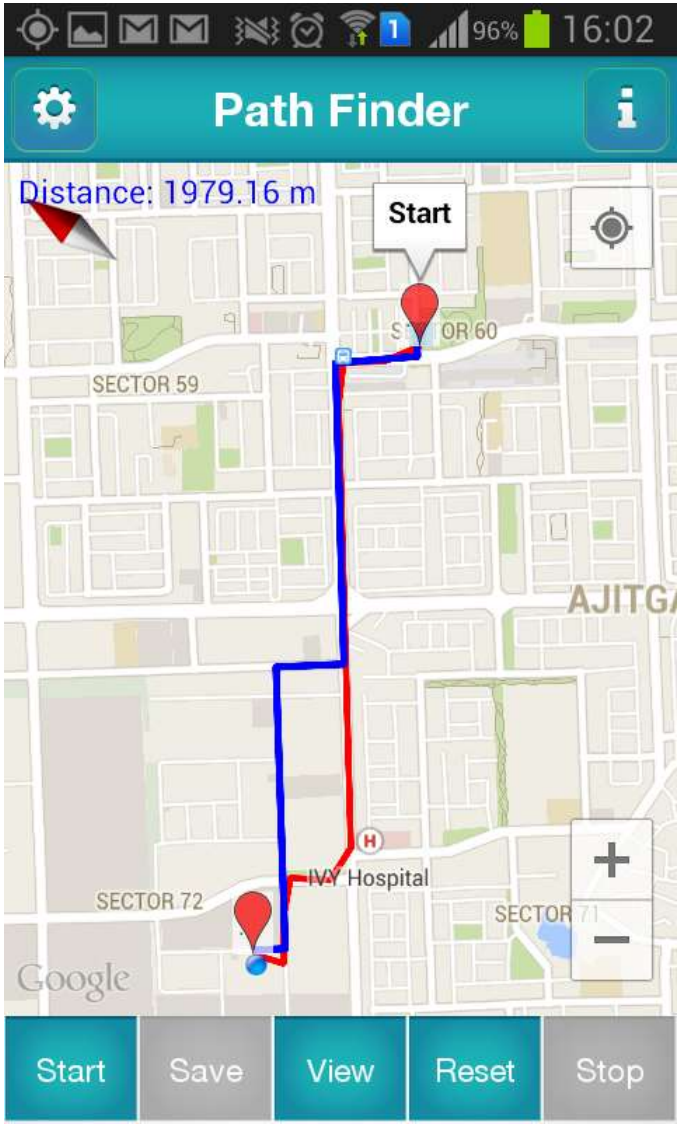
- ***Searching***
  - Search key
  - Several algorithm
- ***String processing***
  - String – string matching



IMPORTANT PROBLEM TYPES

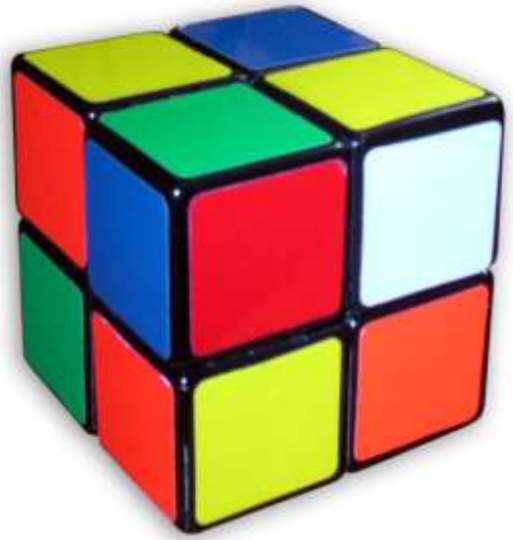
- ***Graph problems***
  - Vertices, edges
  - Graph traversal, shortest path
  - Flight network, Google map – shortest path
  - Ex: travelling salesman problem,
  - Graph coloring – event scheduling





IMPORTANT PROBLEM TYPES

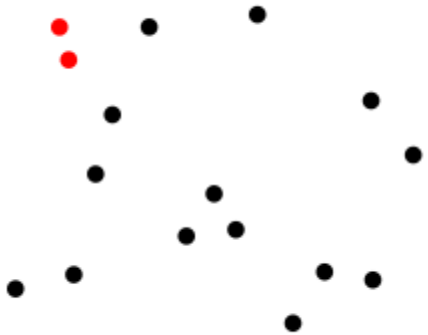
- ***Combinatorial problems***
  - Finding optimal object from a finite set of objects (permutation, combination, subset from a finite set)
  - ***Example:***
    - How many ways are there to make a 2-letter word
    - How many ways are there to select 5 integers from {1, 2, …., 20}



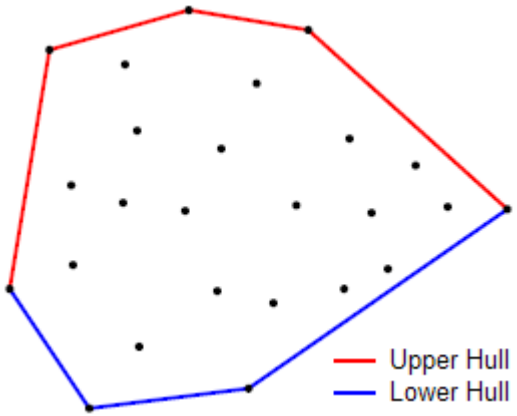
IMPORTANT PROBLEM TYPES

- ***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