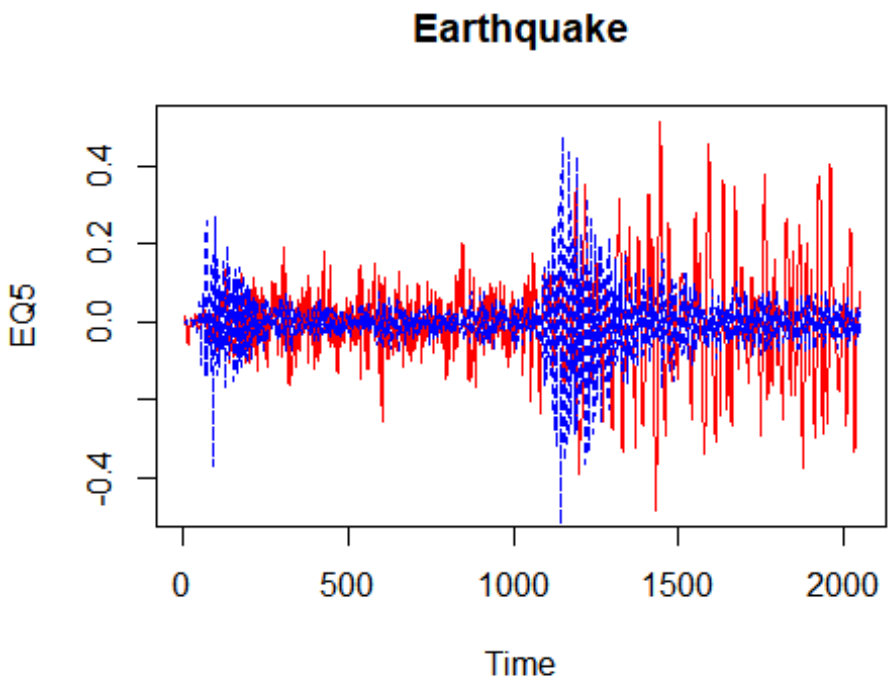
Problem- 01-

To compare the earthquake and explosion signals, plot the data displayed in Figure 1.7 on the same graph using di erent colors or di erent line types and comment on the results.

```
library(astsa)
plot(EQ5,main="Earthquake",col="red")
lines(EXP6, main="Explosion",col="blue",lty="dashed")
```

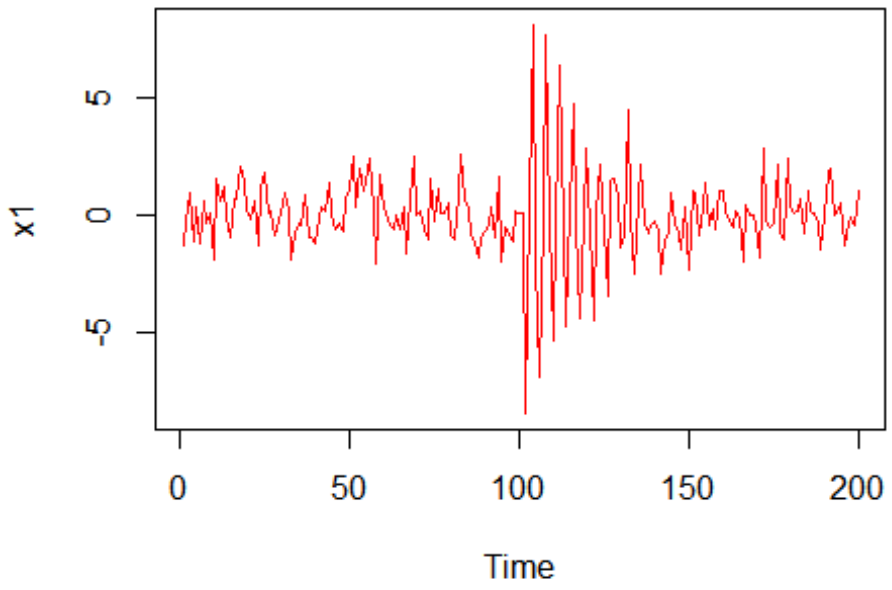


waves for earth-quakes are larger than for explosions.The ratio of maximum amplitudes appears to be somewhat less than .5 for the earthquake and about 1 for the explosion.

Problem-02-

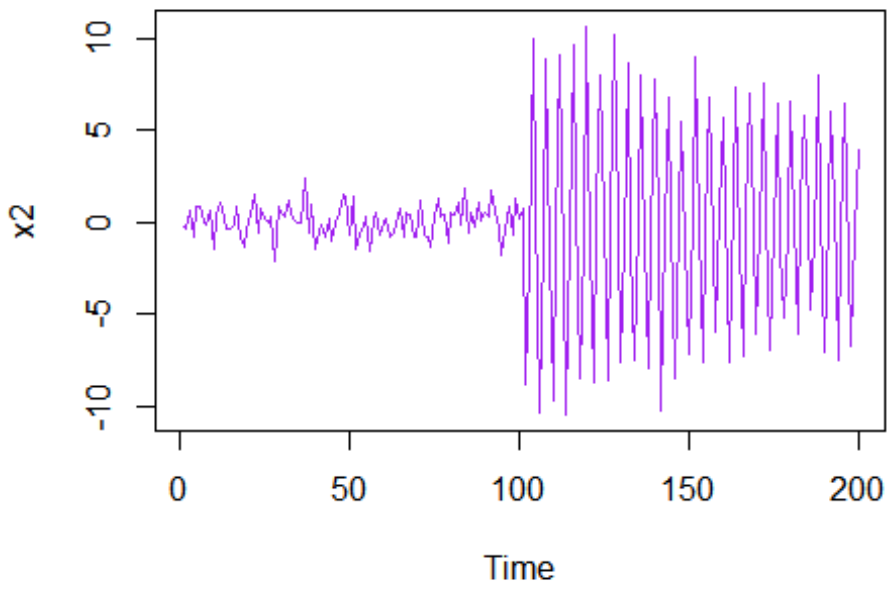
(a) $x_t = s_t + w_t$

```
#Plot of xt=st+wt
s1 = c(rep(0,100), 10*exp(-(1:100)/20)*cos(2*pi*1:100/4))
x1 = ts(s1 + rnorm(200, 0, 1))
plot(x1,col="red")
```



(b) $x_t = s_t + w_t$

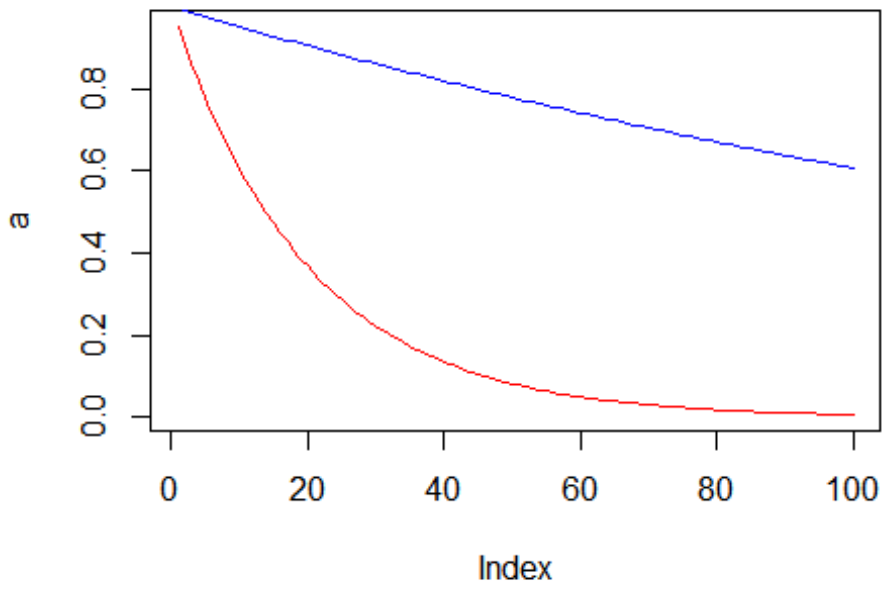
```
#Plot of xt=st+wt
s2 = c(rep(0,100), 10*exp(-(1:100)/200)*cos(2*pi*1:100/4))
x2 = ts(s2 + rnorm(200, 0, 1))
plot(x2,col="purple")
```



(c)

Part A is similart to explosion and Part B is similar to Earthquake plot.

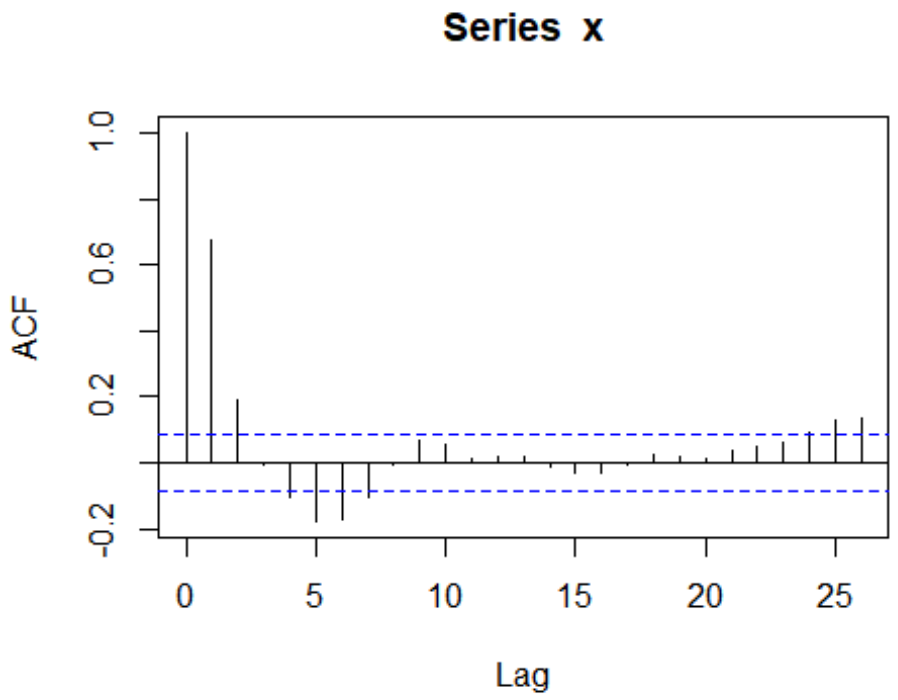
```
a=exp(-(1:100)/20)
b=exp(-(1:100)/200)
plot(a,type='l',col="red")
lines(b,type="l",col="blue")
```



From series, we can see that plot red has faster decays than blue.means part A has fast decay.

Problem -07

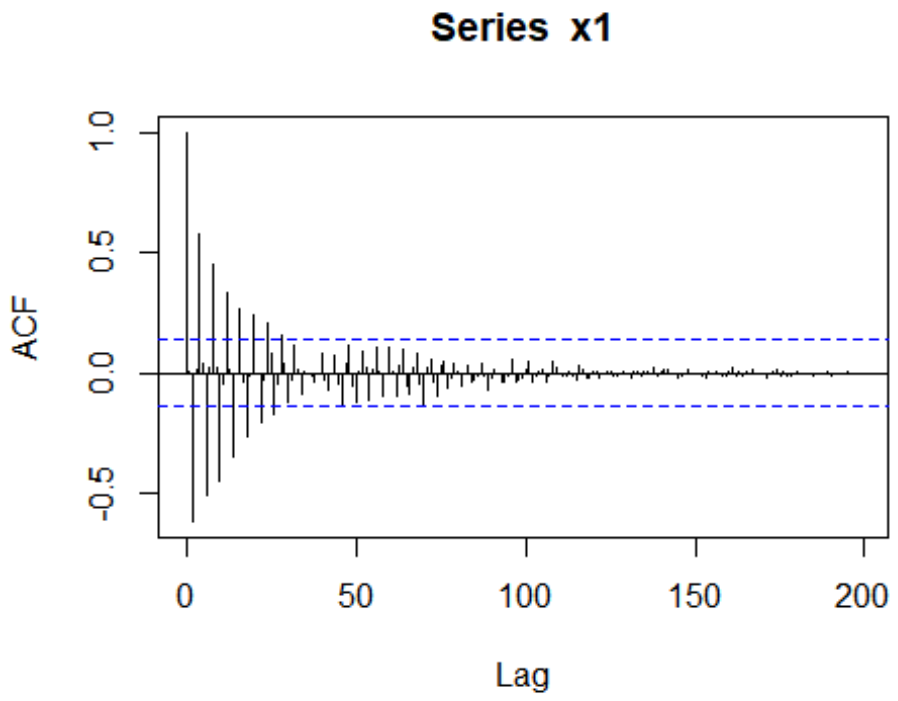
```
w=rnorm(500)
x = numeric(500)
for (i in 1:500)
{
  if (i <= 1) {
    x[i]= 2*w[i]+w[i+1]
  } else if (i > length(w)) {
    x[i] = w[i-1] + 2*w[i]
  } else {
    x[i]=w[i-1] + 2*w[i] + w[i+1]
  }
}

#Auto correlation function
acf(x, na.action = na.pass)
```



Problem-22

ACF of the X1

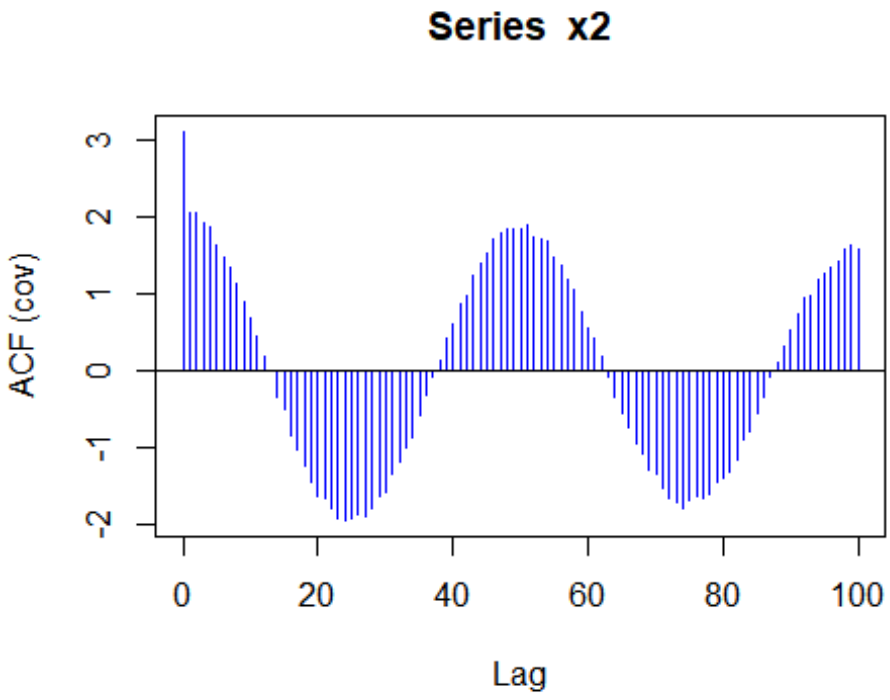
```
acf(x1,lag.max = 200)
```



As autocovariance is determined by lag, seies is not stationary.

Problem-23

```
s2 <- 2*cos(2*pi*((1:500 + 15)/(50)))
x2 <- ts(s2 + rnorm(500))
acf(x2, lag.max = 100, type = "covariance",col="blue")
```



Autocovarriance has strict cyclic pattern.