SGupta_HW02Question1

```
#install.packages("estimability")
library(estimability)

# Define the model matrix X
X <- matrix(c(1, 1, 0, 1, 0, 0,
              1, 1, 0, 0, 1, 0,
              1, 1, 0, 0, 0, 1,
              1, 0, 1, 1, 0, 0,
              1, 0, 1, 0, 1, 0,
              1, 0, 1, 0, 0, 1), nrow = 6, byrow = TRUE)

# Define the coefficient vector c for  1 -  2
cvec1 <- c(0, 1, -1, 0, 0, 0)

# Define the coefficient vector c for  1 - 2 2 +  3
cvec2 <- c(0, 0, 0, 1, -2, 1)

# Create the basis for the null space of X^T
nb <- nonest.basis(X)
#print(nb)

# Check if cvec_alpha and cvec_beta are orthogonal to the null space
print("Checking if  1 -  2 is estimable:")
```

```
[1] "Checking if  1 -  2 is estimable:"
```

```
result1 <- is.estble(cvec1, nb)
print(paste("Is  1 -  2 estimable?", result1))
```

```
[1] "Is  1 -  2 estimable? TRUE"
```

```r
print("Checking if  1 - 2 2 +  3 is estimable:")
```

```
[1] "Checking if  1 - 2 2 +  3 is estimable:"
```

```r
result2 <- is.estble(cvec2, nb)
print(paste("Is  1 - 2 2 +  3 estimable? ", result2))
```

```
[1] "Is  1 - 2 2 +  3 estimable?  TRUE"
```