3 group task in discrete math:

Edited at 8am 21.5.2018.

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. How many subsets are there in a set of 38 elements?

26. Find

27. Find the truth tables.

a. A or not B and C

b. C and not B or not (A or D)

28. Give converse, inverse and contrapositive to “If I study hard, then I will be rich.”

29. Find f(f(f(f(f(2))))) if f(x) = x2.

30. Solve Fibonacci recurring relation. 1, 1, 2, 3, 5, 8, . . .

31. There are 23 cats in a village this year. The growth of the population of the cats is 7% per year. How many cats will there be in the village in 9 years from now?

32. Give the algorithms to find Highest Common Divisor and Lowest Common Multiple.

Include Euclidean algorithm.

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/euclidean4algorithm.txt

33. Represent each of these decimal numbers in numeral systems with bases 2,5,7,9,16. a.67 b.94

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/number2convert.txt

34. Give the best algorithm of finding the largest prime number.

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/primes2find.txt

35. Why are prime number and factorization important?

36. Calculate big integers.

https://en.wikipedia.org/wiki/Arbitrary-precision\_arithmetic

37. Find the number of grains for the Chess problem.

38. How many up to 6-symbols passwords can be made of 26 letters (a-z) and 10 digits (0-9)?

39. How would you cheat in a multiple choice exam if you do not know the answers using your knowledge in discrete math?

40. What are independent random variables and how the compound probability is given in this case?

41. Calculate random between 1 and 5 using Excel 5 times. Draw the histogram.

42. Sum the calculated random between 1 and 5 using Excel 5 times. Draw the histogram of the sums.

43. Make histogram of first 9 digits of π.

44. Give the histogram of Benford of the first digit of 9 the most populated countries.

http://www.worldometers.info/world-population/population-by-country/

Predictions:

45. Predict results of soccer world cup and Indonesian elections of 2018.

http://www.fifa.com/worldcup/

https://en.wikipedia.org/wiki/Indonesian\_local\_elections,\_2018

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

Deadline: 31.5.2018.