



THE UNIVERSITY OF  
MELBOURNE

**620-619 Representation Theory**  
Lecturer: [Arun Ram](#)

2009 Semester I

[University of Melbourne](#)  
[Mathematics Department](#)

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**Homework Due 12 May 2009**

1. Classify and construct the finite dimensional simple modules for cyclic groups.
2. Classify and construct the finite dimensional simple modules for dihedral groups.
3. Explicitly verify the Weyl character formula for the  $\mathfrak{sl}_3$ -crystal  $B(\rho)$ .
4. Explicitly decompose the  $\mathfrak{sl}_3$ -crystal  $B(\rho) \otimes B(\rho)$ .
5. Decompose the adjoint representation of  $SO_5$  as an  $SU_3 \times SU_2 \times U_1$ -module.