COHOMOLOGY OF GROUPS : EXERCISES

Exercise 6.1. Determine the edge homomorphisms for the Lyndon-Hochschild-Serre spectral sequence in cohomology.

Exercise 6.2. Compute the integral cohomology ring $H^*(D_{2m}; \mathbb{Z})$ of the dihedral group D_{2m} with m odd, using an extension

$$1 \to C_m \to D_{2m} \to C_2 \to 1.$$

Exercise 6.3. Let S_k denote the symmetric group with $k!$ elements. Construct a suitable inclusion $S_m \wr S_n \to S_{mn}$, and use it to show that the wreath product is associative.

Exercise 6.4. Show that $C_p \wr \cdots \wr C_p$, with r copies of C_p, embeds as a p-Sylow subgroup in S_{p^r}.