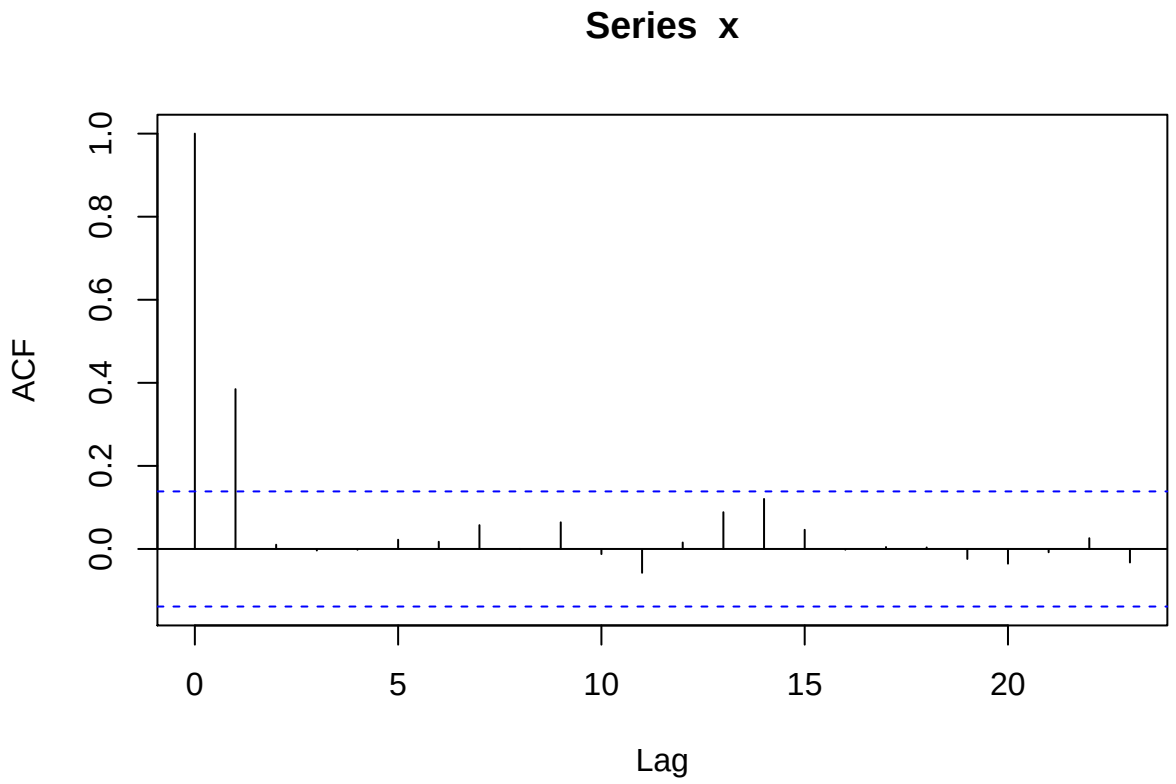
Pstat 174 hw2

Kalvin Goode

2018/10/27

1. (iii)

```
set.seed(1)
theda=0.5
x=arima.sim(n=200,model=list(ma=c(theda)))
y=acf(x)
```

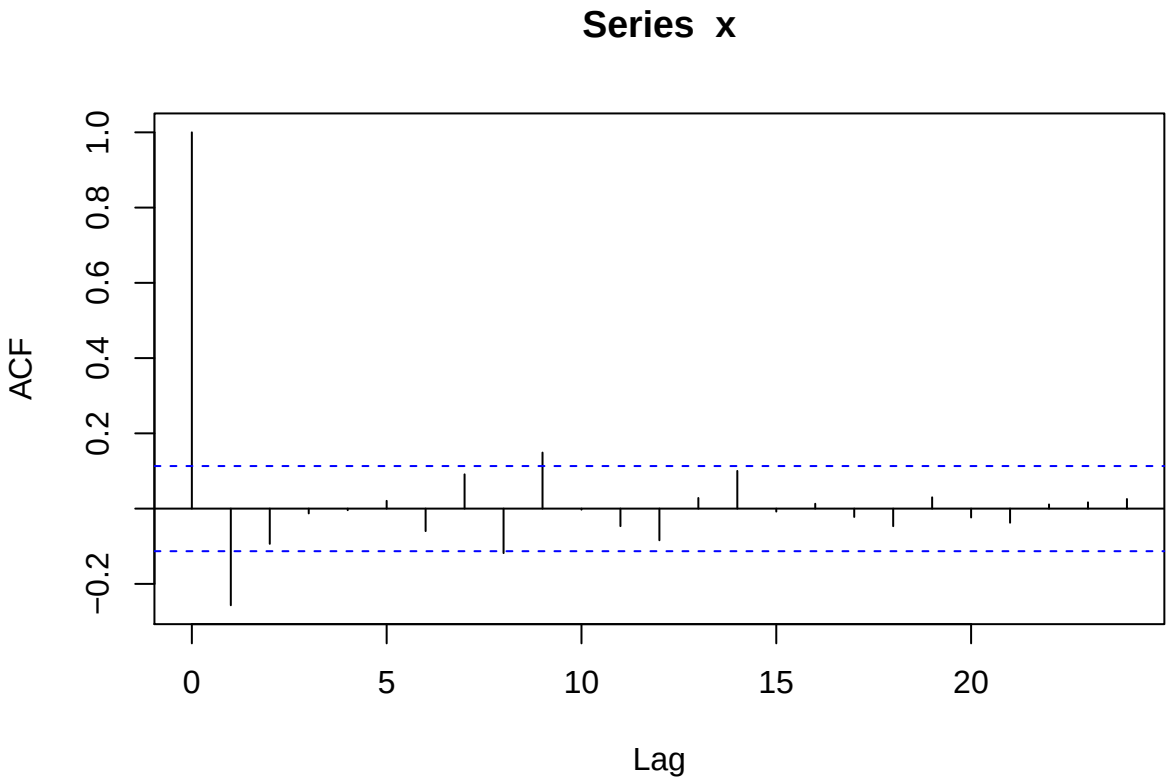


In ACF plot, we see that $\hat{\rho}(0) = 1$ by definition, and $\hat{\rho}(1) = 0.4$ equals to the theoretical value of $\hat{\rho}(1)$. After lag 1, all values of ACF are winthin 95% confidence bound. This shows that they are not statistically difference with 0. This ACF is consistent with theoretical calculation.

3.(iii)

We have $\rho(2) = \frac{\theta_2}{1+\theta_1^2+\theta_2^2} = \frac{-8}{1+4+64} = -\frac{8}{69}$

```
set.seed(1)
theda_1=2
theda_2=-8
x=arima.sim(n=300, model=list(ma=c(theda_1,theda_2)))
y=acf(x)
```



In ACF plot, we see that $\hat{\rho}(0) = 1$, $\hat{\rho}(1) \approx 0.22$ and $\hat{\rho}(2) \approx -0.9$. For $\hat{\rho}(2)$, there is a small difference between theoretical value and sample estimate. For lag 9, we see that this ACF is out of the confidence bound.