Exercice given at the end of Lecture 1 for Lecture 2.

Let \( \mu = (\mu(i); i \geq 0) \) be a probability distribution on \( \mathbb{Z}_+ \). Denote by \((Z_n)_{n \geq 0}\) the Galton–Watson process with offspring distribution with \( Z_0 = 1 \) (started with one individual).

(i) Calculate \( \mathbb{E}[Z_n] \).

(ii) Calculate \( \mathbb{E}[Z_n^2] \).