**STA6856** **HW #1** **Instructor: Tharindu De Alwis**

**Student Name (print):** _____

**Due on Tuesday, February 4th at 11:59 PM**

| Question: | 1 | 2 | Total |
|---|---|---|---|
| Points: | 15 | 15 | 30 |
| Score: | | | |

1. (15 points) Choose and download one of the following datasets

   - Consumption of Electrical Blower Machine: KwhConsumptionBlower78_1.csv.
   - Population Data from U.S. Census Bureau: POP.csv.
   - Air Passenger Data: AirPassengers.csv.

   (a) Import your chosen dataset into R.

   (b) Construct following plots: Time Series Plot, Autocorrelation Function (ACF) Plot

2. (15 points) For the R output bellow, let a 0 denote Tails and a 1 denote Heads for a coin flip.

   Let the $e_t$ be iid where $e_t = 1$ for Heads and $e_t = -1$ for Tails (so change the 0 to a $-1$ from the given output. That is, $e_1 = e_2 = e_3 = e_4 = e_5 = e_6 = -1$; $e_7 = e_8 = 1$ and $e_9 = e_{10} = -1$.) Let $Y_t = \sum_{t=1}^{t} e_t$.

   rbinom(10,1,0.5)
   0 0 0 0 0 0 1 1 0 0

   (a) Plot $Y_t$ on the vertical axis versus time $t$ on the horizontal axis.

   (b) The process $\{Y_t\}$ is a random walk with $E(Y_t) = 0$, as shown in class. Does there seems to be a trend in the plot in (a) or are the $Y_t$ scattering about the horizontal axis in a roughly even band?