> cross=c(23.5,12,21,22,19.125,21.5,21.125,20.375,18.250,21.625,23.25,21,22.125,23,12)

> self=c(17.375,20.375,20,20,18.375,18.625,18.625,15.25,16.5,18,16.25,18,12.75,15.5,18)

> diffs = cross-self

> diffs\_sum = sum(diffs)

> diffs\_sos = sum(diffs^2)

> diffs\_mean = mean(diffs)

> diffs\_sd = sd(diffs)

> diffs\_sd\_manual = sqrt((diffs\_sos - (15\*(diffs\_mean^2)))/(14))

> diffs

[1] 6.125 -8.375 1.000 2.000 0.750 2.875 2.500 5.125 1.750 3.625 7.000 3.000 9.375 7.500 -6.000

> diffs\_sum

[1] 38.25

> diffs\_sos

[1] 408.3438

> diffs\_mean

[1] 2.55

> diffs\_sd

[1] 4.711735

> diffs\_sd\_manual

[1] 4.711735

> boxplot(cross)

> boxplot(self)

> outlier\_range\_c = median(cross) - 1.5\*IQR(cross)

> outlier\_range\_c

[1] 17.65625

> outlier\_range\_s = median(self) - 1.5\*IQR(self)

> outlier\_range\_s

[1] 14.625

> boxplot(diffs)

> cross\_o=c(23.5,21,22,19.125,21.5,21.125,20.375,18.250,21.625,23.25,21,22.125,23)

> self\_o=c(17.375,20,20,18.375,18.625,18.625,15.25,16.5,18,16.25,18,12.75,15.5)

> diffs\_o = cross\_o-self\_o

> diffs\_sum\_o = sum(diffs\_o)

> diffs\_sos\_o = sum(diffs\_o^2)

> diffs\_mean\_o = mean(diffs\_o)

> diffs\_sd\_o = sd(diffs\_o)

> diffs\_sd\_manual\_o = sqrt((diffs\_sos\_o - (13\*(diffs\_mean\_o^2)))/(12))

> diffs\_o

[1] 6.125 1.000 2.000 0.750 2.875 2.500 5.125 1.750 3.625 7.000 3.000 9.375 7.500

> diffs\_sum\_o

[1] 52.625

> diffs\_sos\_o

[1] 302.2031

> diffs\_mean\_o

[1] 4.048077

> diffs\_sd\_o

[1] 2.726003

> diffs\_sd\_manual\_o

[1] 2.726003