> data<-BaseMetrics

> names(data)

[1] "file\_name" "Code\_Ownership\_count"

[3] "lines\_added" "lines\_deleted"

[5] "Pre\_release\_bugs" "Post\_release\_bugs"

[7] "AvgCyclomatic" "AvgCyclomaticModified"

[9] "AvgCyclomaticStrict" "AvgEssential"

[11] "AvgLine" "AvgLineBlank"

[13] "AvgLineCode" "AvgLineComment"

[15] "CountClassBase" "CountClassCoupled"

[17] "CountClassCoupledModified" "CountDeclClass"

[19] "CountDeclClassMethod" "CountDeclClassVariable"

[21] "CountDeclExecutableUnit" "CountDeclFunction"

[23] "CountDeclInstanceMethod" "CountDeclInstanceVariable"

[25] "CountDeclMethod" "CountDeclMethodAll"

[27] "CountDeclMethodDefault" "CountDeclMethodPrivate"

[29] "CountDeclMethodProtected" "CountDeclMethodPublic"

[31] "CountLine" "CountLineBlank"

[33] "CountLineCode" "CountLineCodeDecl"

[35] "CountLineCodeExe" "CountLineComment"

[37] "CountSemicolon" "CountStmt"

[39] "CountStmtDecl" "CountStmtExe"

[41] "MaxCyclomatic" "MaxCyclomaticModified"

[43] "MaxCyclomaticStrict" "MaxEssential"

[45] "MaxNesting" "RatioCommentToCode"

[47] "SumCyclomatic" "SumCyclomaticModified"

[49] "SumCyclomaticStrict" "SumEssential"

> summary(data)

file\_name Code\_Ownership\_count lines\_added lines\_deleted

Length:484 Min. : 1.000 Min. : 0.000 Min. : 0.000

Class :character 1st Qu.: 4.000 1st Qu.: 0.000 1st Qu.: 0.000

Mode :character Median : 4.000 Median : 0.000 Median : 0.000

Mean : 7.252 Mean : 7.757 Mean : 1.237

3rd Qu.:11.000 3rd Qu.: 2.000 3rd Qu.: 1.000

Max. :18.000 Max. :544.000 Max. :56.000

NA's :2 NA's :2

Pre\_release\_bugs Post\_release\_bugs AvgCyclomatic AvgCyclomaticModified

Min. :0.00000 Min. : 0.000 Min. : 1.000 Min. : 1.000

1st Qu.:0.00000 1st Qu.: 0.000 1st Qu.: 1.000 1st Qu.: 1.000

Median :0.00000 Median : 0.000 Median : 1.000 Median : 1.000

Mean :0.09731 Mean : 1.197 Mean : 1.874 Mean : 1.834

3rd Qu.:0.00000 3rd Qu.: 2.000 3rd Qu.: 2.000 3rd Qu.: 2.000

Max. :4.00000 Max. :23.000 Max. :23.000 Max. :23.000

NA's :1 NA's :1 NA's :1 NA's :1

AvgCyclomaticStrict AvgEssential AvgLine AvgLineBlank

Min. : 1.000 Min. : 1.000 Min. : 1.00 Min. : 0.0000

1st Qu.: 1.000 1st Qu.: 1.000 1st Qu.: 7.00 1st Qu.: 0.0000

Median : 2.000 Median : 1.000 Median : 9.00 Median : 0.0000

Mean : 2.027 Mean : 1.104 Mean :11.01 Mean : 0.1988

3rd Qu.: 2.000 3rd Qu.: 1.000 3rd Qu.:13.50 3rd Qu.: 0.0000

Max. :33.000 Max. :10.000 Max. :87.00 Max. :10.0000

NA's :1 NA's :1 NA's :1 NA's :1

AvgLineCode AvgLineComment CountClassBase CountClassCoupled

Min. : 1.0 Min. : 0.0000 Min. :0.000000 Min. : 0.000

1st Qu.: 6.0 1st Qu.: 0.0000 1st Qu.:0.000000 1st Qu.: 0.000

Median : 8.0 Median : 0.0000 Median :0.000000 Median : 0.000

Mean : 9.3 Mean : 0.9772 Mean :0.008282 Mean : 0.118

3rd Qu.:11.0 3rd Qu.: 1.5000 3rd Qu.:0.000000 3rd Qu.: 0.000

Max. :66.0 Max. :19.0000 Max. :3.000000 Max. :34.000

NA's :1 NA's :1 NA's :1 NA's :1

CountClassCoupledModified CountDeclClass CountDeclClassMethod

Min. : 0.00000 Min. : 0.000 Min. : 0.000

1st Qu.: 0.00000 1st Qu.: 1.000 1st Qu.: 0.000

Median : 0.00000 Median : 2.000 Median : 0.000

Mean : 0.05176 Mean : 3.433 Mean : 2.416

3rd Qu.: 0.00000 3rd Qu.: 4.000 3rd Qu.: 2.000

Max. :18.00000 Max. :46.000 Max. :117.000

NA's :1 NA's :1 NA's :1

CountDeclClassVariable CountDeclExecutableUnit CountDeclFunction

Min. : 0.000 Min. : 0.00 Min. : 1.00

1st Qu.: 0.000 1st Qu.: 7.00 1st Qu.: 7.00

Median : 1.000 Median : 14.00 Median : 14.00

Mean : 2.795 Mean : 23.22 Mean : 23.75

3rd Qu.: 3.000 3rd Qu.: 27.00 3rd Qu.: 28.00

Max. :70.000 Max. :269.00 Max. :269.00

NA's :1 NA's :1 NA's :3

CountDeclInstanceMethod CountDeclInstanceVariable CountDeclMethod

Min. : 0.0 Min. : 0.000 Min. : 1.00

1st Qu.: 5.0 1st Qu.: 2.000 1st Qu.: 7.00

Median : 12.0 Median : 5.000 Median : 14.00

Mean : 19.9 Mean : 8.217 Mean : 22.31

3rd Qu.: 25.5 3rd Qu.:11.000 3rd Qu.: 27.00

Max. :229.0 Max. :78.000 Max. :233.00

NA's :1 NA's :1 NA's :1

CountDeclMethodAll CountDeclMethodDefault CountDeclMethodPrivate

Min. : 0.0000 Min. : 0.000 Min. : 0.000

1st Qu.: 0.0000 1st Qu.: 0.000 1st Qu.: 0.000

Median : 0.0000 Median : 1.000 Median : 1.000

Mean : 0.1346 Mean : 2.323 Mean : 2.652

3rd Qu.: 0.0000 3rd Qu.: 3.000 3rd Qu.: 3.000

Max. :39.0000 Max. :32.000 Max. :65.000

NA's :1 NA's :1 NA's :1

CountDeclMethodProtected CountDeclMethodPublic CountLine CountLineBlank

Min. : 0.000 Min. : 0.00 Min. : 36.0 Min. : 3.00

1st Qu.: 0.000 1st Qu.: 3.00 1st Qu.: 125.0 1st Qu.: 15.00

Median : 0.000 Median : 8.00 Median : 227.0 Median : 26.00

Mean : 1.919 Mean : 15.42 Mean : 346.6 Mean : 39.07

3rd Qu.: 3.000 3rd Qu.: 19.00 3rd Qu.: 404.0 3rd Qu.: 46.50

Max. :34.000 Max. :168.00 Max. :3415.0 Max. :284.00

NA's :1 NA's :1 NA's :1 NA's :1

CountLineCode CountLineCodeDecl CountLineCodeExe CountLineComment

Min. : 13.0 Min. : 6.00 Min. : 1.0 Min. : 8.00

1st Qu.: 82.0 1st Qu.: 33.00 1st Qu.: 35.0 1st Qu.: 24.00

Median : 152.0 Median : 59.00 Median : 76.0 Median : 37.00

Mean : 245.4 Mean : 87.73 Mean : 133.5 Mean : 63.73

3rd Qu.: 284.0 3rd Qu.:105.00 3rd Qu.: 160.0 3rd Qu.: 64.00

Max. :2408.0 Max. :717.00 Max. :1429.0 Max. :953.00

NA's :1 NA's :1 NA's :1 NA's :1

CountSemicolon CountStmt CountStmtDecl CountStmtExe

Min. : 5.0 Min. : 9.0 Min. : 6.00 Min. : 1.00

1st Qu.: 40.5 1st Qu.: 57.0 1st Qu.: 31.00 1st Qu.: 24.00

Median : 76.0 Median : 106.0 Median : 54.00 Median : 54.00

Mean : 121.3 Mean : 171.5 Mean : 80.06 Mean : 91.47

3rd Qu.: 145.0 3rd Qu.: 207.5 3rd Qu.: 96.00 3rd Qu.:114.50

Max. :1130.0 Max. :1576.0 Max. :625.00 Max. :951.00

NA's :1 NA's :1 NA's :1 NA's :1

MaxCyclomatic MaxCyclomaticModified MaxCyclomaticStrict MaxEssential

Min. : 1.00 Min. : 1.000 Min. : 1.000 Min. : 1.0

1st Qu.: 4.00 1st Qu.: 3.000 1st Qu.: 4.000 1st Qu.: 1.0

Median : 6.00 Median : 6.000 Median : 7.000 Median : 3.0

Mean : 8.64 Mean : 8.395 Mean : 9.888 Mean : 3.7

3rd Qu.:11.00 3rd Qu.:10.000 3rd Qu.: 12.500 3rd Qu.: 5.0

Max. :86.00 Max. :86.000 Max. :160.000 Max. :56.0

NA's :1 NA's :1 NA's :1 NA's :1

MaxNesting RatioCommentToCode SumCyclomatic SumCyclomaticModified

Min. :0.000 Min. :0.0000 Min. : 0.00 Min. : 0.00

1st Qu.:2.000 1st Qu.:0.1700 1st Qu.: 14.00 1st Qu.: 14.00

Median :3.000 Median :0.2800 Median : 28.00 Median : 27.00

Mean :2.803 Mean :0.3655 Mean : 47.76 Mean : 47.22

3rd Qu.:4.000 3rd Qu.:0.4600 3rd Qu.: 55.50 3rd Qu.: 55.50

Max. :8.000 Max. :3.4700 Max. :468.00 Max. :460.00

NA's :1 NA's :1 NA's :1 NA's :1

SumCyclomaticStrict SumEssential

Min. : 0.00 Min. : 0.00

1st Qu.: 15.00 1st Qu.: 8.00

Median : 30.00 Median : 18.00

Mean : 51.37 Mean : 28.65

3rd Qu.: 59.50 3rd Qu.: 34.00

Max. :525.00 Max. :302.00

NA's :1 NA's :1

> data$Code\_Ownership\_count<-as.numeric(data$Code\_Ownership\_count)

> data$lines\_added<-as.numeric(data$lines\_added)

> data$lines\_deleted<-as.numeric(data$lines\_deleted)

> str(data)

tibble [484 × 50] (S3: tbl\_df/tbl/data.frame)

$ file\_name : chr [1:484] "C:\\Users\\ktanu\\Downloads\\elasticsearch-2.4.0\\plugins\\analysis-icu\\src\\main\\java\\org\\elasticsearch\\i"| \_\_truncated\_\_ "C:\\Users\\ktanu\\Downloads\\elasticsearch-2.4.0\\plugins\\analysis-icu\\src\\main\\java\\org\\elasticsearch\\i"| \_\_truncated\_\_ "C:\\Users\\ktanu\\Downloads\\elasticsearch-2.4.0\\plugins\\analysis-kuromoji\\src\\main\\java\\org\\elasticsear"| \_\_truncated\_\_ "C:\\Users\\ktanu\\Downloads\\elasticsearch-2.4.0\\plugins\\analysis-stempel\\src\\main\\java\\org\\elasticsearc"| \_\_truncated\_\_ ...

$ Code\_Ownership\_count : num [1:484] 4 7 13 13 8 6 6 6 6 7 ...

$ lines\_added : num [1:484] 0 0 0 0 0 4 6 0 1 0 ...

$ lines\_deleted : num [1:484] 0 0 0 0 0 8 1 0 2 0 ...

$ Pre\_release\_bugs : num [1:484] 0 0 0 0 0 1 1 0 0 0 ...

$ Post\_release\_bugs : num [1:484] 0 0 0 0 0 3 2 0 3 0 ...

$ AvgCyclomatic : num [1:484] 2 14 4 1 2 1 4 2 2 1 ...

$ AvgCyclomaticModified : num [1:484] 2 14 4 1 2 1 4 2 2 1 ...

$ AvgCyclomaticStrict : num [1:484] 2 14 4 1 2 1 6 2 2 1 ...

$ AvgEssential : num [1:484] 1 1 1 1 2 1 2 1 1 1 ...

$ AvgLine : num [1:484] 16 60 15 3 11 7 19 9 10 6 ...

$ AvgLineBlank : num [1:484] 0 5 0 0 0 0 1 0 0 0 ...

$ AvgLineCode : num [1:484] 13 54 15 3 10 6 17 6 9 6 ...

$ AvgLineComment : num [1:484] 3 1 0 0 1 1 0 2 0 0 ...

$ CountClassBase : num [1:484] 0 0 0 0 0 0 0 0 0 0 ...

$ CountClassCoupled : num [1:484] 0 0 0 0 0 0 0 0 0 0 ...

$ CountClassCoupledModified: num [1:484] 0 0 0 0 0 0 0 0 0 0 ...

$ CountDeclClass : num [1:484] 1 1 1 1 1 1 1 1 1 4 ...

$ CountDeclClassMethod : num [1:484] 0 0 2 0 14 2 1 2 3 2 ...

$ CountDeclClassVariable : num [1:484] 0 0 4 0 1 1 0 1 2 0 ...

$ CountDeclExecutableUnit : num [1:484] 2 2 4 2 14 10 8 3 43 17 ...

$ CountDeclFunction : num [1:484] 2 2 4 2 14 10 8 3 43 17 ...

$ CountDeclInstanceMethod : num [1:484] 2 2 2 2 0 5 7 1 18 15 ...

$ CountDeclInstanceVariable: num [1:484] 3 1 5 0 0 1 1 0 2 12 ...

$ CountDeclMethod : num [1:484] 2 2 4 2 14 7 8 3 21 17 ...

$ CountDeclMethodAll : num [1:484] 0 0 0 0 0 0 0 0 0 0 ...

$ CountDeclMethodDefault : num [1:484] 0 0 0 0 0 3 0 0 6 3 ...

$ CountDeclMethodPrivate : num [1:484] 0 0 0 0 2 1 3 1 5 0 ...

$ CountDeclMethodProtected : num [1:484] 0 0 0 0 0 0 3 1 0 0 ...

$ CountDeclMethodPublic : num [1:484] 2 2 4 2 12 3 2 1 10 14 ...

$ CountLine : num [1:484] 109 177 120 43 299 131 220 62 477 190 ...

$ CountLineBlank : num [1:484] 6 18 12 8 25 14 27 9 48 36 ...

$ CountLineCode : num [1:484] 41 125 89 17 233 85 164 28 379 133 ...

$ CountLineCodeDecl : num [1:484] 20 34 39 12 100 41 47 10 124 59 ...

$ CountLineCodeExe : num [1:484] 22 83 48 2 123 43 104 12 227 58 ...

$ CountLineComment : num [1:484] 62 34 19 18 41 32 29 25 50 21 ...

$ CountSemicolon : num [1:484] 23 62 53 11 114 49 81 12 195 70 ...

$ CountStmt : num [1:484] 29 91 72 14 150 63 120 19 262 96 ...

$ CountStmtDecl : num [1:484] 17 33 40 12 95 35 41 10 110 54 ...

$ CountStmtExe : num [1:484] 12 58 32 2 55 28 79 9 152 42 ...

$ MaxCyclomatic : num [1:484] 3 27 8 1 5 2 13 3 9 4 ...

$ MaxCyclomaticModified : num [1:484] 3 27 8 1 5 2 13 3 9 4 ...

$ MaxCyclomaticStrict : num [1:484] 3 27 10 1 5 2 22 3 10 5 ...

$ MaxEssential : num [1:484] 1 1 3 1 5 1 13 1 4 4 ...

$ MaxNesting : num [1:484] 2 4 4 0 3 1 2 1 3 2 ...

$ RatioCommentToCode : num [1:484] 1.51 0.27 0.21 1.06 0.18 0.38 0.18 0.89 0.13 0.16 ...

$ SumCyclomatic : num [1:484] 5 28 16 2 35 16 37 6 86 23 ...

$ SumCyclomaticModified : num [1:484] 5 28 16 2 35 16 37 6 86 23 ...

$ SumCyclomaticStrict : num [1:484] 5 28 18 2 37 16 49 6 88 25 ...

$ SumEssential : num [1:484] 2 2 6 2 30 10 20 3 52 22 ...

> nrow(data)

[1] 484

> drop=c("file\_name","Post\_release\_bugs")

>

> independant=data[,!(names(data) %in% drop)]

> names(independant)

[1] "Code\_Ownership\_count" "lines\_added"

[3] "lines\_deleted" "Pre\_release\_bugs"

[5] "AvgCyclomatic" "AvgCyclomaticModified"

[7] "AvgCyclomaticStrict" "AvgEssential"

[9] "AvgLine" "AvgLineBlank"

[11] "AvgLineCode" "AvgLineComment"

[13] "CountClassBase" "CountClassCoupled"

[15] "CountClassCoupledModified" "CountDeclClass"

[17] "CountDeclClassMethod" "CountDeclClassVariable"

[19] "CountDeclExecutableUnit" "CountDeclFunction"

[21] "CountDeclInstanceMethod" "CountDeclInstanceVariable"

[23] "CountDeclMethod" "CountDeclMethodAll"

[25] "CountDeclMethodDefault" "CountDeclMethodPrivate"

[27] "CountDeclMethodProtected" "CountDeclMethodPublic"

[29] "CountLine" "CountLineBlank"

[31] "CountLineCode" "CountLineCodeDecl"

[33] "CountLineCodeExe" "CountLineComment"

[35] "CountSemicolon" "CountStmt"

[37] "CountStmtDecl" "CountStmtExe"

[39] "MaxCyclomatic" "MaxCyclomaticModified"

[41] "MaxCyclomaticStrict" "MaxEssential"

[43] "MaxNesting" "RatioCommentToCode"

[45] "SumCyclomatic" "SumCyclomaticModified"

[47] "SumCyclomaticStrict" "SumEssential"

> independant<-na.omit(independant)

> is.na(independant)

Code\_Ownership\_count lines\_added lines\_deleted Pre\_release\_bugs

[1,] FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE

[6,] FALSE FALSE FALSE FALSE

[7,] FALSE FALSE FALSE FALSE

[8,] FALSE FALSE FALSE FALSE

[9,] FALSE FALSE FALSE FALSE

[10,] FALSE FALSE FALSE FALSE

[11,] FALSE FALSE FALSE FALSE

[12,] FALSE FALSE FALSE FALSE

[13,] FALSE FALSE FALSE FALSE

[14,] FALSE FALSE FALSE FALSE

[15,] FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE

AvgCyclomatic AvgCyclomaticModified AvgCyclomaticStrict AvgEssential

[1,] FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE

[6,] FALSE FALSE FALSE FALSE

[7,] FALSE FALSE FALSE FALSE

[8,] FALSE FALSE FALSE FALSE

[9,] FALSE FALSE FALSE FALSE

[10,] FALSE FALSE FALSE FALSE

[11,] FALSE FALSE FALSE FALSE

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[13,] FALSE FALSE FALSE FALSE

[14,] FALSE FALSE FALSE FALSE

[15,] FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE

AvgLine AvgLineBlank AvgLineCode AvgLineComment CountClassBase

[1,] FALSE FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE FALSE

[6,] FALSE FALSE FALSE FALSE FALSE

[7,] FALSE FALSE FALSE FALSE FALSE

[8,] FALSE FALSE FALSE FALSE FALSE

[9,] FALSE FALSE FALSE FALSE FALSE

[10,] FALSE FALSE FALSE FALSE FALSE

[11,] FALSE FALSE FALSE FALSE FALSE

[12,] FALSE FALSE FALSE FALSE FALSE

[13,] FALSE FALSE FALSE FALSE FALSE

[14,] FALSE FALSE FALSE FALSE FALSE

[15,] FALSE FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE FALSE

CountClassCoupled CountClassCoupledModified CountDeclClass

[1,] FALSE FALSE FALSE

[2,] FALSE FALSE FALSE

[3,] FALSE FALSE FALSE

[4,] FALSE FALSE FALSE

[5,] FALSE FALSE FALSE

[6,] FALSE FALSE FALSE

[7,] FALSE FALSE FALSE

[8,] FALSE FALSE FALSE

[9,] FALSE FALSE FALSE

[10,] FALSE FALSE FALSE

[11,] FALSE FALSE FALSE

[12,] FALSE FALSE FALSE

[13,] FALSE FALSE FALSE

[14,] FALSE FALSE FALSE

[15,] FALSE FALSE FALSE

[16,] FALSE FALSE FALSE

[17,] FALSE FALSE FALSE

[18,] FALSE FALSE FALSE

[19,] FALSE FALSE FALSE

[20,] FALSE FALSE FALSE

CountDeclClassMethod CountDeclClassVariable CountDeclExecutableUnit

[1,] FALSE FALSE FALSE

[2,] FALSE FALSE FALSE

[3,] FALSE FALSE FALSE

[4,] FALSE FALSE FALSE

[5,] FALSE FALSE FALSE

[6,] FALSE FALSE FALSE

[7,] FALSE FALSE FALSE

[8,] FALSE FALSE FALSE

[9,] FALSE FALSE FALSE

[10,] FALSE FALSE FALSE

[11,] FALSE FALSE FALSE

[12,] FALSE FALSE FALSE

[13,] FALSE FALSE FALSE

[14,] FALSE FALSE FALSE

[15,] FALSE FALSE FALSE

[16,] FALSE FALSE FALSE

[17,] FALSE FALSE FALSE

[18,] FALSE FALSE FALSE

[19,] FALSE FALSE FALSE

[20,] FALSE FALSE FALSE

CountDeclFunction CountDeclInstanceMethod CountDeclInstanceVariable

[1,] FALSE FALSE FALSE

[2,] FALSE FALSE FALSE

[3,] FALSE FALSE FALSE

[4,] FALSE FALSE FALSE

[5,] FALSE FALSE FALSE

[6,] FALSE FALSE FALSE

[7,] FALSE FALSE FALSE

[8,] FALSE FALSE FALSE

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[11,] FALSE FALSE FALSE

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[14,] FALSE FALSE FALSE

[15,] FALSE FALSE FALSE

[16,] FALSE FALSE FALSE

[17,] FALSE FALSE FALSE

[18,] FALSE FALSE FALSE

[19,] FALSE FALSE FALSE

[20,] FALSE FALSE FALSE

CountDeclMethod CountDeclMethodAll CountDeclMethodDefault

[1,] FALSE FALSE FALSE

[2,] FALSE FALSE FALSE

[3,] FALSE FALSE FALSE

[4,] FALSE FALSE FALSE

[5,] FALSE FALSE FALSE

[6,] FALSE FALSE FALSE

[7,] FALSE FALSE FALSE

[8,] FALSE FALSE FALSE

[9,] FALSE FALSE FALSE

[10,] FALSE FALSE FALSE

[11,] FALSE FALSE FALSE

[12,] FALSE FALSE FALSE

[13,] FALSE FALSE FALSE

[14,] FALSE FALSE FALSE

[15,] FALSE FALSE FALSE

[16,] FALSE FALSE FALSE

[17,] FALSE FALSE FALSE

[18,] FALSE FALSE FALSE

[19,] FALSE FALSE FALSE

[20,] FALSE FALSE FALSE

CountDeclMethodPrivate CountDeclMethodProtected CountDeclMethodPublic

[1,] FALSE FALSE FALSE

[2,] FALSE FALSE FALSE

[3,] FALSE FALSE FALSE

[4,] FALSE FALSE FALSE

[5,] FALSE FALSE FALSE

[6,] FALSE FALSE FALSE

[7,] FALSE FALSE FALSE

[8,] FALSE FALSE FALSE

[9,] FALSE FALSE FALSE

[10,] FALSE FALSE FALSE

[11,] FALSE FALSE FALSE

[12,] FALSE FALSE FALSE

[13,] FALSE FALSE FALSE

[14,] FALSE FALSE FALSE

[15,] FALSE FALSE FALSE

[16,] FALSE FALSE FALSE

[17,] FALSE FALSE FALSE

[18,] FALSE FALSE FALSE

[19,] FALSE FALSE FALSE

[20,] FALSE FALSE FALSE

CountLine CountLineBlank CountLineCode CountLineCodeDecl CountLineCodeExe

[1,] FALSE FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE FALSE

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[16,] FALSE FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE FALSE

CountLineComment CountSemicolon CountStmt CountStmtDecl CountStmtExe

[1,] FALSE FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE FALSE

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[15,] FALSE FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE FALSE

MaxCyclomatic MaxCyclomaticModified MaxCyclomaticStrict MaxEssential

[1,] FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE

[6,] FALSE FALSE FALSE FALSE

[7,] FALSE FALSE FALSE FALSE

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[15,] FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE

MaxNesting RatioCommentToCode SumCyclomatic SumCyclomaticModified

[1,] FALSE FALSE FALSE FALSE

[2,] FALSE FALSE FALSE FALSE

[3,] FALSE FALSE FALSE FALSE

[4,] FALSE FALSE FALSE FALSE

[5,] FALSE FALSE FALSE FALSE

[6,] FALSE FALSE FALSE FALSE

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[15,] FALSE FALSE FALSE FALSE

[16,] FALSE FALSE FALSE FALSE

[17,] FALSE FALSE FALSE FALSE

[18,] FALSE FALSE FALSE FALSE

[19,] FALSE FALSE FALSE FALSE

[20,] FALSE FALSE FALSE FALSE

SumCyclomaticStrict SumEssential

[1,] FALSE FALSE

[2,] FALSE FALSE

[3,] FALSE FALSE

[4,] FALSE FALSE

[5,] FALSE FALSE

[6,] FALSE FALSE

[7,] FALSE FALSE

[8,] FALSE FALSE

[9,] FALSE FALSE

[10,] FALSE FALSE

[11,] FALSE FALSE

[12,] FALSE FALSE

[13,] FALSE FALSE

[14,] FALSE FALSE

[15,] FALSE FALSE

[16,] FALSE FALSE

[17,] FALSE FALSE

[18,] FALSE FALSE

[19,] FALSE FALSE

[20,] FALSE FALSE

[ reached getOption("max.print") -- omitted 460 rows ]

> zv <- apply(independant, 2, function(independant) length(unique(independant)) == 1)

> dfr <- independant[, !zv]

> n=length(colnames(dfr))

> correlationMatrix <- cor(dfr[,1:n],method="spearman",use="complete.obs")

> correlationMatrix

Code\_Ownership\_count lines\_added lines\_deleted

Code\_Ownership\_count 1.00000000 0.13241839 0.03669759

lines\_added 0.13241839 1.00000000 0.64954558

lines\_deleted 0.03669759 0.64954558 1.00000000

Pre\_release\_bugs -0.09299777 0.18809164 0.16656372

AvgCyclomatic -0.07913570 0.07618848 0.03567956

AvgCyclomaticModified -0.07603526 0.06353978 0.02937368

AvgCyclomaticStrict -0.06365347 0.09136420 0.03789230

AvgEssential -0.06808232 0.02640365 -0.05516171

AvgLine -0.01741188 0.15383784 0.07953007

AvgLineBlank -0.01788217 0.01676411 -0.02373949

AvgLineCode -0.04119252 0.15708199 0.07620498

AvgLineComment 0.04379531 0.06903050 0.05337293

CountDeclClass 0.02423340 0.18471071 0.07311399

CountDeclClassMethod 0.04864114 0.12928765 0.04538343

CountDeclClassVariable 0.03486385 0.20648342 0.10101572

CountDeclExecutableUnit 0.07483065 0.33132690 0.26821365

CountDeclFunction 0.08461739 0.32744687 0.26790163

CountDeclInstanceMethod 0.07114455 0.29605521 0.24262928

CountDeclInstanceVariable 0.06627120 0.23526530 0.16518978

CountDeclMethod 0.07812599 0.29891483 0.23857749

CountDeclMethodDefault -0.02698473 0.14327359 0.09705716

CountDeclMethodPrivate 0.02633417 0.22559332 0.13660400

Pre\_release\_bugs AvgCyclomatic AvgCyclomaticModified

Code\_Ownership\_count -0.09299777 -0.079135701 -0.07603526

lines\_added 0.18809164 0.076188479 0.06353978

lines\_deleted 0.16656372 0.035679559 0.02937368

Pre\_release\_bugs 1.00000000 0.112653661 0.09710952

AvgCyclomatic 0.11265366 1.000000000 0.98262434

AvgCyclomaticModified 0.09710952 0.982624340 1.00000000

AvgCyclomaticStrict 0.10459779 0.932144085 0.91738445

AvgEssential 0.11994158 0.365814429 0.35905106

AvgLine 0.12578741 0.767090592 0.75711041

AvgLineBlank 0.03114160 0.434745572 0.43543042

AvgLineCode 0.13703367 0.796626033 0.78834235

AvgLineComment -0.01956948 0.233475584 0.23191530

CountDeclClass 0.03969944 -0.034814397 -0.05080355

CountDeclClassMethod 0.05027602 0.142759529 0.13751739

CountDeclClassVariable 0.04378889 0.088789976 0.06887272

CountDeclExecutableUnit 0.07411568 -0.114161965 -0.11789917

CountDeclFunction 0.07061824 -0.115040629 -0.11756379

CountDeclInstanceMethod 0.05837151 -0.175600457 -0.17937109

CountDeclInstanceVariable 0.09157739 -0.010939291 -0.02540820

CountDeclMethod 0.07232877 -0.116905478 -0.11972981

CountDeclMethodDefault 0.03992043 0.003113629 -0.00777732

CountDeclMethodPrivate 0.10675595 0.256353358 0.26096596

AvgCyclomaticStrict AvgEssential AvgLine

Code\_Ownership\_count -0.063653468 -0.068082325 -0.01741188

lines\_added 0.091364199 0.026403651 0.15383784

lines\_deleted 0.037892305 -0.055161714 0.07953007

Pre\_release\_bugs 0.104597792 0.119941583 0.12578741

AvgCyclomatic 0.932144085 0.365814429 0.76709059

AvgCyclomaticModified 0.917384455 0.359051060 0.75711041

AvgCyclomaticStrict 1.000000000 0.364154032 0.78514449

AvgEssential 0.364154032 1.000000000 0.25770303

AvgLine 0.785144486 0.257703029 1.00000000

AvgLineBlank 0.423373542 0.259094922 0.50310207

AvgLineCode 0.796542793 0.277467401 0.94769174

AvgLineComment 0.263568545 0.054365483 0.46599500

CountDeclClass -0.026962625 -0.107546238 0.10286914

CountDeclClassMethod 0.170409722 0.006610607 0.17962975

CountDeclClassVariable 0.126415486 -0.039889643 0.13146792

CountDeclExecutableUnit -0.064913792 -0.163320677 0.05018137

CountDeclFunction -0.068224290 -0.172152731 0.05036212

CountDeclInstanceMethod -0.141325774 -0.172705214 -0.04085004

CountDeclInstanceVariable 0.015930666 -0.072913563 0.11306564

CountDeclMethod -0.069386750 -0.154744350 0.03359710

CountDeclMethodDefault 0.002204467 -0.122322584 0.12185885

CountDeclMethodPrivate 0.305255807 0.010835324 0.40010736

AvgLineBlank AvgLineCode AvgLineComment CountDeclClass

Code\_Ownership\_count -0.017882165 -0.041192516 0.04379531 0.024233404

lines\_added 0.016764115 0.157081988 0.06903050 0.184710713

lines\_deleted -0.023739489 0.076204981 0.05337293 0.073113989

Pre\_release\_bugs 0.031141604 0.137033670 -0.01956948 0.039699444

AvgCyclomatic 0.434745572 0.796626033 0.23347558 -0.034814397

AvgCyclomaticModified 0.435430417 0.788342346 0.23191530 -0.050803552

AvgCyclomaticStrict 0.423373542 0.796542793 0.26356854 -0.026962625

AvgEssential 0.259094922 0.277467401 0.05436548 -0.107546238

AvgLine 0.503102072 0.947691738 0.46599500 0.102869144

AvgLineBlank 1.000000000 0.475573603 0.20876536 0.006051955

AvgLineCode 0.475573603 1.000000000 0.24135376 0.142496131

AvgLineComment 0.208765356 0.241353764 1.00000000 -0.059895954

CountDeclClass 0.006051955 0.142496131 -0.05989595 1.000000000

CountDeclClassMethod 0.004276918 0.135517784 0.27264005 0.267344907

CountDeclClassVariable 0.034381804 0.117284090 0.10834714 0.404096220

CountDeclExecutableUnit -0.145928745 0.011382653 0.12444534 0.614310719

CountDeclFunction -0.144694578 0.012088496 0.12272146 0.626219432

CountDeclInstanceMethod -0.148045477 -0.059947018 0.01837170 0.641337200

CountDeclInstanceVariable -0.012665530 0.115841624 0.04166941 0.639752896

CountDeclMethod -0.144386901 -0.007907432 0.11855343 0.634136230

CountDeclMethodDefault 0.020915683 0.135295616 0.06098555 0.527730609

CountDeclMethodPrivate 0.068650903 0.356857689 0.25797009 0.462530806

CountDeclClassMethod CountDeclClassVariable

Code\_Ownership\_count 0.048641140 0.03486385

lines\_added 0.129287650 0.20648342

lines\_deleted 0.045383429 0.10101572

Pre\_release\_bugs 0.050276023 0.04378889

AvgCyclomatic 0.142759529 0.08878998

AvgCyclomaticModified 0.137517385 0.06887272

AvgCyclomaticStrict 0.170409722 0.12641549

AvgEssential 0.006610607 -0.03988964

AvgLine 0.179629746 0.13146792

AvgLineBlank 0.004276918 0.03438180

AvgLineCode 0.135517784 0.11728409

AvgLineComment 0.272640050 0.10834714

CountDeclClass 0.267344907 0.40409622

CountDeclClassMethod 1.000000000 0.44585871

CountDeclClassVariable 0.445858706 1.00000000

CountDeclExecutableUnit 0.439077585 0.48588027

CountDeclFunction 0.434098939 0.49107379

CountDeclInstanceMethod 0.190489425 0.39996337

CountDeclInstanceVariable 0.193262546 0.35308905

CountDeclMethod 0.425639313 0.47999338

CountDeclMethodDefault 0.306060301 0.25603499

CountDeclMethodPrivate 0.521039686 0.42980507

CountDeclExecutableUnit CountDeclFunction

Code\_Ownership\_count 0.07483065 0.08461739

lines\_added 0.33132690 0.32744687

lines\_deleted 0.26821365 0.26790163

Pre\_release\_bugs 0.07411568 0.07061824

AvgCyclomatic -0.11416196 -0.11504063

AvgCyclomaticModified -0.11789917 -0.11756379

AvgCyclomaticStrict -0.06491379 -0.06822429

AvgEssential -0.16332068 -0.17215273

AvgLine 0.05018137 0.05036212

AvgLineBlank -0.14592875 -0.14469458

AvgLineCode 0.01138265 0.01208850

AvgLineComment 0.12444534 0.12272146

CountDeclClass 0.61431072 0.62621943

CountDeclClassMethod 0.43907759 0.43409894

CountDeclClassVariable 0.48588027 0.49107379

CountDeclExecutableUnit 1.00000000 0.99376190

CountDeclFunction 0.99376190 1.00000000

CountDeclInstanceMethod 0.90783831 0.91184205

CountDeclInstanceVariable 0.71072734 0.70809185

CountDeclMethod 0.98747130 0.99110726

CountDeclMethodDefault 0.41950181 0.43826159

CountDeclMethodPrivate 0.58311928 0.58409624

CountDeclInstanceMethod CountDeclInstanceVariable

Code\_Ownership\_count 0.07114455 0.06627120

lines\_added 0.29605521 0.23526530

lines\_deleted 0.24262928 0.16518978

Pre\_release\_bugs 0.05837151 0.09157739

AvgCyclomatic -0.17560046 -0.01093929

AvgCyclomaticModified -0.17937109 -0.02540820

AvgCyclomaticStrict -0.14132577 0.01593067

AvgEssential -0.17270521 -0.07291356

AvgLine -0.04085004 0.11306564

AvgLineBlank -0.14804548 -0.01266553

AvgLineCode -0.05994702 0.11584162

AvgLineComment 0.01837170 0.04166941

CountDeclClass 0.64133720 0.63975290

CountDeclClassMethod 0.19048942 0.19326255

CountDeclClassVariable 0.39996337 0.35308905

CountDeclExecutableUnit 0.90783831 0.71072734

CountDeclFunction 0.91184205 0.70809185

CountDeclInstanceMethod 1.00000000 0.77949151

CountDeclInstanceVariable 0.77949151 1.00000000

CountDeclMethod 0.92235788 0.72424179

CountDeclMethodDefault 0.40603083 0.47612883

CountDeclMethodPrivate 0.43945447 0.39919823

CountDeclMethod CountDeclMethodDefault

Code\_Ownership\_count 0.078125990 -0.026984725

lines\_added 0.298914832 0.143273589

lines\_deleted 0.238577494 0.097057161

Pre\_release\_bugs 0.072328770 0.039920427

AvgCyclomatic -0.116905478 0.003113629

AvgCyclomaticModified -0.119729806 -0.007777320

AvgCyclomaticStrict -0.069386750 0.002204467

AvgEssential -0.154744350 -0.122322584

AvgLine 0.033597097 0.121858851

AvgLineBlank -0.144386901 0.020915683

AvgLineCode -0.007907432 0.135295616

AvgLineComment 0.118553428 0.060985551

CountDeclClass 0.634136230 0.527730609

CountDeclClassMethod 0.425639313 0.306060301

CountDeclClassVariable 0.479993381 0.256034985

CountDeclExecutableUnit 0.987471296 0.419501806

CountDeclFunction 0.991107262 0.438261590

CountDeclInstanceMethod 0.922357881 0.406030832

CountDeclInstanceVariable 0.724241787 0.476128829

CountDeclMethod 1.000000000 0.435426955

CountDeclMethodDefault 0.435426955 1.000000000

CountDeclMethodPrivate 0.569015244 0.392910511

CountDeclMethodPrivate CountDeclMethodProtected

Code\_Ownership\_count 0.02633417 0.115921854

lines\_added 0.22559332 0.199337904

lines\_deleted 0.13660400 0.161110205

Pre\_release\_bugs 0.10675595 0.085457355

AvgCyclomatic 0.25635336 -0.005537208

AvgCyclomaticModified 0.26096596 -0.010580482

AvgCyclomaticStrict 0.30525581 0.017991606

AvgEssential 0.01083532 -0.135584427

AvgLine 0.40010736 0.078502161

AvgLineBlank 0.06865090 -0.047139670

AvgLineCode 0.35685769 0.130320707

AvgLineComment 0.25797009 -0.112957753

CountDeclClass 0.46253081 0.387306322

CountDeclClassMethod 0.52103969 0.058008653

CountDeclClassVariable 0.42980507 0.156984311

CountDeclExecutableUnit 0.58311928 0.305811391

CountDeclFunction 0.58409624 0.321342873

CountDeclInstanceMethod 0.43945447 0.344537266

CountDeclInstanceVariable 0.39919823 0.282733873

CountDeclMethod 0.56901524 0.308737490

CountDeclMethodDefault 0.39291051 0.137072478

CountDeclMethodPrivate 1.00000000 0.230414726

CountDeclMethodPublic CountLine CountLineBlank

Code\_Ownership\_count 0.06223902 0.05831365 0.07401089

lines\_added 0.24823364 0.36127918 0.32108178

lines\_deleted 0.16141112 0.26692642 0.23499305

Pre\_release\_bugs 0.02899082 0.11485455 0.09528938

AvgCyclomatic -0.21100268 0.18670471 0.05374479

AvgCyclomaticModified -0.21601971 0.17901551 0.04581751

AvgCyclomaticStrict -0.16864035 0.23354770 0.09763206

AvgEssential -0.12944302 -0.01828580 -0.07199670

AvgLine -0.09853697 0.38315435 0.22443804

AvgLineBlank -0.17518105 0.07903208 0.08134332

AvgLineCode -0.15627604 0.33228032 0.18231296

AvgLineComment 0.09205026 0.28479597 0.18558295

CountDeclClass 0.53516856 0.61054843 0.65723895

CountDeclClassMethod 0.28243361 0.47750803 0.44472829

CountDeclClassVariable 0.38472258 0.54368716 0.54583454

CountDeclExecutableUnit 0.86704234 0.91121715 0.93611385

CountDeclFunction 0.85859694 0.91212617 0.93958025

CountDeclInstanceMethod 0.85496887 0.80846908 0.86370750

CountDeclInstanceVariable 0.64603858 0.71670025 0.75485985

CountDeclMethod 0.87945050 0.90619143 0.94121434

CountDeclMethodDefault 0.21245283 0.43861770 0.45726497

CountDeclMethodPrivate 0.33619800 0.66898698 0.61782765

CountLineCode CountLineCodeDecl CountLineCodeExe

Code\_Ownership\_count 0.044993188 0.04909888 0.04127233

lines\_added 0.376894989 0.39069231 0.37110517

lines\_deleted 0.274915052 0.29741030 0.26150189

Pre\_release\_bugs 0.129844514 0.12700301 0.13905645

AvgCyclomatic 0.225621284 0.13572471 0.30684692

AvgCyclomaticModified 0.216465770 0.12447666 0.29562092

AvgCyclomaticStrict 0.269379717 0.17364311 0.35201920

AvgEssential -0.004377649 -0.03819938 0.03063540

AvgLine 0.397560718 0.30441662 0.49199837

AvgLineBlank 0.083803681 0.04897194 0.13550547

AvgLineCode 0.380938277 0.29650161 0.47522967

AvgLineComment 0.203912318 0.15594088 0.23826541

CountDeclClass 0.619971107 0.64194907 0.57943331

CountDeclClassMethod 0.465992175 0.43786260 0.47332204

CountDeclClassVariable 0.541677116 0.55274465 0.54570443

CountDeclExecutableUnit 0.900129824 0.89334131 0.85064125

CountDeclFunction 0.898325881 0.89473694 0.84710108

CountDeclInstanceMethod 0.796407630 0.80873724 0.73634690

CountDeclInstanceVariable 0.710009483 0.72284574 0.67624213

CountDeclMethod 0.888682431 0.88135923 0.83561925

CountDeclMethodDefault 0.432423145 0.43250027 0.42589703

CountDeclMethodPrivate 0.664837530 0.61506090 0.67741634

CountLineComment CountSemicolon CountStmt

Code\_Ownership\_count 0.08722020 0.04982632 0.044195479

lines\_added 0.23836471 0.38378948 0.375740230

lines\_deleted 0.18561553 0.28064957 0.274245277

Pre\_release\_bugs 0.03992995 0.14298965 0.135414563

AvgCyclomatic 0.09136705 0.23228161 0.240234363

AvgCyclomaticModified 0.08943530 0.22106052 0.231265901

AvgCyclomaticStrict 0.14071316 0.27209987 0.282109732

AvgEssential -0.04417681 -0.00264677 -0.002220838

AvgLine 0.34721147 0.42066605 0.413232974

AvgLineBlank 0.06646078 0.10462691 0.098362710

AvgLineCode 0.17904894 0.40452199 0.394277446

AvgLineComment 0.65613470 0.21037090 0.212518236

CountDeclClass 0.36544746 0.59907872 0.601210041

CountDeclClassMethod 0.47538374 0.44924573 0.457241033

CountDeclClassVariable 0.40507328 0.55055257 0.544453969

CountDeclExecutableUnit 0.65961850 0.87538086 0.888263519

CountDeclFunction 0.66472647 0.87565609 0.888437400

CountDeclInstanceMethod 0.55115038 0.77886833 0.788201721

CountDeclInstanceVariable 0.48581275 0.71661118 0.708228896

CountDeclMethod 0.66715333 0.86300137 0.878097931

CountDeclMethodDefault 0.37125270 0.43067662 0.428583946

CountDeclMethodPrivate 0.56386472 0.64280215 0.654407864

CountStmtDecl CountStmtExe MaxCyclomatic

Code\_Ownership\_count 0.04502798 0.0428285 -0.02284447

lines\_added 0.38753223 0.3536900 0.32599781

lines\_deleted 0.29081360 0.2508391 0.20331529

Pre\_release\_bugs 0.12488289 0.1401830 0.12383995

AvgCyclomatic 0.17557021 0.2820406 0.61316037

AvgCyclomaticModified 0.16486813 0.2740045 0.59967475

AvgCyclomaticStrict 0.21127946 0.3269616 0.65457020

AvgEssential -0.03560917 0.0208409 0.19869438

AvgLine 0.35413361 0.4463373 0.65901381

AvgLineBlank 0.07190862 0.1146378 0.29609180

AvgLineCode 0.34350369 0.4210871 0.66250836

AvgLineComment 0.17794755 0.2355806 0.23901429

CountDeclClass 0.64139908 0.5606061 0.33028887

CountDeclClassMethod 0.43930833 0.4609834 0.34097595

CountDeclClassVariable 0.55217550 0.5236807 0.37165681

CountDeclExecutableUnit 0.88590495 0.8698234 0.47647402

CountDeclFunction 0.88951424 0.8662384 0.47363350

CountDeclInstanceMethod 0.79631188 0.7646033 0.39510276

CountDeclInstanceVariable 0.71674500 0.6903791 0.43730856

CountDeclMethod 0.87456307 0.8599968 0.46660183

CountDeclMethodDefault 0.44021323 0.4137464 0.21729271

CountDeclMethodPrivate 0.62993173 0.6585015 0.49809228

MaxCyclomaticModified MaxCyclomaticStrict MaxEssential

Code\_Ownership\_count -0.02093836 -0.02073015 -0.06177682

lines\_added 0.31407876 0.32965614 0.18514248

lines\_deleted 0.19679346 0.20481278 0.10622827

Pre\_release\_bugs 0.09321766 0.13971082 0.15255061

AvgCyclomatic 0.59915991 0.59152612 0.33644175

AvgCyclomaticModified 0.60256913 0.57908725 0.32877458

AvgCyclomaticStrict 0.63898275 0.64515151 0.38990109

AvgEssential 0.16669372 0.19370583 0.35447565

AvgLine 0.64950530 0.63438107 0.36284116

AvgLineBlank 0.29272062 0.28702125 0.14250001

AvgLineCode 0.65323447 0.63079023 0.36441262

AvgLineComment 0.24434189 0.25846071 0.16793523

CountDeclClass 0.31907415 0.31890284 0.36562238

CountDeclClassMethod 0.32854155 0.36012331 0.36575107

CountDeclClassVariable 0.36819822 0.37225924 0.29026842

CountDeclExecutableUnit 0.47364951 0.50454334 0.46356925

CountDeclFunction 0.47223303 0.49922400 0.45725149

CountDeclInstanceMethod 0.39403044 0.42056880 0.38775454

CountDeclInstanceVariable 0.42440434 0.45610631 0.40115233

CountDeclMethod 0.46420102 0.49233919 0.46357742

CountDeclMethodDefault 0.21584098 0.22866956 0.24265510

CountDeclMethodPrivate 0.49461196 0.50715679 0.45262524

MaxNesting RatioCommentToCode SumCyclomatic

Code\_Ownership\_count -0.03029612 0.03004886 0.03742181

lines\_added 0.27259035 -0.26422570 0.35955113

lines\_deleted 0.18090220 -0.18272833 0.25890047

Pre\_release\_bugs 0.03132455 -0.15259759 0.12707796

AvgCyclomatic 0.56453997 -0.24841331 0.25141677

AvgCyclomaticModified 0.56960020 -0.23731814 0.24305482

AvgCyclomaticStrict 0.60064736 -0.23533979 0.30008072

AvgEssential 0.16713514 -0.05475940 0.01030481

AvgLine 0.58037362 -0.20986756 0.38509217

AvgLineBlank 0.19112972 -0.06965958 0.07265362

AvgLineCode 0.59803267 -0.36481900 0.35807930

AvgLineComment 0.22619363 0.39582505 0.21325960

CountDeclClass 0.26816433 -0.46574548 0.56951729

CountDeclClassMethod 0.31845709 -0.12349880 0.47679414

CountDeclClassVariable 0.32637339 -0.28477100 0.52571491

CountDeclExecutableUnit 0.40985998 -0.50886574 0.89453886

CountDeclFunction 0.40546758 -0.50137790 0.89024459

CountDeclInstanceMethod 0.32653957 -0.49942955 0.78277906

CountDeclInstanceVariable 0.37131370 -0.45830615 0.66935785

CountDeclMethod 0.39613780 -0.48475982 0.88351245

CountDeclMethodDefault 0.18948510 -0.21295828 0.40350677

CountDeclMethodPrivate 0.44468898 -0.31009193 0.67062502

SumCyclomaticModified SumCyclomaticStrict SumEssential

Code\_Ownership\_count 0.03951918 0.03424691 0.04761057

lines\_added 0.35574387 0.35949980 0.32949991

lines\_deleted 0.25898438 0.25617661 0.24560048

Pre\_release\_bugs 0.11705035 0.12979696 0.11866546

AvgCyclomatic 0.23931034 0.25953693 0.03197263

AvgCyclomaticModified 0.23592727 0.25128058 0.02589016

AvgCyclomaticStrict 0.28808483 0.31552289 0.08513511

AvgEssential 0.00048985 0.02299714 0.03896358

AvgLine 0.37515914 0.38987016 0.17370474

AvgLineBlank 0.07078352 0.07852675 -0.05573487

AvgLineCode 0.34751464 0.36222315 0.13856200

AvgLineComment 0.21609072 0.22097650 0.16931456

CountDeclClass 0.56872406 0.56064683 0.59837673

CountDeclClassMethod 0.47644338 0.48352994 0.46606447

CountDeclClassVariable 0.52465403 0.52422692 0.49813704

CountDeclExecutableUnit 0.89947624 0.88854222 0.95107779

CountDeclFunction 0.89573833 0.88341258 0.94352821

CountDeclInstanceMethod 0.78713286 0.77534498 0.84819793

CountDeclInstanceVariable 0.66526490 0.66521655 0.69150647

CountDeclMethod 0.88854635 0.87682056 0.94198352

CountDeclMethodDefault 0.40508215 0.39993664 0.40127256

CountDeclMethodPrivate 0.67156137 0.67362462 0.62319484

[ reached getOption("max.print") -- omitted 22 rows ]

> highCorr <- findCorrelation(correlationMatrix, cutoff = 0.75)

> highCorr

[1] 29 32 27 34 31 43 41 25 42 33 28 26 44 17 16 20 37 35 36 18 9 11 7 5

> low\_cor\_names=names(independant[, -highCorr])

> low\_corr\_data=independant[(names(independant) %in% low\_cor\_names)]

> names(low\_corr\_data)

[1] "Code\_Ownership\_count" "lines\_added"

[3] "lines\_deleted" "Pre\_release\_bugs"

[5] "AvgCyclomaticModified" "AvgEssential"

[7] "AvgLineBlank" "AvgLineComment"

[9] "CountClassBase" "CountClassCoupled"

[11] "CountClassCoupledModified" "CountDeclExecutableUnit"

[13] "CountDeclInstanceMethod" "CountDeclInstanceVariable"

[15] "CountDeclMethod" "CountDeclMethodAll"

[17] "CountLineBlank" "CountStmtExe"

[19] "MaxCyclomatic" "MaxCyclomaticModified"

[21] "SumCyclomatic" "SumCyclomaticModified"

[23] "SumCyclomaticStrict" "SumEssential"

> #metrics that have high correlation so these have to be removed

> dataforredun=low\_corr\_data

> redun\_obj = redun (~. ,data = dataforredun ,nk =0)

Warning messages:

1: In redun(~., data = dataforredun, nk = 0) : CountClassBase is constant

2: In redun(~., data = dataforredun, nk = 0) :

CountClassCoupled is constant

3: In redun(~., data = dataforredun, nk = 0) :

CountClassCoupledModified is constant

4: In redun(~., data = dataforredun, nk = 0) :

CountDeclMethodAll is constant

> redun\_obj

Redundancy Analysis

redun(formula = ~., data = dataforredun, nk = 0)

n: 480 p: 20 nk: 0

Number of NAs: 0

Transformation of target variables forced to be linear

Binary or categorical variables removed because of inadequate frequencies:

CountClassBase CountClassCoupled CountClassCoupledModified CountDeclMethodAll

R-squared cutoff: 0.9 Type: ordinary

R^2 with which each variable can be predicted from all other variables:

Code\_Ownership\_count lines\_added lines\_deleted

0.051 0.492 0.421

Pre\_release\_bugs AvgCyclomaticModified AvgEssential

0.060 0.650 0.581

AvgLineBlank AvgLineComment CountDeclExecutableUnit

0.691 0.348 0.983

CountDeclInstanceMethod CountDeclInstanceVariable CountDeclMethod

0.949 0.793 0.981

CountLineBlank CountStmtExe MaxCyclomatic

0.950 0.981 0.991

MaxCyclomaticModified SumCyclomatic SumCyclomaticModified

0.991 1.000 1.000

SumCyclomaticStrict SumEssential

0.996 0.977

Rendundant variables:

SumCyclomatic SumCyclomaticModified SumCyclomaticStrict CountDeclExecutableUnit MaxCyclomatic CountDeclMethod SumEssential CountLineBlank

Predicted from variables:

Code\_Ownership\_count lines\_added lines\_deleted Pre\_release\_bugs AvgCyclomaticModified AvgEssential AvgLineBlank AvgLineComment CountDeclInstanceMethod CountDeclInstanceVariable CountStmtExe MaxCyclomaticModified

Variable Deleted R^2 R^2 after later deletions

1 SumCyclomatic 1.000 0.997 0.99 0.989 0.989 0.989 0.98 0.979

2 SumCyclomaticModified 0.996 0.989 0.989 0.988 0.988 0.979 0.978

3 SumCyclomaticStrict 0.987 0.986 0.986 0.986 0.976 0.976

4 CountDeclExecutableUnit 0.982 0.981 0.97 0.952 0.95

5 MaxCyclomatic 0.975 0.975 0.975 0.975

6 CountDeclMethod 0.969 0.964 0.956

7 SumEssential 0.950 0.947

8 CountLineBlank 0.934

> after\_redun= dataforredun[,!(names(dataforredun) %in% redun\_obj $Out)]

>

> names(after\_redun)

[1] "Code\_Ownership\_count" "lines\_added"

[3] "lines\_deleted" "Pre\_release\_bugs"

[5] "AvgCyclomaticModified" "AvgEssential"

[7] "AvgLineBlank" "AvgLineComment"

[9] "CountClassBase" "CountClassCoupled"

[11] "CountClassCoupledModified" "CountDeclInstanceMethod"

[13] "CountDeclInstanceVariable" "CountDeclMethodAll"

[15] "CountStmtExe" "MaxCyclomaticModified"

> summary(data$Post\_release\_bugs)

Min. 1st Qu. Median Mean 3rd Qu. Max. NA's

0.000 0.000 0.000 1.197 2.000 23.000 1

> #to change them into boolean

> data$Post\_release\_bugs>0

[1] FALSE FALSE FALSE FALSE FALSE TRUE TRUE FALSE TRUE FALSE FALSE FALSE FALSE

[14] TRUE FALSE TRUE TRUE FALSE TRUE TRUE FALSE TRUE TRUE FALSE FALSE TRUE

[27] FALSE FALSE FALSE TRUE FALSE TRUE FALSE TRUE TRUE FALSE TRUE TRUE TRUE

[40] TRUE TRUE FALSE TRUE TRUE TRUE TRUE FALSE FALSE FALSE TRUE TRUE FALSE

[53] FALSE FALSE FALSE TRUE TRUE TRUE TRUE FALSE TRUE TRUE TRUE TRUE FALSE

[66] FALSE TRUE TRUE FALSE FALSE TRUE TRUE TRUE TRUE TRUE TRUE FALSE TRUE

[79] TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE FALSE FALSE

[92] TRUE FALSE TRUE TRUE TRUE TRUE TRUE FALSE FALSE FALSE TRUE FALSE TRUE

[105] FALSE TRUE TRUE TRUE FALSE TRUE TRUE FALSE TRUE TRUE FALSE FALSE TRUE

[118] FALSE TRUE FALSE FALSE FALSE FALSE FALSE TRUE TRUE TRUE TRUE TRUE TRUE

[131] TRUE TRUE TRUE TRUE TRUE FALSE TRUE TRUE FALSE FALSE TRUE TRUE TRUE

[144] TRUE TRUE FALSE TRUE TRUE TRUE FALSE FALSE FALSE TRUE FALSE FALSE FALSE

[157] FALSE FALSE FALSE TRUE TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE

[170] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE

[183] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE

[196] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE

[209] FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE

[222] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE

[235] TRUE FALSE TRUE FALSE FALSE TRUE TRUE TRUE FALSE TRUE TRUE TRUE FALSE

[248] TRUE FALSE TRUE TRUE TRUE TRUE TRUE FALSE FALSE FALSE TRUE TRUE FALSE

[261] TRUE TRUE TRUE FALSE TRUE FALSE TRUE TRUE TRUE TRUE TRUE FALSE FALSE

[274] TRUE FALSE TRUE TRUE FALSE TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE

[287] FALSE TRUE FALSE FALSE FALSE TRUE TRUE FALSE FALSE TRUE TRUE TRUE TRUE

[300] TRUE TRUE FALSE TRUE FALSE FALSE FALSE TRUE TRUE FALSE TRUE FALSE TRUE

[313] FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE TRUE FALSE TRUE FALSE TRUE

[326] FALSE TRUE TRUE TRUE TRUE FALSE FALSE TRUE FALSE TRUE FALSE FALSE TRUE

[339] TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE TRUE TRUE TRUE TRUE TRUE

[352] TRUE TRUE TRUE FALSE FALSE TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE

[365] FALSE FALSE FALSE TRUE TRUE FALSE FALSE FALSE TRUE FALSE FALSE TRUE FALSE

[378] TRUE TRUE TRUE TRUE TRUE TRUE FALSE TRUE FALSE TRUE TRUE TRUE FALSE

[391] TRUE TRUE TRUE FALSE TRUE TRUE FALSE FALSE FALSE FALSE TRUE FALSE FALSE

[404] FALSE FALSE FALSE FALSE FALSE TRUE FALSE TRUE FALSE FALSE FALSE FALSE FALSE

[417] TRUE FALSE FALSE TRUE FALSE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE

[430] FALSE FALSE TRUE FALSE TRUE TRUE FALSE FALSE FALSE FALSE FALSE TRUE FALSE

[443] TRUE FALSE TRUE TRUE FALSE FALSE TRUE TRUE TRUE FALSE TRUE TRUE TRUE

[456] FALSE FALSE TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE

[469] TRUE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE TRUE

[482] TRUE FALSE NA

> form=as.formula(paste("Post\_release\_bugs>0~",paste(names(after\_redun),collapse="+")))

> form

Post\_release\_bugs > 0 ~ Code\_Ownership\_count + lines\_added +

lines\_deleted + Pre\_release\_bugs + AvgCyclomaticModified +

AvgEssential + AvgLineBlank + AvgLineComment + CountClassBase +

CountClassCoupled + CountClassCoupledModified + CountDeclInstanceMethod +

CountDeclInstanceVariable + CountDeclMethodAll + CountStmtExe +

MaxCyclomaticModified

> del=c("file\_name")

> data = data[,!(names(data) %in% del)]

> #removing comp as it has charecters

> model=glm(formula=form, data=log10(data+1), family = binomial(link = "logit"))

Warning message:

glm.fit: fitted probabilities numerically 0 or 1 occurred

> model

Call: glm(formula = form, family = binomial(link = "logit"), data = log10(data +

1))

Coefficients:

(Intercept) Code\_Ownership\_count lines\_added

-2.905758 0.006825 17.175457

lines\_deleted Pre\_release\_bugs AvgCyclomaticModified

23.022746 -20.699072 -5.524323

AvgEssential AvgLineBlank AvgLineComment

-0.253376 0.623154 0.250226

CountClassBase CountClassCoupled CountClassCoupledModified

6.024209 -11.433162 NA

CountDeclInstanceMethod CountDeclInstanceVariable CountDeclMethodAll

0.152115 0.156183 NA

CountStmtExe MaxCyclomaticModified

-1.382995 4.520013

Degrees of Freedom: 481 Total (i.e. Null); 467 Residual

(2 observations deleted due to missingness)

Null Deviance: 663.4

Residual Deviance: 97.83 AIC: 127.8

> summary(model)

Call:

glm(formula = form, family = binomial(link = "logit"), data = log10(data +

1))

Deviance Residuals:

Min 1Q Median 3Q Max

-5.0858 -0.2439 -0.1525 0.0005 2.9681

Coefficients: (2 not defined because of singularities)

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

(Intercept) -2.906e+00 2.457e+00 -1.183 0.236916

Code\_Ownership\_count 6.825e-03 1.270e+00 0.005 0.995712

lines\_added 1.718e+01 2.334e+00 7.357 1.87e-13 \*\*\*

lines\_deleted 2.302e+01 5.103e+00 4.512 6.44e-06 \*\*\*

Pre\_release\_bugs -2.070e+01 5.621e+00 -3.683 0.000231 \*\*\*

AvgCyclomaticModified -5.524e+00 3.766e+00 -1.467 0.142422

AvgEssential -2.534e-01 5.961e+00 -0.043 0.966095

AvgLineBlank 6.232e-01 2.844e+00 0.219 0.826572

AvgLineComment 2.502e-01 1.250e+00 0.200 0.841399

CountClassBase 6.024e+00 1.357e+04 0.000 0.999646

CountClassCoupled -1.143e+01 4.411e+03 -0.003 0.997932

CountClassCoupledModified NA NA NA NA

CountDeclInstanceMethod 1.521e-01 1.397e+00 0.109 0.913285

CountDeclInstanceVariable 1.562e-01 1.082e+00 0.144 0.885180

CountDeclMethodAll NA NA NA NA

CountStmtExe -1.383e+00 1.525e+00 -0.907 0.364447

MaxCyclomaticModified 4.520e+00 2.383e+00 1.897 0.057887 .

---

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

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 663.406 on 481 degrees of freedom

Residual deviance: 97.826 on 467 degrees of freedom

(2 observations deleted due to missingness)

AIC: 127.83

Number of Fisher Scoring iterations: 15

> newform=Post\_release\_bugs>0~lines\_added+lines\_deleted+Pre\_release\_bugs

> newmodel=glm(formula=newform, data=log10(data+1), family = binomial(link = "logit"))

Warning message:

glm.fit: fitted probabilities numerically 0 or 1 occurred

>

> summary(newmodel)

Call:

glm(formula = newform, family = binomial(link = "logit"), data = log10(data +

1))

Deviance Residuals:

Min 1Q Median 3Q Max

-5.2656 -0.2638 -0.2638 0.0010 2.8252

Coefficients:

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

(Intercept) -3.3410 0.3386 -9.867 < 2e-16 \*\*\*

lines\_added 16.5647 2.1165 7.826 5.03e-15 \*\*\*

lines\_deleted 21.1048 4.7444 4.448 8.65e-06 \*\*\*

Pre\_release\_bugs -18.6617 4.9515 -3.769 0.000164 \*\*\*

---

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

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 663.41 on 481 degrees of freedom

Residual deviance: 103.01 on 478 degrees of freedom

(2 observations deleted due to missingness)

AIC: 111.01

Number of Fisher Scoring iterations: 10

> names(newmodel)

[1] "coefficients" "residuals" "fitted.values"

[4] "effects" "R" "rank"

[7] "qr" "family" "linear.predictors"

[10] "deviance" "aic" "null.deviance"

[13] "iter" "weights" "prior.weights"

[16] "df.residual" "df.null" "y"

[19] "converged" "boundary" "model"

[22] "na.action" "call" "formula"

[25] "terms" "data" "offset"

[28] "control" "method" "contrasts"

[31] "xlevels"

> #this gives r square and we can know how good is our model

> 1-newmodel$deviance/newmodel$null.deviance

[1] 0.8447208