> library(readr)

> bank\_data <- read\_csv("C:/Users/Admin/Desktop/Assignments/Logestic\_Regression/bank\_data.csv")

> View(bank\_data)

> attach(bank\_data)

> logit<- glm(y~age+factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+pdays+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(joself.employed)+factor(joservices)+factor(jostudent)+factor(jotechnician)+factor(jounemployed)+factor(jounknown),family="binomial",data = bank\_data)

> summary(logit)

Call:

glm(formula = y ~ age + factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + pdays + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(joself.employed) +

factor(joservices) + factor(jostudent) + factor(jotechnician) +

factor(jounemployed) + factor(jounknown), family = "binomial",

data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6748 -0.4060 -0.2731 -0.1625 3.4400

Coefficients: (4 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.855e+00 2.447e-01 -15.754 < 2e-16 \*\*\*

age 3.567e-04 2.123e-03 0.168 0.866617

factor(default)1 -1.822e-01 1.613e-01 -1.130 0.258582

balance 1.872e-05 4.848e-06 3.860 0.000113 \*\*\*

factor(housing)1 -7.756e-01 3.953e-02 -19.618 < 2e-16 \*\*\*

factor(loan)1 -5.720e-01 5.811e-02 -9.843 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.619 < 2e-16 \*\*\*

campaign -1.093e-01 9.905e-03 -11.037 < 2e-16 \*\*\*

pdays 1.441e-04 3.006e-04 0.479 0.631590

previous 1.042e-02 6.435e-03 1.620 0.105281

factor(poutfailure)1 2.563e-01 9.038e-02 2.835 0.004576 \*\*

factor(poutother)1 4.985e-01 1.028e-01 4.849 1.24e-06 \*\*\*

factor(poutsuccess)1 2.565e+00 8.318e-02 30.836 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.762e-02 20.232 < 2e-16 \*\*\*

factor(con\_telephone)1 1.067e+00 8.825e-02 12.093 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.762e-01 6.530e-02 -2.697 0.006986 \*\*

factor(married)1 -3.394e-01 4.448e-02 -7.631 2.32e-14 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.965e-01 2.263e-01 1.310 0.190041

factor(joblue.collar)1 -1.671e-01 2.256e-01 -0.741 0.458886

factor(joentrepreneur)1 -1.073e-01 2.463e-01 -0.436 0.663056

factor(johousemaid)1 -2.776e-01 2.495e-01 -1.113 0.265815

factor(jomanagement)1 2.380e-01 2.232e-01 1.067 0.286143

factor(joretired)1 6.315e-01 2.301e-01 2.745 0.006052 \*\*

factor(joself.employed)1 1.962e-02 2.392e-01 0.082 0.934620

factor(joservices)1 -3.688e-02 2.301e-01 -0.160 0.872676

factor(jostudent)1 8.087e-01 2.395e-01 3.377 0.000734 \*\*\*

factor(jotechnician)1 6.383e-02 2.247e-01 0.284 0.776342

factor(jounemployed)1 8.167e-02 2.397e-01 0.341 0.733322

factor(jounknown)1 NA NA NA NA

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45183 degrees of freedom

AIC: 22696

Number of Fisher Scoring iterations: 6

**After removing jo.selfemployed**

> logit1<- glm(y~age+factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+pdays+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(joservices)+factor(jostudent)+factor(jotechnician)+factor(jounemployed)+factor(jounknown),family="binomial",data = bank\_data)

> summary(logit1)

Call:

glm(formula = y ~ age + factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + pdays + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(joservices) +

factor(jostudent) + factor(jotechnician) + factor(jounemployed) +

factor(jounknown), family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6748 -0.4060 -0.2731 -0.1625 3.4400

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.835e+00 1.374e-01 -27.903 < 2e-16 \*\*\*

age 3.567e-04 2.123e-03 0.168 0.866617

factor(default)1 -1.822e-01 1.613e-01 -1.130 0.258582

balance 1.872e-05 4.848e-06 3.860 0.000113 \*\*\*

factor(housing)1 -7.756e-01 3.953e-02 -19.618 < 2e-16 \*\*\*

factor(loan)1 -5.720e-01 5.811e-02 -9.843 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.619 < 2e-16 \*\*\*

campaign -1.093e-01 9.905e-03 -11.037 < 2e-16 \*\*\*

pdays 1.441e-04 3.006e-04 0.479 0.631590

previous 1.042e-02 6.435e-03 1.620 0.105281

factor(poutfailure)1 2.563e-01 9.038e-02 2.835 0.004576 \*\*

factor(poutother)1 4.985e-01 1.028e-01 4.849 1.24e-06 \*\*\*

factor(poutsuccess)1 2.565e+00 8.318e-02 30.836 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.762e-02 20.232 < 2e-16 \*\*\*

factor(con\_telephone)1 1.067e+00 8.825e-02 12.093 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.762e-01 6.530e-02 -2.697 0.006986 \*\*

factor(married)1 -3.394e-01 4.448e-02 -7.631 2.32e-14 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.769e-01 1.063e-01 2.604 0.009220 \*\*

factor(joblue.collar)1 -1.867e-01 1.047e-01 -1.783 0.074573 .

factor(joentrepreneur)1 -1.269e-01 1.447e-01 -0.877 0.380289

factor(johousemaid)1 -2.973e-01 1.517e-01 -1.960 0.050053 .

factor(jomanagement)1 2.184e-01 1.001e-01 2.181 0.029155 \*

factor(joretired)1 6.119e-01 1.208e-01 5.064 4.11e-07 \*\*\*

factor(joservices)1 -5.651e-02 1.141e-01 -0.495 0.620347

factor(jostudent)1 7.891e-01 1.310e-01 6.021 1.73e-09 \*\*\*

factor(jotechnician)1 4.420e-02 1.031e-01 0.429 0.668045

factor(jounemployed)1 6.204e-02 1.336e-01 0.464 0.642484

factor(jounknown)1 -1.962e-02 2.392e-01 -0.082 0.934620

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45183 degrees of freedom

AIC: 22696

Number of Fisher Scoring iterations: 6

**After removing jounknown**

> logit2<- glm(y~age+factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+pdays+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(joservices)+factor(jostudent)+factor(jotechnician)+factor(jounemployed),family="binomial",data = bank\_data)

> summary(logit2)

Call:

glm(formula = y ~ age + factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + pdays + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(joservices) +

factor(jostudent) + factor(jotechnician) + factor(jounemployed),

family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6748 -0.4060 -0.2731 -0.1625 3.4401

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.838e+00 1.332e-01 -28.817 < 2e-16 \*\*\*

age 3.476e-04 2.121e-03 0.164 0.869799

factor(default)1 -1.821e-01 1.613e-01 -1.129 0.258839

balance 1.872e-05 4.848e-06 3.862 0.000113 \*\*\*

factor(housing)1 -7.755e-01 3.950e-02 -19.632 < 2e-16 \*\*\*

factor(loan)1 -5.719e-01 5.811e-02 -9.842 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.619 < 2e-16 \*\*\*

campaign -1.093e-01 9.905e-03 -11.038 < 2e-16 \*\*\*

pdays 1.439e-04 3.006e-04 0.479 0.632131

previous 1.042e-02 6.435e-03 1.620 0.105277

factor(poutfailure)1 2.563e-01 9.038e-02 2.836 0.004572 \*\*

factor(poutother)1 4.986e-01 1.028e-01 4.850 1.24e-06 \*\*\*

factor(poutsuccess)1 2.565e+00 8.318e-02 30.836 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.761e-02 20.238 < 2e-16 \*\*\*

factor(con\_telephone)1 1.067e+00 8.825e-02 12.093 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.761e-01 6.529e-02 -2.696 0.007008 \*\*

factor(married)1 -3.394e-01 4.448e-02 -7.631 2.33e-14 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.799e-01 9.998e-02 2.799 0.005121 \*\*

factor(joblue.collar)1 -1.837e-01 9.827e-02 -1.870 0.061537 .

factor(joentrepreneur)1 -1.239e-01 1.400e-01 -0.885 0.376003

factor(johousemaid)1 -2.942e-01 1.470e-01 -2.002 0.045331 \*

factor(jomanagement)1 2.214e-01 9.324e-02 2.375 0.017572 \*

factor(joretired)1 6.152e-01 1.142e-01 5.387 7.17e-08 \*\*\*

factor(joservices)1 -5.353e-02 1.082e-01 -0.495 0.620812

factor(jostudent)1 7.920e-01 1.261e-01 6.280 3.39e-10 \*\*\*

factor(jotechnician)1 4.719e-02 9.647e-02 0.489 0.624694

factor(jounemployed)1 6.508e-02 1.285e-01 0.507 0.612444

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45184 degrees of freedom

AIC: 22694

Number of Fisher Scoring iterations: 6

**After removing age**

logit3<- glm(y~factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+pdays+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(joservices)+factor(jostudent)+factor(jotechnician)+factor(jounemployed),family="binomial",data = bank\_data)

> summary(logit3)

Call:

glm(formula = y ~ factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + pdays + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(joservices) +

factor(jostudent) + factor(jotechnician) + factor(jounemployed),

family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6740 -0.4060 -0.2730 -0.1625 3.4407

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.825e+00 1.100e-01 -34.767 < 2e-16 \*\*\*

factor(default)1 -1.822e-01 1.613e-01 -1.130 0.258638

balance 1.878e-05 4.833e-06 3.886 0.000102 \*\*\*

factor(housing)1 -7.763e-01 3.916e-02 -19.824 < 2e-16 \*\*\*

factor(loan)1 -5.722e-01 5.808e-02 -9.852 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.619 < 2e-16 \*\*\*

campaign -1.093e-01 9.904e-03 -11.037 < 2e-16 \*\*\*

pdays 1.435e-04 3.006e-04 0.477 0.633107

previous 1.043e-02 6.436e-03 1.620 0.105175

factor(poutfailure)1 2.566e-01 9.035e-02 2.841 0.004504 \*\*

factor(poutother)1 4.987e-01 1.028e-01 4.851 1.23e-06 \*\*\*

factor(poutsuccess)1 2.565e+00 8.313e-02 30.858 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.760e-02 20.238 < 2e-16 \*\*\*

factor(con\_telephone)1 1.069e+00 8.763e-02 12.197 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.723e-01 6.121e-02 -2.815 0.004872 \*\*

factor(married)1 -3.364e-01 4.064e-02 -8.279 < 2e-16 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.796e-01 9.996e-02 2.797 0.005163 \*\*

factor(joblue.collar)1 -1.841e-01 9.825e-02 -1.874 0.060973 .

factor(joentrepreneur)1 -1.237e-01 1.400e-01 -0.884 0.376935

factor(johousemaid)1 -2.926e-01 1.466e-01 -1.995 0.046016 \*

factor(jomanagement)1 2.212e-01 9.324e-02 2.372 0.017671 \*

factor(joretired)1 6.216e-01 1.072e-01 5.801 6.60e-09 \*\*\*

factor(joservices)1 -5.410e-02 1.082e-01 -0.500 0.616965

factor(jostudent)1 7.886e-01 1.244e-01 6.339 2.32e-10 \*\*\*

factor(jotechnician)1 4.684e-02 9.645e-02 0.486 0.627240

factor(jounemployed)1 6.514e-02 1.285e-01 0.507 0.612127

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45185 degrees of freedom

AIC: 22692

Number of Fisher Scoring iterations: 6

**After removing pdays**

> logit4<- glm(y~factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(joservices)+factor(jostudent)+factor(jotechnician)+factor(jounemployed),family="binomial",data = bank\_data)

> summary(logit4)

Call:

glm(formula = y ~ factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(joservices) +

factor(jostudent) + factor(jotechnician) + factor(jounemployed),

family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6743 -0.4060 -0.2730 -0.1625 3.4399

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.828e+00 1.100e-01 -34.813 < 2e-16 \*\*\*

factor(default)1 -1.816e-01 1.613e-01 -1.126 0.260254

balance 1.873e-05 4.833e-06 3.876 0.000106 \*\*\*

factor(housing)1 -7.739e-01 3.882e-02 -19.936 < 2e-16 \*\*\*

factor(loan)1 -5.723e-01 5.807e-02 -9.855 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.620 < 2e-16 \*\*\*

campaign -1.092e-01 9.902e-03 -11.032 < 2e-16 \*\*\*

previous 1.036e-02 6.415e-03 1.614 0.106423

factor(poutfailure)1 2.898e-01 5.751e-02 5.039 4.67e-07 \*\*\*

factor(poutother)1 5.295e-01 7.993e-02 6.625 3.48e-11 \*\*\*

factor(poutsuccess)1 2.589e+00 6.667e-02 38.834 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.759e-02 20.254 < 2e-16 \*\*\*

factor(con\_telephone)1 1.070e+00 8.762e-02 12.210 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.720e-01 6.121e-02 -2.811 0.004942 \*\*

factor(married)1 -3.367e-01 4.063e-02 -8.287 < 2e-16 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.806e-01 9.995e-02 2.807 0.004996 \*\*

factor(joblue.collar)1 -1.825e-01 9.821e-02 -1.859 0.063064 .

factor(joentrepreneur)1 -1.233e-01 1.400e-01 -0.881 0.378445

factor(johousemaid)1 -2.928e-01 1.466e-01 -1.997 0.045838 \*

factor(jomanagement)1 2.215e-01 9.324e-02 2.376 0.017517 \*

factor(joretired)1 6.218e-01 1.072e-01 5.801 6.58e-09 \*\*\*

factor(joservices)1 -5.260e-02 1.081e-01 -0.486 0.626613

factor(jostudent)1 7.887e-01 1.244e-01 6.339 2.32e-10 \*\*\*

factor(jotechnician)1 4.732e-02 9.645e-02 0.491 0.623722

factor(jounemployed)1 6.604e-02 1.285e-01 0.514 0.607157

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45186 degrees of freedom

AIC: 22690

Number of Fisher Scoring iterations: 6

**After removing joservices**

> logit5<- glm(y~factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(joentrepreneur)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(jostudent)+factor(jotechnician)+factor(jounemployed),family="binomial",data = bank\_data)

> summary(logit5)

Call:

glm(formula = y ~ factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(joentrepreneur) + factor(johousemaid) +

factor(jomanagement) + factor(joretired) + factor(jostudent) +

factor(jotechnician) + factor(jounemployed), family = "binomial",

data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6744 -0.4060 -0.2730 -0.1626 3.4398

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.861e+00 8.615e-02 -44.820 < 2e-16 \*\*\*

factor(default)1 -1.813e-01 1.613e-01 -1.124 0.26094

balance 1.881e-05 4.829e-06 3.895 9.83e-05 \*\*\*

factor(housing)1 -7.752e-01 3.873e-02 -20.017 < 2e-16 \*\*\*

factor(loan)1 -5.730e-01 5.805e-02 -9.871 < 2e-16 \*\*\*

duration 4.048e-03 6.264e-05 64.623 < 2e-16 \*\*\*

campaign -1.092e-01 9.902e-03 -11.029 < 2e-16 \*\*\*

previous 1.037e-02 6.418e-03 1.616 0.10606

factor(poutfailure)1 2.900e-01 5.751e-02 5.042 4.61e-07 \*\*\*

factor(poutother)1 5.291e-01 7.993e-02 6.620 3.59e-11 \*\*\*

factor(poutsuccess)1 2.589e+00 6.667e-02 38.837 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.166e+00 5.759e-02 20.256 < 2e-16 \*\*\*

factor(con\_telephone)1 1.070e+00 8.761e-02 12.218 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.725e-01 6.120e-02 -2.819 0.00481 \*\*

factor(married)1 -3.367e-01 4.063e-02 -8.286 < 2e-16 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 3.144e-01 7.218e-02 4.355 1.33e-05 \*\*\*

factor(joblue.collar)1 -1.486e-01 6.946e-02 -2.139 0.03240 \*

factor(joentrepreneur)1 -8.958e-02 1.218e-01 -0.735 0.46216

factor(johousemaid)1 -2.595e-01 1.298e-01 -1.999 0.04562 \*

factor(jomanagement)1 2.550e-01 6.319e-02 4.036 5.44e-05 \*\*\*

factor(joretired)1 6.549e-01 8.300e-02 7.891 3.00e-15 \*\*\*

factor(jostudent)1 8.219e-01 1.042e-01 7.887 3.09e-15 \*\*\*

factor(jotechnician)1 8.097e-02 6.757e-02 1.198 0.23076

factor(jounemployed)1 9.940e-02 1.088e-01 0.913 0.36109

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22640 on 45187 degrees of freedom

AIC: 22688

Number of Fisher Scoring iterations: 6

**After removing joentrepreneur & jounemployed**

> logit6<- glm(y~factor(default)+balance+factor(housing)+factor(loan)+duration+campaign+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(jostudent)+factor(jotechnician),family="binomial",data = bank\_data)

> summary(logit6)

Call:

glm(formula = y ~ factor(default) + balance + factor(housing) +

factor(loan) + duration + campaign + previous + factor(poutfailure) +

factor(poutother) + factor(poutsuccess) + factor(poutunknown) +

factor(con\_cellular) + factor(con\_telephone) + factor(con\_unknown) +

factor(divorced) + factor(married) + factor(single) + factor(joadmin.) +

factor(joblue.collar) + factor(johousemaid) + factor(jomanagement) +

factor(joretired) + factor(jostudent) + factor(jotechnician),

family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6745 -0.4060 -0.2732 -0.1625 3.4150

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.853e+00 8.088e-02 -47.639 < 2e-16 \*\*\*

factor(default)1 -1.860e-01 1.613e-01 -1.153 0.24898

balance 1.878e-05 4.825e-06 3.893 9.89e-05 \*\*\*

factor(housing)1 -7.779e-01 3.864e-02 -20.133 < 2e-16 \*\*\*

factor(loan)1 -5.770e-01 5.798e-02 -9.951 < 2e-16 \*\*\*

duration 4.048e-03 6.263e-05 64.636 < 2e-16 \*\*\*

campaign -1.094e-01 9.901e-03 -11.053 < 2e-16 \*\*\*

previous 1.037e-02 6.416e-03 1.616 0.10601

factor(poutfailure)1 2.894e-01 5.750e-02 5.033 4.82e-07 \*\*\*

factor(poutother)1 5.288e-01 7.992e-02 6.617 3.66e-11 \*\*\*

factor(poutsuccess)1 2.591e+00 6.666e-02 38.863 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.168e+00 5.757e-02 20.280 < 2e-16 \*\*\*

factor(con\_telephone)1 1.071e+00 8.760e-02 12.229 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.739e-01 6.118e-02 -2.843 0.00448 \*\*

factor(married)1 -3.391e-01 4.058e-02 -8.357 < 2e-16 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 3.090e-01 6.565e-02 4.707 2.52e-06 \*\*\*

factor(joblue.collar)1 -1.532e-01 6.269e-02 -2.443 0.01456 \*

factor(johousemaid)1 -2.652e-01 1.261e-01 -2.103 0.03547 \*

factor(jomanagement)1 2.493e-01 5.541e-02 4.499 6.82e-06 \*\*\*

factor(joretired)1 6.491e-01 7.693e-02 8.438 < 2e-16 \*\*\*

factor(jostudent)1 8.139e-01 9.972e-02 8.162 3.29e-16 \*\*\*

factor(jotechnician)1 7.530e-02 6.043e-02 1.246 0.21278

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22642 on 45189 degrees of freedom

AIC: 22686

Number of Fisher Scoring iterations: 6

**After removing jotechnician & default**

> logit7<- glm(y~balance+factor(housing)+factor(loan)+duration+campaign+previous+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(poutunknown)+factor(con\_cellular)+factor(con\_telephone)+factor(con\_unknown)+factor(divorced)+factor(married)+factor(single)+factor(joadmin.)+factor(joblue.collar)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(jostudent),family="binomial",data = bank\_data)

> summary(logit7)

Call:

glm(formula = y ~ balance + factor(housing) + factor(loan) +

duration + campaign + previous + factor(poutfailure) + factor(poutother) +

factor(poutsuccess) + factor(poutunknown) + factor(con\_cellular) +

factor(con\_telephone) + factor(con\_unknown) + factor(divorced) +

factor(married) + factor(single) + factor(joadmin.) + factor(joblue.collar) +

factor(johousemaid) + factor(jomanagement) + factor(joretired) +

factor(jostudent), family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6657 -0.4060 -0.2734 -0.1628 3.4046

Coefficients: (3 not defined because of singularities)

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.821e+00 7.526e-02 -50.773 < 2e-16 \*\*\*

balance 1.901e-05 4.811e-06 3.952 7.75e-05 \*\*\*

factor(housing)1 -7.771e-01 3.863e-02 -20.120 < 2e-16 \*\*\*

factor(loan)1 -5.822e-01 5.783e-02 -10.068 < 2e-16 \*\*\*

duration 4.047e-03 6.259e-05 64.650 < 2e-16 \*\*\*

campaign -1.093e-01 9.893e-03 -11.045 < 2e-16 \*\*\*

previous 1.043e-02 6.431e-03 1.622 0.104805

factor(poutfailure)1 2.904e-01 5.750e-02 5.050 4.42e-07 \*\*\*

factor(poutother)1 5.294e-01 7.995e-02 6.622 3.55e-11 \*\*\*

factor(poutsuccess)1 2.593e+00 6.666e-02 38.903 < 2e-16 \*\*\*

factor(poutunknown)1 NA NA NA NA

factor(con\_cellular)1 1.170e+00 5.753e-02 20.334 < 2e-16 \*\*\*

factor(con\_telephone)1 1.072e+00 8.758e-02 12.241 < 2e-16 \*\*\*

factor(con\_unknown)1 NA NA NA NA

factor(divorced)1 -1.768e-01 6.115e-02 -2.891 0.003845 \*\*

factor(married)1 -3.407e-01 4.053e-02 -8.405 < 2e-16 \*\*\*

factor(single)1 NA NA NA NA

factor(joadmin.)1 2.739e-01 5.870e-02 4.667 3.06e-06 \*\*\*

factor(joblue.collar)1 -1.889e-01 5.562e-02 -3.397 0.000681 \*\*\*

factor(johousemaid)1 -3.002e-01 1.228e-01 -2.444 0.014516 \*

factor(jomanagement)1 2.135e-01 4.695e-02 4.547 5.45e-06 \*\*\*

factor(joretired)1 6.152e-01 7.148e-02 8.606 < 2e-16 \*\*\*

factor(jostudent)1 7.786e-01 9.495e-02 8.200 2.40e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22645 on 45191 degrees of freedom

AIC: 22685

Number of Fisher Scoring iterations: 6

**After removing previous, poutunknown, con\_unknown & single**

> logit10<- glm(y~balance+factor(housing)+factor(loan)+duration+campaign+factor(poutfailure)+factor(poutother)+factor(poutsuccess)+factor(con\_cellular)+factor(con\_telephone)+factor(divorced)+factor(married)+factor(joadmin.)+factor(joblue.collar)+factor(johousemaid)+factor(jomanagement)+factor(joretired)+factor(jostudent),family="binomial",data = bank\_data)

> summary(logit10)

Call:

glm(formula = y ~ balance + factor(housing) + factor(loan) +

duration + campaign + factor(poutfailure) + factor(poutother) +

factor(poutsuccess) + factor(con\_cellular) + factor(con\_telephone) +

factor(divorced) + factor(married) + factor(joadmin.) + factor(joblue.collar) +

factor(johousemaid) + factor(jomanagement) + factor(joretired) +

factor(jostudent), family = "binomial", data = bank\_data)

Deviance Residuals:

Min 1Q Median 3Q Max

-5.6659 -0.4061 -0.2734 -0.1628 3.4004

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -3.823e+00 7.525e-02 -50.801 < 2e-16 \*\*\*

balance 1.903e-05 4.811e-06 3.954 7.67e-05 \*\*\*

factor(housing)1 -7.763e-01 3.862e-02 -20.101 < 2e-16 \*\*\*

factor(loan)1 -5.816e-01 5.782e-02 -10.058 < 2e-16 \*\*\*

duration 4.047e-03 6.259e-05 64.649 < 2e-16 \*\*\*

campaign -1.088e-01 9.881e-03 -11.011 < 2e-16 \*\*\*

factor(poutfailure)1 3.206e-01 5.432e-02 5.901 3.60e-09 \*\*\*

factor(poutother)1 5.715e-01 7.554e-02 7.565 3.87e-14 \*\*\*

factor(poutsuccess)1 2.625e+00 6.370e-02 41.219 < 2e-16 \*\*\*

factor(con\_cellular)1 1.170e+00 5.753e-02 20.330 < 2e-16 \*\*\*

factor(con\_telephone)1 1.074e+00 8.756e-02 12.267 < 2e-16 \*\*\*

factor(divorced)1 -1.770e-01 6.116e-02 -2.895 0.003792 \*\*

factor(married)1 -3.403e-01 4.053e-02 -8.396 < 2e-16 \*\*\*

factor(joadmin.)1 2.743e-01 5.870e-02 4.674 2.96e-06 \*\*\*

factor(joblue.collar)1 -1.897e-01 5.562e-02 -3.410 0.000649 \*\*\*

factor(johousemaid)1 -3.006e-01 1.228e-01 -2.447 0.014395 \*

factor(jomanagement)1 2.149e-01 4.694e-02 4.579 4.68e-06 \*\*\*

factor(joretired)1 6.150e-01 7.148e-02 8.604 < 2e-16 \*\*\*

factor(jostudent)1 7.789e-01 9.494e-02 8.204 2.32e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 32631 on 45210 degrees of freedom

Residual deviance: 22648 on 45192 degrees of freedom

AIC: 22686

Number of Fisher Scoring iterations: 6

> exp(coef(logit10))

(Intercept) balance factor(housing)1

0.02186255 1.00001903 0.46012374

factor(loan)1 duration campaign

0.55901143 1.00405472 0.89690644

factor(poutfailure)1 factor(poutother)1 factor(poutsuccess)1

1.37794412 1.77086670 13.81123294

factor(con\_cellular)1 factor(con\_telephone)1 factor(divorced)1

3.22091301 2.92712022 0.83774286

factor(married)1 factor(joadmin.)1 factor(joblue.collar)1

0.71154805 1.31565109 0.82721637

factor(johousemaid)1 factor(jomanagement)1 factor(joretired)1

0.74038523 1.23975840 1.84967292

factor(jostudent)1

2.17908489

> prob<- predict(logit10,type=c("response"),bank\_data)

> table(bank\_data$y)

0 1

39922 5289

> prob

1 2 3 4 5 6 7

0.023281818 0.016359243 0.004857472 0.007867534 0.041864368 0.013835595 0.014948051

8 9 10 11 12 13 14

0.033981294 0.014361777 0.011270828 0.023955924 0.020393817 0.049444661 0.008495370

15 16 17 18 19 20 21

0.012853787 0.047400152 0.017345817 0.006161295 0.028030854 0.007924469 0.008614242

22 23 24 25 26 27 28

0.015443711 0.007911950 0.025001608 0.013619860 0.016543161 0.035898320 0.005976750

29 30 31 32 33 34 35

0.027258598 0.020304506 0.019317220 0.019927057 0.010844517 0.013079647 0.036563110

36 37 38 39 40 41 42

0.019750432 0.022727292 0.921964630 0.093953701 0.020246104 0.014943193 0.014586891

43 44 45 46 47 48 49

0.005782943 0.833982821 0.125772501 0.030539815 0.026115397 0.014109552 0.030431141

50 51 52 53 54 55 56

0.046342671 0.015717958 0.025306924 0.016157003 0.222605160 0.008970138 0.021781933

57 58 59 60 61 62 63

0.016886299 0.005598635 0.015540087 0.895646117 0.014548603 0.170724851 0.010255034

64 65 66 67 68 69 70

0.030734969 0.022085344 0.012856499 0.179664306 0.027535718 0.011042680 0.010660117

71 72 73 74 75 76 77

0.009352557 0.007150019 0.008272630 0.016955356 0.013666018 0.013011012 0.015090534

78 79 80 81 82 83 84

0.063277226 0.012542380 0.017235590 0.025361986 0.037404370 0.009814949 0.374496354

85 86 87 88 89 90 91

0.009642444 0.039054881 0.874278811 0.644836776 0.009956626 0.021784506 0.028701538

92 93 94 95 96 97 98

0.007585180 0.082459680 0.012834040 0.032000369 0.024380555 0.035807017 0.017582579

99 100 101 102 103 104 105

0.014387367 0.017431032 0.014616015 0.018737658 0.013269129 0.005326669 0.043545092

106 107 108 109 110 111 112

0.011660104 0.013698920 0.011060945 0.117891114 0.182903387 0.016310945 0.028619603

113 114 115 116 117 118 119

0.007528293 0.016754083 0.021132992 0.012810219 0.064691288 0.046465323 0.040362814

120 121 122 123 124 125 126

0.020321652 0.042794804 0.007261540 0.010922017 0.005356587 0.015590078 0.022872943

127 128 129 130 131 132 133

0.008552890 0.004895081 0.009383330 0.065478438 0.214983843 0.045933671 0.019314818

134 135 136 137 138 139 140

0.008975947 0.013241982 0.011483676 0.015402286 0.025670978 0.043453115 0.045484290

141 142 143 144 145 146 147

0.010899573 0.029598541 0.016542247 0.011987257 0.007841897 0.008487521 0.010476126

148 149 150 151 152 153 154

0.016965246 0.012075230 0.047548270 0.009124482 0.172278168 0.967486755 0.011105547

155 156 157 158 159 160 161

0.019513312 0.009050383 0.006884549 0.035471902 0.006277739 0.008068433 0.010121312

162 163 164 165 166 167 168

0.018438031 0.026925052 0.032546543 0.018814015 0.029041841 0.011801253 0.017107651

169 170 171 172 173 174 175

0.201047359 0.023281170 0.275893688 0.010026034 0.017493595 0.060081105 0.016578057

176 177 178 179 180 181 182

0.051091617 0.011750343 0.006185729 0.035578630 0.128981168 0.022289628 0.098398548

183 184 185 186 187 188 189

0.334225696 0.033563024 0.013546046 0.022907710 0.028553010 0.031890387 0.016655573

190 191 192 193 194 195 196

0.098058598 0.024200647 0.018924867 0.012539551 0.011047513 0.017025265 0.022970155

197 198 199 200 201 202 203

0.017261397 0.013512134 0.022098040 0.007965828 0.080541152 0.020017678 0.035677136

204 205 206 207 208 209 210

0.173668110 0.041389951 0.029113520 0.005263287 0.021712254 0.045123674 0.027591174

211 212 213 214 215 216 217

0.016559216 0.025042379 0.045936038 0.014878315 0.016734150 0.012625244 0.046857908

218 219 220 221 222 223 224

0.055704192 0.021080789 0.006674733 0.026607804 0.010731952 0.024784373 0.024402935

225 226 227 228 229 230 231

0.702832104 0.007878214 0.015233976 0.012331085 0.026913009 0.012674493 0.005678148

232 233 234 235 236 237 238

0.100126495 0.105943405 0.019125991 0.014391439 0.006207880 0.018322251 0.007257975

239 240 241 242 243 244 245

0.022402670 0.016586542 0.006003486 0.099231021 0.032712444 0.010285758 0.017112804

246 247 248 249 250 251 252

0.075175957 0.013623933 0.009269742 0.016500322 0.097512379 0.010317372 0.006137322

253 254 255 256 257 258 259

0.015774845 0.018635702 0.017881580 0.022489866 0.008242648 0.011022025 0.014615642

260 261 262 263 264 265 266

0.018085966 0.053499727 0.015694530 0.010889754 0.009575146 0.011741188 0.024666664

267 268 269 270 271 272 273

0.020499530 0.095024104 0.004152700 0.033423300 0.051692143 0.234687934 0.004899104

274 275 276 277 278 279 280

0.020918168 0.010911858 0.016852946 0.012850698 0.031276249 0.010959663 0.026192347

281 282 283 284 285 286 287

0.050134810 0.005256422 0.034251333 0.008887820 0.006784523 0.025948458 0.012493042

288 289 290 291 292 293 294

0.007310486 0.015303967 0.011198151 0.010512929 0.141143253 0.038265672 0.024592803

295 296 297 298 299 300 301

0.019655125 0.027948715 0.014815197 0.038757866 0.008309677 0.007546717 0.007346858

302 303 304 305 306 307 308

0.022046571 0.028343627 0.018971448 0.013300711 0.013332277 0.009947596 0.006528500

309 310 311 312 313 314 315

0.005702182 0.010799910 0.011575964 0.008978134 0.013187855 0.008995901 0.038109264

316 317 318 319 320 321 322

0.031038813 0.016543070 0.034094992 0.053390579 0.022410283 0.009501101 0.012567793

323 324 325 326 327 328 329

0.015649181 0.027382727 0.023032803 0.026806802 0.015182706 0.018497423 0.012273102

330 331 332 333 334 335 336

0.012491127 0.122147056 0.025932230 0.011697898 0.014805232 0.040964782 0.006576820

337 338 339 340 341 342 343

0.019222212 0.005925136 0.095487774 0.018842151 0.010807789 0.012458378 0.011550562

344 345 346 347 348 349 350

0.017940987 0.006685136 0.087451322 0.006762946 0.069324038 0.025050791 0.012946229

351 352 353 354 355 356 357

0.015656074 0.111450787 0.015071454 0.010376533 0.051087340 0.024112623 0.026891016

358 359 360 361 362 363 364

0.039388106 0.009135645 0.015692058 0.028721754 0.009268457 0.007320584 0.019295752

365 366 367 368 369 370 371

0.014508335 0.012212528 0.014888713 0.031312709 0.023499894 0.023947802 0.025186565

372 373 374 375 376 377 378

0.010295867 0.141990496 0.036470944 0.011309249 0.010362442 0.046787609 0.013583153

379 380 381 382 383 384 385

0.025088201 0.013453236 0.009144144 0.012887994 0.044734805 0.097723654 0.026314598

386 387 388 389 390 391 392

0.005197995 0.010602805 0.033984622 0.368335124 0.017116360 0.477066905 0.013662724

393 394 395 396 397 398 399

0.011953458 0.022082402 0.098664675 0.006957477 0.029484504 0.024358602 0.014305124

400 401 402 403 404 405 406

0.009765801 0.007791894 0.019617222 0.010626312 0.011876185 0.027670615 0.060767103

407 408 409 410 411 412 413

0.112365218 0.013646791 0.043584760 0.015391729 0.022275085 0.075134899 0.108767420

414 415 416 417 418 419 420

0.015504606 0.011485667 0.014129020 0.097339661 0.017007298 0.007372026 0.074055071

421 422 423 424 425 426 427

0.062940281 0.017762126 0.045318907 0.013027515 0.015114452 0.015642602 0.019650828

428 429 430 431 432 433 434

0.007461445 0.013738645 0.011602718 0.146674786 0.153697585 0.015099822 0.008529706

435 436 437 438 439 440 441

0.010565393 0.015313857 0.029718042 0.022976185 0.035339082 0.015352440 0.017094570

442 443 444 445 446 447 448

0.014060448 0.016401740 0.027037737 0.011263495 0.017021807 0.938216603 0.009553428

449 450 451 452 453 454 455

0.015993549 0.013755544 0.026578230 0.018871134 0.019580731 0.024257944 0.005646275

456 457 458 459 460 461 462

0.015376916 0.013003305 0.069911190 0.041514543 0.008506260 0.020928022 0.013564243

463 464 465 466 467 468 469

0.008611901 0.007953737 0.015296648 0.033308103 0.024586136 0.076339414 0.010980540

470 471 472 473 474 475 476

0.012281975 0.008427728 0.083505297 0.006405441 0.007948198 0.942933515 0.014935374

477 478 479 480 481 482 483

0.029083396 0.015434643 0.040054792 0.023920472 0.006519504 0.011600495 0.008245085

484 485 486 487 488 489 490

0.024007554 0.009089761 0.120897851 0.021011924 0.014995118 0.012603367 0.016726326

491 492 493 494 495 496 497

0.011601259 0.012517580 0.020344935 0.045413457 0.011811363 0.021073884 0.013812557

498 499 500 501 502 503 504

0.013318960 0.007394706 0.017223766 0.007971660 0.023002563 0.027734847 0.021339205

505 506 507 508 509 510 511

0.019744697 0.012378563 0.106435841 0.013683612 0.034453607 0.029846889 0.020786392

512 513 514 515 516 517 518

0.018065160 0.238118666 0.007717180 0.013311738 0.006411939 0.017294012 0.012353153

519 520 521 522 523 524 525

0.005800258 0.013019901 0.033068034 0.032055036 0.014107213 0.025597946 0.030497358

526 527 528 529 530 531 532

0.021453282 0.022598596 0.019257184 0.050600755 0.019145775 0.021491273 0.042346946

533 534 535 536 537 538 539

0.019899166 0.021193947 0.022954523 0.011602435 0.007106158 0.013601635 0.005592177

540 541 542 543 544 545 546

0.006496891 0.027831982 0.014486528 0.010754506 0.021316345 0.010625312 0.018181859

547 548 549 550 551 552 553

0.006914419 0.014416572 0.011480839 0.033699060 0.006189019 0.011883499 0.059577673

554 555 556 557 558 559 560

0.015983274 0.008658535 0.012632151 0.012952354 0.016273237 0.016368714 0.016252565

561 562 563 564 565 566 567

0.013435105 0.018178920 0.031142172 0.011759626 0.006217436 0.015269908 0.046552445

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[ reached getOption("max.print") -- omitted 44211 entries ]

> confusion<- table(prob>0.5,bank\_data$y)

> confusion

0 1

FALSE 39017 3581

TRUE 905 1708

> accurecy<- sum(diag(confusion))/sum(confusion)

> accurecy

[1] 0.9007764