Carrying animals from one to another zoo

Presented by

Saikrishna Naripeddi

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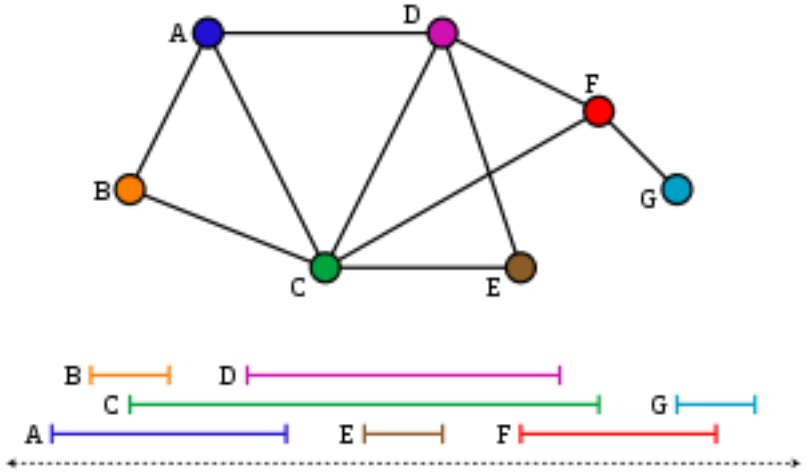
Problem:

The authorities of a zoo decided to gift few animals to another zoo and where in a great confusion about how to send these animals without harming any of the animals. This real life problem has been taken from the book “Introductory graph Theory with Applications”.

Interval Graph:

In graph theory, an interval graph is the intersection graph of a family of intervals on the real line. It has one vertex for each interval in the family, and an edge between every pair of vertices corresponding to intervals that intersect.



Properties:

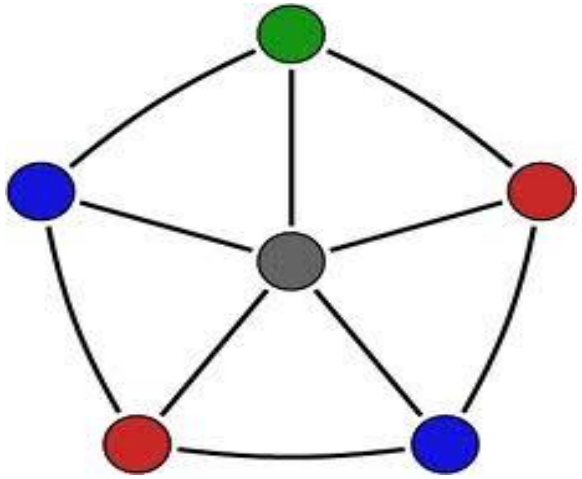
- Any induced subgraph of interval graph is interval.
- Interval graphs don’t have C4 and S3.
- The complement of an interval graph is transitively orientable.
- Interval graphs have no Asteroidal Triples.
- Interval graphs admit Ambrella-free ordering.

Graph Colouring:

In graph theory, graph coloring is a special case of graph labeling. It is a way of coloring the vertices of a graph such that no two adjacent vertices share the same color. this is called a vertex coloring. Similarly, an edge coloring assigns a color to each edge so that no two adjacent edges share the same color, and a face coloring of a planar graph assigns a color to each face or region so that no two faces that share a boundary have the same color.

Chromatic Number:

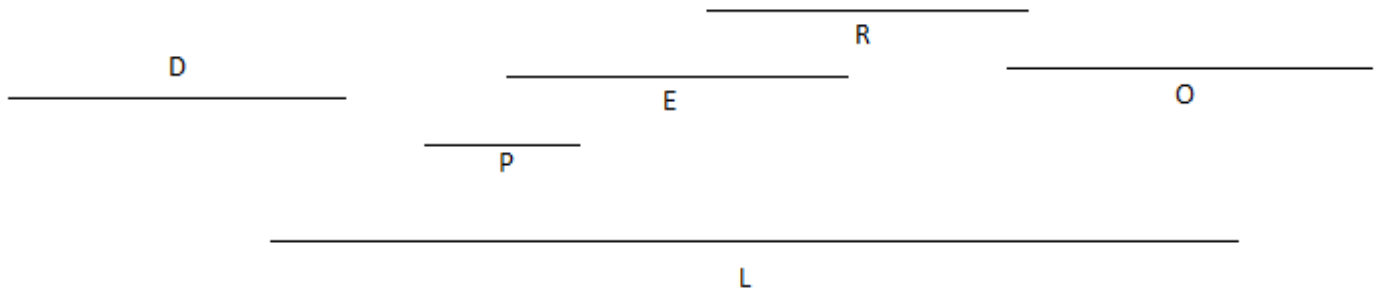
The chromatic number of a graph is the minimum number of colors in a proper coloring of that graph. If chromatic number is r then the graph is r-chromatic.



Chromatic number: 4

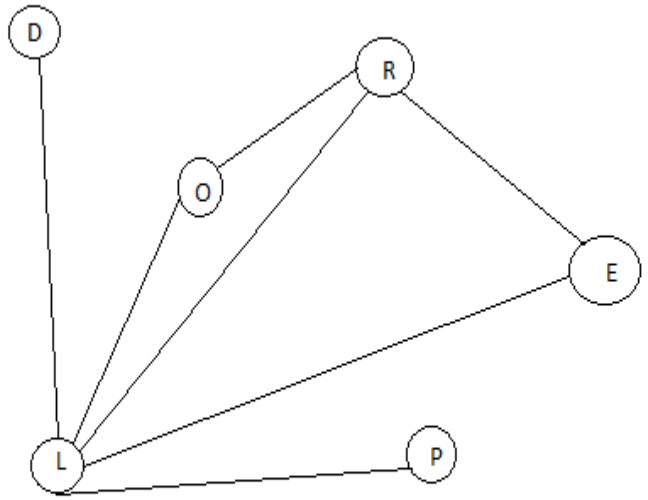
Interval Graph:

Zoo authorities wants to send six animals from one zoo to another. From this we will draw interval graph. In this graph each interval refers to an animal and if two animals are not overlapping then they cannot be placed in one cart.



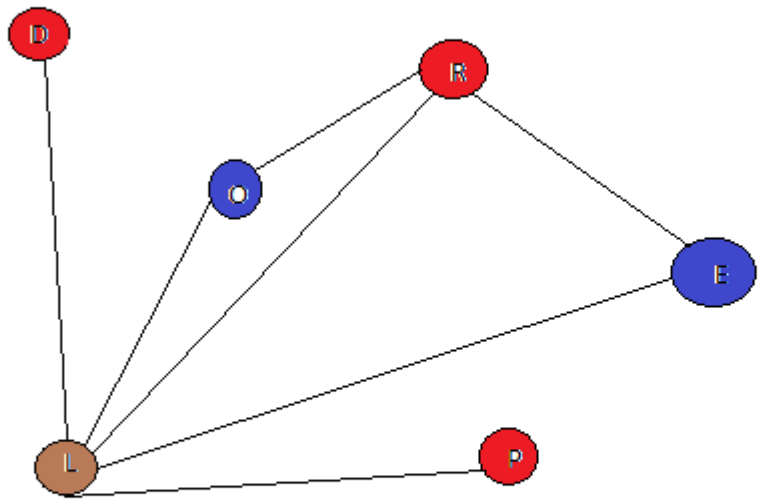
Adjacency List & Graph Construction:

D: L
E: L,R
L: D,E,P,O,R
P: L
O: L,R
R: L,E,O



In the graph vertices represent different animals. If there is an edge between two vertices it means that those two animals cannot be placed in one carrier as one of the animal is predator of the other.

Coloring Vertices:



Solving Complication:

Now the animals or vertices that are having the same color can be placed in the same carrier so that the animals can be transferred to other zoo safely.

Carrier 1: D,R,P
Carrier 2: O,E
Carrier 3: L

References:

https://books.google.com/books?id=PTbb7x-mI5gC&pg=PA151&lpg=PA151&dq=graph+colouring+real+life+applications+zoo&source=bl&ots=hJljkDq6Nu&sig=nUyROX5i-z_0p5JTQtLxdZk-ccY&hl=en&sa=X&ved=0ahUKEwj8z7a5iorMAhWJNiYKHdyfDiEQ6AEIQjAG#v=onepage&q=graph%20colouring%20real%20life%20applications%20zoo&f=false

https://en.wikipedia.org/wiki/Graph_coloring

https://en.wikipedia.org/wiki/Interval_graph