

**PROJECT LIST**

You and your group should look into and then eventually choose one of these topics. Initially choose a shortlist of 3 in case another group has chosen the same topic. Then you will have to discuss, and agree on, which group pursues which topic.

1. Coding theory and linear algebra.
2. Ciphers and modular arithmetic.
3. Permutations: derangements, descents and pattern avoidance.
4. Fibonacci numbers and the golden ratio.
5. Chess problems: rook placements, knight's tours and beyond.
6. Lucas numbers and recurrence relations.
7. Latin squares.
8. Partition identities.
9. Littlewood-Richardson coefficients: generalized sudoku.
10. Motzkin paths and more general walking paths.
11. Graph colouring.
12. Pascal's triangle and binomial coefficients.