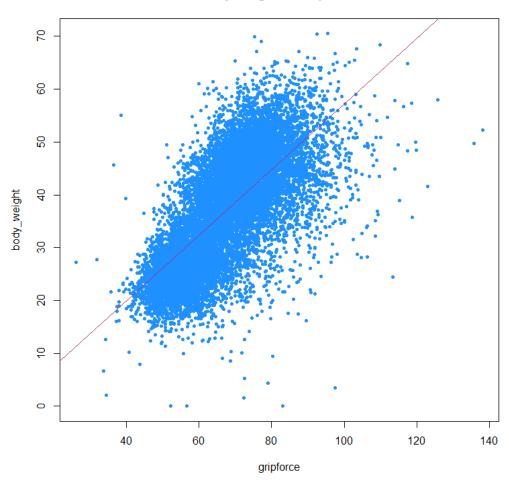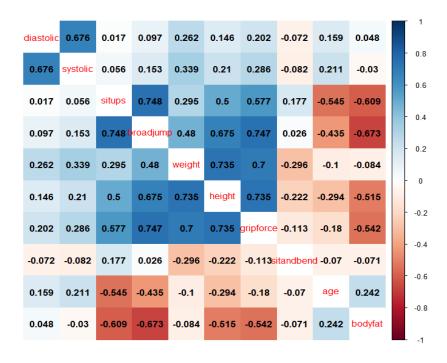# Plots for the required Result (How the gripforce is related to body weight)

Body Weight vs Gripforce

Correlation Plot:

diastolic	0.676	0.017	0.097	0.262	0.146	0.202	-0.072	0.159	0.048
0.676	systolic	0.056	0.153	0.339	0.21	0.286	-0.082	0.211	-0.03
0.017	0.056	situps	0.748	0.295	0.5	0.577	0.177	-0.545	-0.609
0.097	0.153	0.748	broadjump	0.48	0.675	0.747	0.026	-0.435	-0.673
0.262	0.339	0.295	0.48	weight	0.735	0.7	-0.296	-0.1	-0.084
0.146	0.21	0.5	0.675	0.735	height	0.735	-0.222	-0.294	-0.515
0.202	0.286	0.577	0.747	0.7	0.735	gripforce	-0.113	-0.18	-0.542
-0.072	-0.082	0.177	0.026	-0.296	-0.222	-0.113	sitandbend	-0.07	-0.071
0.159	0.211	-0.545	-0.435	-0.1	-0.294	-0.18	-0.07	age	0.242
0.048	-0.03	-0.609	-0.673	-0.084	-0.515	-0.542	-0.071	0.242	bodyfat

Final Model Summary:

```
Call:
lm(formula = gripforce ~ age + gender + height + weight + broadjump +
    situps, data = bodyp)

Residuals:
    Min      1Q  Median      3Q     Max
-49.935  -3.071  -0.067   3.091  21.798

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -23.052830   1.454098  -15.85   <2e-16 ***
age           0.077883   0.004300   18.11   <2e-16 ***
gender        6.343693   0.173361   36.59   <2e-16 ***
height        0.105955   0.009704   10.92   <2e-16 ***
weight        0.243135   0.005843   41.61   <2e-16 ***
broadjump     0.073639   0.002206   33.38   <2e-16 ***
situps        0.122767   0.005057   24.28   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.128 on 13386 degrees of freedom
Multiple R-squared:  0.7672,    Adjusted R-squared:  0.7671
F-statistic:  7351 on 6 and 13386 DF,  p-value: < 2.2e-16
```

Anderson-Darling normality test & Kolmogorov-Smirnov test:

```
        Anderson-Darling normality test

data:  resid(final_model)
A = 23.622, p-value < 2.2e-16

> ks.test(resid(final_model), "pnorm", mean = mean(resid(final_model)), sd = sd(resid(final_model)))

        Asymptotic one-sample Kolmogorov-Smirnov test

data:  resid(final_model)
D = 0.027116, p-value = 5.59e-09
alternative hypothesis: two-sided

Warning message:
In ks.test.default(resid(final_model), "pnorm", mean = mean(resid(final_model)),  :
  ties should not be present for the Kolmogorov-Smirnov test
>
```

Shapiro-Wilk normality test:

```
> res <- residuals(final_model)
> res <- res[is.finite(res)]
> n <- length(res)
> n
[1] 13393
> set.seed(1)
> res_sub <- sample(res, 5000)
> result <- shapiro.test(res_sub)
> print(result$p.value)
[1] 4.66291e-26
>
```