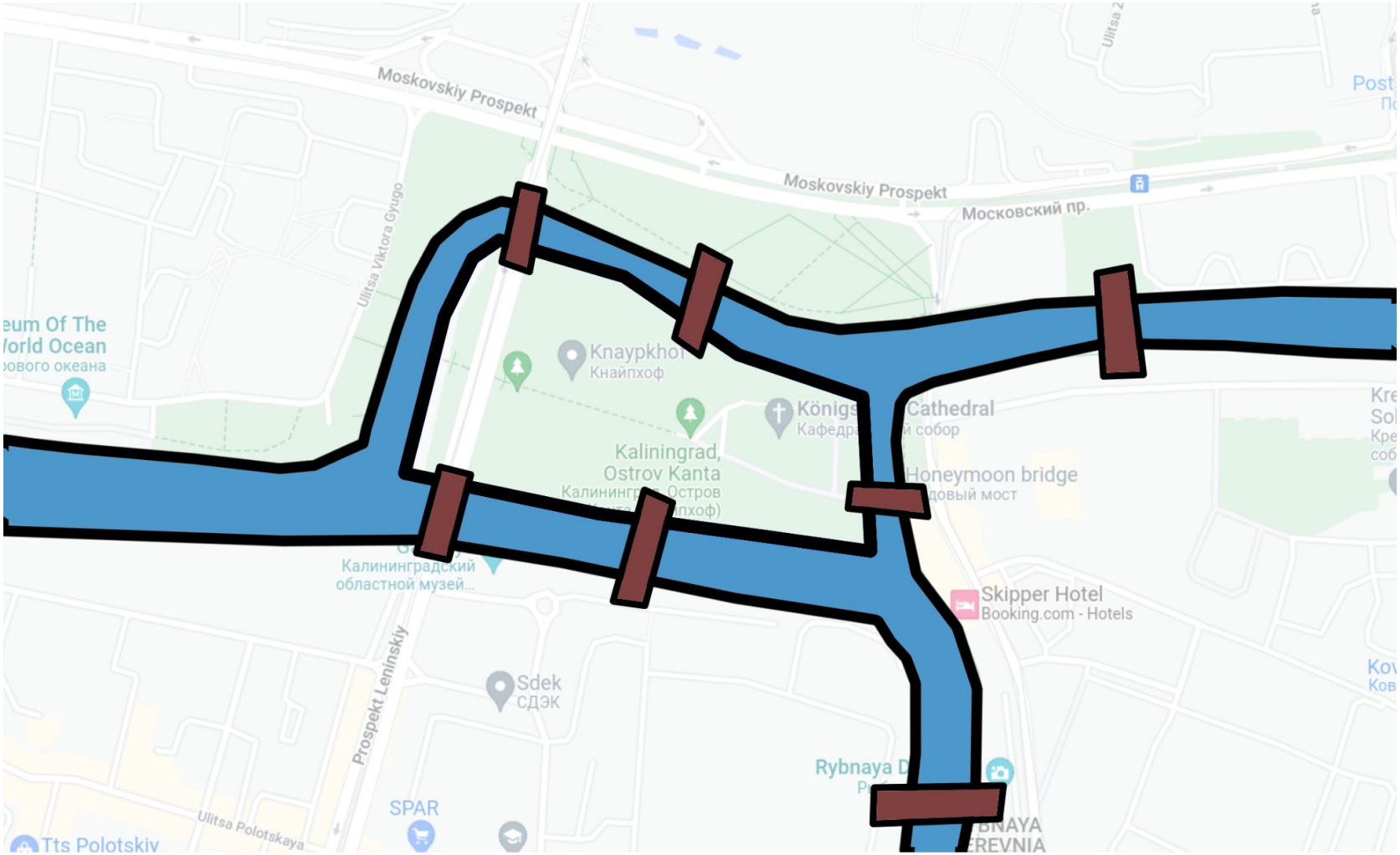
Finding the Right Path

Disha Kuzhively

dishajk@imsc.res.in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Cathedral
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Ostrov Kanta
Honeymoon bridge
Калининградский
областной музей...
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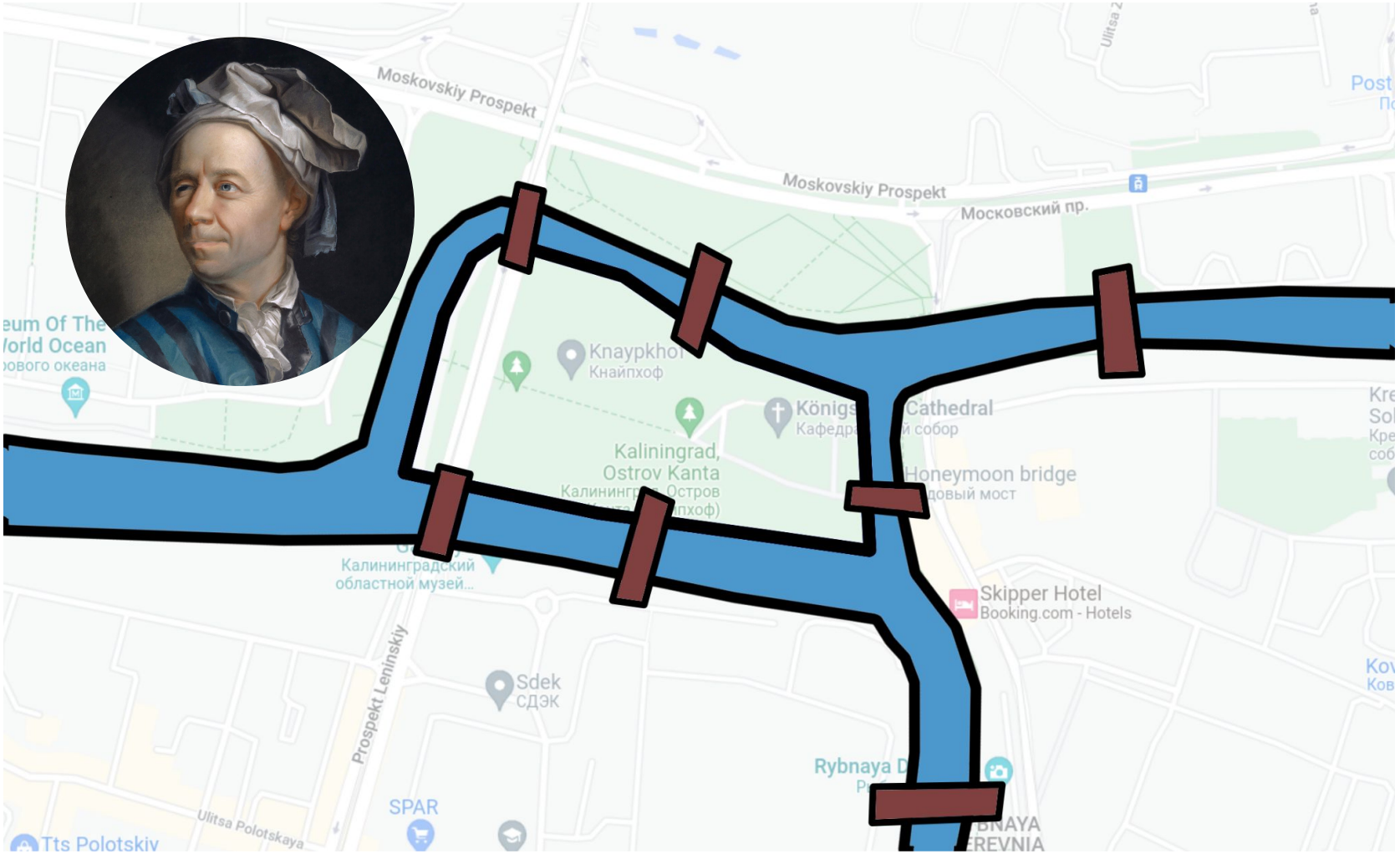
SPAR
Ulitsa Polotskaya

Sketch a route that would let one walk across all seven bridges exactly once? No bridge could be missed or crossed twice and, of course, there was to be no swimming across the river!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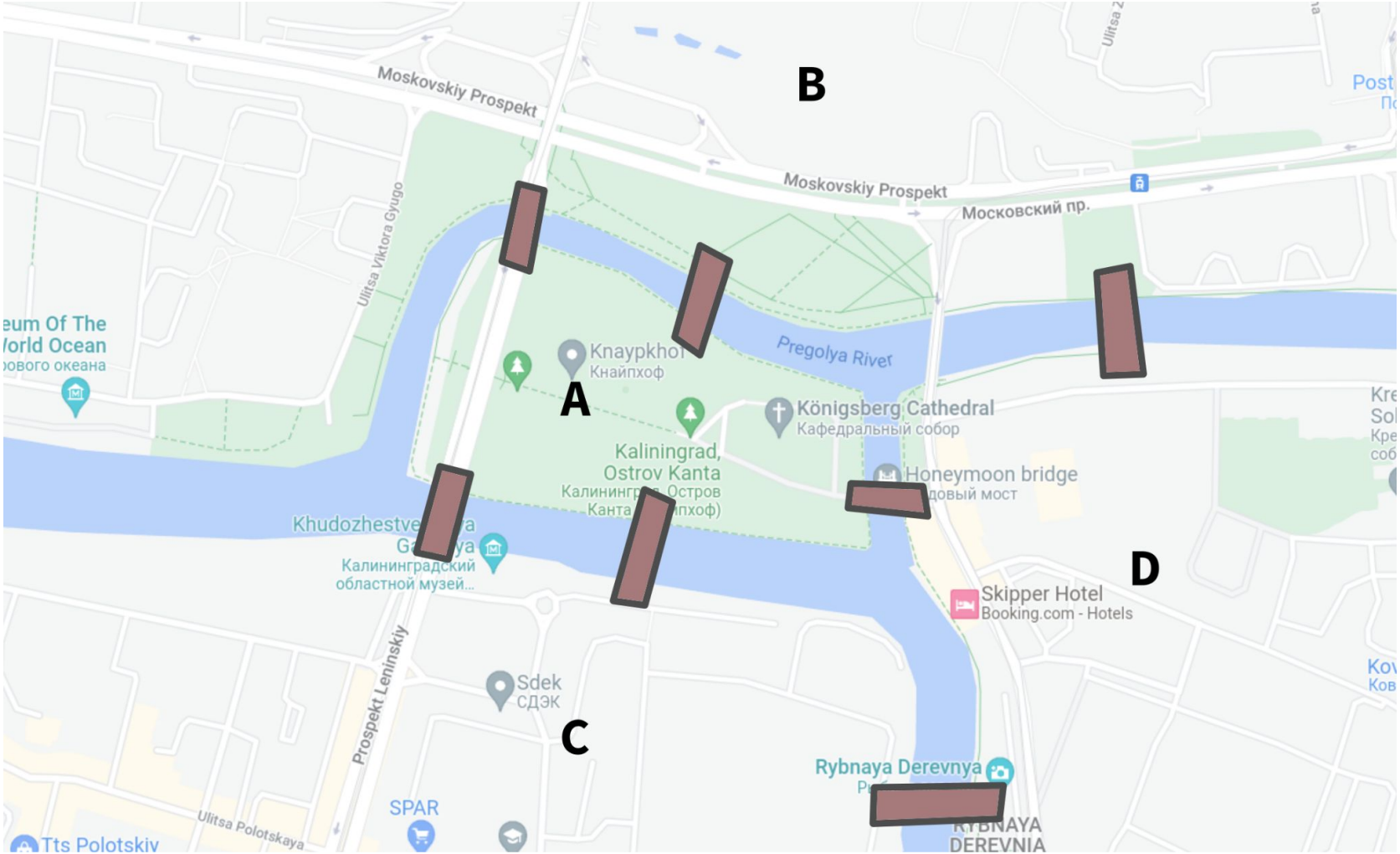
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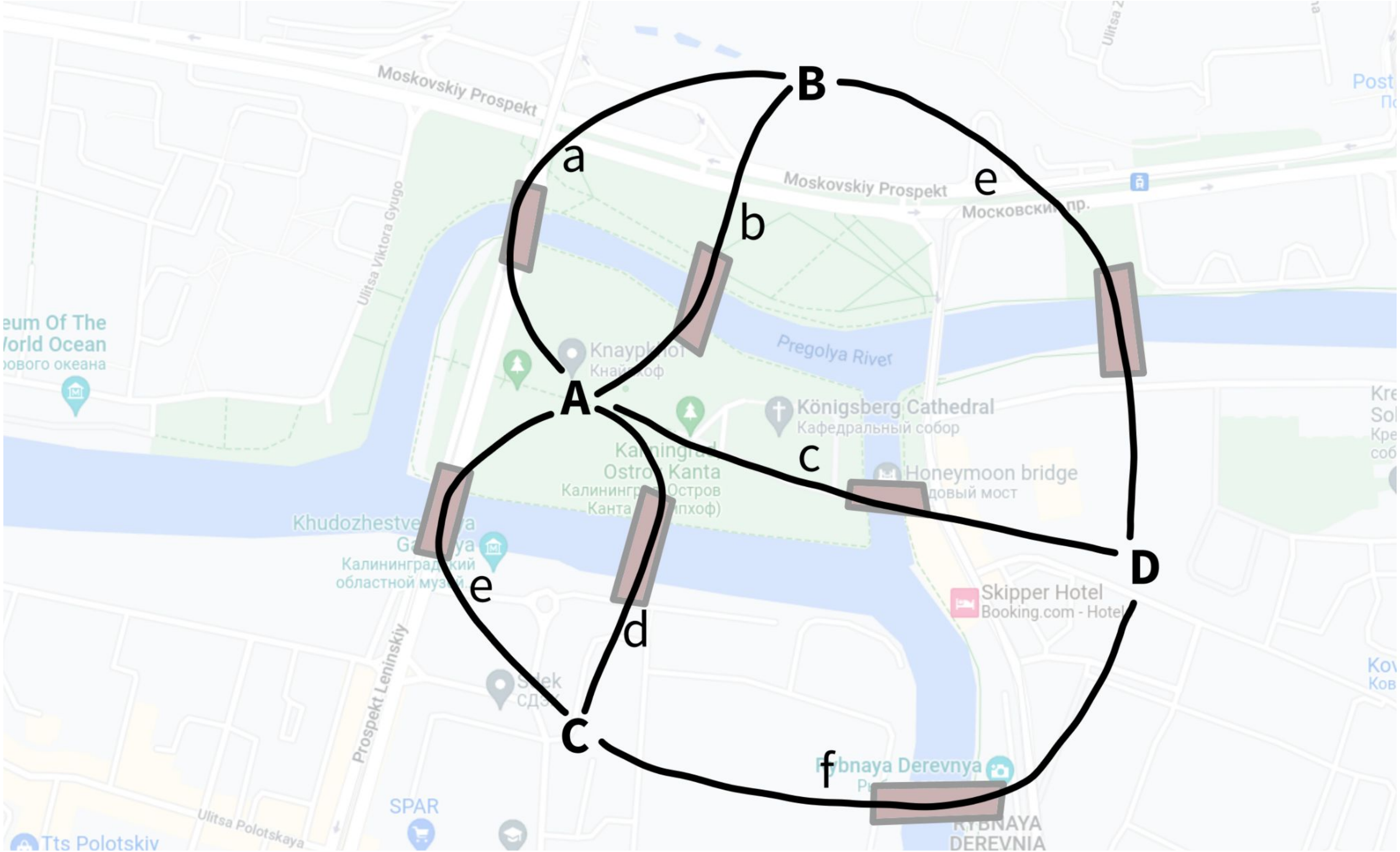
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Initial vertex and the final vertex are the same

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Are the Initial vertex and the final vertex same?
Degree of the vertices?

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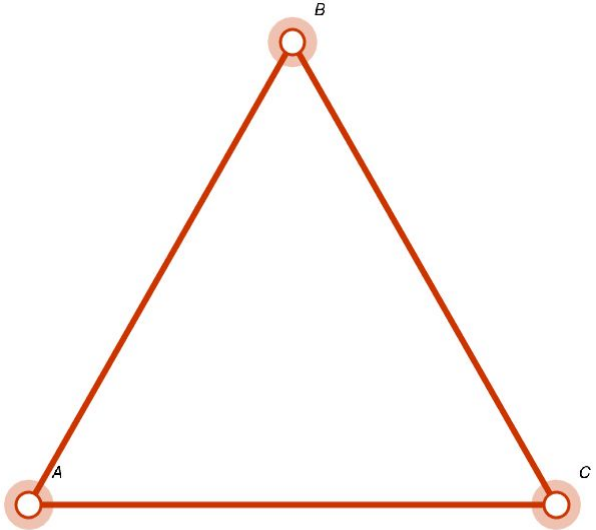

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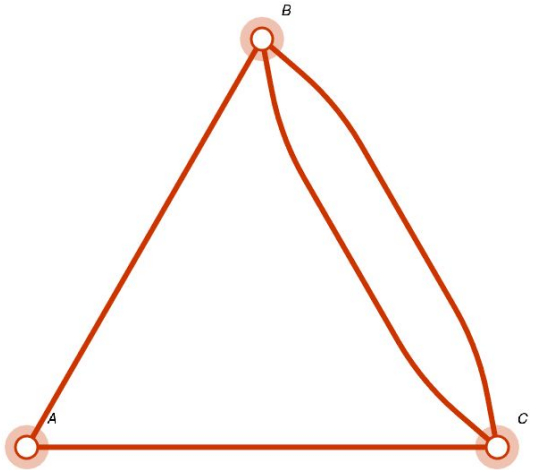

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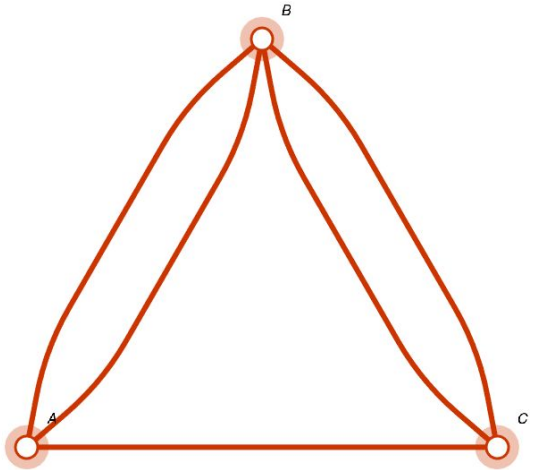

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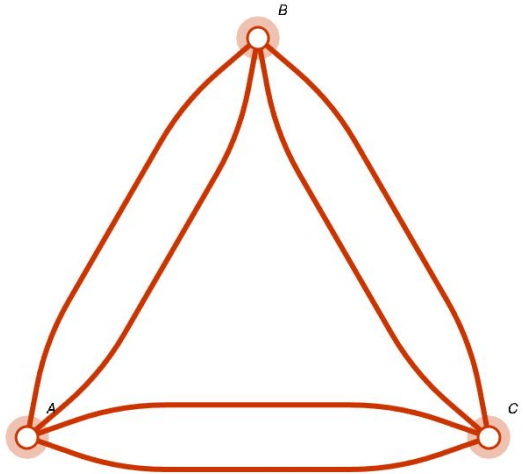

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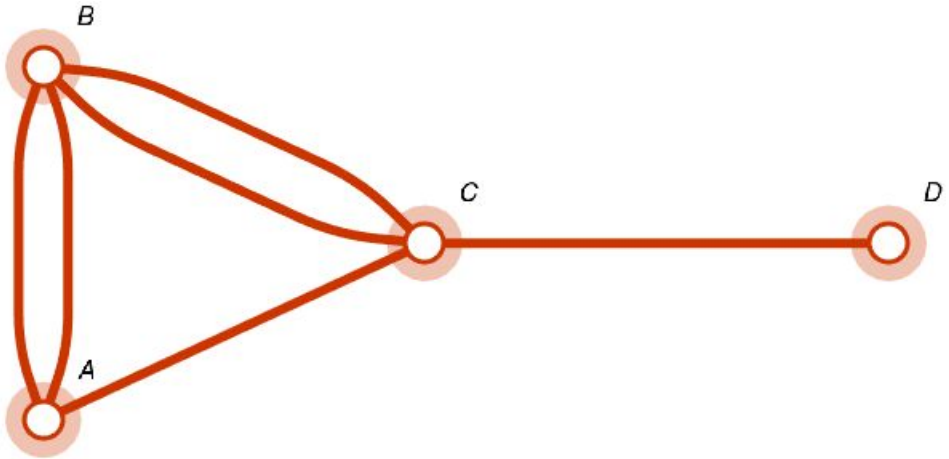

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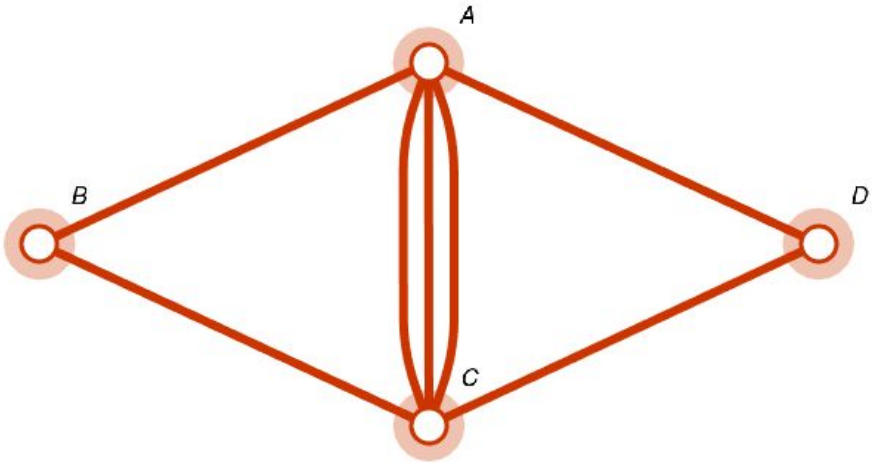

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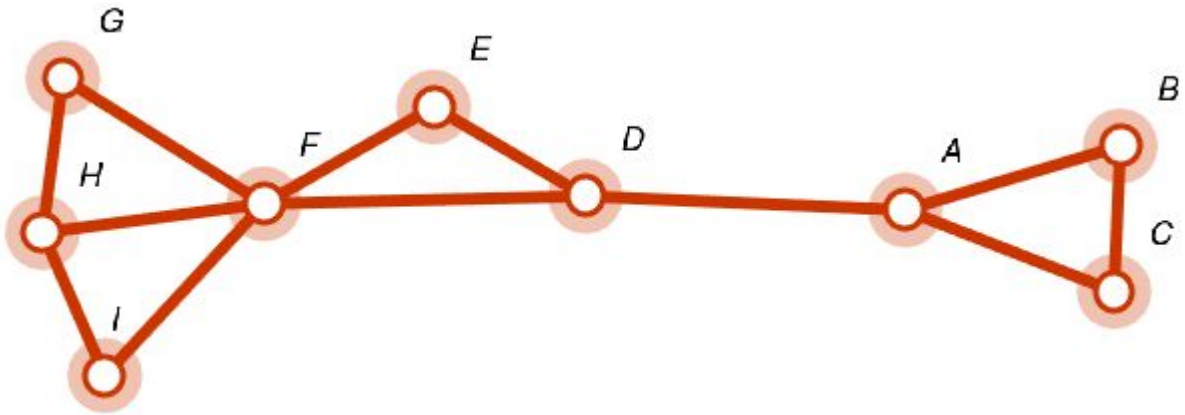

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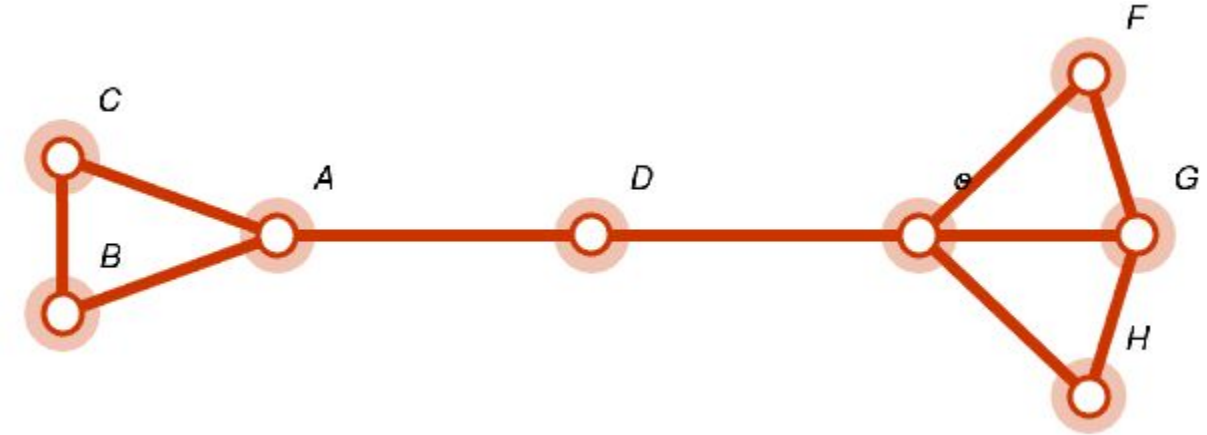

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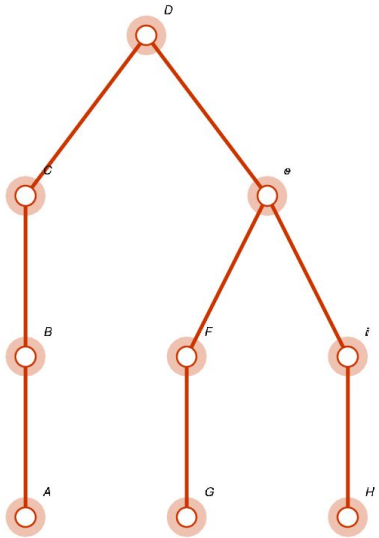

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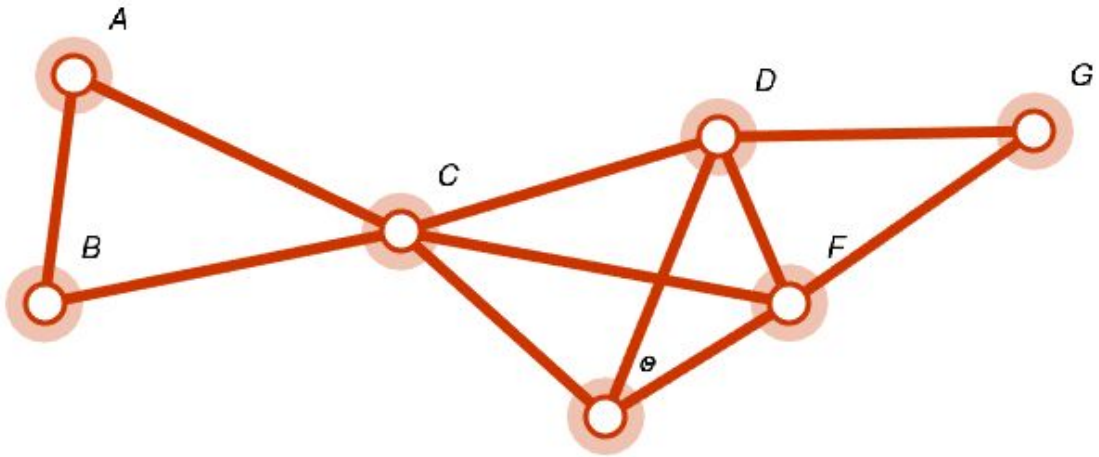

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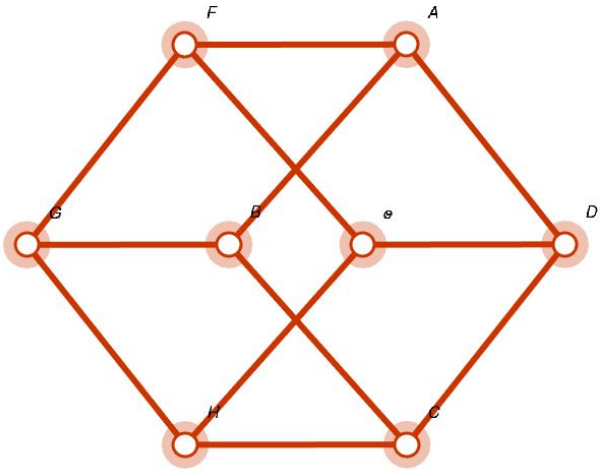

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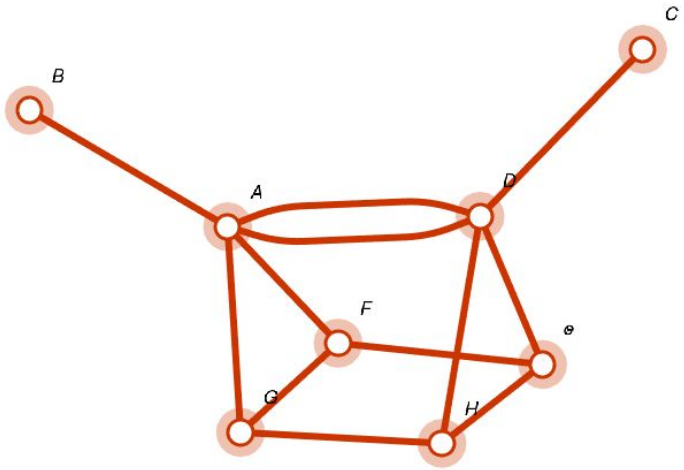

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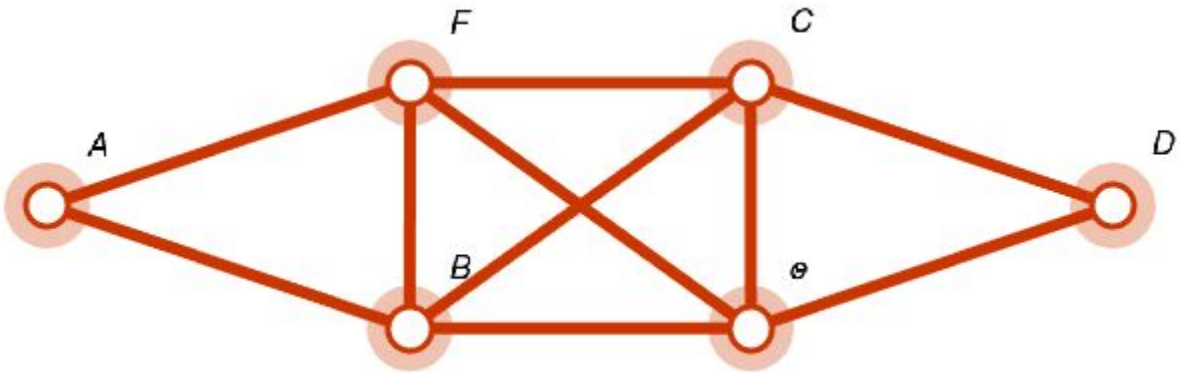

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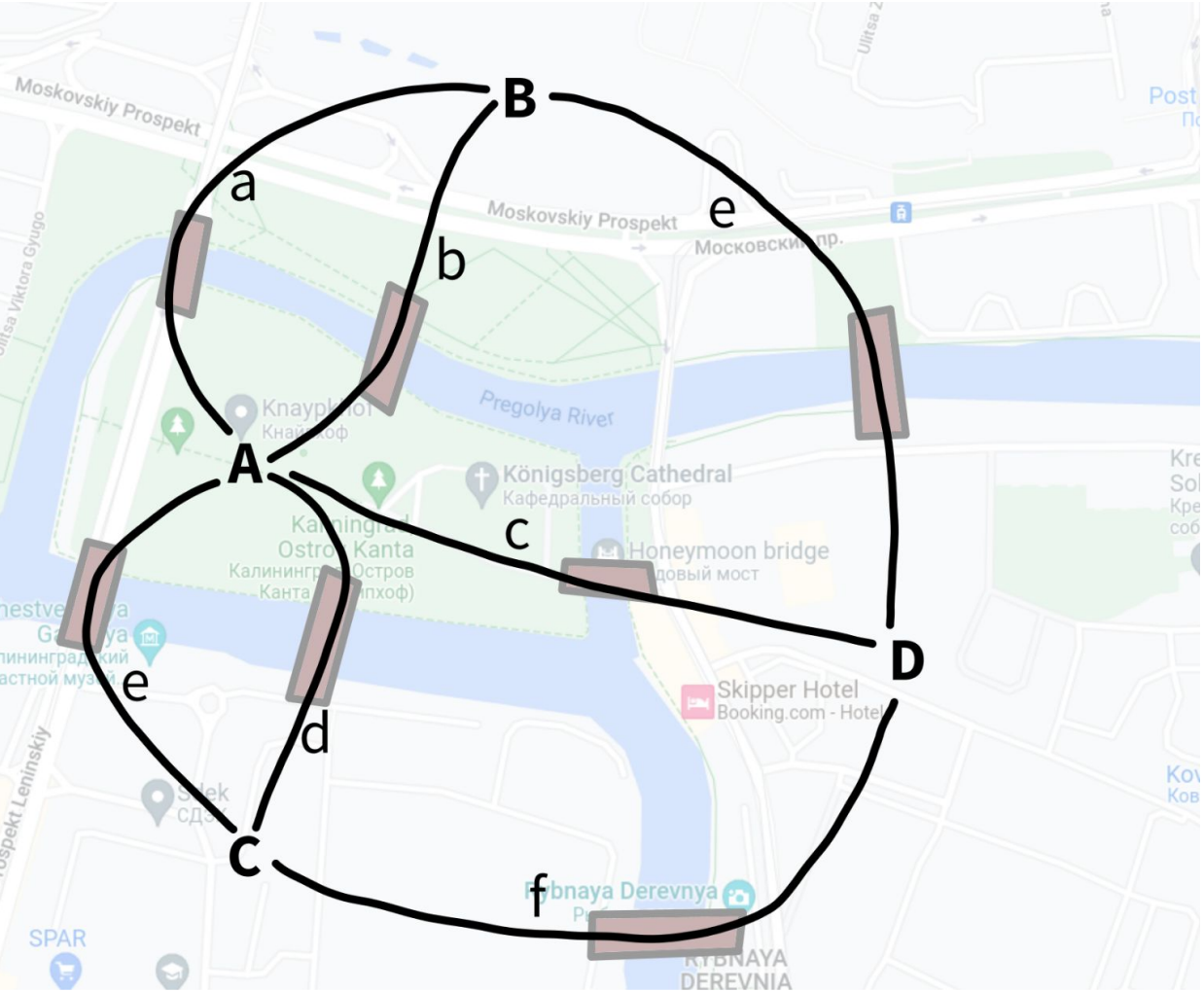
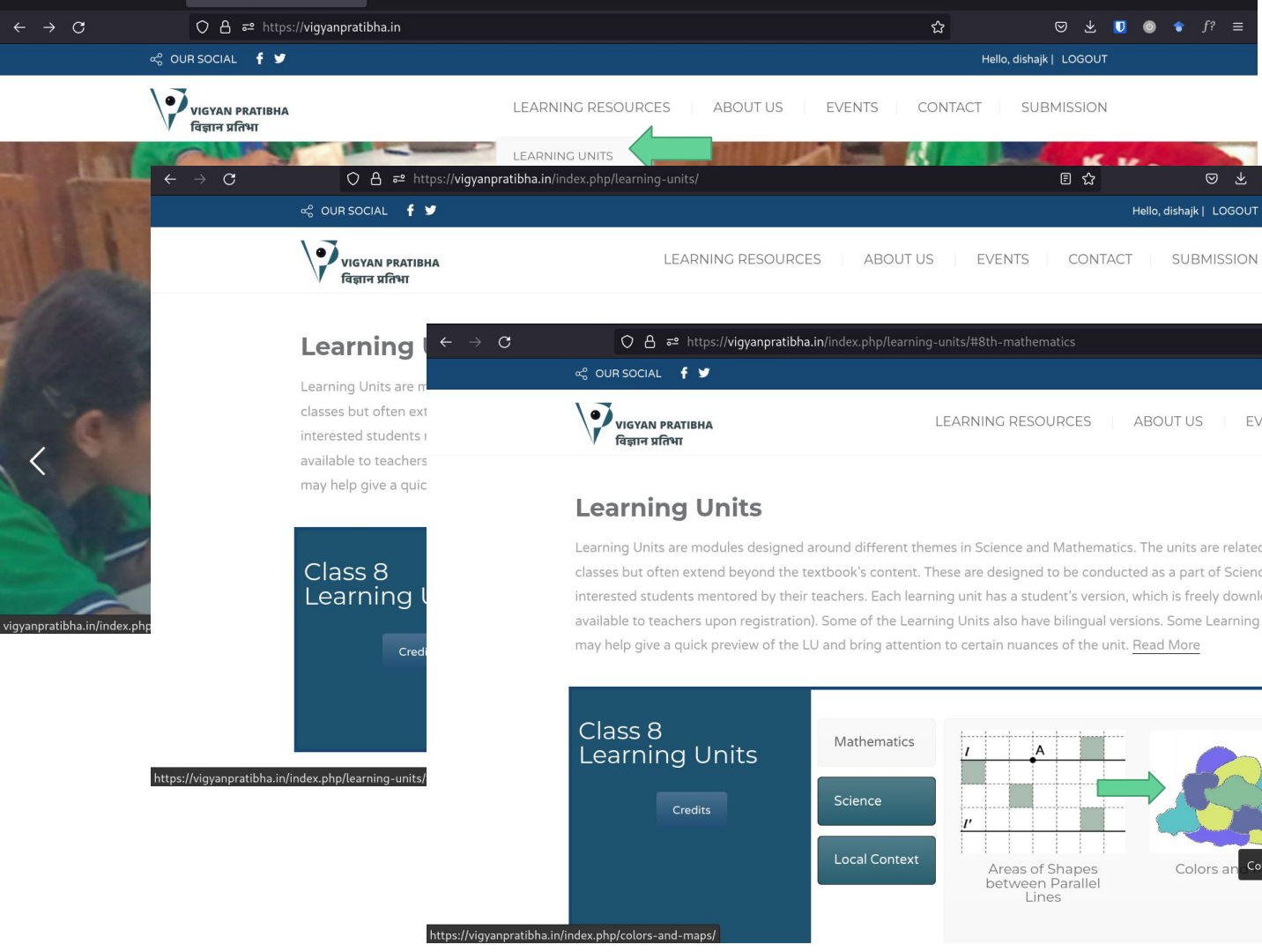


Königsberg Bridge

- ❏ Vertex
- ❏ Edge
- ❏ Graph representation
- ❏ Degree of a vertex
- ❏ Odd vs. even
- ❏ Eulerian Path
- ❏ Eulerian Circuit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1. Scheduling Problem

4 Subjects

1. **P**hysics
2. **C**hemistry
3. **M**aths
4. **B**iology

- Each person can opt for maximum 2 subjects
- Design a schedule with minimum number of slots

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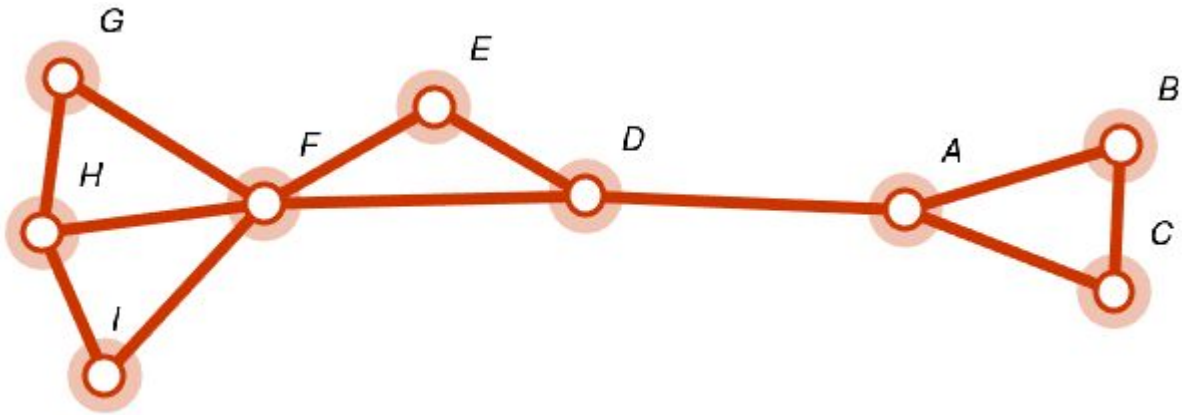
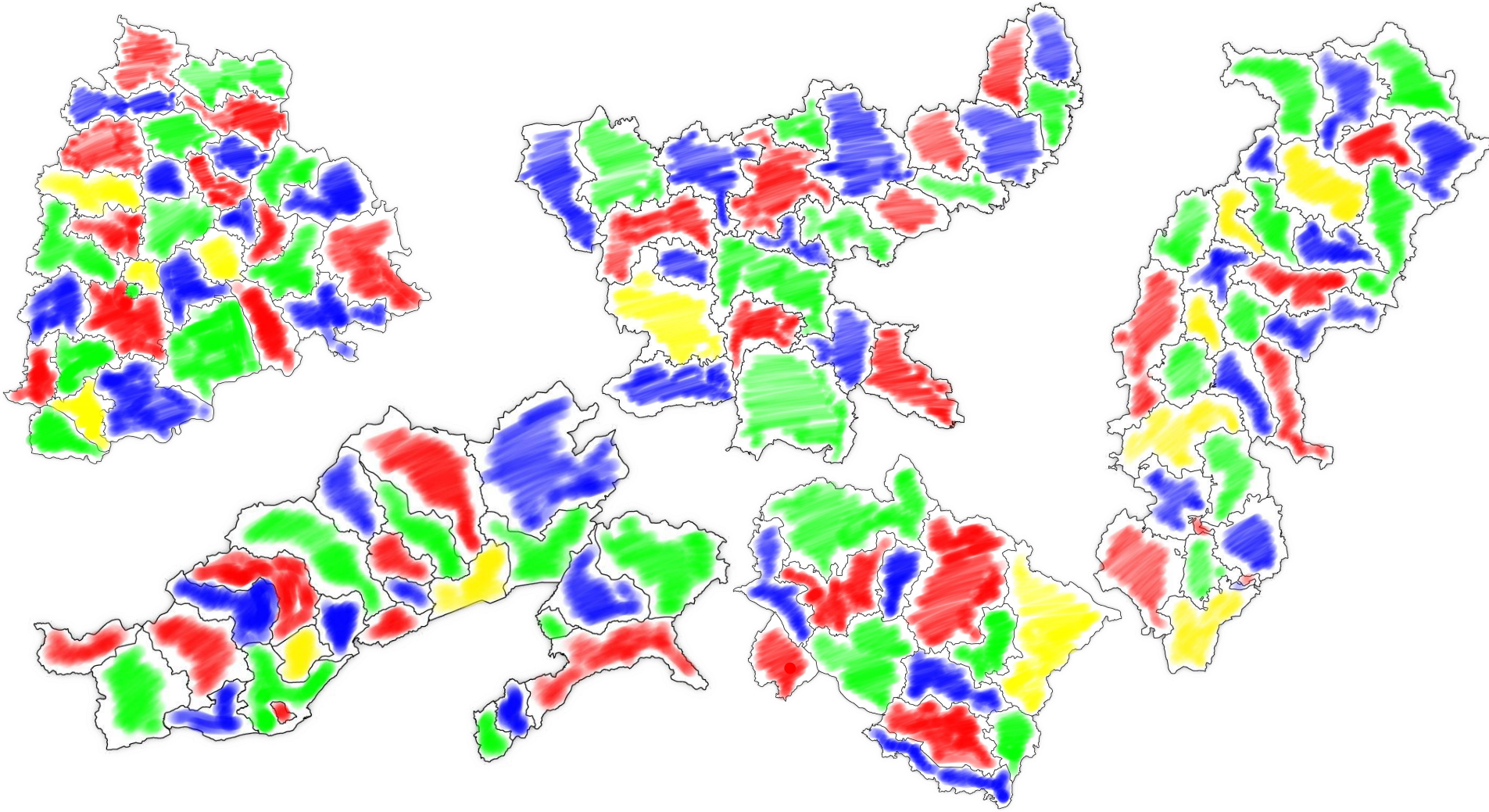
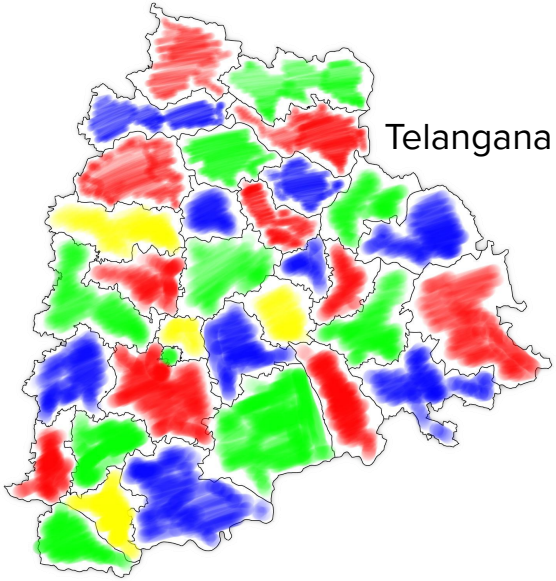


Are the Initial vertex and the final vertex same?
Degree of the vertices?

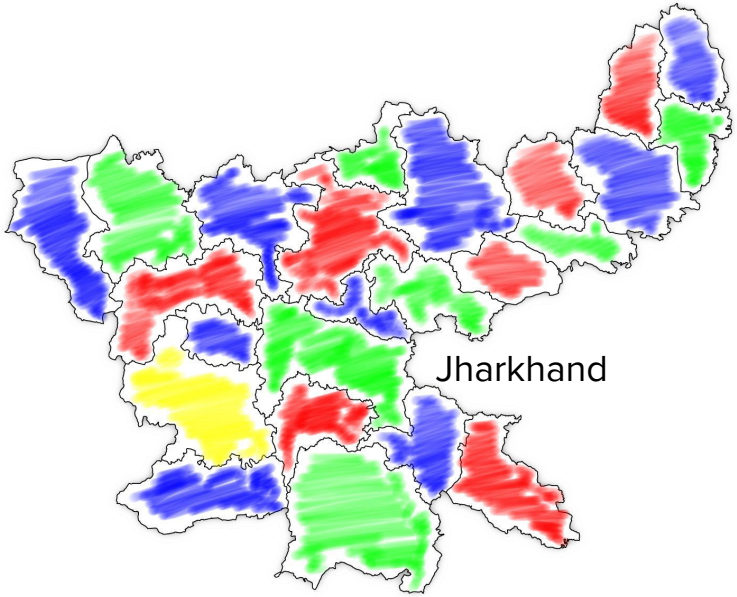
3. Colouring a Map

Colour the map using **minimum** numbers of colors as possible.
Regions sharing a boundary should have different colors.

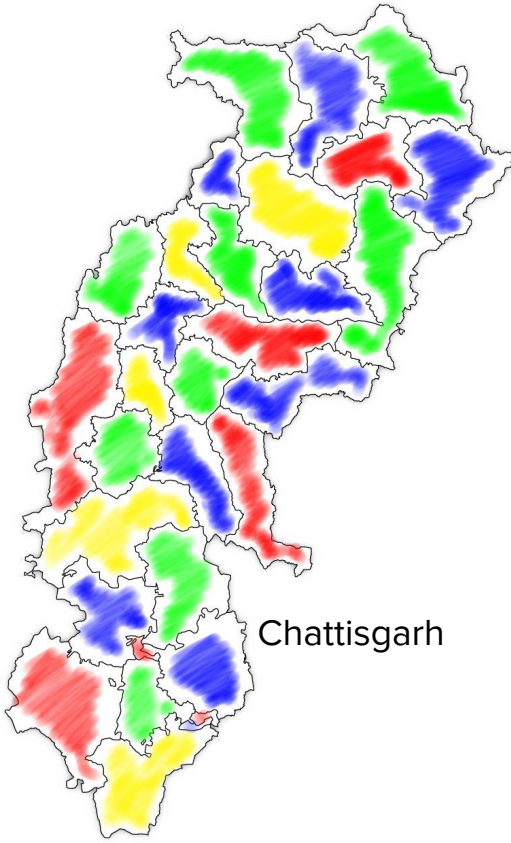




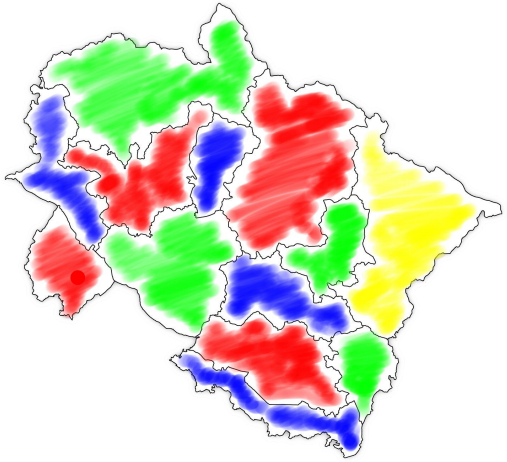
Telangana



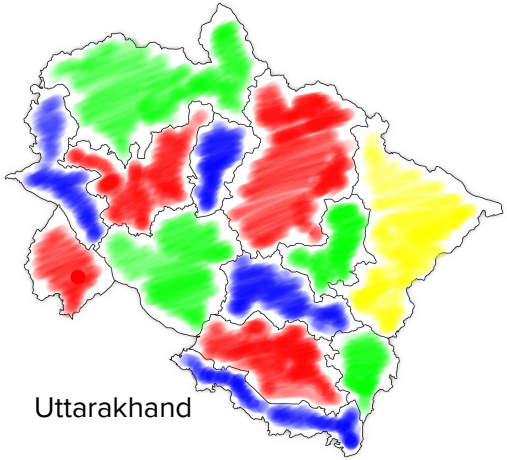
Jharkhand



Chattisgarh



Uttarakhand



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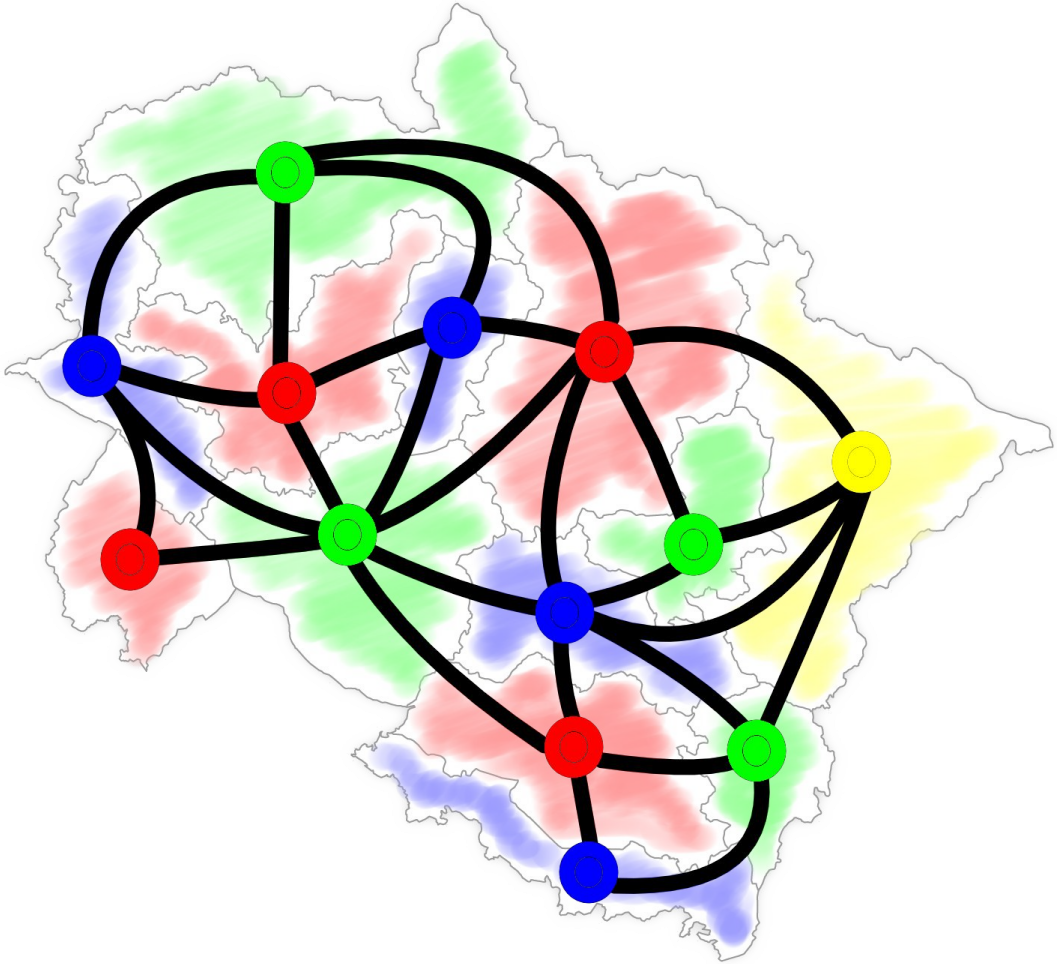


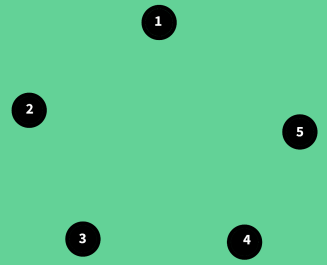
2. Five Neighbours

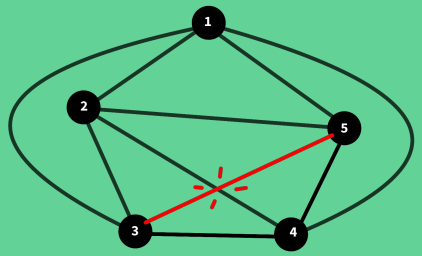


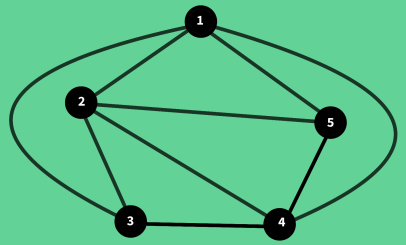


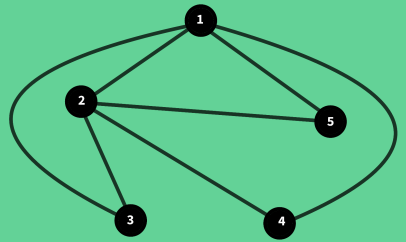
Divide the kingdom into five regions such that everyone is everyone's neighbour - each region would have a common boundary with every other regions.

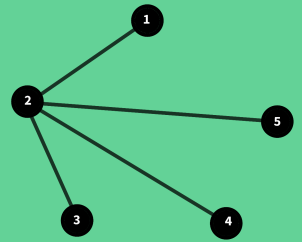
Region - Vertex
Boundary - Edge

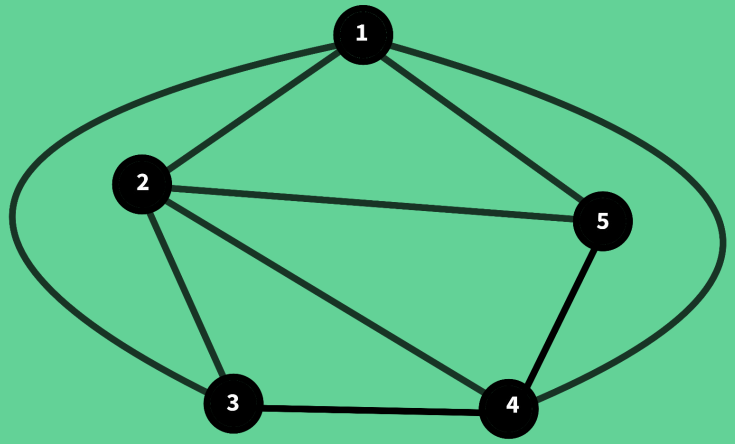


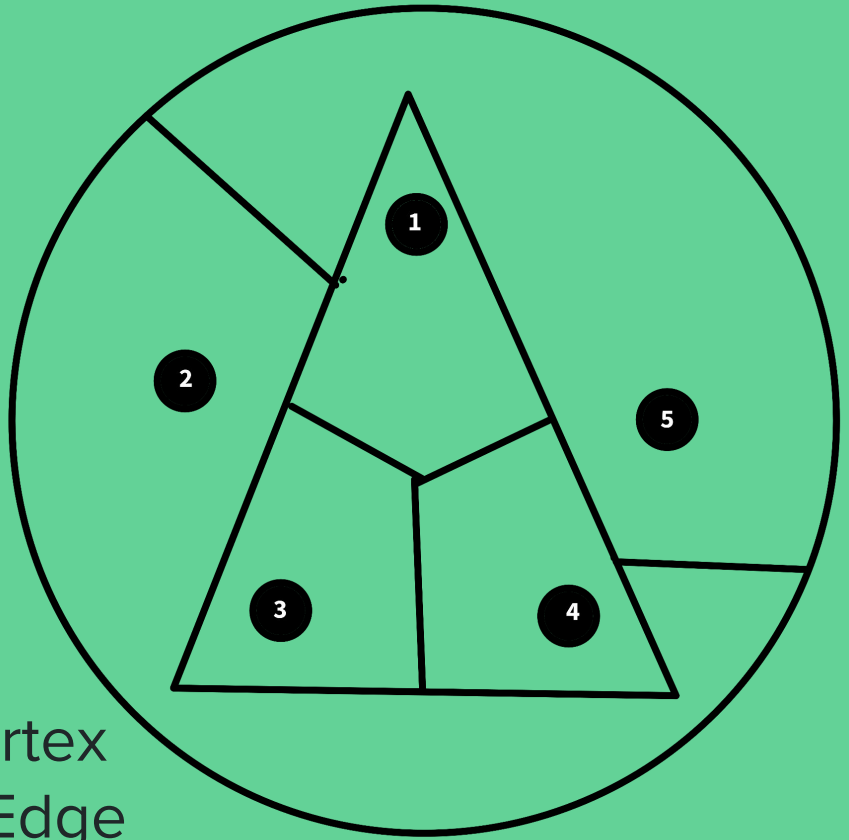












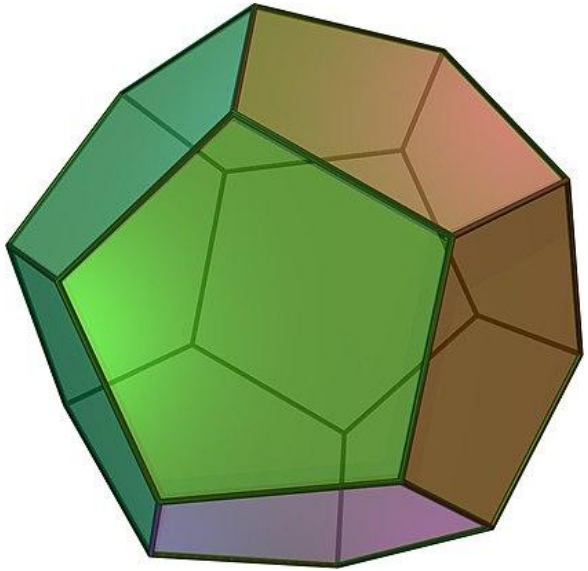
Region - Vertex
Boundary - Edge

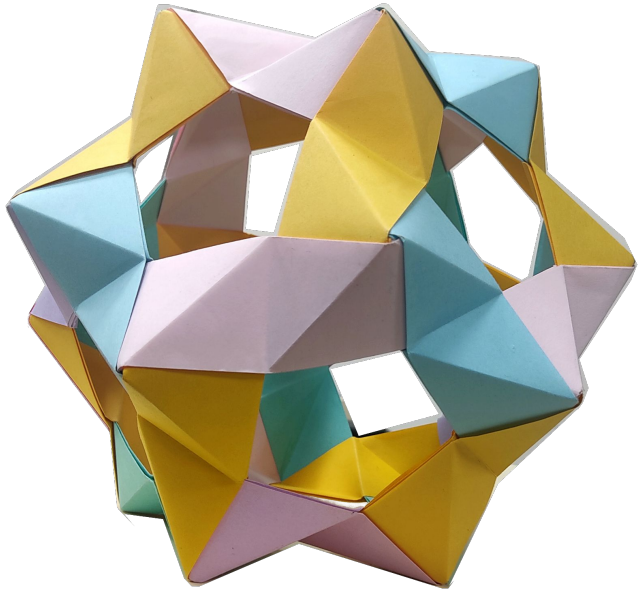
Are 4 colors enough in 3d?
Number of colors needed for a map drawn on a sphere?
Number of colors needed for a map drawn on a torus?

4. Icosian Game

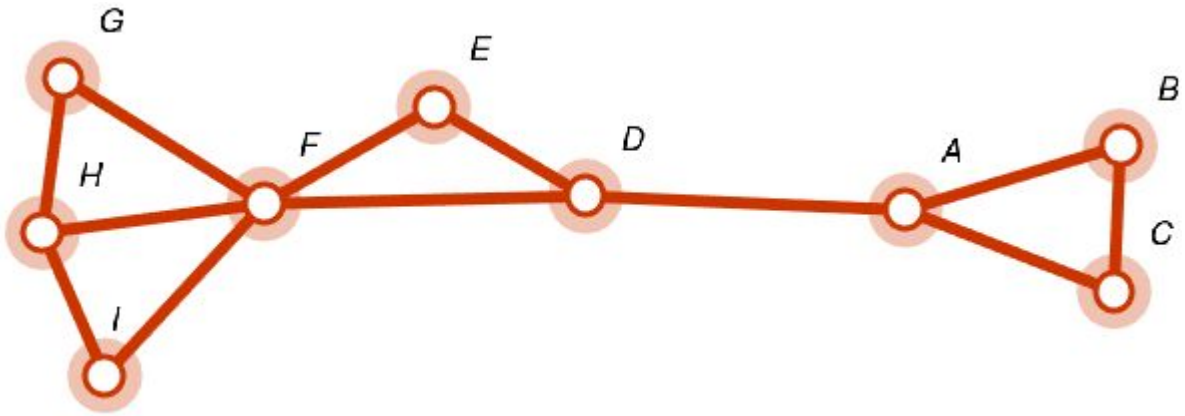
Find a path along the edges of a dodecahedron such that every vertex is visited a single time, and the ending point is the same as the starting point.

Note: You don't have to travel along all edges.





5. Dominating Sets



Acknowledgments

Discussions with Sanjay Seetharaman, Sathish Kumar V, Singanporia Kushal Piyushkumar, Sounak Modak, Varun Kaushal Shah and Dr. Vikash Tripathi helped in constructing some of the problems used in this activity.