5 group task in Discrete math in July:

Edited at 7pm 22.7.2018.

1. Solve Jindoh Riddle problem.

http://dishonored.wikia.com/wiki/The\_Jindosh\_Riddle

**Greedy:**

2. What is a Greedy Algorithm?

https://en.wikipedia.org/wiki/Greedy\_algorithm

How do you use Greedy Algorithms in Zimmermann Problems?

**Graph theory:**

3. Explain the Graph Theory.

https://en.wikipedia.org/wiki/Graph\_theory

4. Explain the **Bipartite** graph.

https://en.wikipedia.org/wiki/Bipartite\_graph

5. Explain the **complete** K4, K3,3, etc. graphs.

https://en.wikipedia.org/wiki/Complete\_graph

6. How many edges are there in K97, K89,97?

7. What is a **Planar** Graph?

https://en.wikipedia.org/wiki/Planar\_graph

8. Are these graphs **planar**, why?

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graph\_to\_analyze\_for\_planarity.ppt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graphs-to-analyze-for-planarity.ppt

9. Give the **Kuratowski** Theorem.

https://en.wikipedia.org/wiki/Kuratowski's\_theorem

10. Explain **Hamiltonian** Cycle.

https://en.wikipedia.org/wiki/Hamiltonian\_path

11. What is **Euler** Cycle?

https://en.wikipedia.org/wiki/Eulerian\_path

12. Solve the **Konigsberg** Bridges Problem.

https://en.wikipedia.org/wiki/Seven\_Bridges\_of\_K%C3%B6nigsberg

13. Explain the **Travelling Salesman Problem**.

https://en.wikipedia.org/wiki/Travelling\_salesman\_problem

14. What is **Djikstras** Algorithm?

https://en.wikipedia.org/wiki/Dijkstra's\_algorithm

15. Explain the **Graceful** Graph.

http://mathworld.wolfram.com/GracefulGraph.html

16. Solve the Graceful Graph Problem for *12* vertices.

http://azspcs.com/Contest/GracefulGraphs

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/12code12.txt

17. Find the graceful labeling of

18. Color the map of the country number 99 using as few colors as possible.

http://www.worldometers.info/geography/alphabetical-list-of-countries/

19. Find the number of regions for the graph with 20 edges and 10 vertices.

**Boolean Algebra:**

20. Explain **Boolean Algebra**.

https://en.wikipedia.org/wiki/Boolean\_algebra

21. Explain **simplifying** Boolean expressions.

22. Explain **Karnaugh** Map.

https://en.wikipedia.org/wiki/Karnaugh\_map

**Computational Time Complexity:**

23. What is the complexity of the Hanoi Towers Problem?

24. Explain Fast Fourier Transform.

25. Try to apply for all grants, scholarships, fellowships, etc. in embassies of USA, Canada, Europe, Australia, Japan, etc.

26. Define Karnaugh map and solve the problems using it.

https://en.wikipedia.org/wiki/Karnaugh\_map

27. Explain Petersen graph.

https://en.wikipedia.org/wiki/Petersen\_graph

28. Define Fast Fourier Transform and Discrete Fourier Transform.

https://en.wikipedia.org/wiki/Fast\_Fourier\_transform

https://en.wikipedia.org/wiki/Discrete\_Fourier\_transform

29. What is complexity of Brute-force search?

https://en.wikipedia.org/wiki/Brute-force\_search

30. Use graph theory to analyze soccer world cup.

https://www.fifa.com/worldcup/matches/?#knockoutphase

Quantum computing:

31. Use quantum computer.

https://www.research.ibm.com/ibm-q/

https://en.wikipedia.org/wiki/Quantum\_computing

32. Study

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/10graphs.ppt

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/11shortest.ppt

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/12trees.ppt

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/13trees.ppt

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/14circuits14etc.ppt

https://discrete4math.weebly.com/uploads/2/5/3/9/25393482/15boolean15algebra15.ppt

33. Play chess.

https://www.chess.com/

Petersen graph:

34.

Does Petersen graph satisfy the condition e < 2v – 4?

Does Petersen graph satisfy the condition e < 3v – 6?

Is this graph planar?

Why?

Which important graph does Petersen graph similar to?

https://en.wikipedia.org/wiki/Petersen\_graph

https://en.wikipedia.org/wiki/Planar\_graph

In individual task do it for your student number.

Trade graphing:

35. Graph Indonesian international trade.

Weights are the percentages.

Optimize the trade.

USA 13

China 12

Japan 11

European Union 10

Singapore 9

India 8

Korea 7

Middle East 6

Malaysia 5

Thailand 4

Philippines 3

Australia 2

Russia 1

https://atlas.media.mit.edu/en/profile/country/idn/

Bad relations are between:

USA and China,

USA and Russia,

USA and Middle East,

Malaysia and Russia,

Australia and Russia.

For group task take all countries.

Deadline is 31.7.2018.