

HOMEWORK IX

ALGEBRAIC COMBINATORICS (MATH 68)

Due November 13, 2019, at the **beginning of the class**

Collaboration among students to find key to the solution is encouraged, but each person must write the homework in his/her own words. You must write the name of the students with whom you work for each problem, as well as any written resource (web, book, etc.) that has been extensively used.

You must write the appropriate justification as part of the solutions.

- (1) Without looking in an external source (but you can talk to each other), find the table of characters of S_4 . Give all the appropriate justifications. You have enough information not to use the Murnaghan-Nakayama rule.
- (2) Without looking in an external source (but you can talk to each other), find the table of characters of S_5 . Give all the appropriate justifications. Try to avoid as often as possible using the Murnaghan-Nakayama.
- (3) Find the character for the Specht module $S^{\begin{array}{c} \square\square\square \\ \square \end{array}}$ (here, you should use the Murnaghan-Nakayama rule).
- (4) Check that the character you found above is irreducible, using the orthogonality relations.

Good luck!