Advent of Code Day 4

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The training data

A word search, we can find horizontal and vertical by using regex and transposition, then shuffle in blocks of four to find diagonals

```
xmasDiag <- function(X){
  # X is a 4 by 4 block
  out <- 0
  if(X[1,1] =="X" & X[2,2] =="M" & X[3,3] =="A" & X[4,4] =="S"){
    out <- out + 1}
  if(X[1,1] =="S" & X[2,2] =="A" & X[3,3] =="M" & X[4,4] =="X"){
    out <- out + 1}
  if(X[4,1] =="X" & X[3,2] =="M" & X[2,3] =="A" & X[1,4] =="S"){
    out <- out + 1}
  if(X[4,1] =="S" & X[3,2] =="A" & X[2,3] =="M" & X[1,4] =="X"){
    out <- out + 1}
  out
}

xmasHori <- function(X){
  # X is a 1 by 4 block
  out <- 0
  if(X[1] =="X" & X[2] =="M" & X[3] =="A" & X[4] =="S"){
    out <- out + 1}
  if(X[1] =="S" & X[2] =="A" & X[3] =="M" & X[4] =="X"){
    out <- out + 1}
  out
}
xmasVert <- function(X){
  # X is a 4 by 1 block
  out <- 0
  if(X[1] =="X" & X[2] =="M" & X[3] =="A" & X[4] =="S"){
    out <- out + 1}
  if(X[1] =="S" & X[2] =="A" & X[3] =="M" & X[4] =="X"){
    out <- out + 1}
  out
}
seive <- function(X, rD, cD){
  if(missing(rD)){rD = 3}
  if(missing(cD)){cD = 3}
  r <- nrow(X)
  c <- ncol(X)
  out = 0
```

```
  for(ii in 1:(r-rD)){
    for(jj in 1:(c-cD)){
      out = out + xmasDiag(X[ii:(ii+3),jj:(jj+3) ])
    }
  }

  for(ii in 1:(r)){
    for(jj in 1:(c-cD)){
      out = out + xmasHori(X[ii,jj:(jj+3) ])
    }
  }

  for(ii in 1:(r-rD)){
    for(jj in 1:(c)){
      out = out + xmasVert(X[ii:(ii+3),jj ])
    }
  }
  out
}
tmp <- unlist(read.table('test.txt'))

tmp <- str_split(tmp, '', simplify=TRUE)
seive(tmp)
```

```
## [1] 18
```

```
dat <- unlist(read.table('input.txt'))
dat <- str_split(dat, '', simplify=TRUE)
seive(dat)
```

```
## [1] 2401
```

Part 2

```
mas <- function(Q){
  # Q is a 3 by 3 matrix
  out <- 0

  if(
    (
      (Q[1,1]=="M" & Q[2,2]=="A"&  Q[3,3]=="S")
     |
      (Q[1,1]=="S" & Q[2,2]=="A"&  Q[3,3]=="M")
    )
    &

    (
      (Q[1,3]=="M" & Q[2,2]=="A"&  Q[3,1]=="S")
     |
      (Q[1,3]=="S" & Q[2,2]=="A"&  Q[3,1]=="M")
    )
  ){
    out = out+1
  }
```

```
    out
    }

Q <- read.table('Q.txt')
Q
```

```
##    V1
## 1 M.S
## 2 .A.
## 3 M.S
```

```
Q <- unlist(read.table('Q.txt'))
Q <- str_split(Q, '', simplify=TRUE)
mas(Q)
```

```
## [1] 1
```

```
seive2 <- function(X, rD, cD){
  if(missing(rD)){rD = 2}
  if(missing(cD)){cD = 2}
  r <- nrow(X)
  c <- ncol(X)
  out = 0
  for(ii in 1:(r-rD)){
    for(jj in 1:(c-cD)){
   out = out + mas(X[ii:(ii+rD),jj:(jj+cD) ])
      }
  }

 out
}

seive2(Q)
```

```
## [1] 1
```

```
Q <- unlist(read.table('test_2.txt'))
Q <- str_split(Q, '', simplify=TRUE)
seive2(Q)
```

```
## [1] 9
```

answer

```
Q <- unlist(read.table('input.txt'))
Q <- str_split(Q, '', simplify=TRUE)
seive2(Q)
```

```
## [1] 1822
```