

## **ST2137 (2018/2019 Semester 2)**

### **Partial Solutions/Hints to Questions in Tutorial 2**

Note: The solutions provided in this document are for reference only

#### **Question 1**

Refer to p3.27 and p3.31

```
htwt2 <-  
read.fwf("d:/tut2htwtfixed.txt", header=F, width=c(3,1,3,2,1));  
varnames <- c("id", "gender", "height", "weight", "siblings");  
names(htwt2) <- varnames
```

#### **Question 2**

Refer to p3.38

```
htwt2m <- htwt2[gender=="M",]; nrow(htwt2m)  
# Alternatively; length(gender[gender=="M"])
```

48 males

#### **Question 3**

Refer to p3.26-3.31, 3.57 (for merging), p.3.37 (for selecting)

```
tut2test <- read.csv("d:/tut2test.csv", header=T);  
htwttest2 <- merge(htwt2, tut2test, by="id", all=T)  
htwttest2[height>182, c("id", "height", "test")]
```

3 individuals. Subjects 261, 271 and 285 with heights 183 cm, 188 cm and 184 cm, and test scores 55, 76 and 54 respectively.

#### **Question 4**

Refer to p.3.36-3.37

```
htwt2remo <- htwt2[id!=210,]
```

#### **Question 5**

```
htwttest2[id == 210, "weight"] <- 68
```

#### **Question 6**

Refer to p3.38-3.40

```
htwttest2f <- htwttest2[gender=="F",];  
pos <- rev(order(htwttest2f[, "height"])); htwttest2f[pos[2],]
```

Subject 273 whose height, weight and test score are 174cm, 64kg and 57 respectively.

#### **Question 7**

```
grade <- NULL; grade[test<50] <- "F"; grade[test>=50 & test<60] <-  
"D"; grade[test>=60 & test<70] <- "C"; grade[test>=70 & test<80]  
<- "B"; grade[test>=80] <- "A";  
length(grade[grade=="F"])
```

6 subjects have F grade

### **Question 8**

```
x <- cbind(rep(1,5), c(1,3,4,7,11)); y <- c(4,6,13,15,18);  
solve(t(x)%*%x) %*% t(x) %*% y
```

$$\hat{\beta} = \begin{pmatrix} 3.861842 \\ 1.411184 \end{pmatrix}$$

### **Question 9**

Refer p3.42 to p.3.45

```
x <- numeric(3); x[1] <- 0; x[2] <- 2;  
for(i in 3:28){x[i] <- 2*x[i-1] - x[i-2]}  
x[28]; sum(x[1:20])
```

51,570

### **Question 10**

```
CM4 <- function(x){ s <- numeric(4); n <- length(x); s[1] <-  
mean(x); for(j in 2:4) {s[j] <- sum((x-s[1])^j/n) }; return(s) }
```

The first four central moments are 165.86667, 75.98222, 205.46193 and 13883.27461.