Launchpad

Graphs

DEEPAK AGGARWAL

CODING BLOCKS

Graphs

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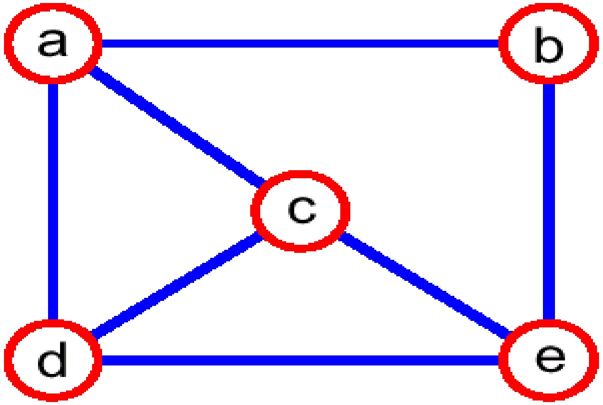
Graphs



V= {a,b,c,d,e}

E= {(a,b),(a,c),(a,d), (b,e),(c,d),(c,e), (d,e)}

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Terminology

1. Adjacent Vertices
2. Degree
3. Path
4. Connected Graph
5. Subgraph
6. Connected Components
7. Tree
8. Forest
9. Spanning Tree

Number of edges

1. Complete Graph
2. Connected Graph

How to implement Graph?

1. Edge List
2. Adjacency lists
3. Adjacency matrix

Searching in a Graph

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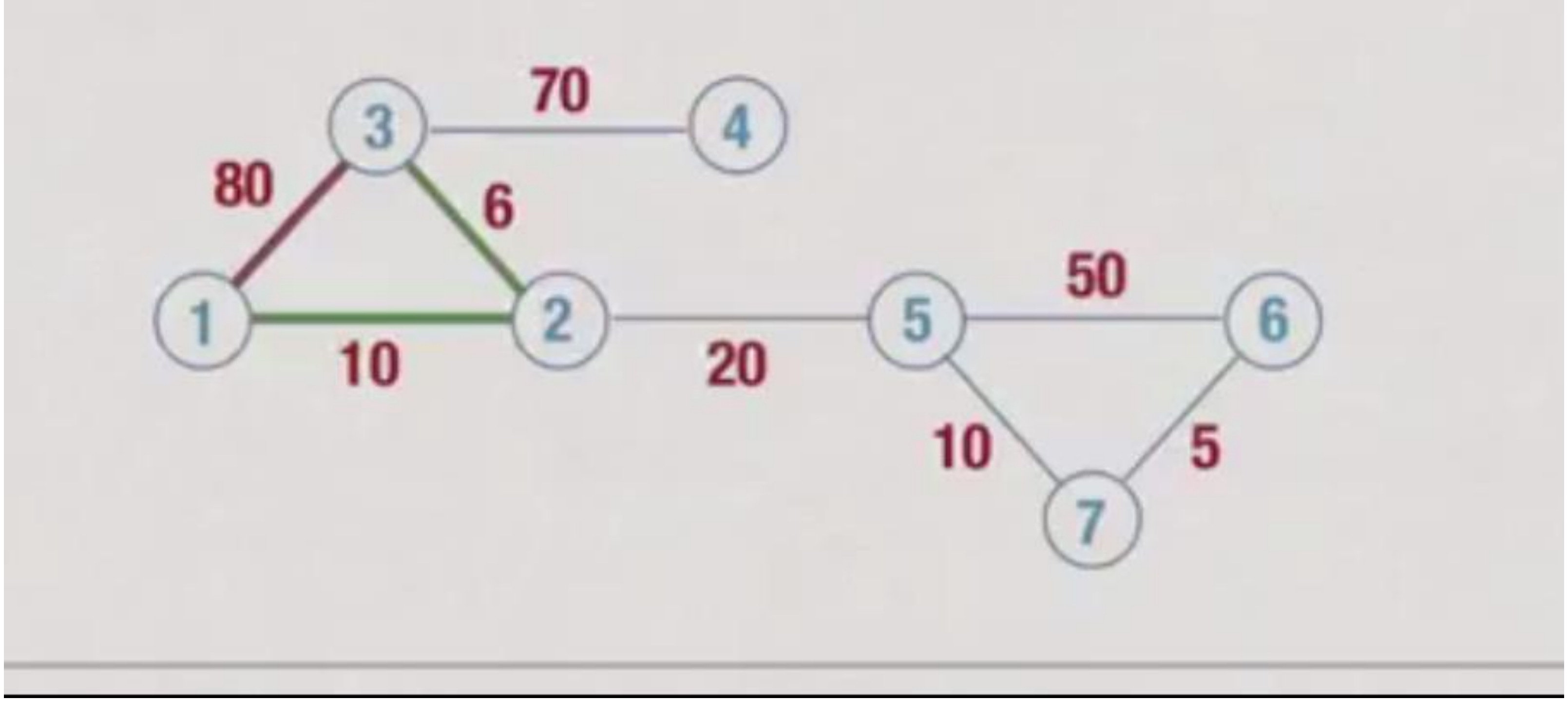
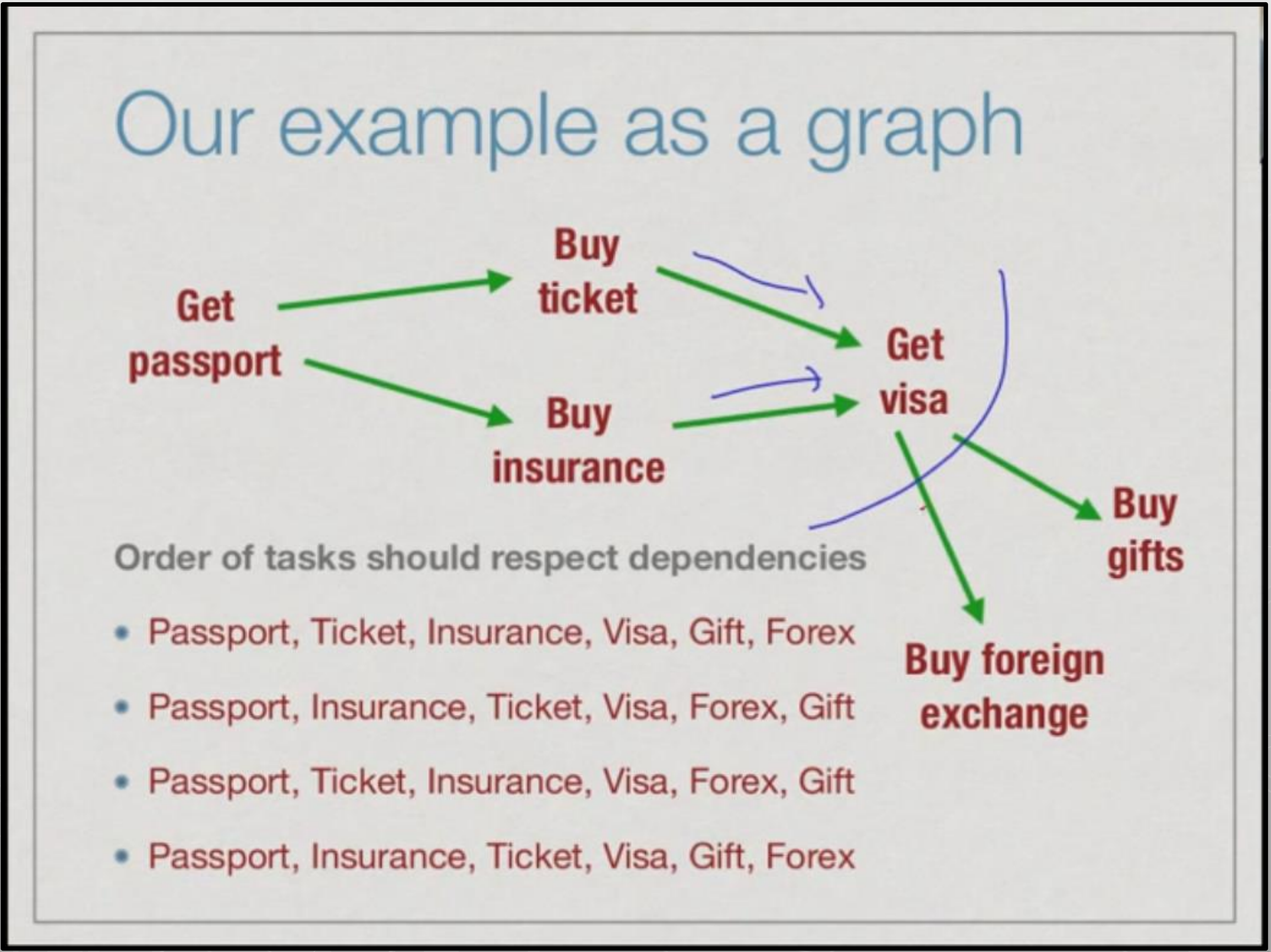
How to Search through a Graph?

1. Breadth First Search
2. Depth First Search


70
3
4
80
6
1
2
10
20
5
50
6
10
5
7

TOPOLOGICAL SORT

- For a foreign trip you need
  0. Get a passport
  1. Buy a ticket
  2. Buy travel insurance
  3. Get a visa
  4. Buy foreign exchange
  5. Buy gifts for your hosts



Our example as a graph

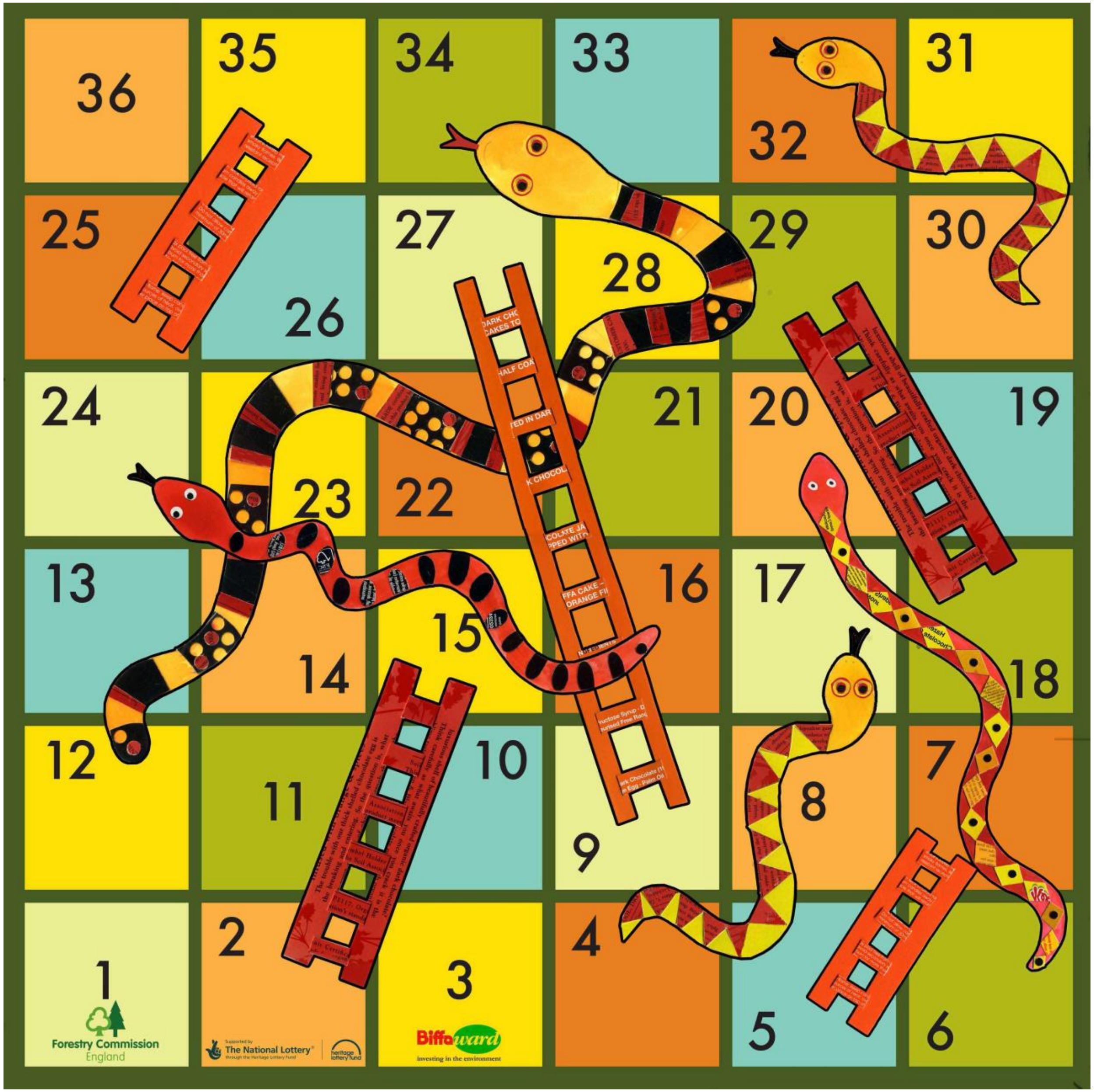
Order of tasks should respect dependencies

- Passport, Ticket, Insurance, Visa, Gift, Forex
- Passport, Insurance, Ticket, Visa, Forex, Gift
- Passport, Ticket, Insurance, Visa, Forex, Gift
- Passport, Insurance, Ticket, Visa, Gift, Forex

Our Example as a graph

Problems

1. Implement isConnected for our graph
2. Return all the connected components of the graph
3. Snakes and Ladders Problem.



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Some more Graph variations

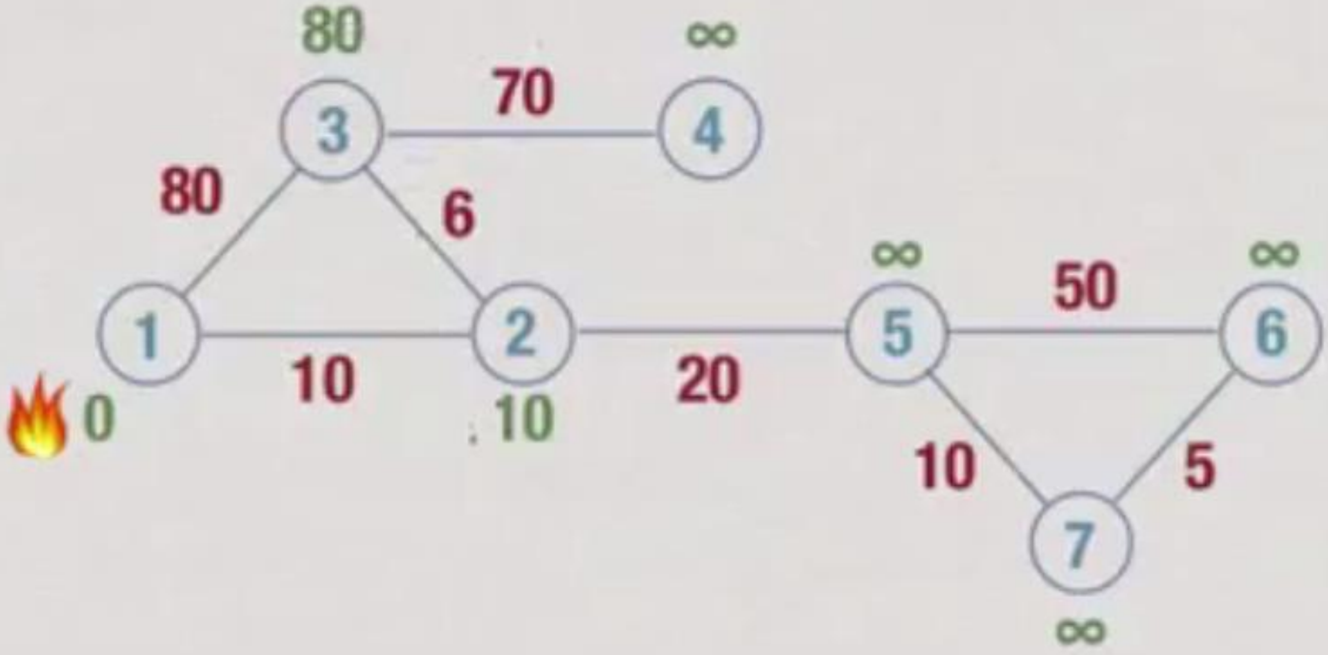
1. Directed Graphs
2. Weighted Graphs

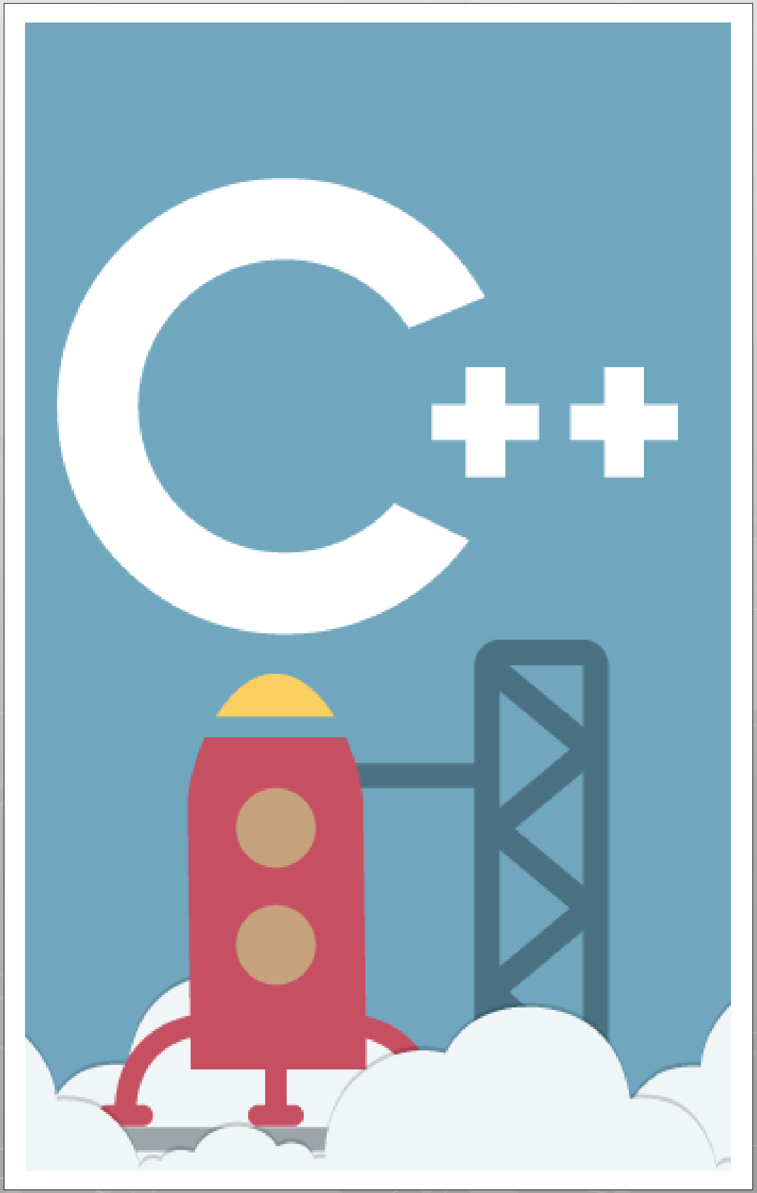
Shortest Path on Weighted Graph-

Dijkstra's Algorithm

Single source shortest paths

- Compute expected time to burn of each vertex
- Update this each time a new vertex burns





Thank You!

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