

### PROBLEMS 3

Q1. Analyze the ‘doubling strategy’: when betting on tossing a fair coin, respond to losing by doubling the stakes.

Q2. We bet on independent tosses of a fair coin. Our strategy is to bet until we are first ahead, and then quit. Let  $T$  be the time we quit (a stopping time). Show that:

- (i)  $T < \infty$  a.s.: we are certain of achieving a net gain of +1 eventually;
- (ii)  $ET = +\infty$ : the mean waiting time till this happens is infinite;
- (iii) No bound can be imposed on our maximum net loss before we realize our certain eventual net profit.

*Recommended Reading:* Grimmett & Stirzaker [GS], §5.2.

NHB