Homework 5 (due May 25 @ 7:30pm)

1. Problem 5.2 from reference book.

2. Problem 5.5 from reference book.

3. Problem 5.7 from reference book.

4. Problem 5.10 from reference book.

5. Problem 5.16 from reference book.

6. For two random variables X, Y, prove the *conditional variance formula*:
$$Var[X] = E\big[Var[X|Y]\big] + Var[E[X|Y]]$$

7. Prove that the embedded Markov chain for $M/G/1$ is irreducible and aperiodic. Furthermore, show that the MC is positive recurrent *if and only if* $\rho < 1$.