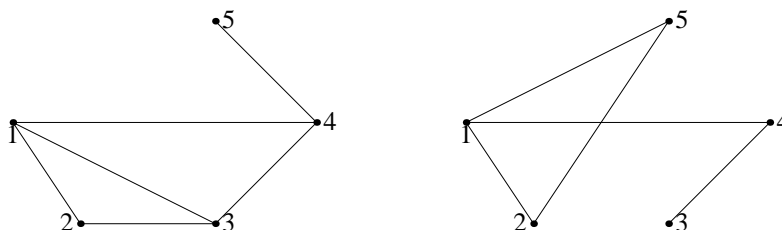


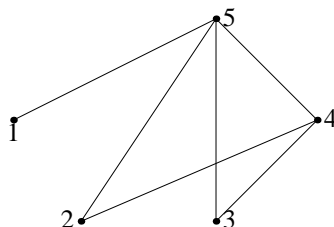
Exercises discussed on May 10, 2011

(HW32) Are the labeled graphs f_1, f_2 given by



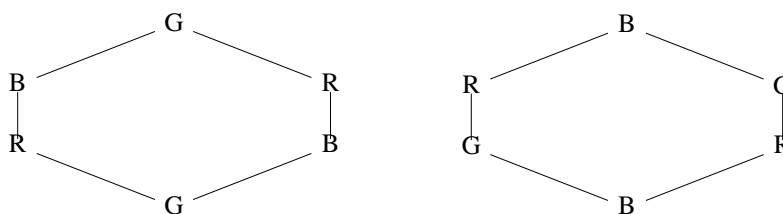
isomorphic? If yes, find $\pi \in S_5$ such that $\pi f_1 = f_2$. If no, prove this.

(HW33) As (HW32) with f_2 given by



(BP9) Prove: Any equivalence relation on a set M is canonically induced by a suitably chosen group action $G \times M \rightarrow M$.

(HW34) (a) How many different necklaces of 6 beads are there where 2 beads are green, 2 beads are red and 2 beads are black? E.g., two isomorphic labelled necklaces:



corresponding to

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ G & R & B & G & R & B \end{pmatrix} \sim \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ B & G & R & B & G & R \end{pmatrix}$$

(b) Formulate the equivalence relation in terms of group actions.

(c) How many necklaces of 6 beads in at most 3 different colors are there?

(HW35) Let Y be a G -set, X a set: define $G \times Y^X \rightarrow Y^X$, $(g, f) := gf$ by

$$\forall x \in X : (gf)(x) := g(f(x)).$$

Show that this is a group action.