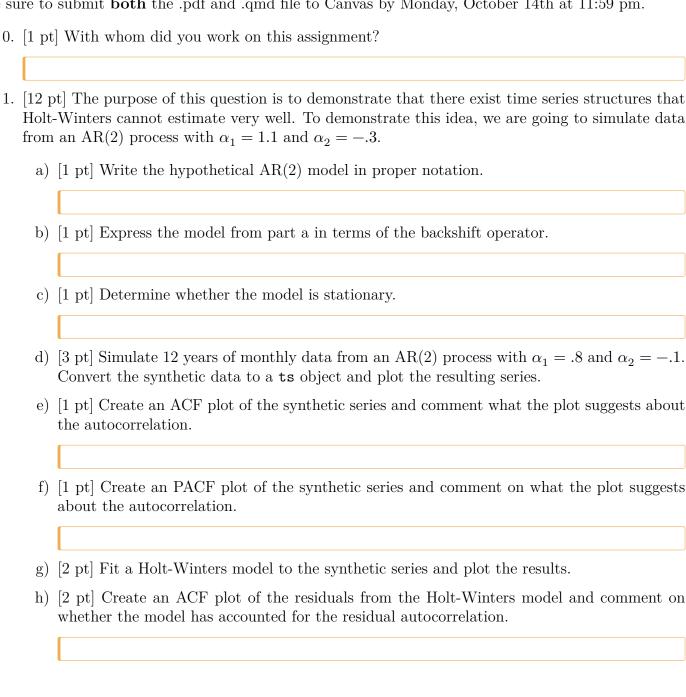
Name: Your name here

Due: 2024/10/14

Homework 5

Be sure to submit **both** the .pdf and .qmd file to Canvas by Monday, October 14th at 11:59 pm.



- 2. [2 pt] Using the characteristic equation, show that a random walk is not stationary.
- 3. [3 pt] Determine for what values of α an AR(1) process is stationary.
- 4. [6 pt] The purpose of this question is to prove one of the second order properties of an AR(1) process.
 - a) [1 pt] Express an AR(1) process in terms of the backshift operator.
 - b) [3 pt] Using the expression from part a, show that $x_t = \sum_{i=0}^{\infty} \alpha^i w_{t-i}$. It is likely helpful to know that $(1-B)^{-1} = 1 + B + B^2 + \dots$ by Binomial expansion.
 - c) [2 pt] Using the expression from part b, show that the $E(x_t) = 0$. Recall that $E\left(\sum_{i=1}^n X_i\right) = \sum_{i=1}^n E(X_i)$ and that E(cX) = cE(X) if c is a constant.