5 group task in discrete math:

Edited at 1pm 25.1.2017.

Answer the questions in your own words. Do NOT copy.

1. Is Hamiltonian cycle possible on the Kongsberg Bridges? Why?

2. Explain the Four Color Theorem.

https://en.wikipedia.org/wiki/Four\_color\_theorem

3. Solve the Chinese postman problem.

https://en.wikipedia.org/wiki/Route\_inspection\_problem

4. Explain the Fast Fourier Transform.

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

5. What is a Dual graph?

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

6. Explain the Topology.

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

7. Calculate hash function for your group number.

http://www.fileformat.info/tool/hash.htm

8. Give the computational complexity of all the algorithms.

We did it in class.

Chaos in cryptography:

9. We can generate chaos using mod function, fractals, irrational numbers, dice, coin, and many physical objects. This is used for the encryption in cryptography. Cryptography is all about generations a perfect chaos.

Is it true?

If true then what else can we use to generate chaos?

If false then why and what are the better ways?

Pattern recognition in cryptanalysis:

10. We can recognize patterns using the algebra in the classical cases and statistics in more complicated and more modern cases. This is used for the decryption and hacking in cryptanalysis. Cryptanalysis is all about pattern recognition.

Is it true?

If true then what else can we use to recognize patterns?

If false then why and what are the better ways?

Cryptanalysis:

11. How could the hacking be prevented?

Analyze the famous hacking cases.

https://en.wikipedia.org/wiki/2016\_United\_States\_election\_interference\_by\_Russia

http://edition.cnn.com/2016/12/12/politics/russian-hack-donald-trump-2016-election/

https://en.wikipedia.org/wiki/Venona\_project

http://www.foxnews.com/tech/2012/10/10/world-war-ii-encryption-for-your-e-mail.html

Hash function:

12. Calculate the hash function for your group number.

http://www.fileformat.info/tool/hash.htm

13. How can we inverse a hash function?

Zimmermann:

14. Solve Zimmermann Polygonal Areas problem.

http://azspcs.com/Contest/PolygonalAreas

Submit as many different areas solutions as possible in the form (1,2), (2,6), (3,4), (4,5), (6,3), (5,1) going clockwise or anti-clockwise along the border of the polygon for 11, 17, 23, 29, 37, 47, 59, 71, 83, 97, 113, 131, 149, 167, 191, 223, 257, 293, 331, 373, 419, 467, 521.

For each problem we need maximum and minimum areas polygons.

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/11polygonal11areas11zimmermann11.txt

Deadline: 31.1.2017.