E group task in discrete math:

Edited at 7am 17.4.2017.

Relations:

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

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

3. The deer population is 350 at time n = 0, and 400 at time n = 1. The increase from time n-1 to time n is four times larger than the increase from time n-2 to time n-1. Find the recurrence relation at time n.

4. 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?

Combinatorics:

5. What are the Multiplication, Addition, Pigeon-Hole, and Inclusion-Exclusion principles?

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

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

Probability:

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

9. Jane takes two buses to work. On a particular day, the probability of her catching the first bus is 0.7 and the probability of catching the second bus is 0.5. The probability of her catching neither is 0.1.

What are the probabilities of catching any of the buses and both buses? Find the conditional probabilities. Do the conditional probabilities agree with the Bayes Theorem, why?

10. How are the Multiplication, Addition, Pigeon-Hole, and Inclusion-Exclusion principles used in probability?

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

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

13. Explain conditional probability and Bayes Theorem.

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

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

16. Make histogram of first 9 digits of π.

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

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

Decision support:

18. Give decision support examples.

Design:

19. Use your knowledge for design.

Deadline: 22.4.2017 Saturday.