Answer #1

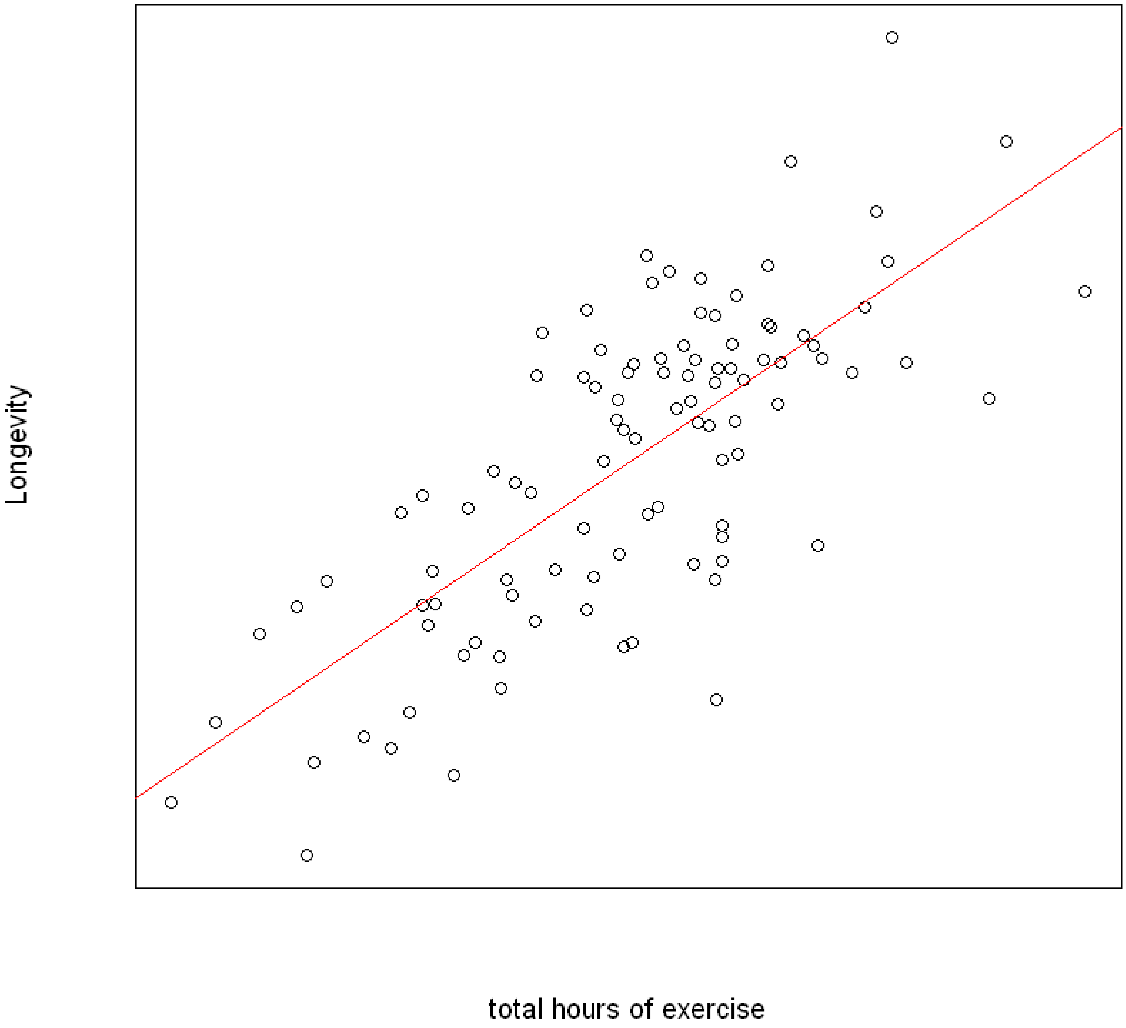
In [81]:

```
#x = total hours of exercise
#y = Longevity
x<- rnorm(100,1,5)
y<- 10+0.2*x+rnorm(100)
data.set<-data.frame(x,y)
plot(x, y, axes=FALSE, frame.plot=TRUE, xlab= "total hours of exercise", ylab=
"Longevity")
abline(lm(y ~ x, data=data.set), col="red")
a<-lm(y ~ x)
summary(a)
par(new=TRUE)
x[100]= - 200
y[100]= 90
data.set2<-data.frame(x,y)
b<-lm(y ~ x)
summary(b)
plot(x,y,xlim= c(-200, -20),ylim= c(1:90),xlab= "total hours of exercise", yla
b="Longevity", col= "blue")
abline(lm(y ~ x, data=data.set2), col="blue",new=TRUE)
```

```
Call:
lm(formula = y ~ x)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.8008 -0.7138  0.1434  0.7661  2.3287 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 10.06632    0.10174   98.94   <2e-16 ***
x            0.20700    0.01884   10.99   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.001 on 98 degrees of freedom
Multiple R-squared:  0.552,	Adjusted R-squared:  0.5474 
F-statistic: 120.7 on 1 and 98 DF,  p-value: < 2.2e-16
```

```
Call:
lm(formula = y ~ x)

Residuals:
    Min      1Q  Median      3Q     Max 
-8.3413 -2.0335  0.2979  2.1149  7.9181 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 10.68686    0.32899   32.48   <2e-16 ***
x           -0.35698    0.01588  -22.48   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.286 on 98 degrees of freedom
Multiple R-squared:  0.8376,	Adjusted R-squared:  0.8359 
F-statistic: 505.3 on 1 and 98 DF,  p-value: < 2.2e-16
```

```
Error in plot.window(...): invalid 'ylim' value
Traceback:

1. plot(x, y, xlim = c(-200, -20), ylim = c(1:90), xlab = "total hours of exe
rcise", 
 .     ylab = "Longevity", col = "blue")
2. plot.default(x, y, xlim = c(-200, -20), ylim = c(1:90), xlab = "total hour
s of exercise", 
 .     ylab = "Longevity", col = "blue")
3. localWindow(xlim, ylim, log, asp, ...)
4. plot.window(...)
```



Answer #2

In [83]:

```
#ANSWER 2
library(Matching)
library(arm)
library()
data("lalonde")
newdata=lalonde[which(lalonde$treat==0),]

lmlalonde<-glm(newdata$re78 ~ newdata$age+newdata$educ+newdata$re74+newdata$re75+newdata$educ:newdata$re74+newdata$educ:newdata$re75+newdata$age:newdata$re74+newdata$age:newdata$re75+newdata$re74:newdata$re75)
summary(lmlalonde)
#lmlalonde$coefficients
Simulation <- sim(lmlalonde, n.sims = 10000)
Simulation@coef[1,5]


storage.vector <- rep(NA,10000)

m_educ=median(newdata$educ)
m_re74=median(newdata$re74)
m_re75=median(newdata$re75)


q90.edu<-quantile(newdata$educ,.90)
q90.re74<-quantile(newdata$re74,.90)
q90.re75<-quantile(newdata$re75,.90)

summary(newdata$age)

#quantile(simulation@coef[,1], probs = c(0.025, 0.975))

storagedf<- matrix(NA, nrow = 10000, ncol= length(newdata$age))

for(i in 1:10000){

    predictedYs <- Simulation@coef[i,1] * 1 +
      Simulation@coef[i,2] * newdata$age +
      Simulation@coef[i,3] * m_educ +
      Simulation@coef[i,4] * m_re74 +
      Simulation@coef[i,5] * m_re75 +
      Simulation@coef[i,6] * m_educ*m_re74 +
      Simulation@coef[i,7] * m_educ*m_re75 +
      Simulation@coef[i,8] * newdata$age*m_re74 +
      Simulation@coef[i,9] * newdata$age*m_re75 +
      Simulation@coef[i,10] * m_re74*m_re75 +
      rnorm(1,0,Simulation@sigma[i])


    # put preductedYs into a matrix
      storagedf[i,] = predictedYs


      #* c(1,newdata$age,m_educ,m_re74,m_re75,m_educ*m_re74,m_educ*m_re75,newdata$age*m_re74,newdata$age*m_re75, m_re74*m_re75))


    #storagedf[i,age-16]<-exp(beta)/(1+exp(beta))
}

#confidence.intervals <- quantile(storagedf, probs = c(0.025, 0.975))
head(storagedf)

lowbounds.medians = rep(NA, length(newdata$age))
upperbounds.medians = rep(NA, length(newdata$age))

for (i in 1:ncol(storagedf)) {
  lowbounds.medians[i] = quantile(storagedf[,i],0.025)
  upperbounds.medians[i] = quantile(storagedf[,i],0.975)

}


plot(newdata$age, lowbounds.medians, ylim = c(-8000,18000), col= "blue",, xlab
 = "lower and upper bounds for median")
points(newdata$age, upperbounds.medians, col="red")

#Simulation@sigma

storagedf_2<- matrix(NA, nrow = 10000, ncol= length(newdata$age))

for(i in 1:10000){

  predictedYs_q<- Simulation@coef[i,1] * 1 +
    Simulation@coef[i,2] * newdata$age +
    Simulation@coef[i,3] * q90.edu +
    Simulation@coef[i,4] * q90.re74 +
    Simulation@coef[i,5] * q90.re75 +
    Simulation@coef[i,6] * q90.edu*q90.re74 +
    Simulation@coef[i,7] * q90.edu*q90.re75 +
    Simulation@coef[i,8] * newdata$age*q90.re74 +
    Simulation@coef[i,9] * newdata$age*q90.re75 +
    Simulation@coef[i,10] * q90.re74*q90.re75 +
    rnorm(1,0,Simulation@sigma[i])


  # put preductedYs into a matrix
  storagedf_2[i,] = predictedYs_q




}

head(storagedf_2)

lowbounds.q90 = rep(NA, length(newdata$age))
upperbounds.q90 = rep(NA, length(newdata$age))

for (i in 1:ncol(storagedf)) {
  lowbounds.q90[i] = quantile(storagedf_2[,i],0.025)
  upperbounds.q90[i] = quantile(storagedf_2[,i],0.975)

}
```

```
plot(newdata$age, lowbounds.q90, ylim = c(-8000,18000), col= "blue")
points(newdata$age, upperbounds.q90, col="red")


Summary(lmlalonde)
```

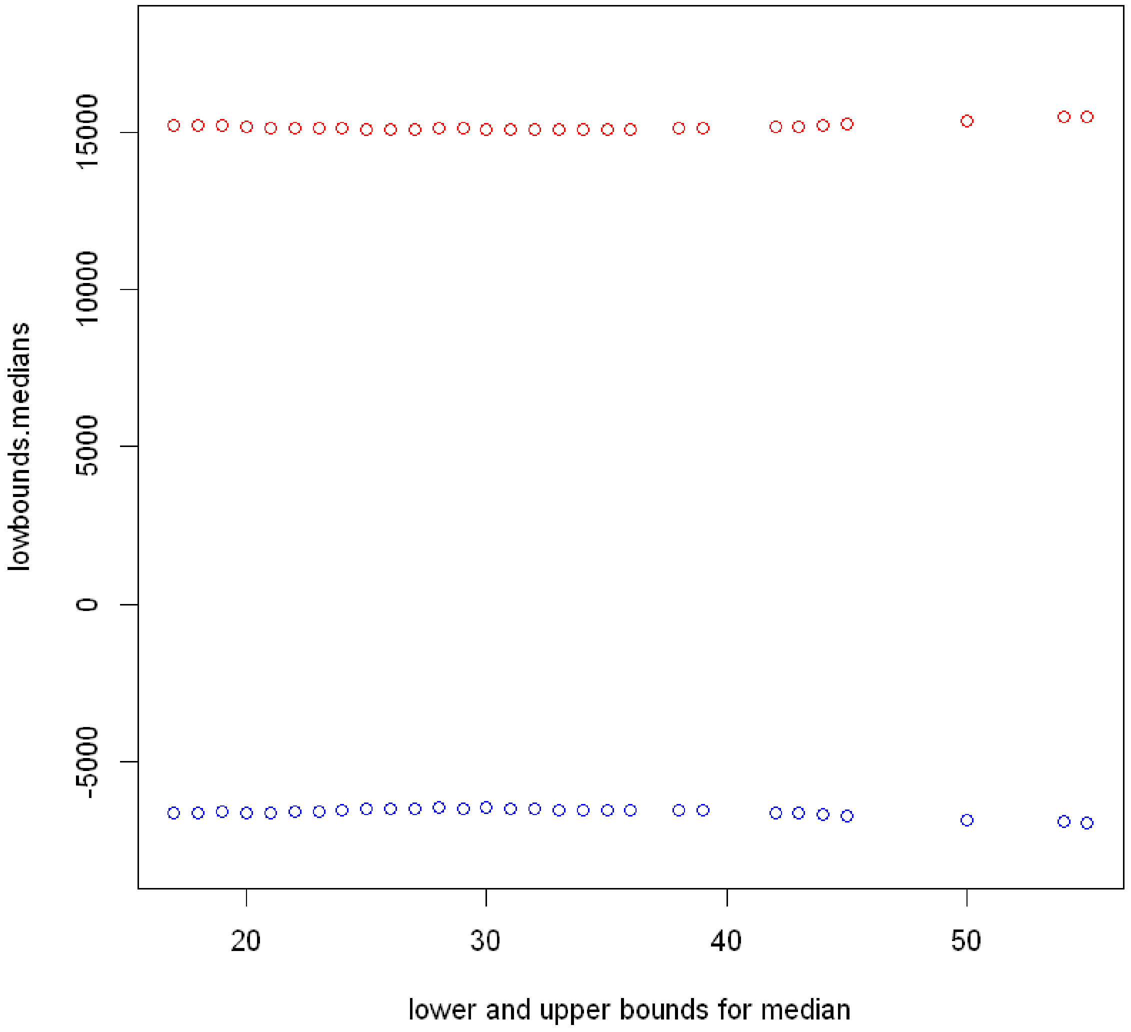
```
Call:
glm(formula = newdata$re78 ~ newdata$age + newdata$educ + newdata$re74 +
    newdata$re75 + newdata$educ:newdata$re74 + newdata$educ:newdata$re75 +
    newdata$age:newdata$re74 + newdata$age:newdata$re75 + newdata$re74:newdat
a$re75)

Deviance Residuals:
   Min      1Q  Median      3Q     Max
 -7264   -4148   -1590    3014   33846

Coefficients:
                            Estimate Std. Error t value Pr(>|t|)
(Intercept)                3.686e+03  2.630e+03   1.401    0.162
newdata$age                2.216e+00  5.206e+01   0.043    0.966
newdata$educ               3.907e+01  2.292e+02   0.170    0.865
newdata$re74              -1.552e-02  4.790e-01  -0.032    0.974
newdata$re75               7.845e-01  1.878e+00   0.418    0.677
newdata$educ:newdata$re74  3.441e-02  6.671e-02   0.516    0.606
newdata$educ:newdata$re75 -7.204e-02  1.341e-01  -0.537    0.592
newdata$age:newdata$re74  -5.705e-03  2.783e-02  -0.205    0.838
newdata$age:newdata$re75   9.309e-03  4.212e-02   0.221    0.825
newdata$re74:newdata$re75 -2.294e-05  1.413e-05  -1.623    0.106

(Dispersion parameter for gaussian family taken to be 30371884)

    Null deviance: 7788768802  on 259  degrees of freedom
Residual deviance: 7592971078  on 250  degrees of freedom
AIC: 5229.2

Number of Fisher Scoring iterations: 2
```

newdata$re75: -0.894239894276869

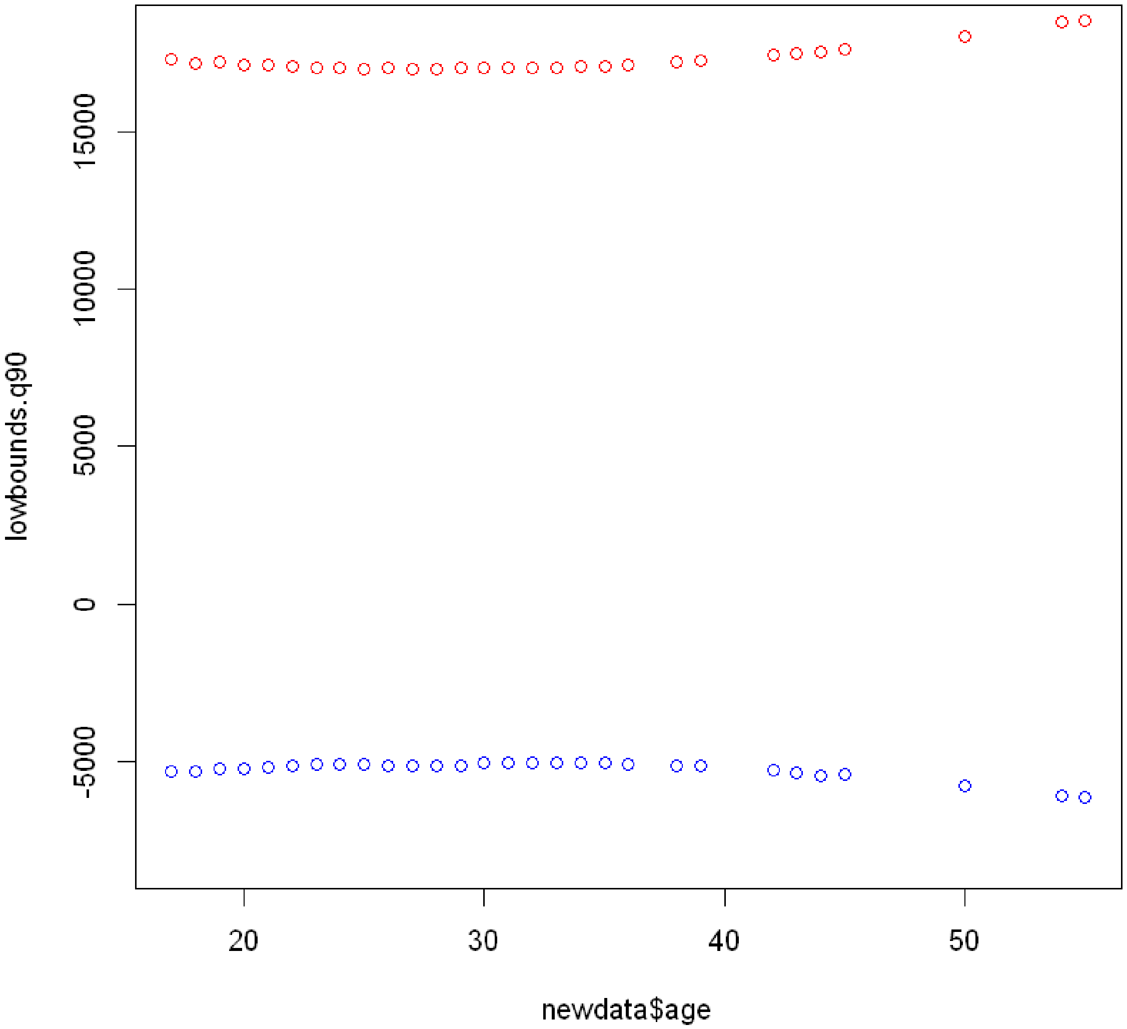
```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  17.00   19.00   24.00   25.05   28.00   55.00
```

3227.1640	3226.77450	3227.2938	3227.8131	3224.3077	3227.8131	3227.0342	3225.735
4331.6234	4186.19845	4380.0984	4573.9984	3265.1735	4573.9984	4283.1484	3798.398
4696.1660	4673.31004	4703.7846	4734.2592	4528.5559	4734.2592	4688.5473	4612.360
5164.6430	4981.00153	5225.8568	5470.7121	3817.9390	5470.7121	5103.4292	4491.291
308.9804	434.20347	267.2393	100.2752	1227.2830	100.2752	350.7214	768.1317
181.2045	85.73219	213.0286	340.3251	-518.9259	340.3251	149.3804	-168.8607

-5562.0480	-5356.840	-5630.4505	-5904.0605	-4057.193	-5904.0605	-5493.645	-4809.
3999.3481	3875.109	4040.7611	4206.4133	3088.261	4206.4133	3957.935	3543.8
9152.2489	9021.080	9195.9721	9370.8646	8190.340	9370.8646	9108.526	8671.2
10267.3443	10236.244	10277.7110	10319.1780	10039.276	10319.1780	10256.978	10153.
5747.4440	6012.843	5658.9777	5305.1127	7693.702	5305.1127	5835.910	6720.5
944.3398	1575.825	733.8446	-108.1361	5575.234	-108.1361	1154.835	3259.7



```
Error in (function (classes, fdef, mtable) : unable to find an inherited meth
od for function 'Summary' for signature '"glm"'
Traceback:

1. Summary(lmlalonde)
2. (function (classes, fdef, mtable)
 . {
 .     methods <- .findInheritedMethods(classes, fdef, mtable)
 .     if (length(methods) == 1L)
 .         return(methods[[1L]])
 .     else if (length(methods) == 0L) {
 .         cnames <- paste0("\"", vapply(classes, as.character,
 .             ""), "\"", collapse = ", ")
 .         stop(gettextf("unable to find an inherited method for function %s
for signature %s",
 .             sQuote(fdef@generic), sQuote(cnames)), domain = NA)
 .     }
 .     else stop("Internal error in finding inherited methods; didn't return
a unique method",
 .         domain = NA)
 . })(list("glm"), new("groupGenericFunction", .Data = function (x,
 .     ..., na.rm = FALSE)
 . standardGeneric("Summary"), groupMembers = list("max", "min",
 .     "range", "prod", "sum", "any", "all"), generic = structure("Summary",
package = "base"),
 .     package = "base", group = list(), valueClass = character(0),
 .     signature = c("x", "na.rm"), default = NULL, skeleton = (function (x,
 .         ..., na.rm = FALSE)
 .     stop("invalid call in method dispatch to 'Summary' (no default metho
d)",
 .         domain = NA))(x, ..., na.rm = na.rm)), <environment>)
3. stop(gettextf("unable to find an inherited method for function %s for sign
ature %s",
 .     sQuote(fdef@generic), sQuote(cnames)), domain = NA)
```



In [85]:

```
head(data.frame(upperbounds.medians,lowbounds.medians,lowbounds.q90,upperbound
s.q90,m_educ,m_re74,m_re75,q90.edu,q90.re74,q90.re75,newdata$age))
```

```
Warning message in data.frame(upperbounds.medians, lowbounds.medians, lowboun
ds.q90, :
"row names were found from a short variable and have been discarded"
```

upperbounds.medians	lowbounds.medians	lowbounds.q90	upperbounds.q90	m_educ
15133.82	-6570.202	-5108.423	17034.12	10
15086.65	-6504.220	-5117.491	17023.95	10
15151.71	-6580.343	-5117.607	17086.50	10
15230.41	-6634.446	-5316.342	17185.75	10
15269.59	-6707.853	-5428.120	17614.52	10
15230.41	-6634.446	-5316.342	17185.75	10

Answer #3

In [36]:

```
library(foreign)
getwd()
setwd("C:/Users/Hanna/Downloads")
mydata<-read.dta("nsw.dta")
cof_storage = rep(1:10000)
for (i in 1:10000) { boot.sample = sample(1:nrow(mydata), nrow(mydata), replac
e= TRUE)
 newset<-mydata[boot.sample,]
 mb<-lm(re78~ treat,data = newset)
 cof_storage[i]<-mb$coef[2]
  }
quantile(cof_storage, c(0.25,0.975))
manual<-quantile(cof_storage, c(0.25,0.975))
#analytical
ma<-lm(mydata$re78~ mydata$treat)
confint(ma)
analytical<-confint(ma)[2,]

table(analytical,manual)
```

'C:/Users/Hanna/Downloads'

25%	546.244009746679
97.5%	1864.21311818525

	2.5 %	**97.5 %**
(Intercept)	4495.60595	5684.491
mydata$treat	-40.52635	1813.134

```
                   manual
analytical          546.244009746679 1864.21311818525
  -40.5263533904598                1                0
  1813.13379829327                 0                1
```

Answer #4

In [31]:

```
preds <- cof_storage[c(1:722)] #taking the first 722 values for the example
actual <- mydata$re78
rss <- sum((preds - actual) ^ 2)
tss <- sum((actual - mean(actual)) ^ 2)
rsq <- 1 - rss/tss
print(rsq)
#shows how much better the predictive model is to the mean model.
```

```
[1] -0.5435433
```

Answer #5

In [37]:

```
mydata<- mydata[, -1]
glm.fit= glm(treat~age+education+black+hispanic+married+nodegree+re75, data= m
ydata, family= "binomial")
summary(glm.fit)

Probability_distribution_for_treatment_group<- predict (glm.fit,type = "respon
se")[which(predict(glm.fit, mydata,type="response")>0.5)]
hist(Probability_distribution_for_treatment_group,col="red")
predict (glm.fit ,mydata,type="response")
predicted_Y<- rep(0,722)
predicted_Y[which(predict(glm.fit,type = "response")>0.5)] <- 1

Probability_distribution_for_control_group<- predict (glm.fit,type = "respons
e")[which(predict(glm.fit, mydata,type="response")<0.5)]
hist(Probability_distribution_for_control_group, col = "blue")
length(which(predict(glm.fit,type = "response")>0.5))
```

```
Call:
glm(formula = treat ~ age + education + black + hispanic + married + 
    nodegree + re75, family = "binomial", data = mydata)

Deviance Residuals: 
    Min       1Q   Median       3Q      Max  
-1.2318  -0.9981  -0.9696   1.3521   1.4851  

Coefficients:
              Estimate Std. Error z value Pr(>|z|)  
(Intercept)  4.343e-01  8.599e-01   0.505   0.6135  
age         -1.624e-03  1.204e-02  -0.135   0.8927  
education   -2.378e-02  5.966e-02  -0.399   0.6901  
black       -9.743e-02  2.635e-01  -0.370   0.7116  
hispanic    -2.525e-01  3.481e-01  -0.725   0.4682  
married      9.292e-02  2.158e-01   0.431   0.6668  
nodegree    -5.292e-01  2.443e-01  -2.167   0.0303 *
re75        -3.121e-06  1.550e-05  -0.201   0.8404  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 978.09  on 721  degrees of freedom
Residual deviance: 970.25  on 714  degrees of freedom
AIC: 986.25

Number of Fisher Scoring iterations: 4
```

1	0.396225912847882
2	0.354962802210249
3	0.500673520701647
4	0.378035995583314
5	0.392626208225703
6	0.391216275670585
7	0.503516107943042
8	0.376128249440221
9	0.480148483656082
10	0.546905278532309
11	0.392377497458912
12	0.498382302003517
13	0.398451628952347
14	0.40584047870905
15	0.404557184787712
16	0.386721670740282
17	0.495945832527907
18	0.385181816524545
19	0.496612651796742
20	0.502297873385584
21	0.379564918924397
22	0.508671660273811
23	0.408357413918736
24	0.37918246254408
25	0.370005674809203
26	0.387106989806774
27	0.399338860495208
28	0.378800156250085
29	0.347691721170464
30	0.387492450218655
31	0.37918246254408
32	0.387492450218655
33	0.398446089491543
34	0.409625190185038
35	0.400898406747964
36	0.504734300753949
37	0.502703955317149
38	0.483913861664219
39	0.412912352185081
40	0.526720914379688
41	0.40987497784081
42	0.384797210626191
43	0.504328242014872
44	0.415834519861758
45	0.398841034609666
46	0.383648092348568
47	0.380713184415002
48	0.400898406747964

49	0.398841034609666
50	0.393152323082491
51	0.412912352185081
52	0.503516107943042
53	0.394564710868809
54	0.398559850069125
55	0.38147943751925
56	0.502703955317149
57	0.398949291347399
58	0.387492450218655
59	0.385428859429113
60	0.435062960585381
61	0.507138053937616
62	0.403154495296983
63	0.398841034609666
64	0.394176742740828
65	0.381170063653447
66	0.380576137675207
67	0.378035995583314
68	0.417109143989018
69	0.388897535409484
70	0.378035995583314
71	0.425844514424865
72	0.42763540390194
73	0.495133713108439
74	0.389283646309638
75	0.488232167083217
76	0.409906379711107
77	0.502703955317149
78	0.483653371781889
79	0.386482381315026
80	0.401982479502198
81	0.503922177566035
82	0.376712778780428
83	0.391603213461201
84	0.373083853171877
85	0.379947524974568
86	0.502703955317149
87	0.410882206992114
88	0.406702851978354
89	0.379637965884288
90	0.505546398960552
91	0.52176914303544
92	0.495945832527907
93	0.394952811910835
94	0.373844020453997
95	0.360052764879864
96	0.378418000458156
97	0.403401081302816

98	0.528655045742064
99	0.39572941096051
100	0.398559850069125
101	0.387492450218655
102	0.396077230921326
103	0.488659185791586
104	0.378800156250085
105	0.504328242014872
106	0.371565401639847
107	0.38643655600967
108	0.527035716640512
109	0.386515642186538
110	0.392764842787508
111	0.391783245230585
112	0.390320791324527
113	0.399465138172406
114	0.495800514497468
115	0.384412748644843
116	0.351622643808709
117	0.384797210626191
118	0.38402843100667
119	0.504439755372049
120	0.40605548281577
121	0.378800156250085
122	0.441510138748802
123	0.522572992845292
124	0.38147943751925
125	0.381096236968731
126	0.383122834074522
127	0.495945832527907
128	0.399923603049733
129	0.340721754360203
130	0.393152323082491
131	0.376890890600614
132	0.387376208379314
133	0.545453003371793
134	0.392873074107087
135	0.505107477013104
136	0.343532007761267
137	0.375489900772844
138	0.341750430400933
139	0.497535337087372
140	0.386159266943549
141	0.378176829797095
142	0.368163240823253
143	0.415397085976937
144	0.349176407606222
145	0.351434150382385
146	0.380954335952557

147	0.347393590228248
148	0.466406372769029
149	0.379501389467873
150	0.391499125052317
151	0.380201059481912
152	0.386588990899109
153	0.386857967276357
154	0.501448345785281
155	0.384774987592466
156	0.503829077034124
157	0.397554644781705
158	0.391808596641207
159	0.386092375389039
160	0.385704790934062
161	0.355225992727685
162	0.349819744030351
163	0.379678144041376
164	0.398514843846204
165	0.384346261835187
166	0.353738614310888
167	0.381275846273798
168	0.399335946053566
169	0.401360282380325
170	0.336520142086624
171	0.404166383321385
172	0.514385849248487
173	0.401746156395239
174	0.339837498134494
175	0.375996088001866
176	0.481948321043956
177	0.400675451462243
178	0.522904438794284
179	0.37445087546907
180	0.349995249914823
181	0.375623293773739
182	0.372461662341537
183	0.514976890988788
184	0.373639176856193
185	0.384501082244884
186	0.479040877458586
187	0.40789384180683
188	0.385083203478533
189	0.386751628865231
190	0.402205648281735
191	0.39191141816606
192	0.37812418842782
193	0.380017189464625
194	0.503163468499139
195	0.380566389002534

196	0.500561142271101
197	0.398090013640814
198	0.384153773678223
199	0.419025313492224
200	0.382569487420965
201	0.376432592567424
202	0.497398066352481
203	0.376390184777814
204	0.373517845623083
205	0.497444821228608
206	0.400118553193602
207	0.492982017191384
208	0.34209271189602
209	0.367657316376948
210	0.331953933798132
211	0.401808154952362
212	0.503697938169112
213	0.380704546116375
214	0.380852564033533
215	0.397282115308712
216	0.402834864090133
217	0.388916103788121
218	0.392153845948765
219	0.39368330573569
220	0.391884855832365
221	0.498528885586781
222	0.389512087982905
223	0.360210370808195
224	0.378743957252591
225	0.37870053276798
226	0.383544147259291
227	0.387582582876874
228	0.376215186233198
229	0.524808725165999
230	0.389582789306902
231	0.394533971052284
232	0.498643744171477
233	0.499986739370891
234	0.497141887187023
235	0.399525578978716
236	0.426863375490011
237	0.373599608384327
238	0.516012282839735
239	0.519022481875238
240	0.373002934218295
241	0.371041142760078
242	0.475143492484841
243	0.488948501127283
244	0.381321458380775

245	0.383209918136181
246	0.392219467091772
247	0.372627263022498
248	0.376081597349284
249	0.379173125157183
250	0.404027726677556
251	0.383009539194957
252	0.501144458335073
253	0.387336947456663
254	0.501728475834223
255	0.388744303535338
256	0.351516353766385
257	0.49434685213323
258	0.400660814971362
259	0.356771352967429
260	0.400040052834065
261	0.50460542081719
262	0.394525718630463
263	0.385786740025623
264	0.501612527737537
265	0.388368193257177
266	0.385681760051517
267	0.382248585481299
268	0.362594636113298
269	0.503191831048719
270	0.521670018118575
271	0.520994776947729
272	0.497273207856365
273	0.383660143856263
274	0.499661810810289
275	0.39805886493305
276	0.500824321834646
277	0.482881375063907
278	0.381027963455364
279	0.403595400704852
280	0.39586808291997
281	0.379815337803158
282	0.528395276464897
283	0.52484094221033
284	0.384283677703338
285	0.503125198929635
286	0.542763321189906
287	0.463933999406844
288	0.500892215009361
289	0.379621174535892
290	0.379029258702433
291	0.505041372018752
292	0.406232228978825
293	0.391990287536949

294	0.413271839156166
295	0.403948115624566
296	0.379144812578569
297	0.514145515003555
298	0.385181816524545
299	0.526630794132957
300	0.391216275670585
301	0.383356076683192
302	0.392764842787508
303	0.371186183406272
304	0.392764842787508
305	0.499953955009645
306	0.419644107550419
307	0.39739229795418
308	0.491794652422906
309	0.381869034261617
310	0.525195726453639
311	0.385269361434167
312	0.502083696210941
313	0.500049694059056
314	0.393968114690137
315	0.397035214796254
316	0.38019328675295
317	0.529297567025128
318	0.492436819501128
319	0.490383256153545
320	0.341635598606448
321	0.388897535409484
322	0.431951279376132
323	0.505045063463499
324	0.423155009225539
325	0.404327617850296
326	0.39767320342322
327	0.386683290559014
328	0.499049153800769
329	0.384797210626191
330	0.390442810697067
331	0.360427128386139
332	0.378800156250085
333	0.403052307108301
334	0.391603213461201
335	0.502944931215959
336	0.384659606898378
337	0.414738998235003
338	0.38383143657978
339	0.38273900423078
340	0.378172505292386
341	0.503506948713401
342	0.394952811910835

343	0.39927778381167
344	0.391570567396922
345	0.39572941096051
346	0.382109022830082
347	0.378427590972656
348	0.405811687838397
349	0.392518217205286
350	0.363156816617628
351	0.403101607521176
352	0.366304828323249
353	0.499455244983709
354	0.391055337668434
355	0.374868778080589
356	0.35101475407303
357	0.524515357610024
358	0.525505961672122
359	0.383290329019958
360	0.500267428969899
361	0.502238582950237
362	0.484496575409923
363	0.380576137675207
364	0.504734300753949
365	0.409128335144427
366	0.378800156250085
367	0.384412748644843
368	0.374985439161913
369	0.392310061480428
370	0.503977929534366
371	0.386336493449516
372	0.395613632310938
373	0.353847825735593
374	0.34667370816133
375	0.373626898509112
376	0.382454887890543
377	0.396758524102543
378	0.383644258137135
379	0.344881630505534
380	0.48877052720685
381	0.381004411499366
382	0.378418000458156
383	0.390691083649741
384	0.396730770722596
385	0.368867894667013
386	0.385092148865854
387	0.486216017329788
388	0.380959137163491
389	0.376123725718844
390	0.389495993137471
391	0.50514035324769

392	0.393013640270975
393	0.355706996694939
394	0.385181816524545
395	0.379428032279281
396	0.37918246254408
397	0.349794410356181
398	0.379564918924397
399	0.366681967647608
400	0.399626361755202
401	0.380330280277406
402	0.384412748644843
403	0.402069386895174
404	0.340815649201038
405	0.378961108907048
406	0.402992979497647
407	0.379564918924397
408	0.503664385502842
409	0.338255676153042
410	0.496585460762926
411	0.527440603584511
412	0.374494702720967
413	0.375245567938379
414	0.377959096183362
415	0.37727244024134
416	0.37918246254408
417	0.391216275670585
418	0.374588612407506
419	0.377654142039853
420	0.35101475407303
421	0.391174623680287
422	0.38402843100667
423	0.384412748644843
424	0.495682417179783
425	0.357852835601391
426	0.360366864335274
427	0.384797210626191
428	0.489083993874738
429	0.412518635484252
430	0.373504534796538
431	0.38019328675295
432	0.379947524974568
433	0.390839954794378
434	0.502703955317149
435	0.38426200826879
436	0.378035995583314
437	0.394176742740828
438	0.391272335193232
439	0.503110033681528
440	0.351967991651276

441	0.391706246048137
442	0.385566565913042
443	0.500019082491112
444	0.392001961875063
445	0.392509594723375
446	0.401821117130629
447	0.486571538536624
448	0.501079611544831
449	0.378976323981998
450	0.364284588734939
451	0.500673520701647
452	0.396895295270065
453	0.412630542523573
454	0.373318346716231
455	0.386336493449516
456	0.387619438833943
457	0.378163092321017
458	0.387705247984082
459	0.400606426905036
460	0.378852482244824
461	0.512053377857834
462	0.360767996653664
463	0.375366221846747
464	0.503922177566035
465	0.484323593707974
466	0.379722225744925
467	0.382109022830082
468	0.392764842787508
469	0.379961313799784
470	0.4901734491699
471	0.33926720182805
472	0.504272617942834
473	0.400898406747964
474	0.407408194071632
475	0.487814709228015
476	0.379428032279281
477	0.363947125238943
478	0.406624098604393
479	0.499456683101977
480	0.37789932448429
481	0.520237860148864
482	0.385209067887015
483	0.516327522263262
484	0.398452636735542
485	0.375861053666402
486	0.401821117130629
487	0.376128249440221
488	0.495945832527907
489	0.500886442799815

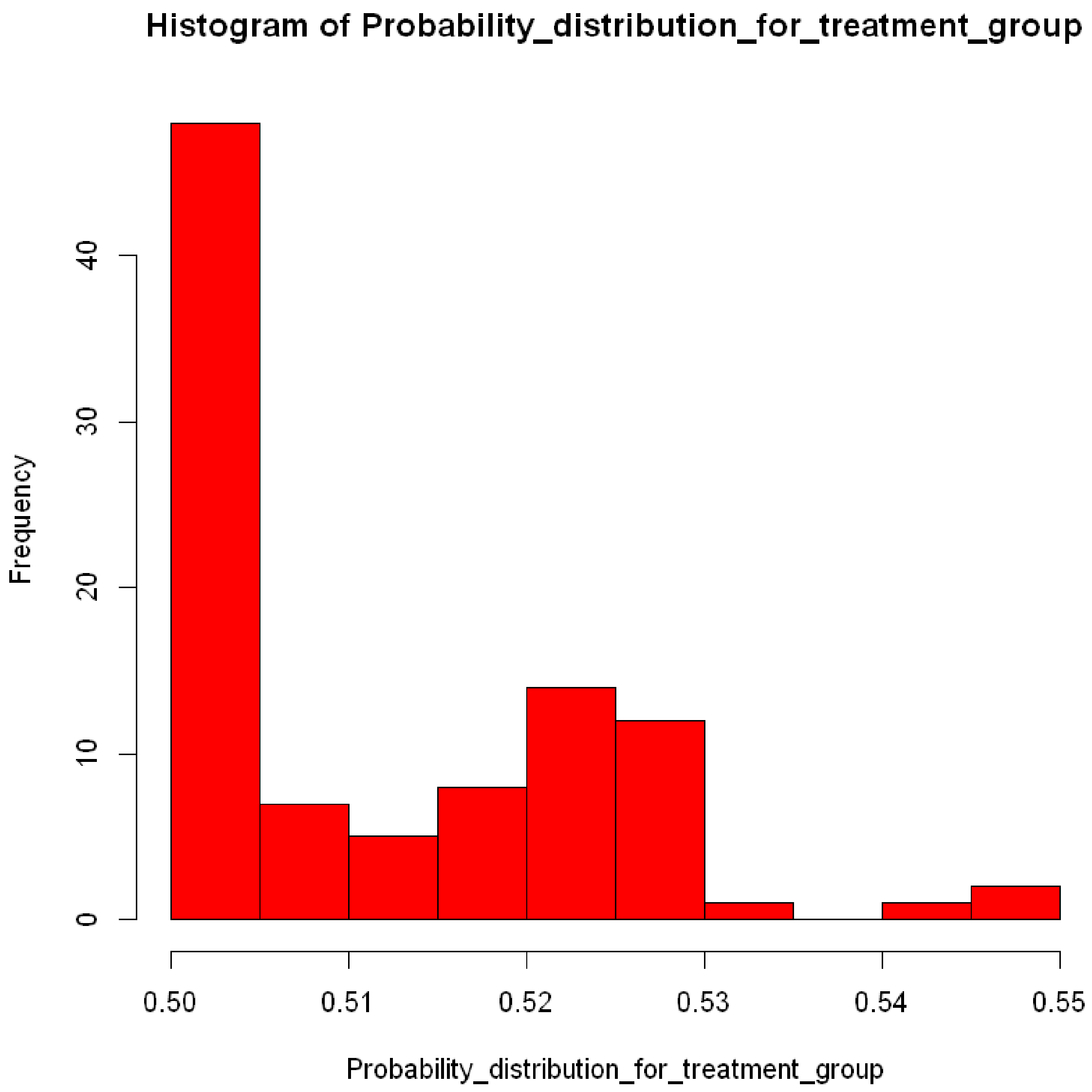
490	0.49336639694505
491	0.38402843100667
492	0.371565401639847
493	0.387388129682405
494	0.424290673863561
495	0.378207376587211
496	0.378800156250085
497	0.417758877545017
498	0.375372980319278
499	0.379499571395132
500	0.496790271578383
501	0.420278018057126
502	0.502703955317149
503	0.37702101980382
504	0.524695824506757
505	0.524422233407392
506	0.401271599191613
507	0.381725580161087
508	0.406847652928235
509	0.392356731846321
510	0.397848004352274
511	0.413986526875668
512	0.385566565913042
513	0.392377497458912
514	0.404274680420318
515	0.379564918924397
516	0.379304244867806
517	0.375747158742574
518	0.383644258137135
519	0.399338860495208
520	0.39056540533189
521	0.406972039386894
522	0.385181816524545
523	0.374888104140599
524	0.384520464366734
525	0.412375277927187
526	0.369410791881747
527	0.384412748644843
528	0.387848896133561
529	0.493831760964245
530	0.385195496525857
531	0.376546381708086
532	0.515910205498572
533	0.399622044515009
534	0.379138182602359
535	0.396780007166831
536	0.519845690393106
537	0.40306581268553
538	0.369274760970404

539	0.384797210626191
540	0.418062525060319
541	0.373402749724091
542	0.444409133813255
543	0.381725629352325
544	0.40676684081138
545	0.38105543956763
546	0.389997380999534
547	0.391199010205618
548	0.39939539951773
549	0.502985300014307
550	0.376998995364122
551	0.381741979940256
552	0.512009334109096
553	0.406624098604393
554	0.488548372978729
555	0.399338860495208
556	0.525910980176805
557	0.495539769876248
558	0.379564918924397
559	0.367780406999547
560	0.372846112583133
561	0.524220677825557
562	0.495860498501084
563	0.404066541924208
564	0.371027385576309
565	0.450659207916629
566	0.39767320342322
567	0.531701656313575
568	0.457852393806772
569	0.516494831966668
570	0.398414976872004
571	0.382355320579187
572	0.40000551964202
573	0.367898030676785
574	0.39737688283803
575	0.383959852031152
576	0.519923123860037
577	0.461108270742776
578	0.401681400494758
579	0.378800156250085
580	0.363206844174474
581	0.502359016258988
582	0.375464711693981
583	0.382988943000486
584	0.371845325719582
585	0.397380566614889
586	0.395696509849336
587	0.502297873385584

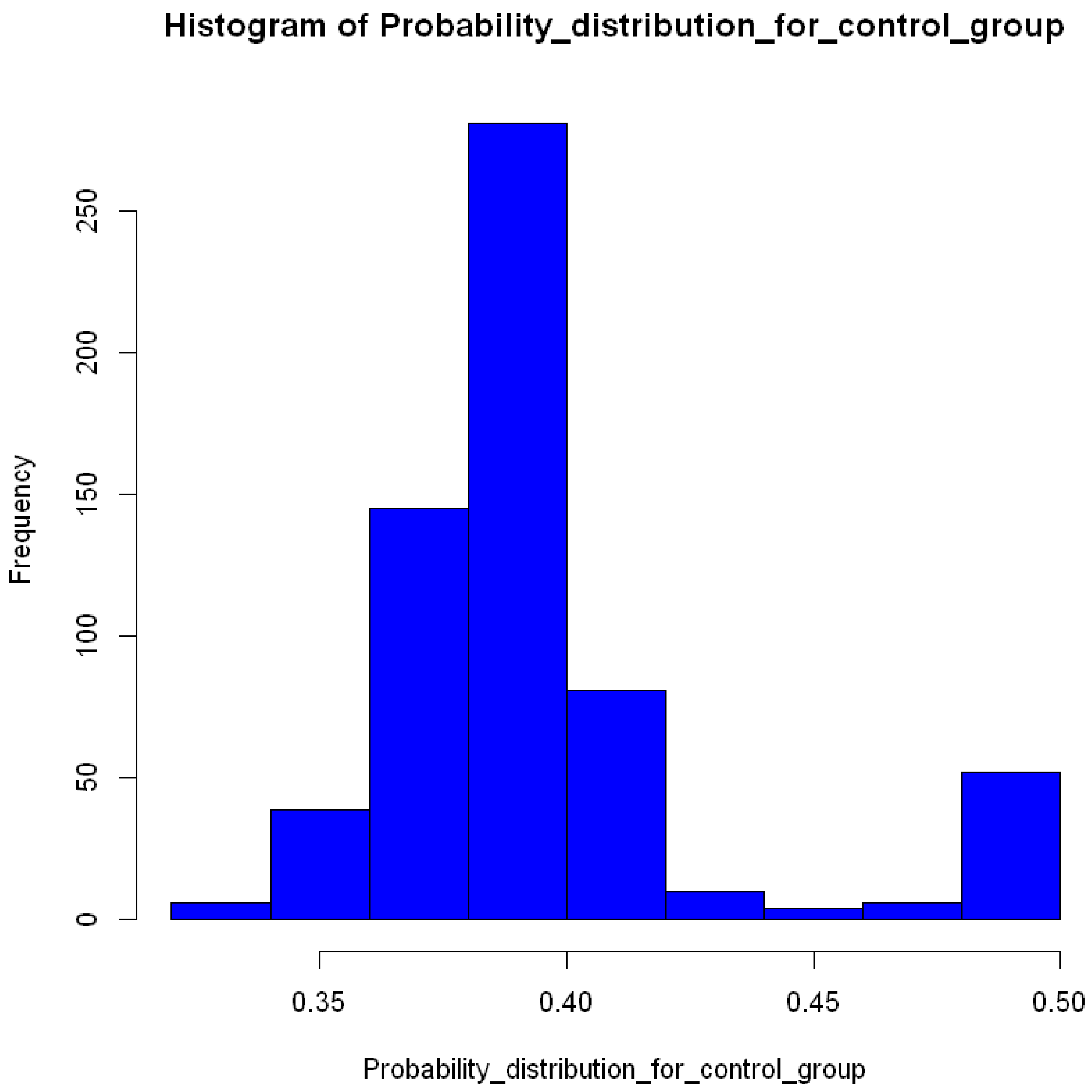
588	0.476176311390714
589	0.522306574780715
590	0.498125882170683
591	0.414658381434883
592	0.398647448609754
593	0.385181816524545
594	0.495887681251242
595	0.395945182216331
596	0.515088825992922
597	0.390506847036996
598	0.413851121076452
599	0.336894107118419
600	0.526225836591439
601	0.377555888665338
602	0.404254021477038
603	0.372328101910449
604	0.392239293071048
605	0.374833455549945
606	0.375659085656524
607	0.406624098604393
608	0.377473884079735
609	0.413419959822208
610	0.5203735332567
611	0.4015932043539
612	0.400920882786877
613	0.396506536330313
614	0.526645002464646
615	0.37868075960415
616	0.356344004679861
617	0.377305339706523
618	0.378426438889814
619	0.350503700926524
620	0.37832561894266
621	0.398451628952347
622	0.383619171644725
623	0.379977440147817
624	0.349029734250239
625	0.398841034609666
626	0.350152167674352
627	0.385123020812517
628	0.386929228958404
629	0.366321294962925
630	0.375032604958491
631	0.379907559065731
632	0.386008429507487
633	0.356079355886115
634	0.385891682539114
635	0.387106989806774
636	0.379070484727185

637	0.368509974066676
638	0.379297787910083
639	0.361926276499859
640	0.38147943751925
641	0.381862785646503
642	0.386721670740282
643	0.386721670740282
644	0.392764842787508
645	0.385416513155224
646	0.379793058143227
647	0.386904470059584
648	0.354532159964512
649	0.392764842787508
650	0.50444996145644
651	0.355274071591768
652	0.38080637661174
653	0.38730676732515
654	0.403709002264394
655	0.360138130941498
656	0.397959770488244
657	0.387106989806774
658	0.386214498045269
659	0.387000335705299
660	0.385825973890004
661	0.386050120173332
662	0.380577309123558
663	0.387492450218655
664	0.404165950324756
665	0.38147943751925
666	0.390144427249292
667	0.350644807033032
668	0.392764842787508
669	0.387492450218655
670	0.381011026841209
671	0.387492450218655
672	0.392399853924735
673	0.381096236968731
674	0.422415834370778
675	0.387106989806774
676	0.392764842787508
677	0.391221700118494
678	0.398841034609666
679	0.397318007238973
680	0.354113468469449
681	0.392690081606357
682	0.385665191127613
683	0.372602245024118
684	0.379512254499311
685	0.410068763127298

686	0.405110308306639
687	0.415804892567342
688	0.375088442008377
689	0.384225396710455
690	0.391990287536949
691	0.390413472556834
692	0.385289404654889
693	0.377787314442949
694	0.393152323082491
695	0.39171301748223
696	0.381741097308441
697	0.387492450218655
698	0.386274612897143
699	0.350553948613054
700	0.384806400527117
701	0.393152323082491
702	0.381096236968731
703	0.408993720690589
704	0.408977796878451
705	0.391990287536949
706	0.380618053167111
707	0.371062645776884
708	0.392764842787508
709	0.38147943751925
710	0.384303893478728
711	0.35138488021583
712	0.381096236968731
713	0.391233824066673
714	0.387492450218655
715	0.37483596026552
716	0.398265918425386
717	0.420995401191493
718	0.385726118576376
719	0.356824596321984
720	0.392254430549742
721	0.381096236968731
722	0.387106989806774


Histogram of Probability_distribution_for_treatment_group
Frequency
0
10
20
30
40
0.50
0.51
0.52
0.53
0.54
0.55
Probability_distribution_for_treatment_group

98


Histogram of Probability_distribution_for_control_group
Frequency
0
50
100
150
200
250
0.35
0.40
0.45
0.50
Probability_distribution_for_control_group