

# Easy and Hard Problems in Computer Science

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The seminar started with 6 points on a simple map, where numbers were written, which denoted time in minutes between two points following the connecting line, followed by a diagram with the overall path and time of the journey, and multiple other paths. He showed the connection between this situation and Mathematics, which is the topic Permutation and Combination. He told us how to calculate the number of paths and the logic behind choosing the factorial of a number which is one less than the number of points. Such problems are called the travelling salesperson problems.

The problems can be classified as easy or hard, depending on the amount of time they require to solve. The definition of a reasonable amount of time varies from time to time but the definition of easy and hard problems remains the same. Few examples were shown of the time required by some fast computer to show the best possible path, which depended on the number of points. These kinds of problems are Hard Problems. However, there is further classification to easy and hard problems. The problem with matrices such as multiplying two matrices can be solved in a very short period, which makes it an easy problem but not the easiest as the best way to multiply is still not known. However, it is hard in other ways such as finding a number in a sequence of millions of unordered numbers. He talked about the application of multiplication of matrices, which is machine learning.

## References

None