1.

```
> correlationtest(survey$Age, survey$Height,, "student age", "student height")
At alpha = 0.05 we have no evidence of a linear correlation between student age and student height .
```

```
> correlationtest(survey$Age, survey$Height, 0.05, "student age", "student height")
At alpha = 0.05 we have no evidence of a linear correlation between student age and student height .
```

```
correlationtest=function(x, y, sigLevel, a, b) {
  if (missing(sigLevel)) {
    sigLevel = 0.05
  }
  pvalue = cor.test(x, y, conf.level = 1-sigLevel)$p.value

  if (pvalue > sigLevel) {
    isEvidence = "have no"
  } else {
    isEvidence = "have"
  }
  CIsentence = cat("At alpha =", sigLevel, "we", isEvidence, "evidence of a linear correlation between", a, "and", b, ".\n")
  return (CIsentence)
}
```

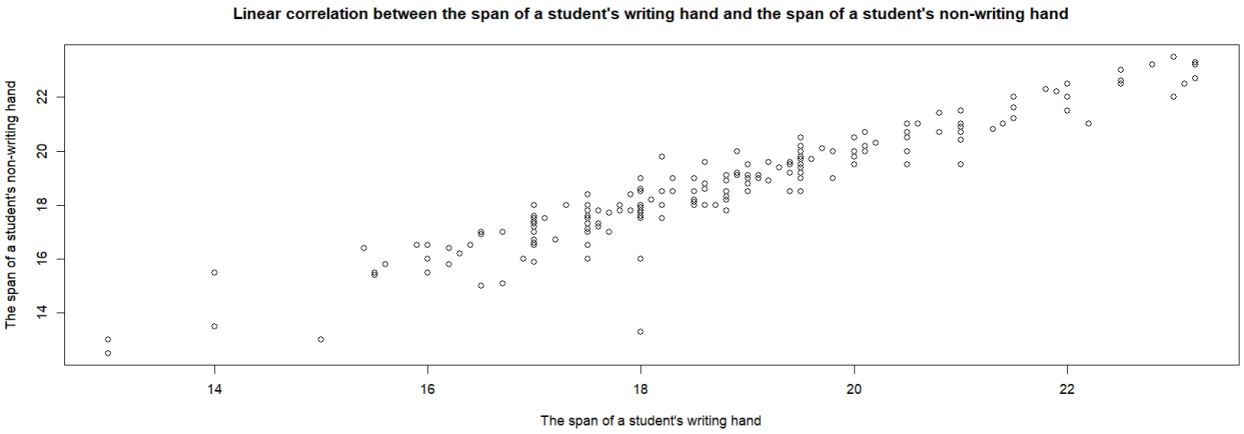
2.

```
> cor(survey$Wr.Hnd, survey$NW.Hnd, use="complete.obs")
[1] 0.9483103
```

3.

```
> correlationtest(survey$NW.Hnd, survey$Wr.Hnd, 0.05, "the span of a student's writing hand", "th
e span of a student's non-writing hand")
At alpha = 0.05 we have evidence of a linear correlation between the span of a student's writing
 hand and the span of a student's non-writing hand .
```

4.



5.

```
> hands=lm(formula=NW.Hnd~Wr.Hnd, data=survey)
```

```
> hands

Call:
lm(formula = NW.Hnd ~ Wr.Hnd, data = survey)

Coefficients:
(Intercept)       Wr.Hnd
    0.04859      0.99277

> 0.04859+0.99277*20
[1] 19.90399
```

6.

```
> cor(survey$Height, survey$Wr.Hnd, use="complete.obs")
[1] 0.6009909
> cor.test(survey$Height, survey$Wr.Hnd)

        Pearson's product-moment correlation

data:  x and y
t = 10.792, df = 206, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.5063486 0.6813271
sample estimates:
      cor
0.6009909
```

The correlation coefficient for a student's height, and the span of their writing hand is smaller than that of student's Wr.Hnd and NW.Hnd. (t value is large means significantly deviate from 0, significantly small p-value, alternative hypothesis is true, conf.interval doesn't include 0, these are enough evidence that there is a linear correlation between student's height and Wr.Hnd)

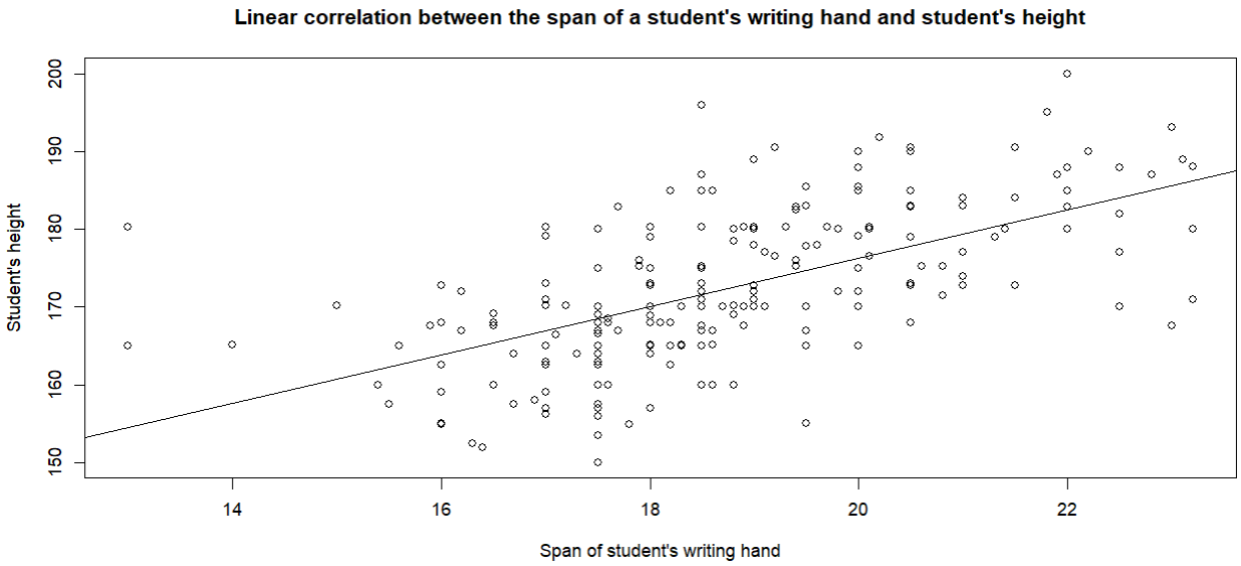
7.

```
> correlationtest(survey$Height, survey$Wr.Hnd, 0.05, "student's heig
ht", "the span of student's writing hand")
At alpha = 0.05 we have evidence of a linear correlation between stud
ent's height and the span of student's writing hand .
```

8.

```
> plot(survey$Wr.Hnd,survey$Height, main = "Linear correlation between the span of a stud
ent's writing hand and student's height", xlab = "Span of student's writing hand", ylab =
 "Student's height")

> HeightWrHnd=lm(formula = Height~Wr.Hnd, data=survey)
> abline(HeightWrHnd)
```



9.

```
> Height173=data.frame(Height=173)
> Height173
  Height
1    173

> WrHndHeight=lm(formula = Wr.Hnd~Height, data=survey)
> predict(WrHndHeight, Height173, interval = "predict")
       fit      lwr      upr
1 18.81914 15.80511 21.83316
```

We are 95% sure that if a student who is 173 cm tall, the span of their writing hand is between 15.80511 cm and 21.83316 cm.

10.

The prediction interval of student's writing hand and student's height is wider than that of student's Wr.Hnd's span and student's NW.Hnd's span.