Binary Classification

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October 29, 2015

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When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

credit <- read.csv("H:/MBA/Trimester V/BFPT/germancredit.csv", header=TRUE)  
View(credit)  
credit$Default <- factor(credit$Default)

The above command takes the data only for the people who will default.  
credit$history = factor(credit$history,  
levels=c("A30","A31","A32","A33","A34"))

The history of the loan takers will be given and levels will be defined under the categories of good poor and terrible.  
levels(credit$history) = c("good","good","poor","poor","terrible")  
credit$foreign <- factor(credit$foreign, levels=c("A201","A202"),  
labels=c("foreign","german"))  
credit$rent <- factor(credit$housing=="A151")  
credit$purpose <- factor(credit$purpose,  
levels=c("A40","A41","A42","A43","A44","A45","A46","A47","A48","A49","A410"))  
levels(credit$purpose) <-  
c("newcar","usedcar",rep("goods/repair",4),"edu",NA,"edu","biz","biz")  
credit <- credit[,c("Default","duration","amount","installment","age",  
"history", "purpose","foreign","rent")]  
The purpose of the loan.

credit

## Default duration amount installment age history purpose foreign  
## 1 0 6 1169 4 67 terrible goods/repair foreign  
## 2 1 48 5951 2 22 poor goods/repair foreign  
## 3 0 12 2096 2 49 terrible edu foreign  
## 4 0 42 7882 2 45 poor goods/repair foreign  
## 5 1 24 4870 3 53 poor newcar foreign  
## 6 0 36 9055 2 35 poor edu foreign  
## 7 0 24 2835 3 53 poor goods/repair foreign  
## 8 0 36 6948 2 35 poor usedcar foreign  
## 9 0 12 3059 2 61 poor goods/repair foreign  
## 10 1 30 5234 4 28 terrible newcar foreign  
## 11 1 12 1295 3 25 poor newcar foreign  
## 12 1 48 4308 3 24 poor biz foreign  
## 13 0 12 1567 1 22 poor goods/repair foreign  
## 14 1 24 1199 4 60 terrible newcar foreign  
## 15 0 15 1403 2 28 poor newcar foreign  
## 16 1 24 1282 4 32 poor goods/repair foreign  
## 17 0 24 2424 4 53 terrible goods/repair foreign  
## 18 0 30 8072 2 25 good biz foreign  
## 19 1 24 12579 4 44 poor usedcar foreign  
## 20 0 24 3430 3 31 poor goods/repair foreign  
## 21 0 9 2134 4 48 terrible newcar foreign  
## 22 0 6 2647 2 44 poor goods/repair foreign  
## 23 0 10 2241 1 48 terrible newcar german  
## 24 0 12 1804 3 44 terrible usedcar foreign  
## 25 0 10 2069 2 26 terrible goods/repair german  
## 26 0 6 1374 1 36 poor goods/repair foreign  
## 27 0 6 426 4 39 good goods/repair foreign  
## 28 0 12 409 3 42 good goods/repair foreign  
## 29 0 7 2415 3 34 poor goods/repair foreign  
## 30 1 60 6836 3 63 poor biz foreign  
## 31 0 18 1913 3 36 poor biz foreign  
## 32 0 24 4020 2 27 poor goods/repair foreign  
## 33 0 18 5866 2 30 poor newcar foreign  
## 34 0 12 1264 4 57 terrible biz foreign  
## 35 0 12 1474 4 33 poor goods/repair foreign  
## 36 1 45 4746 4 25 terrible goods/repair foreign  
## 37 0 48 6110 1 31 terrible edu foreign  
## 38 1 18 2100 4 37 poor goods/repair foreign  
## 39 0 10 1225 2 37 poor goods/repair foreign  
## 40 0 9 458 4 24 poor goods/repair foreign  
## 41 0 30 2333 4 30 poor goods/repair foreign  
## 42 0 12 1158 3 26 poor goods/repair foreign  
## 43 0 18 6204 2 44 poor goods/repair foreign  
## 44 0 30 6187 1 24 terrible usedcar foreign  
## 45 1 48 6143 4 58 terrible usedcar foreign  
## 46 0 11 1393 4 35 terrible newcar foreign  
## 47 0 36 2299 4 39 poor goods/repair foreign  
## 48 0 6 1352 1 23 poor usedcar foreign  
## 49 0 11 7228 1 39 terrible newcar foreign  
## 50 0 12 2073 4 28 poor goods/repair foreign  
## 51 0 24 2333 4 29 poor goods/repair foreign  
## 52 0 27 5965 1 30 poor usedcar foreign  
## 53 0 12 1262 3 25 poor goods/repair foreign  
## 54 0 18 3378 2 31 poor usedcar foreign  
## 55 1 36 2225 4 57 poor newcar foreign  
## 56 0 6 783 1 26 good newcar foreign  
## 57 1 12 6468 2 52 poor goods/repair foreign  
## 58 0 36 9566 2 31 terrible goods/repair foreign  
## 59 0 18 1961 3 23 poor newcar foreign  
## 60 1 36 6229 4 23 terrible goods/repair foreign  
## 61 0 9 1391 2 27 poor biz foreign  
## 62 0 15 1537 4 50 terrible goods/repair foreign  
## 63 1 36 1953 4 61 good biz foreign  
## 64 1 48 14421 2 25 good biz foreign  
## 65 0 24 3181 4 26 poor goods/repair foreign  
## 66 0 27 5190 4 48 poor goods/repair foreign  
## 67 0 12 2171 2 29 poor goods/repair foreign  
## 68 0 12 1007 4 22 poor newcar foreign  
## 69 1 36 1819 4 37 poor edu foreign  
## 70 0 36 2394 4 25 poor goods/repair foreign  
## 71 0 36 8133 1 30 poor usedcar foreign  
## 72 0 7 730 4 46 terrible goods/repair foreign  
## 73 0 8 1164 3 51 terrible biz foreign  
## 74 0 42 5954 2 41 terrible biz foreign  
## 75 1 36 1977 4 40 poor edu foreign  
## 76 0 12 1526 4 66 terrible usedcar foreign  
## 77 1 42 3965 4 34 poor goods/repair foreign  
## 78 0 11 4771 2 51 poor goods/repair foreign  
## 79 0 54 9436 2 39 good usedcar foreign  
## 80 0 30 3832 2 22 poor goods/repair foreign  
## 81 1 24 5943 1 44 poor goods/repair foreign  
## 82 0 15 1213 4 47 poor goods/repair foreign  
## 83 0 18 1568 3 24 poor biz foreign  
## 84 0 24 1755 4 58 poor biz foreign  
## 85 0 10 2315 3 52 poor goods/repair foreign  
## 86 0 12 1412 4 29 terrible biz foreign  
## 87 0 18 1295 4 27 terrible goods/repair foreign  
## 88 1 36 12612 1 47 poor edu foreign  
## 89 0 18 2249 4 30 poor newcar foreign  
## 90 1 12 1108 4 28 good goods/repair foreign  
## 91 0 12 618 4 56 terrible goods/repair foreign  
## 92 0 12 1409 4 54 terrible usedcar foreign  
## 93 1 12 797 4 33 terrible goods/repair foreign  
## 94 0 24 3617 4 20 terrible goods/repair foreign  
## 95 0 12 1318 4 54 poor newcar foreign  
## 96 1 54 15945 3 58 good biz foreign  
## 97 0 12 2012 4 61 terrible edu foreign  
## 98 0 18 2622 4 34 poor biz foreign  
## 99 0 36 2337 4 36 terrible goods/repair foreign  
## 100 0 20 7057 3 36 poor usedcar foreign  
## 101 0 24 1469 4 41 poor newcar foreign  
## 102 0 36 2323 4 24 poor goods/repair foreign  
## 103 0 6 932 3 24 poor goods/repair foreign  
## 104 0 9 1919 4 35 terrible goods/repair foreign  
## 105 0 12 2445 2 26 poor usedcar foreign  
## 106 1 24 11938 2 39 terrible biz foreign  
## 107 1 18 6458 2 39 good newcar foreign  
## 108 0 12 6078 2 32 poor newcar foreign  
## 109 0 24 7721 1 30 poor goods/repair german  
## 110 0 14 1410 1 35 poor biz foreign  
## 111 0 6 1449 1 31 poor biz foreign  
## 112 0 15 392 4 23 poor edu foreign  
## 113 0 18 6260 3 28 poor newcar foreign  
## 114 1 36 7855 4 25 terrible newcar foreign  
## 115 0 12 1680 3 35 poor goods/repair foreign  
## 116 0 48 3578 4 47 terrible goods/repair foreign  
## 117 1 42 7174 4 30 poor goods/repair foreign  
## 118 0 10 2132 2 27 terrible goods/repair german  
## 119 1 33 4281 1 23 terrible goods/repair foreign  
## 120 0 12 2366 3 36 terrible newcar foreign  
## 121 1 21 1835 3 25 poor goods/repair foreign  
## 122 0 24 3868 4 41 terrible usedcar foreign  
## 123 0 12 1768 3 24 poor goods/repair foreign  
## 124 0 10 781 4 63 terrible newcar foreign  
## 125 1 18 1924 4 27 poor goods/repair foreign  
## 126 0 12 2121 4 30 terrible newcar foreign  
## 127 0 12 701 4 40 poor goods/repair foreign  
## 128 1 12 639 4 30 poor goods/repair foreign  
## 129 0 12 1860 4 34 terrible usedcar foreign  
## 130 1 12 3499 3 29 terrible newcar foreign  
## 131 0 48 8487 1 24 poor newcar foreign  
## 132 1 36 6887 4 29 poor edu foreign  
## 133 0 15 2708 2 27 poor goods/repair foreign  
## 134 0 18 1984 4 47 poor goods/repair foreign  
## 135 0 60 10144 2 21 poor goods/repair foreign  
## 136 0 12 1240 4 38 terrible goods/repair foreign  
## 137 0 27 8613 2 27 poor usedcar foreign  
## 138 1 12 766 4 66 poor goods/repair foreign  
## 139 0 15 2728 4 35 terrible goods/repair foreign  
## 140 0 12 1881 2 44 poor goods/repair foreign  
## 141 0 6 709 2 27 poor newcar german  
## 142 0 36 4795 4 30 poor goods/repair foreign  
## 143 0 27 3416 3 27 poor goods/repair foreign  
## 144 1 18 2462 2 22 poor goods/repair foreign  
## 145 0 21 2288 4 23 terrible goods/repair foreign  
## 146 0 48 3566 4 30 good biz foreign  
## 147 0 6 860 1 39 terrible newcar foreign  
## 148 0 12 682 4 51 terrible newcar foreign  
## 149 0 36 5371 3 28 terrible goods/repair foreign  
## 150 0 18 1582 4 46 terrible goods/repair foreign  
## 151 0 6 1346 2 42 poor goods/repair foreign  
## 152 0 10 1924 1 38 poor goods/repair german  
## 153 0 36 5848 4 24 poor goods/repair foreign  
## 154 0 24 7758 2 29 terrible usedcar foreign  
## 155 0 24 6967 4 36 poor biz foreign  
## 156 1 12 1282 2 20 poor goods/repair foreign  
## 157 0 9 1288 3 48 terrible goods/repair german  
## 158 0 12 339 4 45 good edu foreign  
## 159 0 24 3512 2 38 poor newcar foreign  
## 160 0 6 1898 1 34 terrible goods/repair foreign  
## 161 0 24 2872 3 36 terrible goods/repair foreign  
## 162 0 18 1055 4 30 terrible newcar foreign  
## 163 0 15 1262 4 36 poor goods/repair foreign  
## 164 0 10 7308 2 70 poor newcar foreign  
## 165 0 36 909 4 36 poor newcar foreign  
## 166 0 6 2978 1 32 poor goods/repair foreign  
## 167 1 18 1131 4 33 poor goods/repair foreign  
## 168 0 11 1577 4 20 poor goods/repair foreign  
## 169 0 24 3972 2 25 poor goods/repair foreign  
## 170 1 24 1935 4 31 terrible biz foreign  
## 171 1 15 950 4 33 good newcar foreign  
## 172 0 12 763 4 26 poor goods/repair foreign  
## 173 1 24 2064 3 34 poor goods/repair foreign  
## 174 0 8 1414 4 33 poor goods/repair german  
## 175 1 21 3414 2 26 poor edu foreign  
## 176 1 30 7485 4 53 good usedcar foreign  
## 177 0 12 2577 2 42 poor goods/repair foreign  
## 178 0 6 338 4 52 terrible goods/repair foreign  
## 179 0 12 1963 4 31 poor goods/repair foreign  
## 180 0 21 571 4 65 terrible newcar foreign  
## 181 1 36 9572 1 28 poor biz foreign  
## 182 1 36 4455 2 30 poor biz foreign  
## 183 1 21 1647 4 40 good newcar foreign  
## 184 0 24 3777 4 50 terrible goods/repair foreign  
## 185 1 18 884 4 36 terrible newcar foreign  
## 186 0 15 1360 4 31 terrible goods/repair foreign  
## 187 1 9 5129 2 74 good usedcar foreign  
## 188 0 16 1175 2 68 terrible newcar foreign  
## 189 1 12 674 4 20 poor goods/repair foreign  
## 190 0 18 3244 1 33 good goods/repair foreign  
## 191 1 24 4591 2 54 poor biz foreign  
## 192 1 48 3844 4 34 good biz foreign  
## 193 1 27 3915 4 36 poor biz foreign  
## 194 0 6 2108 2 29 poor goods/repair foreign  
## 195 1 45 3031 4 21 poor goods/repair foreign  
## 196 1 9 1501 2 34 terrible edu foreign  
## 197 0 6 1382 1 28 terrible goods/repair foreign  
## 198 1 12 951 4 27 poor goods/repair foreign  
## 199 0 24 2760 4 36 poor usedcar foreign  
## 200 1 18 4297 4 40 poor goods/repair foreign  
## 201 0 9 936 4 52 terrible edu foreign  
## 202 0 12 1168 4 27 poor newcar foreign  
## 203 0 27 5117 3 26 poor biz foreign  
## 204 1 12 902 4 21 poor edu foreign  
## 205 0 12 1495 4 38 terrible newcar foreign  
## 206 0 30 10623 3 38 terrible usedcar foreign  
## 207 0 12 1935 4 43 terrible goods/repair foreign  
## 208 0 12 1424 4 26 terrible goods/repair foreign  
## 209 0 24 6568 2 21 poor biz foreign  
## 210 0 12 1413 3 55 poor usedcar german  
## 211 0 9 3074 1 33 terrible goods/repair foreign  
## 212 0 36 3835 2 45 poor goods/repair foreign  
## 213 1 27 5293 2 50 good biz foreign  
## 214 1 30 1908 4 66 poor biz foreign  
## 215 0 36 3342 4 51 terrible goods/repair foreign  
## 216 0 6 932 1 39 terrible edu foreign  
## 217 0 18 3104 3 31 good biz foreign  
## 218 0 36 3913 2 23 poor goods/repair foreign  
## 219 0 24 3021 2 24 poor goods/repair foreign  
## 220 0 10 1364 2 64 poor newcar foreign  
## 221 0 12 625 4 26 poor goods/repair foreign  
## 222 0 12 1200 4 23 poor edu foreign  
## 223 0 12 707 4 30 poor goods/repair foreign  
## 224 0 24 2978 4 32 poor biz foreign  
## 225 0 15 4657 3 30 poor usedcar foreign  
## 226 0 36 2613 4 27 good goods/repair foreign  
## 227 1 48 10961 1 27 poor goods/repair foreign  
## 228 1 12 7865 4 53 poor goods/repair foreign  
## 229 1 9 1478 4 22 poor goods/repair foreign  
## 230 0 24 3149 4 22 poor goods/repair foreign  
## 231 1 36 4210 4 26 poor goods/repair foreign  
## 232 0 9 2507 2 51 poor newcar foreign  
## 233 0 12 2141 3 35 poor goods/repair foreign  
## 234 0 18 866 4 25 poor goods/repair foreign  
## 235 0 4 1544 2 42 terrible goods/repair foreign  
## 236 1 24 1823 4 30 poor goods/repair foreign  
## 237 1 6 14555 1 23 poor newcar foreign  
## 238 1 21 2767 4 61 poor biz foreign  
## 239 0 12 1291 4 35 terrible goods/repair foreign  
## 240 0 30 2522 1 39 poor goods/repair foreign  
## 241 1 24 915 4 29 poor newcar foreign  
## 242 0 6 1595 3 51 poor goods/repair foreign  
## 243 1 48 4605 3 24 good usedcar foreign  
## 244 0 12 1185 3 27 terrible biz foreign  
## 245 0 12 3447 4 35 good edu foreign  
## 246 0 24 1258 4 25 poor biz foreign  
## 247 0 12 717 4 52 terrible goods/repair foreign  
## 248 0 6 1204 4 35 good newcar german  
## 249 0 24 1925 2 26 poor goods/repair foreign  
## 250 1 18 433 3 22 poor goods/repair foreign  
## 251 0 6 666 3 39 terrible newcar foreign  
## 252 0 12 2251 1 46 poor goods/repair foreign  
## 253 1 30 2150 4 24 poor newcar foreign  
## 254 0 24 4151 2 35 poor goods/repair foreign  
## 255 0 9 2030 2 24 poor goods/repair foreign  
## 256 0 60 7418 1 27 poor goods/repair foreign  
## 257 0 24 2684 4 35 terrible goods/repair foreign  
## 258 1 12 2149 4 29 good goods/repair foreign  
## 259 0 15 3812 1 23 poor usedcar foreign  
## 260 0 11 1154 4 57 terrible goods/repair foreign  
## 261 0 12 1657 2 27 poor goods/repair foreign  
## 262 0 24 1603 4 55 poor goods/repair foreign  
## 263 0 18 5302 2 36 terrible newcar foreign  
## 264 0 12 2748 2 57 terrible edu foreign  
## 265 0 10 1231 3 32 terrible newcar german  
## 266 1 15 802 4 37 poor goods/repair foreign  
## 267 0 36 6304 4 36 terrible biz foreign  
## 268 0 24 1533 4 38 poor goods/repair foreign  
## 269 1 14 8978 1 45 poor newcar german  
## 270 0 24 999 4 25 poor goods/repair foreign  
## 271 0 18 2662 4 32 poor newcar german  
## 272 0 12 1402 3 37 terrible goods/repair foreign  
## 273 0 48 12169 4 36 good newcar foreign  
## 274 1 48 3060 4 28 poor goods/repair foreign  
## 275 1 30 11998 1 34 poor goods/repair foreign  
## 276 0 9 2697 1 32 poor goods/repair foreign  
## 277 0 18 2404 2 26 terrible goods/repair foreign  
## 278 0 12 1262 2 49 poor goods/repair foreign  
## 279 1 6 4611 1 32 poor goods/repair foreign  
## 280 0 24 1901 4 29 poor goods/repair foreign  
## 281 0 15 3368 3 23 terrible usedcar foreign  
## 282 0 12 1574 4 50 poor goods/repair foreign  
## 283 0 18 1445 4 49 good goods/repair foreign  
## 284 0 15 1520 4 63 terrible goods/repair foreign  
## 285 0 24 3878 4 37 terrible newcar foreign  
## 286 0 47 10722 1 35 poor newcar foreign  
## 287 0 48 4788 4 26 poor usedcar foreign  
## 288 0 48 7582 2 31 poor biz foreign  
## 289 0 12 1092 4 49 poor goods/repair foreign  
## 290 1 24 1024 4 48 poor goods/repair foreign  
## 291 0 12 1076 2 26 poor biz german  
## 292 1 36 9398 1 28 poor usedcar foreign  
## 293 0 24 6419 2 44 terrible usedcar foreign  
## 294 0 42 4796 4 56 terrible usedcar foreign  
## 295 0 48 7629 4 46 terrible biz foreign  
## 296 1 48 9960 1 26 poor goods/repair foreign  
## 297 0 12 4675 1 20 poor usedcar foreign  
## 298 0 10 1287 4 45 poor newcar german  
## 299 0 18 2515 3 43 poor goods/repair foreign  
## 300 0 21 2745 3 32 terrible goods/repair foreign  
## 301 0 6 672 1 54 poor newcar foreign  
## 302 1 36 3804 4 42 good goods/repair foreign  
## 303 1 24 1344 4 37 terrible newcar foreign  
## 304 0 10 1038 4 49 terrible newcar foreign  
## 305 1 48 10127 2 44 terrible newcar foreign  
## 306 0 6 1543 4 33 poor goods/repair foreign  
## 307 0 30 4811 2 24 poor usedcar foreign  
## 308 1 12 727 4 33 poor goods/repair foreign  
## 309 1 8 1237 3 24 poor goods/repair foreign  
## 310 0 9 276 4 22 poor newcar foreign  
## 311 0 48 5381 3 40 poor biz foreign  
## 312 0 24 5511 4 25 poor goods/repair foreign  
## 313 0 24 3749 2 26 poor goods/repair foreign  
## 314 1 12 685 2 25 poor newcar foreign  
## 315 0 4 1494 1 29 poor newcar german  
## 316 1 36 2746 4 31 good goods/repair foreign  
## 317 0 12 708 2 38 poor goods/repair foreign  
## 318 0 24 4351 1 48 poor goods/repair foreign  
## 319 0 12 701 4 32 terrible edu foreign  
## 320 0 15 3643 1 27 poor goods/repair foreign  
## 321 1 30 4249 4 28 terrible newcar foreign  
## 322 1 24 1938 4 32 poor goods/repair foreign  
## 323 0 24 2910 2 34 poor usedcar foreign  
## 324 0 18 2659 4 28 poor goods/repair foreign  
## 325 0 18 1028 4 36 terrible newcar foreign  
## 326 0 8 3398 1 39 terrible newcar german  
## 327 0 12 5801 2 49 terrible goods/repair foreign  
## 328 0 24 1525 4 34 poor newcar foreign  
## 329 0 36 4473 4 31 poor goods/repair foreign  
## 330 0 6 1068 4 28 poor goods/repair foreign  
## 331 0 24 6615 2 75 terrible usedcar foreign  
## 332 1 18 1864 4 30 terrible edu foreign  
## 333 1 60 7408 4 24 poor newcar foreign  
## 334 1 48 11590 2 24 terrible usedcar foreign  
## 335 1 24 4110 3 23 good goods/repair foreign  
## 336 1 6 3384 1 44 terrible goods/repair foreign  
## 337 0 13 2101 2 23 poor goods/repair foreign  
## 338 1 15 1275 4 24 poor goods/repair foreign  
## 339 0 24 4169 4 28 poor goods/repair foreign  
## 340 0 10 1521 4 31 poor goods/repair foreign  
## 341 0 24 5743 2 24 terrible edu foreign  
## 342 0 21 3599 1 26 poor goods/repair foreign  
## 343 0 18 3213 1 25 poor goods/repair foreign  
## 344 0 18 4439 1 33 poor biz foreign  
## 345 0 10 3949 1 37 poor newcar foreign  
## 346 0 15 1459 4 43 terrible goods/repair foreign  
## 347 0 13 882 4 23 terrible goods/repair foreign  
## 348 0 24 3758 1 23 poor goods/repair foreign  
## 349 0 6 1743 1 34 poor biz foreign  
## 350 1 9 1136 4 32 terrible edu foreign  
## 351 0 9 1236 1 23 poor goods/repair foreign  
## 352 1 9 959 1 29 poor goods/repair german  
## 353 0 18 3229 2 38 terrible usedcar foreign  
## 354 1 12 6199 4 28 good goods/repair foreign  
## 355 0 10 727 4 46 poor edu foreign  
## 356 1 24 1246 4 23 poor newcar foreign  
## 357 0 12 2331 1 49 terrible goods/repair foreign  
## 358 1 36 4463 4 26 poor goods/repair foreign  
## 359 0 12 776 4 28 poor goods/repair foreign  
## 360 1 30 2406 4 23 poor goods/repair foreign  
## 361 0 18 1239 4 61 poor edu foreign  
## 362 0 12 3399 2 37 poor goods/repair foreign  
## 363 0 12 2247 2 36 poor newcar foreign  
## 364 0 6 1766 1 21 poor goods/repair foreign  
## 365 1 18 2473 4 25 poor goods/repair foreign  
## 366 0 12 1542 2 36 poor biz foreign  
## 367 0 18 3850 3 27 terrible usedcar foreign  
## 368 0 18 3650 1 22 poor goods/repair foreign  
## 369 1 36 3446 4 42 poor goods/repair foreign  
## 370 0 18 3001 2 40 poor goods/repair foreign  
## 371 0 36 3079 4 36 poor newcar foreign  
## 372 0 18 6070 3 33 terrible goods/repair foreign  
## 373 0 10 2146 1 23 terrible goods/repair foreign  
## 374 0 60 13756 2 63 terrible newcar foreign  
## 375 1 60 14782 3 60 good biz foreign  
## 376 1 48 7685 2 37 good biz foreign  
## 377 0 18 2320 2 34 poor goods/repair foreign  
## 378 0 7 846 3 36 poor goods/repair foreign  
## 379 1 36 14318 4 57 poor newcar foreign  
## 380 0 6 362 4 52 terrible newcar foreign  
## 381 0 20 2212 4 39 poor goods/repair foreign  
## 382 1 18 12976 3 38 poor usedcar foreign  
## 383 0 22 1283 4 25 poor newcar foreign  
## 384 0 12 1330 4 26 poor newcar foreign  
## 385 0 30 4272 2 26 poor biz foreign  
## 386 0 18 2238 2 25 terrible goods/repair foreign  
## 387 0 18 1126 4 21 poor goods/repair foreign  
## 388 0 18 7374 4 40 terrible goods/repair foreign  
## 389 0 15 2326 2 27 terrible biz foreign  
## 390 0 9 1449 3 27 poor biz foreign  
## 391 0 18 1820 2 30 poor newcar foreign  
## 392 0 12 983 1 19 poor goods/repair foreign  
## 393 0 36 3249 2 39 poor newcar foreign  
## 394 0 6 1957 1 31 terrible goods/repair foreign  
## 395 0 9 2406 2 31 terrible goods/repair foreign  
## 396 0 39 11760 2 32 poor edu foreign  
## 397 0 12 2578 3 55 poor goods/repair foreign  
## 398 0 36 2348 3 46 terrible goods/repair foreign  
## 399 1 12 1223 1 46 poor newcar foreign  
## 400 0 24 1516 4 43 terrible goods/repair foreign  
## 401 0 18 1473 3 39 poor goods/repair foreign  
## 402 0 18 1887 4 28 terrible biz foreign  
## 403 1 24 8648 2 27 poor biz foreign  
## 404 0 14 802 4 27 poor newcar foreign  
## 405 0 18 2899 4 43 poor newcar foreign  
## 406 1 24 2039 1 22 poor goods/repair foreign  
## 407 0 24 2197 4 43 terrible usedcar foreign  
## 408 0 15 1053 4 27 poor goods/repair german  
## 409 0 24 3235 3 26 poor goods/repair foreign  
## 410 1 12 939 4 28 terrible newcar foreign  
## 411 0 24 1967 4 20 poor goods/repair foreign  
## 412 0 33 7253 3 35 terrible usedcar foreign  
## 413 1 12 2292 4 42 terrible biz foreign  
## 414 0 10 1597 3 40 poor newcar german  
## 415 1 24 1381 4 35 poor newcar foreign  
## 416 0 36 5842 2 35 terrible usedcar foreign  
## 417 1 12 2579 4 33 poor newcar foreign  
## 418 0 18 8471 1 23 poor edu foreign  
## 419 0 21 2782 1 31 poor newcar foreign  
## 420 1 18 1042 4 33 poor newcar foreign  
## 421 0 15 3186 2 20 poor newcar foreign  
## 422 0 12 2028 4 30 poor usedcar foreign  
## 423 0 12 958 2 47 terrible newcar foreign  
## 424 0 21 1591 4 34 poor goods/repair foreign  
## 425 1 12 2762 1 25 poor goods/repair foreign  
## 426 0 18 2779 1 21 poor usedcar foreign  
## 427 0 28 2743 4 29 terrible goods/repair foreign  
## 428 0 18 1149 4 46 terrible goods/repair foreign  
## 429 0 9 1313 1 20 poor goods/repair foreign  
## 430 1 18 1190 2 55 terrible goods/repair foreign  
## 431 0 5 3448 1 74 poor biz foreign  
## 432 1 24 11328 2 29 poor biz foreign  
## 433 0 6 1872 4 36 terrible goods/repair foreign  
## 434 0 24 2058 4 33 terrible goods/repair foreign  
## 435 0 9 2136 3 25 poor goods/repair foreign  
## 436 1 12 1484 2 25 poor goods/repair foreign  
## 437 0 6 660 2 23 poor goods/repair foreign  
## 438 0 24 1287 4 37 terrible newcar foreign  
## 439 0 42 3394 4 65 terrible goods/repair foreign  
## 440 1 12 609 4 26 good biz foreign  
## 441 0 12 1884 4 39 poor newcar foreign  
## 442 0 12 1620 2 30 poor goods/repair foreign  
## 443 0 20 2629 2 29 poor biz foreign  
## 444 1 12 719 4 41 poor edu foreign  
## 445 1 48 5096 2 30 terrible goods/repair foreign  
## 446 0 9 1244 4 41 terrible edu foreign  
## 447 1 36 1842 4 34 poor newcar foreign  
## 448 0 7 2576 2 35 poor goods/repair foreign  
## 449 0 12 1424 3 55 poor goods/repair foreign  
## 450 1 15 1512 3 61 poor goods/repair foreign  
## 451 0 36 11054 4 30 terrible usedcar foreign  
## 452 0 6 518 3 29 poor goods/repair foreign  
## 453 0 12 2759 2 34 good goods/repair foreign  
## 454 0 24 2670 4 35 poor usedcar foreign  
## 455 1 24 4817 2 31 poor newcar foreign  
## 456 0 24 2679 4 29 poor usedcar foreign  
## 457 0 11 3905 2 36 terrible newcar foreign  
## 458 1 12 3386 3 35 poor usedcar foreign  
## 459 0 6 343 4 27 poor goods/repair foreign  
## 460 0 18 4594 3 32 poor goods/repair foreign  
## 461 0 36 3620 1 37 poor goods/repair foreign  
## 462 0 15 1721 2 36 poor newcar foreign  
## 463 0 12 3017 3 34 poor goods/repair foreign  
## 464 0 12 754 4 38 poor edu foreign  
## 465 0 18 1950 4 34 poor biz foreign  
## 466 0 24 2924 3 63 poor usedcar foreign  
## 467 1 24 1659 4 29 poor goods/repair foreign  
## 468 0 48 7238 3 32 poor goods/repair foreign  
## 469 0 33 2764 2 26 poor biz foreign  
## 470 0 24 4679 3 35 poor usedcar foreign  
## 471 1 24 3092 3 22 poor goods/repair foreign  
## 472 1 6 448 4 23 poor edu foreign  
## 473 1 9 654 4 28 poor newcar foreign  
## 474 0 6 1238 4 36 poor edu foreign  
## 475 1 18 1245 4 33 terrible goods/repair foreign  
## 476 1 18 3114 1 26 good goods/repair foreign  
## 477 0 39 2569 4 24 poor usedcar foreign  
## 478 0 24 5152 4 25 poor goods/repair foreign  
## 479 0 12 1037 3 39 poor biz foreign  
## 480 0 15 1478 4 44 terrible goods/repair foreign  
## 481 0 12 3573 1 23 terrible goods/repair foreign  
## 482 0 24 1201 4 26 poor newcar foreign  
## 483 0 30 3622 4 57 poor goods/repair foreign  
## 484 0 15 960 3 30 poor goods/repair foreign  
## 485 0 12 1163 4 44 terrible newcar foreign  
## 486 1 6 1209 4 47 poor newcar foreign  
## 487 0 12 3077 2 52 poor goods/repair foreign  
## 488 0 24 3757 4 62 poor newcar foreign  
## 489 0 10 1418 3 35 poor newcar german  
## 490 0 6 3518 2 26 poor newcar foreign  
## 491 0 12 1934 2 26 terrible goods/repair foreign  
## 492 1 27 8318 2 42 good biz foreign  
## 493 0 6 1237 1 27 terrible goods/repair foreign  
## 494 0 6 368 4 38 poor goods/repair foreign  
## 495 0 12 2122 3 39 terrible newcar german  
## 496 1 24 2996 2 20 poor goods/repair foreign  
## 497 1 36 9034 4 29 poor goods/repair foreign  
## 498 0 24 1585 4 40 terrible goods/repair foreign  
## 499 0 18 1301 4 32 poor goods/repair foreign  
## 500 0 6 1323 2 28 terrible newcar foreign  
## 501 1 24 3123 4 27 poor newcar foreign  
## 502 0 36 5493 2 42 poor usedcar foreign  
## 503 0 9 1126 2 49 poor goods/repair foreign  
## 504 1 24 1216 4 38 terrible goods/repair foreign  
## 505 1 24 1207 4 24 poor newcar foreign  
## 506 1 10 1309 4 27 poor newcar foreign  
## 507 0 15 2360 2 36 terrible usedcar foreign  
## 508 1 15 6850 1 34 good newcar foreign  
## 509 0 24 1413 4 28 poor goods/repair foreign  
## 510 0 39 8588 4 45 poor usedcar foreign  
## 511 1 12 759 4 26 poor newcar foreign  
## 512 0 36 4686 2 32 poor usedcar foreign  
## 513 0 15 2687 2 26 poor biz foreign  
## 514 0 12 585 4 20 poor goods/repair foreign  
## 515 0 24 2255 4 54 poor newcar foreign  
## 516 0 6 609 4 37 terrible newcar german  
## 517 0 6 1361 2 40 terrible newcar german  
## 518 1 36 7127 2 23 terrible goods/repair foreign  
## 519 0 6 1203 3 43 poor newcar foreign  
## 520 0 6 700 4 36 terrible goods/repair foreign  
## 521 0 24 5507 3 44 terrible goods/repair foreign  
## 522 1 18 3190 2 24 poor goods/repair foreign  
## 523 1 48 7119 3 53 good goods/repair foreign  
## 524 0 24 3488 3 23 poor usedcar foreign  
## 525 0 18 1113 4 26 poor goods/repair foreign  
## 526 0 26 7966 2 30 poor usedcar foreign  
## 527 0 15 1532 4 31 terrible edu foreign  
## 528 0 4 1503 2 42 terrible goods/repair foreign  
## 529 1 36 2302 4 31 poor goods/repair foreign  
## 530 0 6 662 3 41 poor newcar foreign  
## 531 0 36 2273 3 32 poor edu foreign  
## 532 1 15 2631 2 28 poor newcar foreign  
## 533 0 12 1503 4 41 poor usedcar foreign  
## 534 0 24 1311 4 26 poor goods/repair foreign  
## 535 0 24 3105 4 25 poor goods/repair foreign  
## 536 1 21 2319 2 33 terrible edu foreign  
## 537 0 6 1374 4 75 poor newcar foreign  
## 538 0 18 3612 3 37 terrible goods/repair foreign  
## 539 1 48 7763 4 42 poor newcar foreign  
## 540 0 18 3049 1 45 poor goods/repair foreign  
## 541 1 12 1534 1 23 poor goods/repair foreign  
## 542 0 24 2032 4 60 poor newcar foreign  
## 543 1 30 6350 4 31 poor goods/repair foreign  
## 544 1 18 2864 2 34 poor goods/repair foreign  
## 545 0 12 1255 4 61 terrible newcar foreign  
## 546 1 24 1333 4 43 poor newcar foreign  
## 547 0 24 2022 4 37 terrible newcar foreign  
## 548 0 24 1552 3 32 poor goods/repair foreign  
## 549 1 12 626 4 24 good goods/repair foreign  
## 550 0 48 8858 2 35 terrible usedcar foreign  
## 551 0 12 996 4 23 terrible goods/repair foreign  
## 552 0 6 1750 2 45 good goods/repair foreign  
## 553 1 48 6999 1 34 poor goods/repair foreign  
## 554 0 12 1995 4 27 terrible newcar foreign  
## 555 0 9 1199 4 67 poor edu foreign  
## 556 1 12 1331 2 22 poor goods/repair foreign  
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## 558 1 21 5003 1 29 good newcar foreign  
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## 560 1 18 1928 2 31 terrible goods/repair foreign  
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## 562 1 24 1546 4 24 good goods/repair foreign  
## 563 0 6 683 2 29 poor goods/repair foreign  
## 564 1 36 12389 1 37 poor newcar foreign  
## 565 0 24 4712 4 37 poor biz foreign  
## 566 0 24 1553 3 23 poor goods/repair foreign  
## 567 1 12 1372 2 36 poor newcar foreign  
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## 569 0 48 3979 4 41 poor goods/repair foreign  
## 570 1 48 6758 3 31 poor goods/repair foreign  
## 571 1 24 3234 4 23 poor goods/repair foreign  
## 572 0 30 5954 3 38 terrible goods/repair foreign  
## 573 0 24 5433 2 26 poor usedcar foreign  
## 574 0 15 806 4 22 poor biz foreign  
## 575 0 9 1082 4 27 poor goods/repair foreign  
## 576 0 15 2788 2 24 terrible goods/repair foreign  
## 577 0 12 2930 2 27 poor goods/repair foreign  
## 578 0 24 1927 3 33 terrible edu foreign  
## 579 1 36 2820 4 27 terrible newcar foreign  
## 580 0 24 937 4 27 poor edu foreign  
## 581 1 18 1056 3 30 terrible newcar foreign  
## 582 0 12 3124 1 49 terrible newcar foreign  
## 583 0 9 1388 4 26 poor goods/repair foreign  
## 584 1 36 2384 4 33 poor goods/repair foreign  
## 585 0 12 2133 4 52 poor newcar foreign  
## 586 1 18 2039 1 20 poor goods/repair foreign  
## 587 0 9 2799 2 36 terrible newcar foreign  
## 588 0 12 1289 4 21 poor goods/repair foreign  
## 589 1 18 1217 4 47 poor goods/repair foreign  
## 590 1 12 2246 3 60 terrible goods/repair foreign  
## 591 0 12 385 4 58 terrible goods/repair foreign  
## 592 0 24 1965 4 42 poor newcar foreign  
## 593 0 21 1572 4 36 poor biz foreign  
## 594 1 24 2718 3 20 poor newcar foreign  
## 595 1 24 1358 4 40 good biz foreign  
## 596 1 6 931 1 32 good newcar foreign  
## 597 1 24 1442 4 23 poor newcar foreign  
## 598 1 24 4241 1 36 good biz foreign  
## 599 1 18 2775 2 31 terrible newcar foreign  
## 600 0 24 3863 1 32 poor biz foreign  
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## 603 1 24 1837 4 34 good edu foreign  
## 604 1 36 3349 4 28 poor goods/repair foreign  
## 605 0 10 1275 4 23 poor goods/repair foreign  
## 606 0 24 2828 4 22 good goods/repair foreign  
## 607 0 24 4526 3 74 terrible biz foreign  
## 608 1 36 2671 4 50 poor goods/repair foreign  
## 609 0 18 2051 4 33 poor goods/repair foreign  
## 610 0 15 1300 4 45 poor usedcar foreign  
## 611 1 12 741 4 22 poor goods/repair foreign  
## 612 1 10 1240 1 48 poor newcar foreign  
## 613 0 21 3357 4 29 poor goods/repair foreign  
## 614 0 24 3632 1 22 good usedcar german  
## 615 1 18 1808 4 22 poor goods/repair foreign  
## 616 0 48 12204 2 48 good biz foreign  
## 617 0 60 9157 2 27 poor goods/repair foreign  
## 618 0 6 3676 1 37 terrible newcar foreign  
## 619 1 30 3441 2 21 poor goods/repair foreign  
## 620 0 12 640 4 49 poor newcar foreign  
## 621 0 21 3652 2 27 terrible biz foreign  
## 622 1 18 1530 3 32 terrible newcar foreign  
## 623 1 48 3914 4 38 poor biz foreign  
## 624 0 12 1858 4 22 poor goods/repair foreign  
## 625 1 18 2600 4 65 poor goods/repair foreign  
## 626 0 15 1979 4 35 poor goods/repair foreign  
## 627 0 6 2116 2 41 poor goods/repair foreign  
## 628 1 9 1437 2 29 good newcar foreign  
## 629 0 42 4042 4 36 terrible goods/repair foreign  
## 630 0 9 3832 1 64 poor edu foreign  
## 631 0 24 3660 2 28 poor goods/repair foreign  
## 632 1 18 1553 4 44 good goods/repair foreign  
## 633 0 15 1444 4 23 poor goods/repair foreign  
## 634 1 9 1980 2 19 poor goods/repair foreign  
## 635 1 24 1355 3 25 poor newcar foreign  
## 636 0 12 1393 4 47 poor edu foreign  
## 637 0 24 1376 4 28 poor goods/repair foreign  
## 638 0 60 15653 2 21 poor goods/repair foreign  
## 639 0 12 1493 4 34 poor goods/repair foreign  
## 640 1 42 4370 3 26 poor goods/repair foreign  
## 641 1 18 750 4 27 poor edu foreign  
## 642 0 15 1308 4 38 poor goods/repair foreign  
## 643 1 15 4623 3 40 poor edu foreign  
## 644 0 24 1851 4 33 terrible goods/repair foreign  
## 645 0 18 1880 4 32 terrible goods/repair foreign  
## 646 1 36 7980 4 27 poor biz foreign  
## 647 0 30 4583 2 32 good goods/repair foreign  
## 648 1 12 1386 2 26 poor newcar foreign  
## 649 1 24 947 4 38 poor newcar foreign  
## 650 1 12 684 4 40 poor edu foreign  
## 651 0 48 7476 4 50 poor edu foreign  
## 652 1 12 1922 4 37 poor goods/repair foreign  
## 653 1 24 2303 4 45 poor newcar foreign  
## 654 1 36 8086 2 42 poor newcar foreign  
## 655 0 24 2346 4 35 terrible usedcar foreign  
## 656 0 14 3973 1 22 poor newcar foreign  
## 657 1 12 888 4 41 poor newcar foreign  
## 658 0 48 10222 4 37 poor goods/repair foreign  
## 659 0 30 4221 2 28 good biz foreign  
## 660 0 18 6361 2 41 terrible goods/repair foreign  
## 661 0 12 1297 3 23 poor goods/repair foreign  
## 662 1 12 900 4 23 poor newcar foreign  
## 663 0 21 2241 4 50 poor goods/repair foreign  
## 664 0 6 1050 4 35 poor goods/repair foreign  
## 665 0 6 1047 2 50 terrible edu foreign  
## 666 0 24 6314 4 27 terrible biz foreign  
## 667 0 30 3496 4 34 good goods/repair foreign  
## 668 0 48 3609 1 27 good biz foreign  
## 669 1 12 4843 3 43 terrible newcar foreign  
## 670 0 30 3017 4 47 terrible goods/repair foreign  
## 671 0 24 4139 3 27 terrible biz foreign  
## 672 0 36 5742 2 31 poor biz foreign  
## 673 0 60 10366 2 42 poor newcar foreign  
## 674 0 6 2080 1 24 terrible newcar foreign  
## 675 1 21 2580 4 41 poor biz foreign  
## 676 0 30 4530 4 26 terrible goods/repair foreign  
## 677 0 24 5150 4 33 terrible goods/repair foreign  
## 678 1 72 5595 2 24 poor goods/repair foreign  
## 679 0 24 2384 4 64 poor goods/repair foreign  
## 680 0 18 1453 3 26 poor goods/repair foreign  
## 681 0 6 1538 1 56 poor edu foreign  
## 682 0 12 2279 4 37 poor goods/repair foreign  
## 683 0 15 1478 4 33 poor goods/repair foreign  
## 684 0 24 5103 3 47 terrible goods/repair foreign  
## 685 0 36 9857 1 31 poor biz foreign  
## 686 0 60 6527 4 34 poor newcar foreign  
## 687 0 10 1347 4 27 terrible goods/repair foreign  
## 688 0 36 2862 4 30 poor newcar foreign  
## 689 0 9 2753 3 35 poor goods/repair foreign  
## 690 0 12 3651 1 31 poor newcar foreign  
## 691 0 15 975 2 25 terrible goods/repair foreign  
## 692 0 15 2631 3 25 poor goods/repair foreign  
## 693 0 24 2896 2 29 poor goods/repair foreign  
## 694 0 6 4716 1 44 terrible newcar foreign  
## 695 0 24 2284 4 28 poor goods/repair foreign  
## 696 0 6 1236 2 50 poor usedcar foreign  
## 697 0 12 1103 4 29 poor goods/repair german  
## 698 0 12 926 1 38 terrible newcar foreign  
## 699 0 18 1800 4 24 terrible goods/repair foreign  
## 700 0 15 1905 4 40 poor edu foreign  
## 701 1 12 1123 4 29 poor goods/repair foreign  
## 702 1 48 6331 4 46 terrible usedcar foreign  
## 703 0 24 1377 4 47 poor goods/repair foreign  
## 704 0 30 2503 4 41 poor biz foreign  
## 705 0 27 2528 4 32 poor biz foreign  
## 706 0 15 5324 1 35 poor newcar foreign  
## 707 1 48 6560 3 24 poor newcar foreign  
## 708 1 12 2969 4 25 good goods/repair foreign  
## 709 0 9 1206 4 25 poor goods/repair foreign  
## 710 0 9 2118 2 37 poor goods/repair foreign  
## 711 0 18 629 4 32 terrible goods/repair foreign  
## 712 1 6 1198 4 35 good edu foreign  
## 713 0 21 2476 4 46 poor usedcar foreign  
## 714 0 9 1138 4 25 terrible goods/repair foreign  
## 715 1 60 14027 4 27 poor newcar foreign  
## 716 0 30 7596 1 63 terrible usedcar foreign  
## 717 0 30 3077 3 40 terrible goods/repair foreign  
## 718 0 18 1505 4 32 poor goods/repair foreign  
## 719 0 24 3148 3 31 terrible goods/repair foreign  
## 720 0 20 6148 3 31 good usedcar foreign  
## 721 1 9 1337 4 34 good goods/repair foreign  
## 722 1 6 433 4 24 good edu foreign  
## 723 1 12 1228 4 24 poor newcar foreign  
## 724 0 9 790 4 66 poor goods/repair foreign  
## 725 1 27 2570 3 21 poor newcar foreign  
## 726 0 6 250 2 41 terrible newcar foreign  
## 727 0 15 1316 2 47 terrible goods/repair foreign  
## 728 1 18 1882 4 25 poor goods/repair foreign  
## 729 1 48 6416 4 59 good biz foreign  
## 730 0 24 1275 2 36 terrible biz foreign  
## 731 0 24 6403 1 33 poor goods/repair foreign  
## 732 1 24 1987 2 21 poor goods/repair foreign  
## 733 0 8 760 4 44 poor goods/repair foreign  
## 734 0 24 2603 2 28 poor usedcar foreign  
## 735 0 4 3380 1 37 terrible newcar foreign  
## 736 0 36 3990 3 29 good goods/repair foreign  
## 737 1 24 11560 1 23 poor usedcar foreign  
## 738 0 18 4380 3 35 poor newcar foreign  
## 739 0 6 6761 1 45 terrible newcar foreign  
## 740 1 30 4280 4 26 good biz foreign  
## 741 0 24 2325 2 32 good newcar foreign  
## 742 0 10 1048 4 23 good goods/repair foreign  
## 743 0 21 3160 4 41 poor goods/repair foreign  
## 744 0 24 2483 4 22 good goods/repair foreign  
## 745 0 39 14179 4 30 terrible goods/repair foreign  
## 746 0 13 1797 3 28 terrible biz foreign  
## 747 0 15 2511 1 23 poor newcar foreign  
## 748 1 12 1274 3 37 poor newcar foreign  
## 749 0 21 5248 1 26 poor usedcar foreign  
## 750 0 15 3029 2 33 poor usedcar foreign  
## 751 0 6 428 2 49 poor goods/repair foreign  
## 752 1 18 976 1 23 poor newcar foreign  
## 753 0 12 841 2 23 poor biz foreign  
## 754 0 30 5771 4 25 terrible goods/repair foreign  
## 755 1 12 1555 4 55 poor goods/repair foreign  
## 756 1 24 1285 4 32 poor newcar foreign  
## 757 0 6 1299 1 74 terrible newcar german  
## 758 1 15 1271 3 39 terrible goods/repair foreign  
## 759 0 24 1393 2 31 poor newcar foreign  
## 760 1 12 691 4 35 terrible newcar foreign  
## 761 0 15 5045 1 59 terrible newcar foreign  
## 762 1 18 2124 4 24 terrible goods/repair foreign  
## 763 0 12 2214 4 24 poor goods/repair foreign  
## 764 1 21 12680 4 30 terrible newcar foreign  
## 765 0 24 2463 4 27 terrible newcar foreign  
## 766 0 12 1155 3 40 poor goods/repair foreign  
## 767 1 30 3108 2 31 poor goods/repair foreign  
## 768 0 10 2901 1 31 poor usedcar foreign  
## 769 0 12 3617 1 28 terrible goods/repair foreign  
## 770 0 12 1655 2 63 terrible goods/repair foreign  
## 771 0 24 2812 2 26 poor usedcar foreign  
## 772 1 36 8065 3 25 terrible edu foreign  
## 773 0 21 3275 1 36 terrible usedcar foreign  
## 774 0 24 2223 4 52 terrible goods/repair foreign  
## 775 0 12 1480 2 66 terrible newcar foreign  
## 776 1 24 1371 4 25 poor newcar foreign  
## 777 0 36 3535 4 37 terrible newcar foreign  
## 778 0 18 3509 4 25 poor goods/repair foreign  
## 779 0 36 5711 4 38 terrible usedcar foreign  
## 780 0 18 3872 2 67 poor goods/repair foreign  
## 781 1 39 4933 2 25 terrible goods/repair foreign  
## 782 0 24 1940 4 60 terrible newcar foreign  
## 783 0 12 1410 2 31 good edu foreign  
## 784 1 12 836 4 23 poor newcar foreign  
## 785 0 20 6468 1 60 poor usedcar foreign  
## 786 0 18 1941 4 35 poor biz foreign  
## 787 0 22 2675 3 40 poor goods/repair foreign  
## 788 0 48 2751 4 38 terrible usedcar foreign  
## 789 1 48 6224 4 50 poor edu foreign  
## 790 1 40 5998 4 27 terrible edu foreign  
## 791 1 21 1188 2 39 poor biz foreign  
## 792 0 24 6313 3 41 poor usedcar foreign  
## 793 0 6 1221 1 27 terrible goods/repair foreign  
## 794 0 24 2892 3 51 poor goods/repair foreign  
## 795 0 24 3062 4 32 poor goods/repair foreign  
## 796 0 9 2301 2 22 poor goods/repair foreign  
## 797 1 18 7511 1 51 poor usedcar foreign  
## 798 0 12 1258 2 22 terrible goods/repair foreign  
## 799 0 24 717 4 54 poor newcar foreign  
## 800 0 9 1549 4 35 poor newcar foreign  
## 801 0 24 1597 4 54 terrible edu foreign  
## 802 0 18 1795 3 48 terrible goods/repair foreign  
## 803 0 20 4272 1 24 terrible goods/repair foreign  
## 804 0 12 976 4 35 terrible goods/repair foreign  
## 805 0 12 7472 1 24 poor newcar foreign  
## 806 1 36 9271 2 24 poor newcar foreign  
## 807 0 6 590 3 26 poor goods/repair german  
## 808 0 12 930 4 65 terrible goods/repair foreign  
## 809 0 42 9283 1 55 good usedcar foreign  
## 810 1 15 1778 2 26 good newcar foreign  
## 811 0 8 907 3 26 poor biz foreign  
## 812 0 6 484 3 28 poor goods/repair foreign  
## 813 1 36 9629 4 24 terrible usedcar foreign  
## 814 1 48 3051 3 54 poor goods/repair foreign  
## 815 1 48 3931 4 46 poor newcar foreign  
## 816 0 36 7432 2 54 poor newcar foreign  
## 817 0 6 1338 1 62 poor goods/repair foreign  
## 818 0 6 1554 1 24 terrible goods/repair foreign  
## 819 0 36 15857 2 43 poor biz foreign  
## 820 1 18 1345 4 26 poor goods/repair foreign  
## 821 0 12 1101 3 27 poor newcar foreign  
## 822 0 12 3016 3 24 poor goods/repair foreign  
## 823 1 36 2712 2 41 poor goods/repair foreign  
## 824 0 8 731 4 47 terrible newcar foreign  
## 825 0 18 3780 3 35 terrible goods/repair foreign  
## 826 0 21 1602 4 30 terrible newcar foreign  
## 827 1 18 3966 1 33 terrible newcar foreign  
## 828 1 18 4165 2 36 good biz foreign  
## 829 1 36 8335 3 47 poor usedcar foreign  
## 830 0 48 6681 4 38 poor biz foreign  
## 831 0 24 2375 4 44 poor biz foreign  
## 832 1 18 1216 4 23 poor newcar foreign  
## 833 1 45 11816 2 29 good biz foreign  
## 834 0 24 5084 2 42 poor goods/repair foreign  
## 835 1 15 2327 2 25 poor goods/repair foreign  
## 836 1 12 1082 4 48 good newcar foreign  
## 837 0 12 886 4 21 poor goods/repair foreign  
## 838 0 4 601 1 23 poor goods/repair foreign  
## 839 0 24 2957 4 63 terrible usedcar foreign  
## 840 0 24 2611 4 46 terrible goods/repair foreign  
## 841 1 36 5179 4 29 poor goods/repair foreign  
## 842 0 21 2993 3 28 poor usedcar foreign  
## 843 1 18 1943 4 23 poor goods/repair foreign  
## 844 0 24 1559 4 50 good biz foreign  
## 845 0 18 3422 4 47 poor goods/repair foreign  
## 846 0 21 3976 2 35 poor goods/repair foreign  
## 847 1 18 6761 2 68 poor newcar foreign  
## 848 0 24 1249 4 28 poor newcar foreign  
## 849 0 9 1364 3 59 poor goods/repair foreign  
## 850 1 12 709 4 57 poor goods/repair foreign  
## 851 1 20 2235 4 33 terrible newcar german  
## 852 0 24 4042 3 43 terrible usedcar foreign  
## 853 0 15 1471 4 35 terrible goods/repair foreign  
## 854 1 18 1442 4 32 good newcar foreign  
## 855 0 36 10875 2 45 poor newcar foreign  
## 856 0 24 1474 4 33 poor newcar foreign  
## 857 0 10 894 4 40 poor edu foreign  
## 858 0 15 3343 4 28 terrible goods/repair foreign  
## 859 1 15 3959 3 29 poor newcar foreign  
## 860 0 9 3577 1 26 poor newcar german  
## 861 0 24 5804 4 27 terrible usedcar foreign  
## 862 1 18 2169 4 28 poor biz foreign  
## 863 1 24 2439 4 35 poor goods/repair foreign  
## 864 0 27 4526 4 32 terrible goods/repair foreign  
## 865 1 10 2210 2 25 poor goods/repair foreign  
## 866 0 15 2221 2 20 poor goods/repair foreign  
## 867 0 18 2389 4 27 poor goods/repair foreign  
## 868 0 12 3331 2 42 terrible goods/repair foreign  
## 869 0 36 7409 3 37 poor biz foreign  
## 870 0 12 652 4 24 poor goods/repair foreign  
## 871 0 36 7678 2 40 poor goods/repair foreign  
## 872 0 6 1343 1 46 terrible newcar german  
## 873 0 24 1382 4 26 terrible biz foreign  
## 874 0 15 874 4 24 poor goods/repair foreign  
## 875 0 12 3590 2 29 poor goods/repair foreign  
## 876 0 11 1322 4 40 terrible newcar foreign  
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## 878 0 36 3595 4 28 poor goods/repair foreign  
## 879 1 9 1422 3 27 poor newcar foreign  
## 880 0 30 6742 2 36 terrible goods/repair foreign  
## 881 0 24 7814 3 38 poor usedcar foreign  
## 882 0 24 9277 2 48 poor usedcar foreign  
## 883 0 30 2181 4 36 terrible newcar foreign  
## 884 0 18 1098 4 65 terrible goods/repair foreign  
## 885 1 24 4057 3 43 poor goods/repair foreign  
## 886 1 12 795 4 53 poor edu foreign  
## 887 0 24 2825 4 34 terrible biz foreign  
## 888 1 48 15672 2 23 poor biz foreign  
## 889 0 36 6614 4 34 terrible newcar foreign  
## 890 0 28 7824 3 40 good usedcar foreign  
## 891 0 27 2442 4 43 terrible biz foreign  
## 892 0 15 1829 4 46 terrible goods/repair foreign  
## 893 0 12 2171 4 38 terrible newcar german  
## 894 0 36 5800 3 34 terrible usedcar foreign  
## 895 0 18 1169 4 29 terrible goods/repair foreign  
## 896 0 36 8947 3 31 poor usedcar foreign  
## 897 0 21 2606 4 28 poor goods/repair foreign  
## 898 0 12 1592 3 35 terrible goods/repair german  
## 899 0 15 2186 1 33 poor goods/repair foreign  
## 900 1 18 4153 2 42 poor goods/repair foreign  
## 901 1 16 2625 2 43 terrible newcar foreign  
## 902 0 20 3485 2 44 terrible newcar foreign  
## 903 0 36 10477 2 42 terrible usedcar foreign  
## 904 0 15 1386 4 40 poor goods/repair foreign  
## 905 0 24 1278 4 36 poor goods/repair foreign  
## 906 0 12 1107 2 20 poor goods/repair foreign  
## 907 0 21 3763 2 24 poor newcar german  
## 908 0 36 3711 2 27 poor edu foreign  
## 909 0 15 3594 1 46 poor usedcar foreign  
## 910 0 9 3195 1 33 poor newcar foreign  
## 911 0 36 4454 4 34 poor goods/repair foreign  
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## 913 0 30 2991 2 25 poor goods/repair foreign  
## 914 0 11 2142 1 28 poor biz foreign  
## 915 1 24 3161 4 31 good biz foreign  
## 916 1 48 18424 1 32 good biz german  
## 917 0 10 2848 1 32 poor usedcar foreign  
## 918 1 6 14896 1 68 poor newcar foreign  
## 919 1 24 2359 1 33 poor goods/repair foreign  
## 920 1 24 3345 4 39 poor goods/repair foreign  
## 921 0 18 1817 4 28 terrible goods/repair foreign  
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## 923 1 9 1366 3 22 poor goods/repair foreign  
## 924 0 12 2002 3 30 poor newcar foreign  
## 925 1 24 6872 2 55 good goods/repair foreign  
## 926 1 12 697 4 46 good newcar foreign  
## 927 0 18 1049 4 21 terrible goods/repair foreign  
## 928 1 48 10297 4 39 poor usedcar foreign  
## 929 0 30 1867 4 58 poor goods/repair foreign  
## 930 0 12 1344 4 43 poor newcar foreign  
## 931 0 24 1747 4 24 poor goods/repair german  
## 932 1 9 1670 4 22 poor goods/repair foreign  
## 933 0 9 1224 3 30 terrible newcar foreign  
## 934 0 12 522 4 42 terrible goods/repair foreign  
## 935 0 12 1498 4 23 poor goods/repair foreign  
## 936 1 30 1919 4 30 poor goods/repair foreign  
## 937 1 9 745 3 28 poor goods/repair foreign  
## 938 0 6 2063 4 30 poor goods/repair foreign  
## 939 1 60 6288 4 42 poor edu foreign  
## 940 0 24 6842 2 46 terrible usedcar foreign  
## 941 0 12 3527 2 45 poor newcar foreign  
## 942 0 10 1546 3 31 poor newcar german  
## 943 0 24 929 4 31 poor goods/repair foreign  
## 944 0 4 1455 2 42 terrible newcar foreign  
## 945 0 15 1845 4 46 poor goods/repair foreign  
## 946 0 48 8358 1 30 good newcar foreign  
## 947 1 24 3349 4 30 good goods/repair foreign  
## 948 0 12 2859 4 38 poor newcar foreign  
## 949 1 18 1533 4 43 poor goods/repair foreign  
## 950 1 24 3621 2 31 poor goods/repair foreign  
## 951 0 18 3590 3 40 terrible biz foreign  
## 952 1 36 2145 2 24 poor biz foreign  
## 953 1 24 4113 3 28 poor usedcar foreign  
## 954 1 36 10974 4 26 poor goods/repair foreign  
## 955 0 12 1893 4 29 poor newcar foreign  
## 956 0 24 1231 4 57 terrible goods/repair foreign  
## 957 0 30 3656 4 49 terrible goods/repair foreign  
## 958 0 9 1154 2 37 terrible goods/repair foreign  
## 959 1 28 4006 3 45 poor newcar foreign  
## 960 0 24 3069 4 30 poor goods/repair foreign  
## 961 0 6 1740 2 30 terrible goods/repair foreign  
## 962 0 21 2353 1 47 poor newcar foreign  
## 963 0 15 3556 3 29 poor newcar foreign  
## 964 1 24 2397 3 35 poor goods/repair foreign  
## 965 0 6 454 3 22 poor goods/repair foreign  
## 966 0 30 1715 4 26 poor goods/repair foreign  
## 967 1 27 2520 4 23 terrible goods/repair foreign  
## 968 0 15 3568 4 54 poor goods/repair foreign  
## 969 0 42 7166 2 29 poor goods/repair foreign  
## 970 0 11 3939 1 40 terrible newcar foreign  
## 971 0 15 1514 4 22 poor goods/repair foreign  
## 972 0 24 7393 1 43 poor newcar foreign  
## 973 1 24 1193 1 29 good newcar foreign  
## 974 1 60 7297 4 36 poor biz foreign  
## 975 0 30 2831 4 33 terrible goods/repair foreign  
## 976 0 24 1258 3 57 poor goods/repair foreign  
## 977 0 6 753 2 64 poor goods/repair foreign  
## 978 0 18 2427 4 42 poor biz foreign  
## 979 1 24 2538 4 47 poor newcar foreign  
## 980 1 15 1264 2 25 good newcar foreign  
## 981 1 30 8386 2 49 terrible goods/repair foreign  
## 982 1 48 4844 3 33 poor biz foreign  
## 983 0 21 2923 1 28 poor newcar foreign  
## 984 1 36 8229 2 26 poor usedcar foreign  
## 985 0 24 2028 2 30 terrible goods/repair foreign  
## 986 0 15 1433 4 25 terrible goods/repair foreign  
## 987 0 42 6289 2 33 good biz foreign  
## 988 0 13 1409 2 64 poor goods/repair foreign  
## 989 0 24 6579 4 29 poor usedcar foreign  
## 990 0 24 1743 4 48 terrible goods/repair foreign  
## 991 0 12 3565 2 37 terrible edu foreign  
## 992 0 15 1569 4 34 good goods/repair foreign  
## 993 0 18 1936 2 23 poor goods/repair foreign  
## 994 0 36 3959 4 30 poor goods/repair foreign  
## 995 0 12 2390 4 50 poor newcar foreign  
## 996 0 12 1736 3 31 poor goods/repair foreign  
## 997 0 30 3857 4 40 poor usedcar foreign  
## 998 0 12 804 4 38 poor goods/repair foreign  
## 999 1 45 1845 4 23 poor goods/repair foreign  
## 1000 0 45 4576 3 27 terrible usedcar foreign  
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summary(credit)

## Default duration amount installment age   
## 0:700 Min. : 4.0 Min. : 250 Min. :1.000 Min. :19.00   
## 1:300 1st Qu.:12.0 1st Qu.: 1366 1st Qu.:2.000 1st Qu.:27.00   
## Median :18.0 Median : 2320 Median :3.000 Median :33.00   
## Mean :20.9 Mean : 3271 Mean :2.973 Mean :35.55   
## 3rd Qu.:24.0 3rd Qu.: 3972 3rd Qu.:4.000 3rd Qu.:42.00   
## Max. :72.0 Max. :18424 Max. :4.000 Max. :75.00   
## history purpose foreign rent   
## good : 89 newcar :234 foreign:963 FALSE:821   
## poor :618 usedcar :103 german : 37 TRUE :179   
## terrible:293 goods/repair:495   
## edu : 59   
## biz :109   
##

This functions gives out the summary of the loan takers for the history purpose foreign and rent.

Xcred <- model.matrix(Default~.,data=credit)[,-1]  
Xcred[1:3,]

## duration amount installment age historypoor historyterrible  
## 1 6 1169 4 67 0 1  
## 2 48 5951 2 22 1 0  
## 3 12 2096 2 49 0 1  
## purposeusedcar purposegoods/repair purposeedu purposebiz foreigngerman  
## 1 0 1 0 0 0  
## 2 0 1 0 0 0  
## 3 0 0 1 0 0  
## rentTRUE  
## 1 0  
## 2 0  
## 3 0

set.seed(1)  
train <- sample(1:1000,900)  
xtrain <- Xcred[train,]  
xnew <- Xcred[-train,]  
ytrain <- credit$Default[train]  
ynew <- credit$Default[-train]  
credglm=glm(Default~.,family=binomial,data=data.frame(Default=ytrain,xtrain))  
summary(credglm)

##   
## Call:  
## glm(formula = Default ~ ., family = binomial, data = data.frame(Default = ytrain,   
## xtrain))  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -2.2912 -0.7951 -0.5553 0.9922 2.2601   
##   
## Coefficients:  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) -2.705e-01 4.833e-01 -0.560 0.575693   
## duration 2.721e-02 8.464e-03 3.215 0.001303 \*\*   
## amount 9.040e-05 3.854e-05 2.346 0.018987 \*   
## installment 2.228e-01 8.064e-02 2.763 0.005722 \*\*   
## age -1.327e-02 7.704e-03 -1.723 0.084961 .   
## historypoor -1.102e+00 2.641e-01 -4.173 3.01e-05 \*\*\*  
## historyterrible -1.860e+00 3.007e-01 -6.184 6.25e-10 \*\*\*  
## purposeusedcar -1.793e+00 3.555e-01 -5.043 4.58e-07 \*\*\*  
## purposegoods.repair -7.447e-01 1.976e-01 -3.769 0.000164 \*\*\*  
## purposeedu -6.809e-02 3.401e-01 -0.200 0.841325   
## purposebiz -7.342e-01 2.916e-01 -2.518 0.011812 \*   
## foreigngerman -1.363e+00 6.638e-01 -2.053 0.040054 \*   
## rentTRUE 7.011e-01 2.075e-01 3.378 0.000730 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 1102.92 on 899 degrees of freedom  
## Residual deviance: 955.21 on 887 degrees of freedom  
## AIC: 981.21  
##   
## Number of Fisher Scoring iterations: 5

ptest <- predict(credglm, newdata=data.frame(xnew),type="response")  
data.frame(ynew,ptest)

## ynew ptest  
## 16 1 0.29285579  
## 18 0 0.65821629  
## 19 1 0.25582878  
## 26 0 0.11059259  
## 27 0 0.39183380  
## 43 0 0.23061764  
## 44 0 0.12544267  
## 50 0 0.25283649  
## 61 0 0.16128056  
## 65 0 0.34745105  
## 76 0 0.03097682  
## 78 0 0.16551320  
## 85 0 0.16010711  
## 86 0 0.12969852  
## 93 1 0.11682772  
## 101 0 0.61342859  
## 115 0 0.19235148  
## 128 1 0.22448569  
## 152 0 0.03504181  
## 159 0 0.38685523  
## 174 0 0.06409169  
## 178 0 0.07729040  
## 226 0 0.67563398  
## 236 1 0.30872069  
## 248 0 0.44195287  
## 264 0 0.12630870  
## 265 0 0.05387320  
## 285 0 0.32605318  
## 291 0 0.04996535  
## 297 0 0.14707164  
## 321 1 0.39895328  
## 327 0 0.17838034  
## 352 1 0.03521084  
## 370 0 0.32296569  
## 379 1 0.73815667  
## 389 0 0.10353993  
## 390 0 0.19456001  
## 402 0 0.15654947  
## 411 0 0.34065379  
## 417 1 0.41109637  
## 428 0 0.11917861  
## 430 1 0.07164830  
## 435 0 0.20709643  
## 449 0 0.15143891  
## 456 0 0.14633377  
## 458 1 0.08876750  
## 465 0 0.26884658  
## 475 1 0.13954988  
## 482 0 0.48387209  
## 483 0 0.46570731  
## 487 0 0.14717176  
## 497 1 0.70821299  
## 500 0 0.14514916  
## 508 1 0.62915563  
## 515 0 0.41560675  
## 533 0 0.16047908  
## 540 0 0.15108125  
## 543 1 0.43859786  
## 566 0 0.43552511  
## 573 0 0.22803447  
## 578 0 0.24226477  
## 594 1 0.65260318  
## 607 0 0.10759239  
## 620 0 0.32146437  
## 631 0 0.25746579  
## 632 1 0.48063233  
## 648 1 0.30574992  
## 677 0 0.21370451  
## 684 0 0.15243655  
## 700 0 0.55018376  
## 710 0 0.15107007  
## 712 1 0.58901410  
## 723 1 0.41044478  
## 727 0 0.07407406  
## 738 0 0.42978704  
## 765 0 0.32710731  
## 768 0 0.10730873  
## 771 0 0.18902185  
## 776 1 0.66043205  
## 794 0 0.22952487  
## 810 1 0.75030029  
## 822 0 0.23720736  
## 831 0 0.28262399  
## 841 1 0.45936917  
## 853 0 0.12934205  
## 857 0 0.32581634  
## 860 0 0.16963091  
## 866 0 0.34821020  
## 870 0 0.38750805  
## 880 0 0.18527230  
## 893 0 0.07023244  
## 901 1 0.29291563  
## 913 0 0.28565953  
## 915 1 0.75311392  
## 927 0 0.27360925  
## 949 1 0.23719315  
## 957 0 0.18439670  
## 968 0 0.37503536  
## 984 1 0.20730814  
## 999 1 0.46512762

cut=1/6  
gg1=floor(ptest+(1-cut))  
ttt=table(ynew,gg1)  
ttt

## gg1  
## ynew 0 1  
## 0 30 42  
## 1 5 23

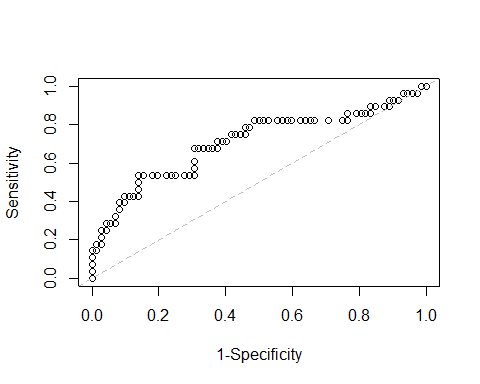
truepos <- ynew==1 & ptest>=cut  
trueneg <- ynew==0 & ptest<cut  
sum(truepos)/sum(ynew==1)

## [1] 0.8214286

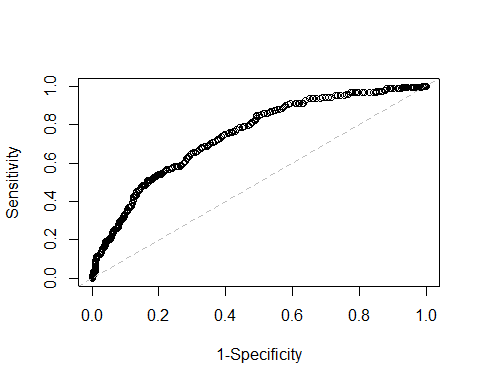
sum(trueneg)/sum(ynew==0)

## [1] 0.4166667

roc <- function(p,y){  
y <- factor(y)  
n <- length(p)  
p <- as.vector(p)  
Q <- p > matrix(rep(seq(0,1,length=500),n),ncol=500,byrow=TRUE)  
fp <- colSums((y==levels(y)[1])\*Q)/sum(y==levels(y)[1])  
tp <- colSums((y==levels(y)[2])\*Q)/sum(y==levels(y)[2])  
plot(fp, tp, xlab="1-Specificity", ylab="Sensitivity")  
abline(a=0,b=1,lty=2,col=8)  
}  
roc(p=ptest,y=ynew)



credglmall <- glm(credit$Default ~ Xcred,family=binomial)  
roc(p=credglmall$fitted, y=credglmall$y)



library(ROCR)

## Loading required package: gplots  
##   
## Attaching package: 'gplots'  
##   
## The following object is masked from 'package:stats':  
##   
## lowess

predictions=ptest  
labels=ynew  
data=data.frame(predictions,labels)  
data

## predictions labels  
## 16 0.29285579 1  
## 18 0.65821629 0  
## 19 0.25582878 1  
## 26 0.11059259 0  
## 27 0.39183380 0  
## 43 0.23061764 0  
## 44 0.12544267 0  
## 50 0.25283649 0  
## 61 0.16128056 0  
## 65 0.34745105 0  
## 76 0.03097682 0  
## 78 0.16551320 0  
## 85 0.16010711 0  
## 86 0.12969852 0  
## 93 0.11682772 1  
## 101 0.61342859 0  
## 115 0.19235148 0  
## 128 0.22448569 1  
## 152 0.03504181 0  
## 159 0.38685523 0  
## 174 0.06409169 0  
## 178 0.07729040 0  
## 226 0.67563398 0  
## 236 0.30872069 1  
## 248 0.44195287 0  
## 264 0.12630870 0  
## 265 0.05387320 0  
## 285 0.32605318 0  
## 291 0.04996535 0  
## 297 0.14707164 0  
## 321 0.39895328 1  
## 327 0.17838034 0  
## 352 0.03521084 1  
## 370 0.32296569 0  
## 379 0.73815667 1  
## 389 0.10353993 0  
## 390 0.19456001 0  
## 402 0.15654947 0  
## 411 0.34065379 0  
## 417 0.41109637 1  
## 428 0.11917861 0  
## 430 0.07164830 1  
## 435 0.20709643 0  
## 449 0.15143891 0  
## 456 0.14633377 0  
## 458 0.08876750 1  
## 465 0.26884658 0  
## 475 0.13954988 1  
## 482 0.48387209 0  
## 483 0.46570731 0  
## 487 0.14717176 0  
## 497 0.70821299 1  
## 500 0.14514916 0  
## 508 0.62915563 1  
## 515 0.41560675 0  
## 533 0.16047908 0  
## 540 0.15108125 0  
## 543 0.43859786 1  
## 566 0.43552511 0  
## 573 0.22803447 0  
## 578 0.24226477 0  
## 594 0.65260318 1  
## 607 0.10759239 0  
## 620 0.32146437 0  
## 631 0.25746579 0  
## 632 0.48063233 1  
## 648 0.30574992 1  
## 677 0.21370451 0  
## 684 0.15243655 0  
## 700 0.55018376 0  
## 710 0.15107007 0  
## 712 0.58901410 1  
## 723 0.41044478 1  
## 727 0.07407406 0  
## 738 0.42978704 0  
## 765 0.32710731 0  
## 768 0.10730873 0  
## 771 0.18902185 0  
## 776 0.66043205 1  
## 794 0.22952487 0  
## 810 0.75030029 1  
## 822 0.23720736 0  
## 831 0.28262399 0  
## 841 0.45936917 1  
## 853 0.12934205 0  
## 857 0.32581634 0  
## 860 0.16963091 0  
## 866 0.34821020 0  
## 870 0.38750805 0  
## 880 0.18527230 0  
## 893 0.07023244 0  
## 901 0.29291563 1  
## 913 0.28565953 0  
## 915 0.75311392 1  
## 927 0.27360925 0  
## 949 0.23719315 1  
## 957 0.18439670 0  
## 968 0.37503536 0  
## 984 0.20730814 1  
## 999 0.46512762 1

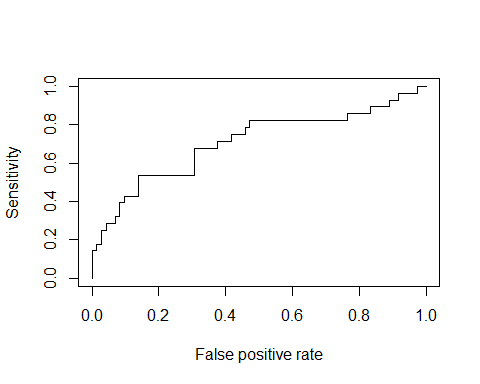
pred <- prediction(data$predictions,data$labels)  
pred

## An object of class "prediction"  
## Slot "predictions":  
## [[1]]  
## [1] 0.29285579 0.65821629 0.25582878 0.11059259 0.39183380 0.23061764  
## [7] 0.12544267 0.25283649 0.16128056 0.34745105 0.03097682 0.16551320  
## [13] 0.16010711 0.12969852 0.11682772 0.61342859 0.19235148 0.22448569  
## [19] 0.03504181 0.38685523 0.06409169 0.07729040 0.67563398 0.30872069  
## [25] 0.44195287 0.12630870 0.05387320 0.32605318 0.04996535 0.14707164  
## [31] 0.39895328 0.17838034 0.03521084 0.32296569 0.73815667 0.10353993  
## [37] 0.19456001 0.15654947 0.34065379 0.41109637 0.11917861 0.07164830  
## [43] 0.20709643 0.15143891 0.14633377 0.08876750 0.26884658 0.13954988  
## [49] 0.48387209 0.46570731 0.14717176 0.70821299 0.14514916 0.62915563  
## [55] 0.41560675 0.16047908 0.15108125 0.43859786 0.43552511 0.22803447  
## [61] 0.24226477 0.65260318 0.10759239 0.32146437 0.25746579 0.48063233  
## [67] 0.30574992 0.21370451 0.15243655 0.55018376 0.15107007 0.58901410  
## [73] 0.41044478 0.07407406 0.42978704 0.32710731 0.10730873 0.18902185  
## [79] 0.66043205 0.22952487 0.75030029 0.23720736 0.28262399 0.45936917  
## [85] 0.12934205 0.32581634 0.16963091 0.34821020 0.38750805 0.18527230  
## [91] 0.07023244 0.29291563 0.28565953 0.75311392 0.27360925 0.23719315  
## [97] 0.18439670 0.37503536 0.20730814 0.46512762  
##   
##   
## Slot "labels":  
## [[1]]  
## [1] 1 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 1 0 1 0 1  
## [36] 0 0 0 0 1 0 1 0 0 0 1 0 1 0 0 0 1 0 1 0 0 0 1 0 0 0 1 0 0 0 1 1 0 0 0  
## [71] 0 1 1 0 0 0 0 0 1 0 1 0 0 1 0 0 0 0 0 0 0 1 0 1 0 1 0 0 1 1  
## Levels: 0 < 1  
##   
##   
## Slot "cutoffs":  
## [[1]]  
## [1] Inf 0.75311392 0.75030029 0.73815667 0.70821299 0.67563398  
## [7] 0.66043205 0.65821629 0.65260318 0.62915563 0.61342859 0.58901410  
## [13] 0.55018376 0.48387209 0.48063233 0.46570731 0.46512762 0.45936917  
## [19] 0.44195287 0.43859786 0.43552511 0.42978704 0.41560675 0.41109637  
## [25] 0.41044478 0.39895328 0.39183380 0.38750805 0.38685523 0.37503536  
## [31] 0.34821020 0.34745105 0.34065379 0.32710731 0.32605318 0.32581634  
## [37] 0.32296569 0.32146437 0.30872069 0.30574992 0.29291563 0.29285579  
## [43] 0.28565953 0.28262399 0.27360925 0.26884658 0.25746579 0.25582878  
## [49] 0.25283649 0.24226477 0.23720736 0.23719315 0.23061764 0.22952487  
## [55] 0.22803447 0.22448569 0.21370451 0.20730814 0.20709643 0.19456001  
## [61] 0.19235148 0.18902185 0.18527230 0.18439670 0.17838034 0.16963091  
## [67] 0.16551320 0.16128056 0.16047908 0.16010711 0.15654947 0.15243655  
## [73] 0.15143891 0.15108125 0.15107007 0.14717176 0.14707164 0.14633377  
## [79] 0.14514916 0.13954988 0.12969852 0.12934205 0.12630870 0.12544267  
## [85] 0.11917861 0.11682772 0.11059259 0.10759239 0.10730873 0.10353993  
## [91] 0.08876750 0.07729040 0.07407406 0.07164830 0.07023244 0.06409169  
## [97] 0.05387320 0.04996535 0.03521084 0.03504181 0.03097682  
##   
##   
## Slot "fp":  
## [[1]]  
## [1] 0 0 0 0 0 1 1 2 2 2 3 3 4 5 5 6 6 6 7 7 8 9 10  
## [24] 10 10 10 11 12 13 14 15 16 17 18 19 20 21 22 22 22 22 22 23 24 25 26  
## [47] 27 27 28 29 30 30 31 32 33 33 34 34 35 36 37 38 39 40 41 42 43 44 45  
## [70] 46 47 48 49 50 51 52 53 54 55 55 56 57 58 59 60 60 61 62 63 64 64 65  
## [93] 66 66 67 68 69 70 70 71 72  
##   
##   
## Slot "tp":  
## [[1]]  
## [1] 0 1 2 3 4 4 5 5 6 7 7 8 8 8 9 9 10 11 11 12 12 12 12  
## [24] 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15 16 17 18 19 19 19 19 19  
## [47] 19 20 20 20 20 21 21 21 21 22 22 23 23 23 23 23 23 23 23 23 23 23 23  
## [70] 23 23 23 23 23 23 23 23 23 23 24 24 24 24 24 24 25 25 25 25 25 26 26  
## [93] 26 27 27 27 27 27 28 28 28  
##   
##   
## Slot "tn":  
## [[1]]  
## [1] 72 72 72 72 72 71 71 70 70 70 69 69 68 67 67 66 66 66 65 65 64 63 62  
## [24] 62 62 62 61 60 59 58 57 56 55 54 53 52 51 50 50 50 50 50 49 48 47 46  
## [47] 45 45 44 43 42 42 41 40 39 39 38 38 37 36 35 34 33 32 31 30 29 28 27  
## [70] 26 25 24 23 22 21 20 19 18 17 17 16 15 14 13 12 12 11 10 9 8 8 7  
## [93] 6 6 5 4 3 2 2 1 0  
##   
##   
## Slot "fn":  
## [[1]]  
## [1] 28 27 26 25 24 24 23 23 22 21 21 20 20 20 19 19 18 17 17 16 16 16 16  
## [24] 15 14 13 13 13 13 13 13 13 13 13 13 13 13 13 12 11 10 9 9 9 9 9  
## [47] 9 8 8 8 8 7 7 7 7 6 6 5 5 5 5 5 5 5 5 5 5 5 5  
## [70] 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 4 3 3 3 3 3 2 2  
## [93] 2 1 1 1 1 1 0 0 0  
##   
##   
## Slot "n.pos":  
## [[1]]  
## [1] 28  
##   
##   
## Slot "n.neg":  
## [[1]]  
## [1] 72  
##   
##   
## Slot "n.pos.pred":  
## [[1]]  
## [1] 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
## [18] 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33  
## [35] 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50  
## [52] 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67  
## [69] 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84  
## [86] 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
##   
##   
## Slot "n.neg.pred":  
## [[1]]  
## [1] 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84  
## [18] 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67  
## [35] 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50  
## [52] 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33  
## [69] 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16  
## [86] 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

perf <- performance(pred, "sens", "fpr")  
perf

## An object of class "performance"  
## Slot "x.name":  
## [1] "False positive rate"  
##   
## Slot "y.name":  
## [1] "Sensitivity"  
##   
## Slot "alpha.name":  
## [1] "Cutoff"  
##   
## Slot "x.values":  
## [[1]]  
## [1] 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000 0.01388889  
## [7] 0.01388889 0.02777778 0.02777778 0.02777778 0.04166667 0.04166667  
## [13] 0.05555556 0.06944444 0.06944444 0.08333333 0.08333333 0.08333333  
## [19] 0.09722222 0.09722222 0.11111111 0.12500000 0.13888889 0.13888889  
## [25] 0.13888889 0.13888889 0.15277778 0.16666667 0.18055556 0.19444444  
## [31] 0.20833333 0.22222222 0.23611111 0.25000000 0.26388889 0.27777778  
## [37] 0.29166667 0.30555556 0.30555556 0.30555556 0.30555556 0.30555556  
## [43] 0.31944444 0.33333333 0.34722222 0.36111111 0.37500000 0.37500000  
## [49] 0.38888889 0.40277778 0.41666667 0.41666667 0.43055556 0.44444444  
## [55] 0.45833333 0.45833333 0.47222222 0.47222222 0.48611111 0.50000000  
## [61] 0.51388889 0.52777778 0.54166667 0.55555556 0.56944444 0.58333333  
## [67] 0.59722222 0.61111111 0.62500000 0.63888889 0.65277778 0.66666667  
## [73] 0.68055556 0.69444444 0.70833333 0.72222222 0.73611111 0.75000000  
## [79] 0.76388889 0.76388889 0.77777778 0.79166667 0.80555556 0.81944444  
## [85] 0.83333333 0.83333333 0.84722222 0.86111111 0.87500000 0.88888889  
## [91] 0.88888889 0.90277778 0.91666667 0.91666667 0.93055556 0.94444444  
## [97] 0.95833333 0.97222222 0.97222222 0.98611111 1.00000000  
##   
##   
## Slot "y.values":  
## [[1]]  
## [1] 0.00000000 0.03571429 0.07142857 0.10714286 0.14285714 0.14285714  
## [7] 0.17857143 0.17857143 0.21428571 0.25000000 0.25000000 0.28571429  
## [13] 0.28571429 0.28571429 0.32142857 0.32142857 0.35714286 0.39285714  
## [19] 0.39285714 0.42857143 0.42857143 0.42857143 0.42857143 0.46428571  
## [25] 0.50000000 0.53571429 0.53571429 0.53571429 0.53571429 0.53571429  
## [31] 0.53571429 0.53571429 0.53571429 0.53571429 0.53571429 0.53571429  
## [37] 0.53571429 0.53571429 0.57142857 0.60714286 0.64285714 0.67857143  
## [43] 0.67857143 0.67857143 0.67857143 0.67857143 0.67857143 0.71428571  
## [49] 0.71428571 0.71428571 0.71428571 0.75000000 0.75000000 0.75000000  
## [55] 0.75000000 0.78571429 0.78571429 0.82142857 0.82142857 0.82142857  
## [61] 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857  
## [67] 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857  
## [73] 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857 0.82142857  
## [79] 0.82142857 0.85714286 0.85714286 0.85714286 0.85714286 0.85714286  
## [85] 0.85714286 0.89285714 0.89285714 0.89285714 0.89285714 0.89285714  
## [91] 0.92857143 0.92857143 0.92857143 0.96428571 0.96428571 0.96428571  
## [97] 0.96428571 0.96428571 1.00000000 1.00000000 1.00000000  
##   
##   
## Slot "alpha.values":  
## [[1]]  
## [1] Inf 0.75311392 0.75030029 0.73815667 0.70821299 0.67563398  
## [7] 0.66043205 0.65821629 0.65260318 0.62915563 0.61342859 0.58901410  
## [13] 0.55018376 0.48387209 0.48063233 0.46570731 0.46512762 0.45936917  
## [19] 0.44195287 0.43859786 0.43552511 0.42978704 0.41560675 0.41109637  
## [25] 0.41044478 0.39895328 0.39183380 0.38750805 0.38685523 0.37503536  
## [31] 0.34821020 0.34745105 0.34065379 0.32710731 0.32605318 0.32581634  
## [37] 0.32296569 0.32146437 0.30872069 0.30574992 0.29291563 0.29285579  
## [43] 0.28565953 0.28262399 0.27360925 0.26884658 0.25746579 0.25582878  
## [49] 0.25283649 0.24226477 0.23720736 0.23719315 0.23061764 0.22952487  
## [55] 0.22803447 0.22448569 0.21370451 0.20730814 0.20709643 0.19456001  
## [61] 0.19235148 0.18902185 0.18527230 0.18439670 0.17838034 0.16963091  
## [67] 0.16551320 0.16128056 0.16047908 0.16010711 0.15654947 0.15243655  
## [73] 0.15143891 0.15108125 0.15107007 0.14717176 0.14707164 0.14633377  
## [79] 0.14514916 0.13954988 0.12969852 0.12934205 0.12630870 0.12544267  
## [85] 0.11917861 0.11682772 0.11059259 0.10759239 0.10730873 0.10353993  
## [91] 0.08876750 0.07729040 0.07407406 0.07164830 0.07023244 0.06409169  
## [97] 0.05387320 0.04996535 0.03521084 0.03504181 0.03097682

plot(perf)



credglmall <- glm(credit$Default ~ Xcred,family=binomial)  
predictions=credglmall$fitted  
labels=credglmall$y  
data=data.frame(predictions,labels)  
pred <- prediction(data$predictions,data$labels)  
perf <- performance(pred, "sens", "fpr")  
plot(perf)

