Homework problems will be assigned bi-weekly and selected even problems will be graded. Please hand the problems to me before the class begins. You may discuss these problems with other students, but you must independently write up and submit your own solutions. Copying any part of a solution from a book, solutions guide, or website is cheating! Students are expected to abide by the Georgia Tech Academic Honor Code. Late homeworks will not be excepted, but you may drop your two lowest homework grades. Emailed homeworks will only be accepted with prior agreement of the Instructor - else they will not be accepted.

In order to grade as many problems as possible, your submitted problem sets should be printed very neatly and stapled. Please do not cross out. Write on only one side of each page and do not use paper that has been torn out of spiral bound notebooks. You may typeset your solutions, but I do not consider this a good use of your time. Edit your solutions carefully. Please do not show arithmetic and most algebra calculations. Your solutions should look like the solutions of examples in the text. Finally, if a problem can be solved without the use of a computer, then no partial credit will be awarded for a computer solution. Please solve all non-text problems.

1. 3.8: 10 (just variance), 13 (read Section 3.5), 15, 22 (uses Section 3.5)
2. 4.5: 1, 2
3. Let $X \sim \text{Uniform}(0, 1)$ and $Y = X^2$. Compute the Pearson correlation of $X$ and $Y$.
4. If $X$ and $Y$ are independent random variables, prove that $V(X - Y) = V(X) + V(Y)$.
5. Prove $\text{Cov}(aX + b, cY + d) = ac\text{Cov}(X, Y)$.
6. Let $X$ denote the total time in minutes that a customer spends in a bank and $Y$ the time that a customer waits on line until they are served by a teller. Assuming that the customer gets on line immediately after entering the bank. Compute the expectation of the service time two different ways assuming that the joint pdf for $X$ and $Y$ is

$$f(x, y) = \begin{cases} \lambda^2 \exp(-\lambda x) & \text{if } 0 \leq y \leq x < \infty \\ 0 & \text{if else} \end{cases}.$$

Are $X$ and $Y$ independent?
7. 6.8: 1