EXERCISES FOR MA4J7 ALGEBRAIC TOPOLOGY II

WEEK 2

(1) Fix an abelian group G and let $0 \to A \to B \to C \to 0$ be a short exact sequence of abelian groups. For any C, show that

$$0 \to Hom(C, G) \to Hom(B, G) \to Hom(A, G)$$

is exact. (Compare with last week's exercise, where you assumed C is free).

(2) (a) Verify that a chain map $f\colon C \to C'$ induces a homomorphism $H^k(C'; G) \to H^k(C; G)$.
(b) Show that if f and g are chain homotopic chain maps, they induce the same map on *co*homology.

(3) Hatcher, Exercises 5 and 6, p.205 (after Section 3.1).