Category Theory
Exercise Sheet 9

Exercise 1. For a group G and a functor $F\colon BG \to Set$, describe $\lim_{BG} F$ and $\operatorname{colim}_{BG} F$.

Exercise 2. For a small category C, show that $\operatorname{Fun}(C, Set)$ is complete and cocomplete and describe small (co)limits in this category.

Exercise 3. Let C be a locally small category and $c \in C$. Show that the functor $\operatorname{Hom}(c, \_)$ preserves all limits which exist in C.

Exercise 4. Show that every group can be written as a colimit of a diagram consisting of finitely generated groups.