Project 2

2023-03-03

ames = read\_csv("ames\_student-1.csv")

## Rows: 2053 Columns: 81  
## ── Column specification ────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (47): MS\_SubClass, MS\_Zoning, Street, Alley, Lot\_Shape, Land\_Contour, Ut...  
## dbl (34): Lot\_Frontage, Lot\_Area, Year\_Built, Year\_Remod\_Add, Mas\_Vnr\_Area, ...  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.

str(ames)

## spc\_tbl\_ [2,053 × 81] (S3: spec\_tbl\_df/tbl\_df/tbl/data.frame)  
## $ MS\_SubClass : chr [1:2053] "One\_Story\_1946\_and\_Newer\_All\_Styles" "One\_Story\_1946\_and\_Newer\_All\_Styles" "One\_Story\_1946\_and\_Newer\_All\_Styles" "One\_Story\_1946\_and\_Newer\_All\_Styles" ...  
## $ MS\_Zoning : chr [1:2053] "Residential\_Low\_Density" "Residential\_High\_Density" "Residential\_Low\_Density" "Residential\_Low\_Density" ...  
## $ Lot\_Frontage : num [1:2053] 141 80 81 93 74 78 43 39 0 85 ...  
## $ Lot\_Area : num [1:2053] 31770 11622 14267 11160 13830 ...  
## $ Street : chr [1:2053] "Pave" "Pave" "Pave" "Pave" ...  
## $ Alley : chr [1:2053] "No\_Alley\_Access" "No\_Alley\_Access" "No\_Alley\_Access" "No\_Alley\_Access" ...  
## $ Lot\_Shape : chr [1:2053] "Slightly\_Irregular" "Regular" "Slightly\_Irregular" "Regular" ...  
## $ Land\_Contour : chr [1:2053] "Lvl" "Lvl" "Lvl" "Lvl" ...  
## $ Utilities : chr [1:2053] "AllPub" "AllPub" "AllPub" "AllPub" ...  
## $ Lot\_Config : chr [1:2053] "Corner" "Inside" "Corner" "Corner" ...  
## $ Land\_Slope : chr [1:2053] "Gtl" "Gtl" "Gtl" "Gtl" ...  
## $ Neighborhood : chr [1:2053] "North\_Ames" "North\_Ames" "North\_Ames" "North\_Ames" ...  
## $ Condition\_1 : chr [1:2053] "Norm" "Feedr" "Norm" "Norm" ...  
## $ Condition\_2 : chr [1:2053] "Norm" "Norm" "Norm" "Norm" ...  
## $ Bldg\_Type : chr [1:2053] "OneFam" "OneFam" "OneFam" "OneFam" ...  
## $ House\_Style : chr [1:2053] "One\_Story" "One\_Story" "One\_Story" "One\_Story" ...  
## $ Overall\_Qual : chr [1:2053] "Above\_Average" "Average" "Above\_Average" "Good" ...  
## $ Overall\_Cond : chr [1:2053] "Average" "Above\_Average" "Above\_Average" "Average" ...  
## $ Year\_Built : num [1:2053] 1960 1961 1958 1968 1997 ...  
## $ Year\_Remod\_Add : num [1:2053] 1960 1961 1958 1968 1998 ...  
## $ Roof\_Style : chr [1:2053] "Hip" "Gable" "Hip" "Hip" ...  
## $ Roof\_Matl : chr [1:2053] "CompShg" "CompShg" "CompShg" "CompShg" ...  
## $ Exterior\_1st : chr [1:2053] "BrkFace" "VinylSd" "Wd Sdng" "BrkFace" ...  
## $ Exterior\_2nd : chr [1:2053] "Plywood" "VinylSd" "Wd Sdng" "BrkFace" ...  
## $ Mas\_Vnr\_Type : chr [1:2053] "Stone" "None" "BrkFace" "None" ...  
## $ Mas\_Vnr\_Area : num [1:2053] 112 0 108 0 0 20 0 0 0 0 ...  
## $ Exter\_Qual : chr [1:2053] "Typical" "Typical" "Typical" "Good" ...  
## $ Exter\_Cond : chr [1:2053] "Typical" "Typical" "Typical" "Typical" ...  
## $ Foundation : chr [1:2053] "CBlock" "CBlock" "CBlock" "CBlock" ...  
## $ Bsmt\_Qual : chr [1:2053] "Typical" "Typical" "Typical" "Typical" ...  
## $ Bsmt\_Cond : chr [1:2053] "Good" "Typical" "Typical" "Typical" ...  
## $ Bsmt\_Exposure : chr [1:2053] "Gd" "No" "No" "No" ...  
## $ BsmtFin\_Type\_1 : chr [1:2053] "BLQ" "Rec" "ALQ" "ALQ" ...  
## $ BsmtFin\_SF\_1 : num [1:2053] 2 6 1 1 3 3 1 3 1 3 ...  
## $ BsmtFin\_Type\_2 : chr [1:2053] "Unf" "LwQ" "Unf" "Unf" ...  
## $ BsmtFin\_SF\_2 : num [1:2053] 0 144 0 0 0 0 0 0 0 0 ...  
## $ Bsmt\_Unf\_SF : num [1:2053] 441 270 406 1045 137 ...  
## $ Total\_Bsmt\_SF : num [1:2053] 1080 882 1329 2110 928 ...  
## $ Heating : chr [1:2053] "GasA" "GasA" "GasA" "GasA" ...  
## $ Heating\_QC : chr [1:2053] "Fair" "Typical" "Typical" "Excellent" ...  
## $ Central\_Air : chr [1:2053] "Y" "Y" "Y" "Y" ...  
## $ Electrical : chr [1:2053] "SBrkr" "SBrkr" "SBrkr" "SBrkr" ...  
## $ First\_Flr\_SF : num [1:2053] 1656 896 1329 2110 928 ...  
## $ Second\_Flr\_SF : num [1:2053] 0 0 0 0 701 678 0 0 0 0 ...  
## $ Low\_Qual\_Fin\_SF : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Gr\_Liv\_Area : num [1:2053] 1656 896 1329 2110 1629 ...  
## $ Bsmt\_Full\_Bath : num [1:2053] 1 0 0 1 0 0 0 1 1 1 ...  
## $ Bsmt\_Half\_Bath : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Full\_Bath : num [1:2053] 1 1 1 2 2 2 2 2 2 1 ...  
## $ Half\_Bath : num [1:2053] 0 0 1 1 1 1 0 0 0 1 ...  
## $ Bedroom\_AbvGr : num [1:2053] 3 2 3 3 3 3 2 2 3 2 ...  
## $ Kitchen\_AbvGr : num [1:2053] 1 1 1 1 1 1 1 1 1 1 ...  
## $ Kitchen\_Qual : chr [1:2053] "Typical" "Typical" "Good" "Excellent" ...  
## $ TotRms\_AbvGrd : num [1:2053] 7 5 6 8 6 7 5 5 6 5 ...  
## $ Functional : chr [1:2053] "Typ" "Typ" "Typ" "Typ" ...  
## $ Fireplaces : num [1:2053] 2 0 0 2 1 1 0 1 0 1 ...  
## $ Fireplace\_Qu : chr [1:2053] "Good" "No\_Fireplace" "No\_Fireplace" "Typical" ...  
## $ Garage\_Type : chr [1:2053] "Attchd" "Attchd" "Attchd" "Attchd" ...  
## $ Garage\_Finish : chr [1:2053] "Fin" "Unf" "Unf" "Fin" ...  
## $ Garage\_Cars : num [1:2053] 2 1 1 2 2 2 2 2 2 2 ...  
## $ Garage\_Area : num [1:2053] 528 730 312 522 482 470 506 608 420 506 ...  
## $ Garage\_Qual : chr [1:2053] "Typical" "Typical" "Typical" "Typical" ...  
## $ Garage\_Cond : chr [1:2053] "Typical" "Typical" "Typical" "Typical" ...  
## $ Paved\_Drive : chr [1:2053] "Partial\_Pavement" "Paved" "Paved" "Paved" ...  
## $ Wood\_Deck\_SF : num [1:2053] 210 140 393 0 212 360 0 237 483 192 ...  
## $ Open\_Porch\_SF : num [1:2053] 62 0 36 0 34 36 82 152 21 0 ...  
## $ Enclosed\_Porch : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Three\_season\_porch: num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Screen\_Porch : num [1:2053] 0 120 0 0 0 0 144 0 0 0 ...  
## $ Pool\_Area : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Pool\_QC : chr [1:2053] "No\_Pool" "No\_Pool" "No\_Pool" "No\_Pool" ...  
## $ Fence : chr [1:2053] "No\_Fence" "Minimum\_Privacy" "No\_Fence" "No\_Fence" ...  
## $ Misc\_Feature : chr [1:2053] "None" "None" "Gar2" "None" ...  
## $ Misc\_Val : num [1:2053] 0 0 12500 0 0 0 0 0 500 0 ...  
## $ Mo\_Sold : num [1:2053] 5 6 6 4 3 6 1 3 3 2 ...  
## $ Year\_Sold : num [1:2053] 2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 ...  
## $ Sale\_Type : chr [1:2053] "WD" "WD" "WD" "WD" ...  
## $ Sale\_Condition : chr [1:2053] "Normal" "Normal" "Normal" "Normal" ...  
## $ Longitude : num [1:2053] -93.6 -93.6 -93.6 -93.6 -93.6 ...  
## $ Latitude : num [1:2053] 42.1 42.1 42.1 42.1 42.1 ...  
## $ Above\_Median : chr [1:2053] "Yes" "No" "Yes" "Yes" ...  
## - attr(\*, "spec")=  
## .. cols(  
## .. MS\_SubClass = col\_character(),  
## .. MS\_Zoning = col\_character(),  
## .. Lot\_Frontage = col\_double(),  
## .. Lot\_Area = col\_double(),  
## .. Street = col\_character(),  
## .. Alley = col\_character(),  
## .. Lot\_Shape = col\_character(),  
## .. Land\_Contour = col\_character(),  
## .. Utilities = col\_character(),  
## .. Lot\_Config = col\_character(),  
## .. Land\_Slope = col\_character(),  
## .. Neighborhood = col\_character(),  
## .. Condition\_1 = col\_character(),  
## .. Condition\_2 = col\_character(),  
## .. Bldg\_Type = col\_character(),  
## .. House\_Style = col\_character(),  
## .. Overall\_Qual = col\_character(),  
## .. Overall\_Cond = col\_character(),  
## .. Year\_Built = col\_double(),  
## .. Year\_Remod\_Add = col\_double(),  
## .. Roof\_Style = col\_character(),  
## .. Roof\_Matl = col\_character(),  
## .. Exterior\_1st = col\_character(),  
## .. Exterior\_2nd = col\_character(),  
## .. Mas\_Vnr\_Type = col\_character(),  
## .. Mas\_Vnr\_Area = col\_double(),  
## .. Exter\_Qual = col\_character(),  
## .. Exter\_Cond = col\_character(),  
## .. Foundation = col\_character(),  
## .. Bsmt\_Qual = col\_character(),  
## .. Bsmt\_Cond = col\_character(),  
## .. Bsmt\_Exposure = col\_character(),  
## .. BsmtFin\_Type\_1 = col\_character(),  
## .. BsmtFin\_SF\_1 = col\_double(),  
## .. BsmtFin\_Type\_2 = col\_character(),  
## .. BsmtFin\_SF\_2 = col\_double(),  
## .. Bsmt\_Unf\_SF = col\_double(),  
## .. Total\_Bsmt\_SF = col\_double(),  
## .. Heating = col\_character(),  
## .. Heating\_QC = col\_character(),  
## .. Central\_Air = col\_character(),  
## .. Electrical = col\_character(),  
## .. First\_Flr\_SF = col\_double(),  
## .. Second\_Flr\_SF = col\_double(),  
## .. Low\_Qual\_Fin\_SF = col\_double(),  
## .. Gr\_Liv\_Area = col\_double(),  
## .. Bsmt\_Full\_Bath = col\_double(),  
## .. Bsmt\_Half\_Bath = col\_double(),  
## .. Full\_Bath = col\_double(),  
## .. Half\_Bath = col\_double(),  
## .. Bedroom\_AbvGr = col\_double(),  
## .. Kitchen\_AbvGr = col\_double(),  
## .. Kitchen\_Qual = col\_character(),  
## .. TotRms\_AbvGrd = col\_double(),  
## .. Functional = col\_character(),  
## .. Fireplaces = col\_double(),  
## .. Fireplace\_Qu = col\_character(),  
## .. Garage\_Type = col\_character(),  
## .. Garage\_Finish = col\_character(),  
## .. Garage\_Cars = col\_double(),  
## .. Garage\_Area = col\_double(),  
## .. Garage\_Qual = col\_character(),  
## .. Garage\_Cond = col\_character(),  
## .. Paved\_Drive = col\_character(),  
## .. Wood\_Deck\_SF = col\_double(),  
## .. Open\_Porch\_SF = col\_double(),  
## .. Enclosed\_Porch = col\_double(),  
## .. Three\_season\_porch = col\_double(),  
## .. Screen\_Porch = col\_double(),  
## .. Pool\_Area = col\_double(),  
## .. Pool\_QC = col\_character(),  
## .. Fence = col\_character(),  
## .. Misc\_Feature = col\_character(),  
## .. Misc\_Val = col\_double(),  
## .. Mo\_Sold = col\_double(),  
## .. Year\_Sold = col\_double(),  
## .. Sale\_Type = col\_character(),  
## .. Sale\_Condition = col\_character(),  
## .. Longitude = col\_double(),  
## .. Latitude = col\_double(),  
## .. Above\_Median = col\_character()  
## .. )  
## - attr(\*, "problems")=<externalptr>

summary(ames)

## MS\_SubClass MS\_Zoning Lot\_Frontage Lot\_Area   
## Length:2053 Length:2053 Min. : 0.00 Min. : 1300   
## Class :character Class :character 1st Qu.: 43.00 1st Qu.: 7500   
## Mode :character Mode :character Median : 62.00 Median : 9548   
## Mean : 57.38 Mean : 10258   
## 3rd Qu.: 78.00 3rd Qu.: 11600   
## Max. :313.00 Max. :215245   
## Street Alley Lot\_Shape Land\_Contour   
## Length:2053 Length:2053 Length:2053 Length:2053   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
##   
##   
##   
## Utilities Lot\_Config Land\_Slope Neighborhood   
## Length:2053 Length:2053 Length:2053 Length:2053   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
##   
##   
##   
## Condition\_1 Condition\_2 Bldg\_Type House\_Style   
## Length:2053 Length:2053 Length:2053 Length:2053   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
##   
##   
##   
## Overall\_Qual Overall\_Cond Year\_Built Year\_Remod\_Add  
## Length:2053 Length:2053 Min. :1875 Min. :1950   
## Class :character Class :character 1st Qu.:1953 1st Qu.:1965   
## Mode :character Mode :character Median :1972 Median :1993   
## Mean :1971 Mean :1984   
## 3rd Qu.:2000 3rd Qu.:2004   
## Max. :2010 Max. :2010   
## Roof\_Style Roof\_Matl Exterior\_1st Exterior\_2nd   
## Length:2053 Length:2053 Length:2053 Length:2053   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
##   
##   
##   
## Mas\_Vnr\_Type Mas\_Vnr\_Area Exter\_Qual Exter\_Cond   
## Length:2053 Min. : 0.0 Length:2053 Length:2053   
## Class :character 1st Qu.: 0.0 Class :character Class :character   
## Mode :character Median : 0.0 Mode :character Mode :character   
## Mean : 103.8   
## 3rd Qu.: 164.0   
## Max. :1600.0   
## Foundation Bsmt\_Qual Bsmt\_Cond Bsmt\_Exposure   
## Length:2053 Length:2053 Length:2053 Length:2053   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
##   
##   
##   
## BsmtFin\_Type\_1 BsmtFin\_SF\_1 BsmtFin\_Type\_2 BsmtFin\_SF\_2   
## Length:2053 Min. :1.00 Length:2053 Min. : 0.00   
## Class :character 1st Qu.:3.00 Class :character 1st Qu.: 0.00   
## Mode :character Median :3.00 Mode :character Median : 0.00   
## Mean :4.21 Mean : 52.57   
## 3rd Qu.:7.00 3rd Qu.: 0.00   
## Max. :7.00 Max. :1526.00   
## Bsmt\_Unf\_SF Total\_Bsmt\_SF Heating Heating\_QC   
## Min. : 0.0 Min. : 0 Length:2053 Length:2053   
## 1st Qu.: 226.0 1st Qu.: 793 Class :character Class :character   
## Median : 460.0 Median : 988 Mode :character Mode :character   
## Mean : 561.2 Mean :1055   
## 3rd Qu.: 801.0 3rd Qu.:1304   
## Max. :2336.0 Max. :5095   
## Central\_Air Electrical First\_Flr\_SF Second\_Flr\_SF   
## Length:2053 Length:2053 Min. : 432 Min. : 0.0   
## Class :character Class :character 1st Qu.: 882 1st Qu.: 0.0   
## Mode :character Mode :character Median :1088 Median : 0.0   
## Mean :1168 Mean : 326.1   
## 3rd Qu.:1402 3rd Qu.: 701.0   
## Max. :5095 Max. :1862.0   
## Low\_Qual\_Fin\_SF Gr\_Liv\_Area Bsmt\_Full\_Bath Bsmt\_Half\_Bath   
## Min. : 0.000 Min. : 480 Min. :0.0000 Min. :0.00000   
## 1st Qu.: 0.000 1st Qu.:1137 1st Qu.:0.0000 1st Qu.:0.00000   
## Median : 0.000 Median :1447 Median :0.0000 Median :0.00000   
## Mean : 4.973 Mean :1499 Mean :0.4301 Mean :0.05796   
## 3rd Qu.: 0.000 3rd Qu.:1737 3rd Qu.:1.0000 3rd Qu.:0.00000   
## Max. :1064.000 Max. :5095 Max. :3.0000 Max. :2.00000   
## Full\_Bath Half\_Bath Bedroom\_AbvGr Kitchen\_AbvGr   
## Min. :0.000 Min. :0.0000 Min. :0.000 Min. :1.000   
## 1st Qu.:1.000 1st Qu.:0.0000 1st Qu.:2.000 1st Qu.:1.000   
## Median :2.000 Median :0.0000 Median :3.000 Median :1.000   
## Mean :1.564 Mean :0.3751 Mean :2.855 Mean :1.047   
## 3rd Qu.:2.000 3rd Qu.:1.0000 3rd Qu.:3.000 3rd Qu.:1.000   
## Max. :4.000 Max. :2.0000 Max. :6.000 Max. :3.000   
## Kitchen\_Qual TotRms\_AbvGrd Functional Fireplaces   
## Length:2053 Min. : 3.000 Length:2053 Min. :0.000   
## Class :character 1st Qu.: 5.000 Class :character 1st Qu.:0.000   
## Mode :character Median : 6.000 Mode :character Median :1.000   
## Mean : 6.442 Mean :0.603   
## 3rd Qu.: 7.000 3rd Qu.:1.000   
## Max. :15.000 Max. :4.000   
## Fireplace\_Qu Garage\_Type Garage\_Finish Garage\_Cars   
## Length:2053 Length:2053 Length:2053 Min. :0.000   
## Class :character Class :character Class :character 1st Qu.:1.000   
## Mode :character Mode :character Mode :character Median :2.000   
## Mean :1.774   
## 3rd Qu.:2.000   
## Max. :5.000   
## Garage\_Area Garage\_Qual Garage\_Cond Paved\_Drive   
## Min. : 0 Length:2053 Length:2053 Length:2053   
## 1st Qu.: 320 Class :character Class :character Class :character   
## Median : 478 Mode :character Mode :character Mode :character   
## Mean : 472   
## 3rd Qu.: 576   
## Max. :1488   
## Wood\_Deck\_SF Open\_Porch\_SF Enclosed\_Porch Three\_season\_porch  
## Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.000   
## 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.000   
## Median : 0.00 Median : 27.00 Median : 0.00 Median : 0.000   
## Mean : 93.52 Mean : 48.17 Mean : 23.02 Mean : 2.799   
## 3rd Qu.: 168.00 3rd Qu.: 72.00 3rd Qu.: 0.00 3rd Qu.: 0.000   
## Max. :1424.00 Max. :742.00 Max. :584.00 Max. :407.000   
## Screen\_Porch Pool\_Area Pool\_QC Fence   
## Min. : 0.00 Min. : 0.000 Length:2053 Length:2053   
## 1st Qu.: 0.00 1st Qu.: 0.000 Class :character Class :character   
## Median : 0.00 Median : 0.000 Mode :character Mode :character   
## Mean : 16.68 Mean : 1.339   
## 3rd Qu.: 0.00 3rd Qu.: 0.000   
## Max. :576.00 Max. :800.000   
## Misc\_Feature Misc\_Val Mo\_Sold Year\_Sold   
## Length:2053 Min. : 0.00 Min. : 1.000 Min. :2006   
## Class :character 1st Qu.: 0.00 1st Qu.: 4.000 1st Qu.:2007   
## Mode :character Median : 0.00 Median : 6.000 Median :2008   
## Mean : 60.12 Mean : 6.189 Mean :2008   
## 3rd Qu.: 0.00 3rd Qu.: 8.000 3rd Qu.:2009   
## Max. :17000.00 Max. :12.000 Max. :2010   
## Sale\_Type Sale\_Condition Longitude Latitude   
## Length:2053 Length:2053 Min. :-93.69 Min. :41.99   
## Class :character Class :character 1st Qu.:-93.66 1st Qu.:42.02   
## Mode :character Mode :character Median :-93.64 Median :42.03   
## Mean :-93.64 Mean :42.03   
## 3rd Qu.:-93.62 3rd Qu.:42.05   
## Max. :-93.58 Max. :42.06   
## Above\_Median   
## Length:2053   
## Class :character   
## Mode :character   
##   
##   
##

clean the data

ames = ames %>% dplyr::select(-Longitude, -Latitude)  
ames = ames %>% mutate\_if(is.character,as\_factor)  
ames = ames %>% drop\_na()  
ames = ames %>% mutate(Above\_Median = as\_factor(Above\_Median)) %>%   
 mutate(Above\_Median = fct\_recode(Above\_Median, "Yes" = "1", "No" = "0" ))

## Warning: Unknown levels in `f`: 1, 0

str(ames)

## tibble [2,053 × 79] (S3: tbl\_df/tbl/data.frame)  
## $ MS\_SubClass : Factor w/ 16 levels "One\_Story\_1946\_and\_Newer\_All\_Styles",..: 1 1 1 1 2 2 3 3 1 1 ...  
## $ MS\_Zoning : Factor w/ 7 levels "Residential\_Low\_Density",..: 1 2 1 1 1 1 1 1 1 1 ...  
## $ Lot\_Frontage : num [1:2053] 141 80 81 93 74 78 43 39 0 85 ...  
## $ Lot\_Area : num [1:2053] 31770 11622 14267 11160 13830 ...  
## $ Street : Factor w/ 2 levels "Pave","Grvl": 1 1 1 1 1 1 1 1 1 1 ...  
## $ Alley : Factor w/ 3 levels "No\_Alley\_Access",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Lot\_Shape : Factor w/ 4 levels "Slightly\_Irregular",..: 1 2 1 2 1 1 1 1 1 2 ...  
## $ Land\_Contour : Factor w/ 4 levels "Lvl","HLS","Bnk",..: 1 1 1 1 1 1 2 1 1 1 ...  
## $ Utilities : Factor w/ 2 levels "AllPub","NoSewr": 1 1 1 1 1 1 1 1 1 1 ...  
## $ Lot\_Config : Factor w/ 5 levels "Corner","Inside",..: 1 2 1 1 2 2 2 2 2 2 ...  
## $ Land\_Slope : Factor w/ 3 levels "Gtl","Mod","Sev": 1 1 1 1 1 1 1 1 1 1 ...  
## $ Neighborhood : Factor w/ 28 levels "North\_Ames","Gilbert",..: 1 1 1 1 2 2 3 3 2 2 ...  
## $ Condition\_1 : Factor w/ 9 levels "Norm","Feedr",..: 1 2 1 1 1 1 1 1 1 1 ...  
## $ Condition\_2 : Factor w/ 8 levels "Norm","Feedr",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Bldg\_Type : Factor w/ 5 levels "OneFam","TwnhsE",..: 1 1 1 1 1 1 2 2 1 1 ...  
## $ House\_Style : Factor w/ 8 levels "One\_Story","Two\_Story",..: 1 1 1 1 2 2 1 1 1 1 ...  
## $ Overall\_Qual : Factor w/ 10 levels "Above\_Average",..: 1 2 1 3 2 1 4 4 1 3 ...  
## $ Overall\_Cond : Factor w/ 9 levels "Average","Above\_Average",..: 1 2 2 1 1 2 1 1 3 1 ...  
## $ Year\_Built : num [1:2053] 1960 1961 1958 1968 1997 ...  
## $ Year\_Remod\_Add : num [1:2053] 1960 1961 1958 1968 1998 ...  
## $ Roof\_Style : Factor w/ 6 levels "Hip","Gable",..: 1 2 1 1 2 2 2 2 2 2 ...  
## $ Roof\_Matl : Factor w/ 6 levels "CompShg","WdShake",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Exterior\_1st : Factor w/ 16 levels "BrkFace","VinylSd",..: 1 2 3 1 2 2 4 5 4 4 ...  
## $ Exterior\_2nd : Factor w/ 17 levels "Plywood","VinylSd",..: 1 2 3 4 2 2 5 6 5 5 ...  
## $ Mas\_Vnr\_Type : Factor w/ 5 levels "Stone","None",..: 1 2 3 2 2 3 2 2 2 2 ...  
## $ Mas\_Vnr\_Area : num [1:2053] 112 0 108 0 0 20 0 0 0 0 ...  
## $ Exter\_Qual : Factor w/ 4 levels "Typical","Good",..: 1 1 1 2 1 1 2 2 1 1 ...  
## $ Exter\_Cond : Factor w/ 5 levels "Typical","Good",..: 1 1 1 1 1 1 1 1 2 1 ...  
## $ Foundation : Factor w/ 6 levels "CBlock","PConc",..: 1 1 1 1 2 2 2 2 2 2 ...  
## $ Bsmt\_Qual : Factor w/ 6 levels "Typical","Good",..: 1 1 1 1 2 1 2 2 2 2 ...  
## $ Bsmt\_Cond : Factor w/ 6 levels "Good","Typical",..: 1 2 2 2 2 2 2 2 2 2 ...  
## $ Bsmt\_Exposure : Factor w/ 5 levels "Gd","No","Av",..: 1 2 2 2 2 2 2 2 2 1 ...  
## $ BsmtFin\_Type\_1 : Factor w/ 7 levels "BLQ","Rec","ALQ",..: 1 2 3 3 4 4 3 4 3 4 ...  
## $ BsmtFin\_SF\_1 : num [1:2053] 2 6 1 1 3 3 1 3 1 3 ...  
## $ BsmtFin\_Type\_2 : Factor w/ 7 levels "Unf","LwQ","BLQ",..: 1 2 1 1 1 1 1 1 1 1 ...  
## $ BsmtFin\_SF\_2 : num [1:2053] 0 144 0 0 0 0 0 0 0 0 ...  
## $ Bsmt\_Unf\_SF : num [1:2053] 441 270 406 1045 137 ...  
## $ Total\_Bsmt\_SF : num [1:2053] 1080 882 1329 2110 928 ...  
## $ Heating : Factor w/ 6 levels "GasA","GasW",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Heating\_QC : Factor w/ 5 levels "Fair","Typical",..: 1 2 2 3 4 3 3 3 3 4 ...  
## $ Central\_Air : Factor w/ 2 levels "Y","N": 1 1 1 1 1 1 1 1 1 1 ...  
## $ Electrical : Factor w/ 5 levels "SBrkr","FuseA",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ First\_Flr\_SF : num [1:2053] 1656 896 1329 2110 928 ...  
## $ Second\_Flr\_SF : num [1:2053] 0 0 0 0 701 678 0 0 0 0 ...  
## $ Low\_Qual\_Fin\_SF : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Gr\_Liv\_Area : num [1:2053] 1656 896 1329 2110 1629 ...  
## $ Bsmt\_Full\_Bath : num [1:2053] 1 0 0 1 0 0 0 1 1 1 ...  
## $ Bsmt\_Half\_Bath : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Full\_Bath : num [1:2053] 1 1 1 2 2 2 2 2 2 1 ...  
## $ Half\_Bath : num [1:2053] 0 0 1 1 1 1 0 0 0 1 ...  
## $ Bedroom\_AbvGr : num [1:2053] 3 2 3 3 3 3 2 2 3 2 ...  
## $ Kitchen\_AbvGr : num [1:2053] 1 1 1 1 1 1 1 1 1 1 ...  
## $ Kitchen\_Qual : Factor w/ 5 levels "Typical","Good",..: 1 1 2 3 1 2 2 2 1 2 ...  
## $ TotRms\_AbvGrd : num [1:2053] 7 5 6 8 6 7 5 5 6 5 ...  
## $ Functional : Factor w/ 8 levels "Typ","Mod","Min2",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Fireplaces : num [1:2053] 2 0 0 2 1 1 0 1 0 1 ...  
## $ Fireplace\_Qu : Factor w/ 6 levels "Good","No\_Fireplace",..: 1 2 2 3 3 1 2 3 2 4 ...  
## $ Garage\_Type : Factor w/ 7 levels "Attchd","BuiltIn",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Garage\_Finish : Factor w/ 4 levels "Fin","Unf","RFn",..: 1 2 2 1 1 1 3 3 1 2 ...  
## $ Garage\_Cars : num [1:2053] 2 1 1 2 2 2 2 2 2 2 ...  
## $ Garage\_Area : num [1:2053] 528 730 312 522 482 470 506 608 420 506 ...  
## $ Garage\_Qual : Factor w/ 6 levels "Typical","No\_Garage",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Garage\_Cond : Factor w/ 6 levels "Typical","No\_Garage",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Paved\_Drive : Factor w/ 3 levels "Partial\_Pavement",..: 1 2 2 2 2 2 2 2 2 2 ...  
## $ Wood\_Deck\_SF : num [1:2053] 210 140 393 0 212 360 0 237 483 192 ...  
## $ Open\_Porch\_SF : num [1:2053] 62 0 36 0 34 36 82 152 21 0 ...  
## $ Enclosed\_Porch : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Three\_season\_porch: num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Screen\_Porch : num [1:2053] 0 120 0 0 0 0 144 0 0 0 ...  
## $ Pool\_Area : num [1:2053] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Pool\_QC : Factor w/ 5 levels "No\_Pool","Excellent",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Fence : Factor w/ 5 levels "No\_Fence","Minimum\_Privacy",..: 1 2 1 1 2 1 1 1 3 1 ...  
## $ Misc\_Feature : Factor w/ 5 levels "None","Gar2",..: 1 1 2 1 1 1 1 1 3 1 ...  
## $ Misc\_Val : num [1:2053] 0 0 12500 0 0 0 0 0 500 0 ...  
## $ Mo\_Sold : num [1:2053] 5 6 6 4 3 6 1 3 3 2 ...  
## $ Year\_Sold : num [1:2053] 2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 ...  
## $ Sale\_Type : Factor w/ 10 levels "WD","New","COD",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Sale\_Condition : Factor w/ 6 levels "Normal","Partial",..: 1 1 1 1 1 1 1 1 1 1 ...  
## $ Above\_Median : Factor w/ 2 levels "Yes","No": 1 2 1 1 1 1 1 1 1 1 ...

summary(ames)

## MS\_SubClass MS\_Zoning   
## One\_Story\_1946\_and\_Newer\_All\_Styles :772 Residential\_Low\_Density :1600   
## Two\_Story\_1946\_and\_Newer :383 Residential\_High\_Density : 20   
## One\_and\_Half\_Story\_Finished\_All\_Ages:204 Floating\_Village\_Residential: 87   
## One\_Story\_PUD\_1946\_and\_Newer :129 Residential\_Medium\_Density : 326   
## One\_Story\_1945\_and\_Older : 98 C\_all : 17   
## Two\_Story\_1945\_and\_Older : 95 A\_agr : 2   
## (Other) :372 I\_all : 1   
## Lot\_Frontage Lot\_Area Street Alley   
## Min. : 0.00 Min. : 1300 Pave:2046 No\_Alley\_Access:1914   
## 1st Qu.: 43.00 1st Qu.: 7500 Grvl: 7 Paved : 45   
## Median : 62.00 Median : 9548 Gravel : 94   
## Mean : 57.38 Mean : 10258   
## 3rd Qu.: 78.00 3rd Qu.: 11600   
## Max. :313.00 Max. :215245   
##   
## Lot\_Shape Land\_Contour Utilities Lot\_Config   
## Slightly\_Irregular : 714 Lvl:1833 AllPub:2052 Corner : 359   
## Regular :1275 HLS: 94 NoSewr: 1 Inside :1495   
## Moderately\_Irregular: 53 Bnk: 81 CulDSac: 135   
## Irregular : 11 Low: 45 FR2 : 56   
## FR3 : 8   
##   
##   
## Land\_Slope Neighborhood Condition\_1 Condition\_2 Bldg\_Type   
## Gtl:1951 North\_Ames : 327 Norm :1771 Norm :2027 OneFam :1706   
## Mod: 89 College\_Creek: 183 Feedr : 113 Feedr : 12 TwnhsE : 157   
## Sev: 13 Old\_Town : 181 Artery : 67 PosA : 4 Twnhs : 67   
## Edwards : 129 RRAn : 35 Artery : 4 Duplex : 76   
## Somerset : 119 PosN : 24 PosN : 3 TwoFmCon: 47   
## Gilbert : 109 RRAe : 19 RRNn : 1   
## (Other) :1005 (Other): 24 (Other): 2   
## House\_Style Overall\_Qual Overall\_Cond   
## One\_Story :1052 Average :587 Average :1143   
## Two\_Story : 590 Above\_Average:518 Above\_Average: 376   
## One\_and\_Half\_Fin: 225 Good :411 Good : 286   
## SLvl : 90 Very\_Good :237 Very\_Good : 98   
## SFoyer : 56 Below\_Average:169 Below\_Average: 73   
## Two\_and\_Half\_Unf: 19 Excellent : 70 Fair : 35   
## (Other) : 21 (Other) : 61 (Other) : 42   
## Year\_Built Year\_Remod\_Add Roof\_Style Roof\_Matl Exterior\_1st  
## Min. :1875 Min. :1950 Hip : 404 CompShg:2023 VinylSd:705   
## 1st Qu.:1953 1st Qu.:1965 Gable :1607 WdShake: 8 MetalSd:319   
## Median :1972 Median :1993 Mansard: 9 Tar&Grv: 17 Wd Sdng:313   
## Mean :1971 Mean :1984 Gambrel: 14 WdShngl: 3 HdBoard:303   
## 3rd Qu.:2000 3rd Qu.:2004 Shed : 5 Roll : 1 Plywood:151   
## Max. :2010 Max. :2010 Flat : 14 Metal : 1 CemntBd: 90   
## (Other):172   
## Exterior\_2nd Mas\_Vnr\_Type Mas\_Vnr\_Area Exter\_Qual   
## VinylSd:699 Stone : 166 Min. : 0.0 Typical :1272   
## MetalSd:317 None :1231 1st Qu.: 0.0 Good : 682   
## Wd Sdng:302 BrkFace: 638 Median : 0.0 Excellent: 78   
## HdBoard:277 BrkCmn : 17 Mean : 103.8 Fair : 21   
## Plywood:190 CBlock : 1 3rd Qu.: 164.0   
## CmentBd: 90 Max. :1600.0   
## (Other):178   
## Exter\_Cond Foundation Bsmt\_Qual Bsmt\_Cond   
## Typical :1787 CBlock:880 Typical :911 Good : 80   
## Good : 213 PConc :911 Good :849 Typical :1833   
## Fair : 43 Wood : 4 Excellent :178 Poor : 4   
## Excellent: 9 BrkTil:216 No\_Basement: 57 No\_Basement: 57   
## Poor : 1 Slab : 36 Fair : 57 Fair : 76   
## Stone : 6 Poor : 1 Excellent : 3   
##   
## Bsmt\_Exposure BsmtFin\_Type\_1 BsmtFin\_SF\_1 BsmtFin\_Type\_2  
## Gd : 199 BLQ :196 Min. :1.00 Unf :1740   
## No :1331 Rec :216 1st Qu.:3.00 LwQ : 64   
## Av : 284 ALQ :298 Median :3.00 BLQ : 47   
## Mn : 179 GLQ :578 Mean :4.21 Rec : 79   
## No\_Basement: 60 Unf :602 3rd Qu.:7.00 GLQ : 23   
## LwQ :106 Max. :7.00 No\_Basement: 58   
## No\_Basement: 57 ALQ : 42   
## BsmtFin\_SF\_2 Bsmt\_Unf\_SF Total\_Bsmt\_SF Heating   
## Min. : 0.00 Min. : 0.0 Min. : 0 GasA :2019   
## 1st Qu.: 0.00 1st Qu.: 226.0 1st Qu.: 793 GasW : 21   
## Median : 0.00 Median : 460.0 Median : 988 Grav : 6   
## Mean : 52.57 Mean : 561.2 Mean :1055 Wall : 5   
## 3rd Qu.: 0.00 3rd Qu.: 801.0 3rd Qu.:1304 Floor: 1   
## Max. :1526.00 Max. :2336.0 Max. :5095 OthW : 1   
##   
## Heating\_QC Central\_Air Electrical First\_Flr\_SF Second\_Flr\_SF   
## Fair : 61 Y:1916 SBrkr :1887 Min. : 432 Min. : 0.0   
## Typical : 618 N: 137 FuseA : 126 1st Qu.: 882 1st Qu.: 0.0   
## Excellent:1040 FuseF : 33 Median :1088 Median : 0.0   
## Good : 333 FuseP : 6 Mean :1168 Mean : 326.1   
## Poor : 1 Unknown: 1 3rd Qu.:1402 3rd Qu.: 701.0   
## Max. :5095 Max. :1862.0   
##   
## Low\_Qual\_Fin\_SF Gr\_Liv\_Area Bsmt\_Full\_Bath Bsmt\_Half\_Bath   
## Min. : 0.000 Min. : 480 Min. :0.0000 Min. :0.00000   
## 1st Qu.: 0.000 1st Qu.:1137 1st Qu.:0.0000 1st Qu.:0.00000   
## Median : 0.000 Median :1447 Median :0.0000 Median :0.00000   
## Mean : 4.973 Mean :1499 Mean :0.4301 Mean :0.05796   
## 3rd Qu.: 0.000 3rd Qu.:1737 3rd Qu.:1.0000 3rd Qu.:0.00000   
## Max. :1064.000 Max. :5095 Max. :3.0000 Max. :2.00000   
##   
## Full\_Bath Half\_Bath Bedroom\_AbvGr Kitchen\_AbvGr   
## Min. :0.000 Min. :0.0000 Min. :0.000 Min. :1.000   
## 1st Qu.:1.000 1st Qu.:0.0000 1st Qu.:2.000 1st Qu.:1.000   
## Median :2.000 Median :0.0000 Median :3.000 Median :1.000   
## Mean :1.564 Mean :0.3751 Mean :2.855 Mean :1.047   
## 3rd Qu.:2.000 3rd Qu.:1.0000 3rd Qu.:3.000 3rd Qu.:1.000   
## Max. :4.000 Max. :2.0000 Max. :6.000 Max. :3.000   
##   
## Kitchen\_Qual TotRms\_AbvGrd Functional Fireplaces   
## Typical :1070 Min. : 3.000 Typ :1896 Min. :0.000   
## Good : 790 1st Qu.: 5.000 Min2 : 54 1st Qu.:0.000   
## Excellent: 142 Median : 6.000 Min1 : 51 Median :1.000   
## Fair : 50 Mean : 6.442 Mod : 27 Mean :0.603   
## Poor : 1 3rd Qu.: 7.000 Maj1 : 15 3rd Qu.:1.000   
## Max. :15.000 Maj2 : 6 Max. :4.000   
## (Other): 4   
## Fireplace\_Qu Garage\_Type Garage\_Finish Garage\_Cars   
## Good :538 Attchd :1204 Fin :509 Min. :0.000   
## No\_Fireplace:993 BuiltIn : 127 Unf :872 1st Qu.:1.000   
## Typical :409 Basment : 29 RFn :563 Median :2.000   
## Poor : 36 Detchd : 549 No\_Garage:109 Mean :1.774   
## Excellent : 21 No\_Garage : 108 3rd Qu.:2.000   
## Fair : 56 CarPort : 15 Max. :5.000   
## More\_Than\_Two\_Types: 21   
## Garage\_Area Garage\_Qual Garage\_Cond Paved\_Drive   
## Min. : 0 Typical :1839 Typical :1872 Partial\_Pavement: 42   
## 1st Qu.: 320 No\_Garage: 109 No\_Garage: 109 Paved :1848   
## Median : 478 Fair : 85 Fair : 53 Dirt\_Gravel : 163   
## Mean : 472 Good : 16 Excellent: 1   
## 3rd Qu.: 576 Excellent: 2 Poor : 8   
## Max. :1488 Poor : 2 Good : 10   
##   
## Wood\_Deck\_SF Open\_Porch\_SF Enclosed\_Porch Three\_season\_porch  
## Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.000   
## 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.000   
## Median : 0.00 Median : 27.00 Median : 0.00 Median : 0.000   
## Mean : 93.52 Mean : 48.17 Mean : 23.02 Mean : 2.799   
## 3rd Qu.: 168.00 3rd Qu.: 72.00 3rd Qu.: 0.00 3rd Qu.: 0.000   
## Max. :1424.00 Max. :742.00 Max. :584.00 Max. :407.000   
##   
## Screen\_Porch Pool\_Area Pool\_QC Fence   
## Min. : 0.00 Min. : 0.000 No\_Pool :2047 No\_Fence :1661   
## 1st Qu.: 0.00 1st Qu.: 0.000 Excellent: 2 Minimum\_Privacy : 225   
## Median : 0.00 Median : 0.000 Typical : 2 Good\_Privacy : 81   
## Mean : 16.68 Mean : 1.339 Fair : 1 Good\_Wood : 77   
## 3rd Qu.: 0.00 3rd Qu.: 0.000 Good : 1 Minimum\_Wood\_Wire: 9   
## Max. :576.00 Max. :800.000   
##   
## Misc\_Feature Misc\_Val Mo\_Sold Year\_Sold Sale\_Type   
## None:1978 Min. : 0.00 Min. : 1.000 Min. :2006 WD :1789   
## Gar2: 5 1st Qu.: 0.00 1st Qu.: 4.000 1st Qu.:2007 New : 163   
## Shed: 66 Median : 0.00 Median : 6.000 Median :2008 COD : 54   
## Othr: 3 Mean : 60.12 Mean : 6.189 Mean :2008 ConLD : 16   
## Elev: 1 3rd Qu.: 0.00 3rd Qu.: 8.000 3rd Qu.:2009 ConLI : 8   
## Max. :17000.00 Max. :12.000 Max. :2010 CWD : 8   
## (Other): 15   
## Sale\_Condition Above\_Median  
## Normal :1712 Yes:1043   
## Partial: 169 No :1010   
## Family : 30   
## Abnorml: 121   
## Alloca : 16   
## AdjLand: 5   
##

skim(ames)

Data summary

|  |  |
| --- | --- |
| Name | ames |
| Number of rows | 2053 |
| Number of columns | 79 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Column type frequency: |  |
| factor | 47 |
| numeric | 32 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Group variables | None |

**Variable type: factor**

| skim\_variable | n\_missing | complete\_rate | ordered | n\_unique | top\_counts |
| --- | --- | --- | --- | --- | --- |
| MS\_SubClass | 0 | 1 | FALSE | 16 | One: 772, Two: 383, One: 204, One: 129 |
| MS\_Zoning | 0 | 1 | FALSE | 7 | Res: 1600, Res: 326, Flo: 87, Res: 20 |
| Street | 0 | 1 | FALSE | 2 | Pav: 2046, Grv: 7 |
| Alley | 0 | 1 | FALSE | 3 | No\_: 1914, Gra: 94, Pav: 45 |
| Lot\_Shape | 0 | 1 | FALSE | 4 | Reg: 1275, Sli: 714, Mod: 53, Irr: 11 |
| Land\_Contour | 0 | 1 | FALSE | 4 | Lvl: 1833, HLS: 94, Bnk: 81, Low: 45 |
| Utilities | 0 | 1 | FALSE | 2 | All: 2052, NoS: 1 |
| Lot\_Config | 0 | 1 | FALSE | 5 | Ins: 1495, Cor: 359, Cul: 135, FR2: 56 |
| Land\_Slope | 0 | 1 | FALSE | 3 | Gtl: 1951, Mod: 89, Sev: 13 |
| Neighborhood | 0 | 1 | FALSE | 28 | Nor: 327, Col: 183, Old: 181, Edw: 129 |
| Condition\_1 | 0 | 1 | FALSE | 9 | Nor: 1771, Fee: 113, Art: 67, RRA: 35 |
| Condition\_2 | 0 | 1 | FALSE | 8 | Nor: 2027, Fee: 12, Pos: 4, Art: 4 |
| Bldg\_Type | 0 | 1 | FALSE | 5 | One: 1706, Twn: 157, Dup: 76, Twn: 67 |
| House\_Style | 0 | 1 | FALSE | 8 | One: 1052, Two: 590, One: 225, SLv: 90 |
| Overall\_Qual | 0 | 1 | FALSE | 10 | Ave: 587, Abo: 518, Goo: 411, Ver: 237 |
| Overall\_Cond | 0 | 1 | FALSE | 9 | Ave: 1143, Abo: 376, Goo: 286, Ver: 98 |
| Roof\_Style | 0 | 1 | FALSE | 6 | Gab: 1607, Hip: 404, Gam: 14, Fla: 14 |
| Roof\_Matl | 0 | 1 | FALSE | 6 | Com: 2023, Tar: 17, WdS: 8, WdS: 3 |
| Exterior\_1st | 0 | 1 | FALSE | 16 | Vin: 705, Met: 319, Wd : 313, HdB: 303 |
| Exterior\_2nd | 0 | 1 | FALSE | 17 | Vin: 699, Met: 317, Wd : 302, HdB: 277 |
| Mas\_Vnr\_Type | 0 | 1 | FALSE | 5 | Non: 1231, Brk: 638, Sto: 166, Brk: 17 |
| Exter\_Qual | 0 | 1 | FALSE | 4 | Typ: 1272, Goo: 682, Exc: 78, Fai: 21 |
| Exter\_Cond | 0 | 1 | FALSE | 5 | Typ: 1787, Goo: 213, Fai: 43, Exc: 9 |
| Foundation | 0 | 1 | FALSE | 6 | PCo: 911, CBl: 880, Brk: 216, Sla: 36 |
| Bsmt\_Qual | 0 | 1 | FALSE | 6 | Typ: 911, Goo: 849, Exc: 178, No\_: 57 |
| Bsmt\_Cond | 0 | 1 | FALSE | 6 | Typ: 1833, Goo: 80, Fai: 76, No\_: 57 |
| Bsmt\_Exposure | 0 | 1 | FALSE | 5 | No: 1331, Av: 284, Gd: 199, Mn: 179 |
| BsmtFin\_Type\_1 | 0 | 1 | FALSE | 7 | Unf: 602, GLQ: 578, ALQ: 298, Rec: 216 |
| BsmtFin\_Type\_2 | 0 | 1 | FALSE | 7 | Unf: 1740, Rec: 79, LwQ: 64, No\_: 58 |
| Heating | 0 | 1 | FALSE | 6 | Gas: 2019, Gas: 21, Gra: 6, Wal: 5 |
| Heating\_QC | 0 | 1 | FALSE | 5 | Exc: 1040, Typ: 618, Goo: 333, Fai: 61 |
| Central\_Air | 0 | 1 | FALSE | 2 | Y: 1916, N: 137 |
| Electrical | 0 | 1 | FALSE | 5 | SBr: 1887, Fus: 126, Fus: 33, Fus: 6 |
| Kitchen\_Qual | 0 | 1 | FALSE | 5 | Typ: 1070, Goo: 790, Exc: 142, Fai: 50 |
| Functional | 0 | 1 | FALSE | 8 | Typ: 1896, Min: 54, Min: 51, Mod: 27 |
| Fireplace\_Qu | 0 | 1 | FALSE | 6 | No\_: 993, Goo: 538, Typ: 409, Fai: 56 |
| Garage\_Type | 0 | 1 | FALSE | 7 | Att: 1204, Det: 549, Bui: 127, No\_: 108 |
| Garage\_Finish | 0 | 1 | FALSE | 4 | Unf: 872, RFn: 563, Fin: 509, No\_: 109 |
| Garage\_Qual | 0 | 1 | FALSE | 6 | Typ: 1839, No\_: 109, Fai: 85, Goo: 16 |
| Garage\_Cond | 0 | 1 | FALSE | 6 | Typ: 1872, No\_: 109, Fai: 53, Goo: 10 |
| Paved\_Drive | 0 | 1 | FALSE | 3 | Pav: 1848, Dir: 163, Par: 42 |
| Pool\_QC | 0 | 1 | FALSE | 5 | No\_: 2047, Exc: 2, Typ: 2, Fai: 1 |
| Fence | 0 | 1 | FALSE | 5 | No\_: 1661, Min: 225, Goo: 81, Goo: 77 |
| Misc\_Feature | 0 | 1 | FALSE | 5 | Non: 1978, She: 66, Gar: 5, Oth: 3 |
| Sale\_Type | 0 | 1 | FALSE | 10 | WD: 1789, New: 163, COD: 54, Con: 16 |
| Sale\_Condition | 0 | 1 | FALSE | 6 | Nor: 1712, Par: 169, Abn: 121, Fam: 30 |
| Above\_Median | 0 | 1 | FALSE | 2 | Yes: 1043, No: 1010 |

**Variable type: numeric**

| skim\_variable | n\_missing | complete\_rate | mean | sd | p0 | p25 | p50 | p75 | p100 | hist |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lot\_Frontage | 0 | 1 | 57.38 | 33.20 | 0 | 43 | 62 | 78 | 313 | ▇▇▁▁▁ |
| Lot\_Area | 0 | 1 | 10258.40 | 8427.38 | 1300 | 7500 | 9548 | 11600 | 215245 | ▇▁▁▁▁ |
| Year\_Built | 0 | 1 | 1970.64 | 30.40 | 1875 | 1953 | 1972 | 2000 | 2010 | ▁▂▃▆▇ |
| Year\_Remod\_Add | 0 | 1 | 1984.08 | 20.96 | 1950 | 1965 | 1993 | 2004 | 2010 | ▅▂▂▃▇ |
| Mas\_Vnr\_Area | 0 | 1 | 103.75 | 183.59 | 0 | 0 | 0 | 164 | 1600 | ▇▁▁▁▁ |
| BsmtFin\_SF\_1 | 0 | 1 | 4.21 | 2.24 | 1 | 3 | 3 | 7 | 7 | ▅▆▁▁▇ |
| BsmtFin\_SF\_2 | 0 | 1 | 52.57 | 175.99 | 0 | 0 | 0 | 0 | 1526 | ▇▁▁▁▁ |
| Bsmt\_Unf\_SF | 0 | 1 | 561.19 | 441.72 | 0 | 226 | 460 | 801 | 2336 | ▇▅▂▁▁ |
| Total\_Bsmt\_SF | 0 | 1 | 1054.57 | 435.33 | 0 | 793 | 988 | 1304 | 5095 | ▇▇▁▁▁ |
| First\_Flr\_SF | 0 | 1 | 1167.52 | 391.79 | 432 | 882 | 1088 | 1402 | 5095 | ▇▃▁▁▁ |
| Second\_Flr\_SF | 0 | 1 | 326.07 | 422.44 | 0 | 0 | 0 | 701 | 1862 | ▇▂▂▁▁ |
| Low\_Qual\_Fin\_SF | 0 | 1 | 4.97 | 49.09 | 0 | 0 | 0 | 0 | 1064 | ▇▁▁▁▁ |
| Gr\_Liv\_Area | 0 | 1 | 1498.56 | 487.84 | 480 | 1137 | 1447 | 1737 | 5095 | ▇▇▁▁▁ |
| Bsmt\_Full\_Bath | 0 | 1 | 0.43 | 0.53 | 0 | 0 | 0 | 1 | 3 | ▇▆▁▁▁ |
| Bsmt\_Half\_Bath | 0 | 1 | 0.06 | 0.24 | 0 | 0 | 0 | 0 | 2 | ▇▁▁▁▁ |
| Full\_Bath | 0 | 1 | 1.56 | 0.55 | 0 | 1 | 2 | 2 | 4 | ▁▇▇▁▁ |
| Half\_Bath | 0 | 1 | 0.38 | 0.50 | 0 | 0 | 0 | 1 | 2 | ▇▁▅▁▁ |
| Bedroom\_AbvGr | 0 | 1 | 2.86 | 0.82 | 0 | 2 | 3 | 3 | 6 | ▁▃▇▂▁ |
| Kitchen\_AbvGr | 0 | 1 | 1.05 | 0.22 | 1 | 1 | 1 | 1 | 3 | ▇▁▁▁▁ |
| TotRms\_AbvGrd | 0 | 1 | 6.44 | 1.54 | 3 | 5 | 6 | 7 | 15 | ▅▇▃▁▁ |
| Fireplaces | 0 | 1 | 0.60 | 0.65 | 0 | 0 | 1 | 1 | 4 | ▇▇▁▁▁ |
| Garage\_Cars | 0 | 1 | 1.77 | 0.76 | 0 | 1 | 2 | 2 | 5 | ▅▇▂▁▁ |
| Garage\_Area | 0 | 1 | 471.96 | 213.43 | 0 | 320 | 478 | 576 | 1488 | ▃▇▂▁▁ |
| Wood\_Deck\_SF | 0 | 1 | 93.52 | 127.71 | 0 | 0 | 0 | 168 | 1424 | ▇▁▁▁▁ |
| Open\_Porch\_SF | 0 | 1 | 48.17 | 69.51 | 0 | 0 | 27 | 72 | 742 | ▇▁▁▁▁ |
| Enclosed\_Porch | 0 | 1 | 23.02 | 60.59 | 0 | 0 | 0 | 0 | 584 | ▇▁▁▁▁ |
| Three\_season\_porch | 0 | 1 | 2.80 | 25.65 | 0 | 0 | 0 | 0 | 407 | ▇▁▁▁▁ |
| Screen\_Porch | 0 | 1 | 16.68 | 57.94 | 0 | 0 | 0 | 0 | 576 | ▇▁▁▁▁ |
| Pool\_Area | 0 | 1 | 1.34 | 27.74 | 0 | 0 | 0 | 0 | 800 | ▇▁▁▁▁ |
| Misc\_Val | 0 | 1 | 60.12 | 662.76 | 0 | 0 | 0 | 0 | 17000 | ▇▁▁▁▁ |
| Mo\_Sold | 0 | 1 | 6.19 | 2.70 | 1 | 4 | 6 | 8 | 12 | ▅▆▇▃▃ |
| Year\_Sold | 0 | 1 | 2007.75 | 1.30 | 2006 | 2007 | 2008 | 2009 | 2010 | ▇▇▇▇▃ |

logistic regression model

ames\_model =   
 logistic\_reg() %>% #note the use of logistic\_reg  
 set\_engine("glm") #standard logistic regression engine is glm  
  
ames\_recipe = recipe(Above\_Median ~ ., ames) %>%  
 step\_dummy(all\_nominal(), -all\_outcomes()) #exclude the response variable from being dummy converted   
  
logreg\_wf = workflow() %>%  
 add\_recipe(ames\_recipe) %>%   
 add\_model(ames\_model)  
  
ames\_fit = fit(logreg\_wf, ames)

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

summary(ames\_fit$fit$fit$fit)

##   
## Call:  
## stats::glm(formula = ..y ~ ., family = stats::binomial, data = data)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -3.1026 -0.0037 0.0000 0.0068 4.1555   
##   
## Coefficients: (10 not defined because of singularities)  
## Estimate Std. Error  
## (Intercept) 2.244e+02 3.204e+02  
## Lot\_Frontage -7.065e-03 7.520e-03  
## Lot\_Area -2.334e-04 7.626e-05  
## Year\_Built -1.101e-01 2.909e-02  
## Year\_Remod\_Add -6.360e-03 1.597e-02  
## Mas\_Vnr\_Area -2.546e-03 2.111e-03  
## BsmtFin\_SF\_1 4.301e-01 5.412e-01  
## BsmtFin\_SF\_2 -1.813e-04 2.175e-03  
## Bsmt\_Unf\_SF -1.965e-03 1.275e-03  
## Total\_Bsmt\_SF -5.516e-04 1.673e-03  
## First\_Flr\_SF -1.100e-02 2.143e-03  
## Second\_Flr\_SF -8.076e-03 2.336e-03  
## Low\_Qual\_Fin\_SF -2.387e-03 4.327e-03  
## Gr\_Liv\_Area NA NA  
## Bsmt\_Full\_Bath -1.018e+00 6.091e-01  
## Bsmt\_Half\_Bath -2.247e+00 8.912e-01  
## Full\_Bath -2.038e+00 6.561e-01  
## Half\_Bath -1.224e+00 6.747e-01  
## Bedroom\_AbvGr 1.927e-01 5.046e-01  
## Kitchen\_AbvGr 5.822e+00 2.662e+00  
## TotRms\_AbvGrd -2.741e-01 3.223e-01  
## Fireplaces -2.416e+00 8.478e-01  
## Garage\_Cars -2.893e+00 9.264e-01  
## Garage\_Area 4.702e-03 3.046e-03  
## Wood\_Deck\_SF -2.774e-03 1.875e-03  
## Open\_Porch\_SF 1.816e-03 4.078e-03  
## Enclosed\_Porch 3.346e-03 3.881e-03  
## Three\_season\_porch -2.831e-03 5.574e-03  
## Screen\_Porch -4.827e-03 3.103e-03  
## Pool\_Area -1.430e-01 4.201e+02  
## Misc\_Val -1.758e-03 1.298e-03  
## Mo\_Sold -3.214e-02 8.172e-02  
## Year\_Sold 7.676e-03 1.560e-01  
## MS\_SubClass\_Two\_Story\_1946\_and\_Newer -1.443e+00 2.942e+00  
## MS\_SubClass\_One\_Story\_PUD\_1946\_and\_Newer -1.376e+01 2.431e+03  
## MS\_SubClass\_One\_and\_Half\_Story\_Finished\_All\_Ages 5.403e-01 2.768e+00  
## MS\_SubClass\_Two\_Story\_PUD\_1946\_and\_Newer 1.484e+01 2.435e+03  
## MS\_SubClass\_Split\_or\_Multilevel -3.251e+00 1.654e+01  
## MS\_SubClass\_One\_Story\_1945\_and\_Older -3.167e+00 2.011e+00  
## MS\_SubClass\_Duplex\_All\_Styles\_and\_Ages 5.931e-01 2.863e+00  
## MS\_SubClass\_Split\_Foyer 9.029e-01 2.549e+00  
## MS\_SubClass\_Two\_Family\_conversion\_All\_Styles\_and\_Ages 2.172e+00 3.341e+01  
## MS\_SubClass\_Two\_Story\_1945\_and\_Older -4.758e+00 3.248e+00  
## MS\_SubClass\_One\_Story\_with\_Finished\_Attic\_All\_Ages 1.873e+01 1.040e+04  
## MS\_SubClass\_PUD\_Multilevel\_Split\_Level\_Foyer 7.062e+00 1.018e+04  
## MS\_SubClass\_One\_and\_Half\_Story\_Unfinished\_All\_Ages 2.142e+01 4.959e+04  
## MS\_SubClass\_Two\_and\_Half\_Story\_All\_Ages 2.853e+00 7.565e+00  
## MS\_SubClass\_One\_and\_Half\_Story\_PUD\_All\_Ages 1.756e+01 4.826e+04  
## MS\_Zoning\_Residential\_High\_Density -6.020e+00 2.208e+00  
## MS\_Zoning\_Floating\_Village\_Residential -3.239e+01 2.143e+03  
## MS\_Zoning\_Residential\_Medium\_Density 1.823e+00 1.355e+00  
## MS\_Zoning\_C\_all 2.030e+01 6.336e+03  
## MS\_Zoning\_A\_agr -2.094e+01 1.465e+05  
## MS\_Zoning\_I\_all 2.655e+01 6.325e+04  
## Street\_Grvl 1.230e+00 1.122e+02  
## Alley\_Paved -4.708e+00 1.447e+00  
## Alley\_Gravel -4.966e+00 1.483e+00  
## Lot\_Shape\_Regular 1.672e-01 5.680e-01  
## Lot\_Shape\_Moderately\_Irregular -6.803e-01 2.366e+00  
## Lot\_Shape\_Irregular -4.772e+00 7.155e+00  
## Land\_Contour\_HLS 1.432e+00 1.800e+00  
## Land\_Contour\_Bnk 7.438e-01 1.263e+00  
## Land\_Contour\_Low 3.479e+00 2.686e+00  
## Utilities\_NoSewr -2.449e+00 5.530e+04  
## Lot\_Config\_Inside -3.433e-03 5.743e-01  
## Lot\_Config\_CulDSac 5.618e-01 1.090e+00  
## Lot\_Config\_FR2 7.082e-02 1.345e+00  
## Lot\_Config\_FR3 -6.924e-01 2.381e+00  
## Land\_Slope\_Mod -1.665e+00 1.561e+00  
## Land\_Slope\_Sev 5.023e+00 4.111e+00  
## Neighborhood\_Gilbert -1.079e+00 1.584e+00  
## Neighborhood\_Stone\_Brook -3.862e+01 3.980e+03  
## Neighborhood\_Northwest\_Ames -2.376e-01 9.475e-01  
## Neighborhood\_Somerset 2.482e+00 2.613e+00  
## Neighborhood\_Briardale -1.716e+01 8.495e+03  
## Neighborhood\_Northpark\_Villa 1.538e+01 2.235e+04  
## Neighborhood\_Northridge\_Heights -2.379e+01 2.143e+03  
## Neighborhood\_Bloomington\_Heights 1.764e+00 1.974e+00  
## Neighborhood\_Northridge -3.280e+00 4.108e+03  
## Neighborhood\_Sawyer\_West -6.244e-01 1.460e+00  
## Neighborhood\_Sawyer 3.375e-01 1.035e+00  
## Neighborhood\_Greens -3.896e+00 3.926e+00  
## Neighborhood\_Old\_Town 6.228e-01 2.007e+00  
## Neighborhood\_Brookside -2.522e+00 1.893e+00  
## Neighborhood\_Iowa\_DOT\_and\_Rail\_Road -8.527e-01 2.486e+00  
## Neighborhood\_Clear\_Creek -5.226e+00 5.051e+00  
## Neighborhood\_South\_and\_West\_of\_Iowa\_State\_University -6.468e-01 1.915e+00  
## Neighborhood\_Edwards -1.882e-01 9.449e-01  
## Neighborhood\_College\_Creek 3.366e-02 1.343e+00  
## Neighborhood\_Crawford -6.041e+00 1.636e+00  
## Neighborhood\_Mitchell -9.685e-01 1.115e+00  
## Neighborhood\_Timberland 4.963e-01 1.648e+00  
## Neighborhood\_Meadow\_Village 1.150e+01 6.613e+03  
## Neighborhood\_Veenker -4.278e+00 1.006e+01  
## Neighborhood\_Blueste -2.019e+01 1.635e+03  
## Neighborhood\_Landmark -3.561e+00 4.824e+04  
## Neighborhood\_Green\_Hills -4.387e+01 4.884e+04  
## Condition\_1\_Feedr 1.753e+00 8.742e-01  
## Condition\_1\_RRAe 5.613e+00 2.531e+00  
## Condition\_1\_PosA -3.906e+00 3.477e+00  
## Condition\_1\_Artery 1.438e+00 1.361e+00  
## Condition\_1\_PosN -6.066e+00 1.937e+00  
## Condition\_1\_RRAn -7.520e-01 2.088e+00  
## Condition\_1\_RRNn 9.725e+00 3.048e+00  
## Condition\_1\_RRNe -3.425e+00 2.453e+02  
## Condition\_2\_Feedr 5.405e-01 3.940e+00  
## Condition\_2\_PosA -7.785e+00 1.855e+04  
## Condition\_2\_PosN 3.128e+01 1.882e+04  
## Condition\_2\_Artery 1.882e+01 1.718e+04  
## Condition\_2\_RRNn -8.786e-01 4.820e+04  
## Condition\_2\_RRAe -3.164e+01 4.911e+04  
## Condition\_2\_RRAn 2.002e+01 4.820e+04  
## Bldg\_Type\_TwnhsE 1.444e+01 2.431e+03  
## Bldg\_Type\_Twnhs 1.305e+01 2.431e+03  
## Bldg\_Type\_Duplex NA NA  
## Bldg\_Type\_TwoFmCon -9.330e-01 3.344e+01  
## House\_Style\_Two\_Story 1.743e+00 3.465e+00  
## House\_Style\_One\_and\_Half\_Fin -2.841e+00 2.976e+00  
## House\_Style\_SLvl 2.873e+00 1.655e+01  
## House\_Style\_SFoyer -3.935e+00 2.390e+00  
## House\_Style\_One\_and\_Half\_Unf -8.075e+00 4.870e+04  
## House\_Style\_Two\_and\_Half\_Unf -6.111e+00 7.017e+00  
## House\_Style\_Two\_and\_Half\_Fin -9.057e+00 1.690e+01  
## Overall\_Qual\_Average 8.248e-01 5.717e-01  
## Overall\_Qual\_Good -1.296e+00 6.765e-01  
## Overall\_Qual\_Very\_Good -1.410e+00 2.223e+00  
## Overall\_Qual\_Excellent 9.331e+00 1.025e+01  
## Overall\_Qual\_Below\_Average 2.341e-01 1.648e+00  
## Overall\_Qual\_Fair 1.845e+01 5.688e+03  
## Overall\_Qual\_Poor -4.542e+00 3.597e+04  
## Overall\_Qual\_Very\_Excellent 2.094e+01 7.431e+03  
## Overall\_Qual\_Very\_Poor -1.563e+01 7.577e+04  
## Overall\_Cond\_Above\_Average -1.473e+00 6.757e-01  
## Overall\_Cond\_Good -2.455e+00 8.077e-01  
## Overall\_Cond\_Poor 2.138e+01 2.712e+04  
## Overall\_Cond\_Very\_Good -2.453e+00 1.236e+00  
## Overall\_Cond\_Below\_Average 2.384e-01 1.245e+00  
## Overall\_Cond\_Excellent -5.174e+00 2.456e+00  
## Overall\_Cond\_Fair 9.375e+00 6.129e+00  
## Overall\_Cond\_Very\_Poor -4.400e+00 4.096e+04  
## Roof\_Style\_Gable 5.729e-01 6.205e-01  
## Roof\_Style\_Mansard 9.107e+00 1.310e+01  
## Roof\_Style\_Gambrel -1.402e+00 2.312e+00  
## Roof\_Style\_Shed 2.010e+01 9.450e+03  
## Roof\_Style\_Flat 9.542e+00 1.160e+01  
## Roof\_Matl\_WdShake -5.058e+01 1.712e+04  
## Roof\_Matl\_Tar.Grv -6.888e+00 1.032e+01  
## Roof\_Matl\_WdShngl -2.790e+01 2.730e+04  
## Roof\_Matl\_Roll 8.736e+00 4.820e+04  
## Roof\_Matl\_Metal -3.487e+01 4.820e+04  
## Exterior\_1st\_VinylSd 1.102e+01 3.037e+00  
## Exterior\_1st\_Wd.Sdng 5.959e+00 1.730e+00  
## Exterior\_1st\_HdBoard 7.406e+00 2.253e+00  
## Exterior\_1st\_CemntBd 1.377e+00 4.297e+00  
## Exterior\_1st\_Plywood 8.625e+00 2.340e+00  
## Exterior\_1st\_MetalSd 1.041e+01 2.503e+00  
## Exterior\_1st\_AsbShng 5.360e+00 4.321e+00  
## Exterior\_1st\_WdShing 6.544e+00 2.588e+00  
## Exterior\_1st\_Stucco 9.743e+00 2.728e+00  
## Exterior\_1st\_AsphShn 1.894e+01 6.862e+04  
## Exterior\_1st\_BrkComm -1.340e+01 2.587e+04  
## Exterior\_1st\_PreCast -1.359e+01 4.820e+04  
## Exterior\_1st\_ImStucc -3.177e+00 4.837e+04  
## Exterior\_1st\_Stone 9.894e+00 5.184e+04  
## Exterior\_1st\_CBlock 3.560e+01 1.134e+05  
## Exterior\_2nd\_VinylSd -4.213e+00 2.242e+00  
## Exterior\_2nd\_Wd.Sdng 1.781e+00 1.567e+00  
## Exterior\_2nd\_BrkFace 8.167e+00 3.116e+00  
## Exterior\_2nd\_HdBoard -1.231e+00 1.035e+00  
## Exterior\_2nd\_CmentBd 7.687e+00 4.285e+00  
## Exterior\_2nd\_Wd.Shng -2.278e+00 1.772e+00  
## Exterior\_2nd\_MetalSd -1.844e+00 2.096e+00  
## Exterior\_2nd\_ImStucc 2.644e+00 4.530e+00  
## Exterior\_2nd\_Brk.Cmn -1.722e+00 2.373e+04  
## Exterior\_2nd\_AsbShng 6.456e+00 4.789e+00  
## Exterior\_2nd\_Stucco -1.950e+00 2.602e+00  
## Exterior\_2nd\_AsphShn -2.399e+01 4.820e+04  
## Exterior\_2nd\_CBlock -2.593e+01 4.820e+04  
## Exterior\_2nd\_Stone -9.328e+00 1.910e+04  
## Exterior\_2nd\_PreCast NA NA  
## Exterior\_2nd\_Other 3.238e+01 4.836e+04  
## Mas\_Vnr\_Type\_None 6.453e-01 1.176e+00  
## Mas\_Vnr\_Type\_BrkFace 8.160e-01 1.100e+00  
## Mas\_Vnr\_Type\_BrkCmn 5.300e-01 2.008e+00  
## Mas\_Vnr\_Type\_CBlock -1.453e+01 4.911e+04  
## Exter\_Qual\_Good -1.261e+00 8.209e-01  
## Exter\_Qual\_Excellent -2.599e+01 3.386e+03  
## Exter\_Qual\_Fair -5.653e+00 2.719e+00  
## Exter\_Cond\_Good 2.168e-01 7.586e-01  
## Exter\_Cond\_Fair 6.497e-03 1.903e+00  
## Exter\_Cond\_Excellent -1.210e+00 2.633e+00  
## Exter\_Cond\_Poor NA NA  
## Foundation\_PConc -1.206e+00 8.311e-01  
## Foundation\_Wood 4.609e+00 3.530e+00  
## Foundation\_BrkTil -4.845e-01 1.125e+00  
## Foundation\_Slab -1.939e+01 7.920e+03  
## Foundation\_Stone -5.015e-03 1.069e+01  
## Bsmt\_Qual\_Good 1.867e+00 7.731e-01  
## Bsmt\_Qual\_Excellent 2.222e+00 1.711e+00  
## Bsmt\_Qual\_No\_Basement 1.692e+01 5.254e+04  
## Bsmt\_Qual\_Fair -2.688e+00 1.929e+00  
## Bsmt\_Qual\_Poor -3.805e+00 7.928e+04  
## Bsmt\_Cond\_Typical 1.930e+00 1.097e+00  
## Bsmt\_Cond\_Poor 1.615e+01 4.173e+04  
## Bsmt\_Cond\_No\_Basement NA NA  
## Bsmt\_Cond\_Fair 1.398e-01 1.599e+00  
## Bsmt\_Cond\_Excellent -1.079e+00 2.856e+00  
## Bsmt\_Exposure\_No 1.826e+00 1.186e+00  
## Bsmt\_Exposure\_Av 2.864e+00 1.145e+00  
## Bsmt\_Exposure\_Mn 1.579e+00 1.309e+00  
## Bsmt\_Exposure\_No\_Basement -1.116e+01 1.924e+04  
## BsmtFin\_Type\_1\_Rec -1.593e+00 1.963e+00  
## BsmtFin\_Type\_1\_ALQ -1.167e+00 1.124e+00  
## BsmtFin\_Type\_1\_GLQ -2.785e+00 1.043e+00  
## BsmtFin\_Type\_1\_Unf -4.918e-01 2.584e+00  
## BsmtFin\_Type\_1\_LwQ NA NA  
## BsmtFin\_Type\_1\_No\_Basement NA NA  
## BsmtFin\_Type\_2\_LwQ 2.203e-01 1.347e+00  
## BsmtFin\_Type\_2\_BLQ 2.622e-01 1.739e+00  
## BsmtFin\_Type\_2\_Rec -2.525e-01 1.182e+00  
## BsmtFin\_Type\_2\_GLQ -2.569e+00 2.782e+00  
## BsmtFin\_Type\_2\_No\_Basement 1.834e+01 4.824e+04  
## BsmtFin\_Type\_2\_ALQ -4.203e+00 1.816e+00  
## Heating\_GasW -1.511e+00 4.707e+00  
## Heating\_Grav 6.100e+00 4.035e+04  
## Heating\_Wall 1.828e+01 2.556e+04  
## Heating\_Floor -3.395e+01 4.917e+04  
## Heating\_OthW 1.880e+01 4.820e+04  
## Heating\_QC\_Typical 2.398e+00 1.400e+00  
## Heating\_QC\_Excellent 2.198e+00 1.392e+00  
## Heating\_QC\_Good 2.619e+00 1.493e+00  
## Heating\_QC\_Poor NA NA  
## Central\_Air\_N 8.797e-01 2.356e+00  
## Electrical\_FuseA 8.216e-01 9.253e-01  
## Electrical\_FuseF -1.132e-01 2.089e+00  
## Electrical\_FuseP 8.857e+00 9.075e+03  
## Electrical\_Unknown -1.970e+01 4.820e+04  
## Kitchen\_Qual\_Good -2.832e-01 6.424e-01  
## Kitchen\_Qual\_Excellent -4.206e+00 2.205e+00  
## Kitchen\_Qual\_Fair 1.328e+00 2.429e+00  
## Kitchen\_Qual\_Poor -4.289e+00 4.820e+04  
## Functional\_Mod 3.219e-02 2.288e+00  
## Functional\_Min2 1.807e+00 1.459e+00  
## Functional\_Min1 4.972e-01 1.196e+00  
## Functional\_Maj1 9.374e+00 6.423e+00  
## Functional\_Maj2 5.176e+01 1.753e+04  
## Functional\_Sev 1.800e+01 2.732e+04  
## Functional\_Sal 1.986e+01 6.325e+04  
## Fireplace\_Qu\_No\_Fireplace -2.185e+00 1.167e+00  
## Fireplace\_Qu\_Typical -2.237e+00 7.011e-01  
## Fireplace\_Qu\_Poor -3.936e-03 1.823e+00  
## Fireplace\_Qu\_Excellent -9.153e+00 4.860e+03  
## Fireplace\_Qu\_Fair 1.010e-01 1.108e+00  
## Garage\_Type\_BuiltIn -3.710e+00 1.786e+00  
## Garage\_Type\_Basment 3.217e-01 1.972e+00  
## Garage\_Type\_Detchd 8.272e-01 7.546e-01  
## Garage\_Type\_No\_Garage 1.739e+01 4.820e+04  
## Garage\_Type\_CarPort 2.146e+00 3.398e+00  
## Garage\_Type\_More\_Than\_Two\_Types 1.245e+00 2.162e+00  
## Garage\_Finish\_Unf 6.373e-01 7.383e-01  
## Garage\_Finish\_RFn -1.754e-01 6.757e-01  
## Garage\_Finish\_No\_Garage -1.581e+01 4.820e+04  
## Garage\_Qual\_No\_Garage NA NA  
## Garage\_Qual\_Fair 1.483e+00 1.469e+00  
## Garage\_Qual\_Good 5.846e-01 2.828e+00  
## Garage\_Qual\_Excellent 1.544e+01 5.589e+04  
## Garage\_Qual\_Poor -1.201e+01 6.285e+04  
## Garage\_Cond\_No\_Garage NA NA  
## Garage\_Cond\_Fair -1.435e+00 1.968e+00  
## Garage\_Cond\_Excellent -8.324e+00 7.380e+04  
## Garage\_Cond\_Poor 1.110e+01 4.033e+04  
## Garage\_Cond\_Good 2.014e+00 2.931e+00  
## Paved\_Drive\_Paved 8.611e-01 1.426e+00  
## Paved\_Drive\_Dirt\_Gravel 1.594e-01 1.816e+00  
## Pool\_QC\_Excellent 2.875e+01 1.006e+05  
## Pool\_QC\_Typical 7.391e+01 2.194e+05  
## Pool\_QC\_Fair 7.617e+01 2.765e+05  
## Pool\_QC\_Good 1.261e+02 3.395e+05  
## Fence\_Minimum\_Privacy -2.533e-01 6.317e-01  
## Fence\_Good\_Privacy -8.203e-01 9.061e-01  
## Fence\_Good\_Wood 1.562e+00 1.040e+00  
## Fence\_Minimum\_Wood\_Wire 1.717e+01 1.165e+04  
## Misc\_Feature\_Gar2 1.855e+01 1.819e+01  
## Misc\_Feature\_Shed 2.551e+00 1.449e+00  
## Misc\_Feature\_Othr -8.188e+00 7.334e+03  
## Misc\_Feature\_Elev 8.524e+01 4.865e+04  
## Sale\_Type\_New -7.032e+00 4.116e+00  
## Sale\_Type\_COD 6.503e+00 1.905e+00  
## Sale\_Type\_Con 1.085e+00 4.767e+01  
## Sale\_Type\_ConLD -2.840e+00 2.560e+00  
## Sale\_Type\_Oth 1.334e+01 1.386e+04  
## Sale\_Type\_ConLI 6.864e+00 1.370e+02  
## Sale\_Type\_ConLw 5.644e+00 1.789e+03  
## Sale\_Type\_CWD 5.310e+00 2.176e+00  
## Sale\_Type\_VWD 1.433e+01 4.820e+04  
## Sale\_Condition\_Partial 8.028e+00 4.198e+00  
## Sale\_Condition\_Family 4.976e+00 1.791e+00  
## Sale\_Condition\_Abnorml 2.150e+00 1.259e+00  
## Sale\_Condition\_Alloca -3.150e+00 3.027e+00  
## Sale\_Condition\_AdjLand 8.562e+00 3.988e+04  
## z value Pr(>|z|)   
## (Intercept) 0.701 0.483555   
## Lot\_Frontage -0.940 0.347473   
## Lot\_Area -3.060 0.002211 \*\*   
## Year\_Built -3.786 0.000153 \*\*\*  
## Year\_Remod\_Add -0.398 0.690355   
## Mas\_Vnr\_Area -1.206 0.227860   
## BsmtFin\_SF\_1 0.795 0.426832   
## BsmtFin\_SF\_2 -0.083 0.933551   
## Bsmt\_Unf\_SF -1.541 0.123281   
## Total\_Bsmt\_SF -0.330 0.741650   
## First\_Flr\_SF -5.134 2.83e-07 \*\*\*  
## Second\_Flr\_SF -3.457 0.000545 \*\*\*  
## Low\_Qual\_Fin\_SF -0.552 0.581265   
## Gr\_Liv\_Area NA NA   
## Bsmt\_Full\_Bath -1.672 0.094535 .   
## Bsmt\_Half\_Bath -2.522 0.011672 \*   
## Full\_Bath -3.106 0.001896 \*\*   
## Half\_Bath -1.814 0.069612 .   
## Bedroom\_AbvGr 0.382 0.702540   
## Kitchen\_AbvGr 2.187 0.028713 \*   
## TotRms\_AbvGrd -0.851 0.395008   
## Fireplaces -2.849 0.004381 \*\*   
## Garage\_Cars -3.122 0.001793 \*\*   
## Garage\_Area 1.544 0.122685   
## Wood\_Deck\_SF -1.480 0.138916   
## Open\_Porch\_SF 0.445 0.656074   
## Enclosed\_Porch 0.862 0.388524   
## Three\_season\_porch -0.508 0.611599   
## Screen\_Porch -1.556 0.119787   
## Pool\_Area 0.000 0.999728   
## Misc\_Val -1.354 0.175722   
## Mo\_Sold -0.393 0.694109   
## Year\_Sold 0.049 0.960749   
## MS\_SubClass\_Two\_Story\_1946\_and\_Newer -0.491 0.623697   
## MS\_SubClass\_One\_Story\_PUD\_1946\_and\_Newer -0.006 0.995483   
## MS\_SubClass\_One\_and\_Half\_Story\_Finished\_All\_Ages 0.195 0.845266   
## MS\_SubClass\_Two\_Story\_PUD\_1946\_and\_Newer 0.006 0.995138   
## MS\_SubClass\_Split\_or\_Multilevel -0.197 0.844178   
## MS\_SubClass\_One\_Story\_1945\_and\_Older -1.575 0.115243   
## MS\_SubClass\_Duplex\_All\_Styles\_and\_Ages 0.207 0.835890   
## MS\_SubClass\_Split\_Foyer 0.354 0.723167   
## MS\_SubClass\_Two\_Family\_conversion\_All\_Styles\_and\_Ages 0.065 0.948157   
## MS\_SubClass\_Two\_Story\_1945\_and\_Older -1.465 0.142962   
## MS\_SubClass\_One\_Story\_with\_Finished\_Attic\_All\_Ages 0.002 0.998564   
## MS\_SubClass\_PUD\_Multilevel\_Split\_Level\_Foyer 0.001 0.999446   
## MS\_SubClass\_One\_and\_Half\_Story\_Unfinished\_All\_Ages 0.000 0.999655   
## MS\_SubClass\_Two\_and\_Half\_Story\_All\_Ages 0.377 0.706056   
## MS\_SubClass\_One\_and\_Half\_Story\_PUD\_All\_Ages 0.000 0.999710   
## MS\_Zoning\_Residential\_High\_Density -2.727 0.006398 \*\*   
## MS\_Zoning\_Floating\_Village\_Residential -0.015 0.987942   
## MS\_Zoning\_Residential\_Medium\_Density 1.345 0.178562   
## MS\_Zoning\_C\_all 0.003 0.997444   
## MS\_Zoning\_A\_agr 0.000 0.999886   
## MS\_Zoning\_I\_all 0.000 0.999665   
## Street\_Grvl 0.011 0.991254   
## Alley\_Paved -3.253 0.001141 \*\*   
## Alley\_Gravel -3.349 0.000811 \*\*\*  
## Lot\_Shape\_Regular 0.294 0.768486   
## Lot\_Shape\_Moderately\_Irregular -0.288 0.773727   
## Lot\_Shape\_Irregular -0.667 0.504777   
## Land\_Contour\_HLS 0.796 0.426265   
## Land\_Contour\_Bnk 0.589 0.555878   
## Land\_Contour\_Low 1.295 0.195198   
## Utilities\_NoSewr 0.000 0.999965   
## Lot\_Config\_Inside -0.006 0.995231   
## Lot\_Config\_CulDSac 0.515 0.606319   
## Lot\_Config\_FR2 0.053 0.958012   
## Lot\_Config\_FR3 -0.291 0.771169   
## Land\_Slope\_Mod -1.067 0.285945   
## Land\_Slope\_Sev 1.222 0.221799   
## Neighborhood\_Gilbert -0.681 0.495750   
## Neighborhood\_Stone\_Brook -0.010 0.992256   
## Neighborhood\_Northwest\_Ames -0.251 0.801998   
## Neighborhood\_Somerset 0.950 0.342266   
## Neighborhood\_Briardale -0.002 0.998388   
## Neighborhood\_Northpark\_Villa 0.001 0.999451   
## Neighborhood\_Northridge\_Heights -0.011 0.991142   
## Neighborhood\_Bloomington\_Heights 0.893 0.371652   
## Neighborhood\_Northridge -0.001 0.999363   
## Neighborhood\_Sawyer\_West -0.428 0.668862   
## Neighborhood\_Sawyer 0.326 0.744278   
## Neighborhood\_Greens -0.992 0.321023   
## Neighborhood\_Old\_Town 0.310 0.756294   
## Neighborhood\_Brookside -1.332 0.182780   
## Neighborhood\_Iowa\_DOT\_and\_Rail\_Road -0.343 0.731573   
## Neighborhood\_Clear\_Creek -1.035 0.300826   
## Neighborhood\_South\_and\_West\_of\_Iowa\_State\_University -0.338 0.735543   
## Neighborhood\_Edwards -0.199 0.842139   
## Neighborhood\_College\_Creek 0.025 0.980008   
## Neighborhood\_Crawford -3.692 0.000223 \*\*\*  
## Neighborhood\_Mitchell -0.869 0.384931   
## Neighborhood\_Timberland 0.301 0.763307   
## Neighborhood\_Meadow\_Village 0.002 0.998613   
## Neighborhood\_Veenker -0.425 0.670752   
## Neighborhood\_Blueste -0.012 0.990150   
## Neighborhood\_Landmark 0.000 0.999941   
## Neighborhood\_Green\_Hills -0.001 0.999283   
## Condition\_1\_Feedr 2.006 0.044882 \*   
## Condition\_1\_RRAe 2.218 0.026584 \*   
## Condition\_1\_PosA -1.123 0.261340   
## Condition\_1\_Artery 1.056 0.290784   
## Condition\_1\_PosN -3.131 0.001743 \*\*   
## Condition\_1\_RRAn -0.360 0.718697   
## Condition\_1\_RRNn 3.191 0.001420 \*\*   
## Condition\_1\_RRNe -0.014 0.988859   
## Condition\_2\_Feedr 0.137 0.890887   
## Condition\_2\_PosA 0.000 0.999665   
## Condition\_2\_PosN 0.002 0.998674   
## Condition\_2\_Artery 0.001 0.999126   
## Condition\_2\_RRNn 0.000 0.999985   
## Condition\_2\_RRAe -0.001 0.999486   
## Condition\_2\_RRAn 0.000 0.999669   
## Bldg\_Type\_TwnhsE 0.006 0.995260   
## Bldg\_Type\_Twnhs 0.005 0.995718   
## Bldg\_Type\_Duplex NA NA   
## Bldg\_Type\_TwoFmCon -0.028 0.977745   
## House\_Style\_Two\_Story 0.503 0.614868   
## House\_Style\_One\_and\_Half\_Fin -0.955 0.339787   
## House\_Style\_SLvl 0.174 0.862173   
## House\_Style\_SFoyer -1.646 0.099685 .   
## House\_Style\_One\_and\_Half\_Unf 0.000 0.999868   
## House\_Style\_Two\_and\_Half\_Unf -0.871 0.383858   
## House\_Style\_Two\_and\_Half\_Fin -0.536 0.591967   
## Overall\_Qual\_Average 1.443 0.149111   
## Overall\_Qual\_Good -1.915 0.055481 .   
## Overall\_Qual\_Very\_Good -0.634 0.525809   
## Overall\_Qual\_Excellent 0.910 0.362598   
## Overall\_Qual\_Below\_Average 0.142 0.887063   
## Overall\_Qual\_Fair 0.003 0.997412   
## Overall\_Qual\_Poor 0.000 0.999899   
## Overall\_Qual\_Very\_Excellent 0.003 0.997751   
## Overall\_Qual\_Very\_Poor 0.000 0.999835   
## Overall\_Cond\_Above\_Average -2.181 0.029218 \*   
## Overall\_Cond\_Good -3.040 0.002368 \*\*   
## Overall\_Cond\_Poor 0.001 0.999371   
## Overall\_Cond\_Very\_Good -1.985 0.047190 \*   
## Overall\_Cond\_Below\_Average 0.192 0.848133   
## Overall\_Cond\_Excellent -2.107 0.035151 \*   
## Overall\_Cond\_Fair 1.530 0.126118   
## Overall\_Cond\_Very\_Poor 0.000 0.999914   
## Roof\_Style\_Gable 0.923 0.355915   
## Roof\_Style\_Mansard 0.695 0.486870   
## Roof\_Style\_Gambrel -0.606 0.544263   
## Roof\_Style\_Shed 0.002 0.998303   
## Roof\_Style\_Flat 0.823 0.410593   
## Roof\_Matl\_WdShake -0.003 0.997642   
## Roof\_Matl\_Tar.Grv -0.667 0.504532   
## Roof\_Matl\_WdShngl -0.001 0.999185   
## Roof\_Matl\_Roll 0.000 0.999855   
## Roof\_Matl\_Metal -0.001 0.999423   
## Exterior\_1st\_VinylSd 3.628 0.000286 \*\*\*  
## Exterior\_1st\_Wd.Sdng 3.444 0.000574 \*\*\*  
## Exterior\_1st\_HdBoard 3.287 0.001013 \*\*   
## Exterior\_1st\_CemntBd 0.321 0.748584   
## Exterior\_1st\_Plywood 3.686 0.000227 \*\*\*  
## Exterior\_1st\_MetalSd 4.162 3.16e-05 \*\*\*  
## Exterior\_1st\_AsbShng 1.240 0.214813   
## Exterior\_1st\_WdShing 2.529 0.011451 \*   
## Exterior\_1st\_Stucco 3.571 0.000355 \*\*\*  
## Exterior\_1st\_AsphShn 0.000 0.999780   
## Exterior\_1st\_BrkComm -0.001 0.999587   
## Exterior\_1st\_PreCast 0.000 0.999775   
## Exterior\_1st\_ImStucc 0.000 0.999948   
## Exterior\_1st\_Stone 0.000 0.999848   
## Exterior\_1st\_CBlock 0.000 0.999750   
## Exterior\_2nd\_VinylSd -1.879 0.060213 .   
## Exterior\_2nd\_Wd.Sdng 1.137 0.255667   
## Exterior\_2nd\_BrkFace 2.621 0.008767 \*\*   
## Exterior\_2nd\_HdBoard -1.189 0.234480   
## Exterior\_2nd\_CmentBd 1.794 0.072838 .   
## Exterior\_2nd\_Wd.Shng -1.285 0.198685   
## Exterior\_2nd\_MetalSd -0.880 0.379080   
## Exterior\_2nd\_ImStucc 0.584 0.559428   
## Exterior\_2nd\_Brk.Cmn 0.000 0.999942   
## Exterior\_2nd\_AsbShng 1.348 0.177589   
## Exterior\_2nd\_Stucco -0.750 0.453479   
## Exterior\_2nd\_AsphShn 0.000 0.999603   
## Exterior\_2nd\_CBlock -0.001 0.999571   
## Exterior\_2nd\_Stone 0.000 0.999610   
## Exterior\_2nd\_PreCast NA NA   
## Exterior\_2nd\_Other 0.001 0.999466   
## Mas\_Vnr\_Type\_None 0.549 0.583175   
## Mas\_Vnr\_Type\_BrkFace 0.742 0.458148   
## Mas\_Vnr\_Type\_BrkCmn 0.264 0.791874   
## Mas\_Vnr\_Type\_CBlock 0.000 0.999764   
## Exter\_Qual\_Good -1.536 0.124593   
## Exter\_Qual\_Excellent -0.008 0.993876   
## Exter\_Qual\_Fair -2.079 0.037592 \*   
## Exter\_Cond\_Good 0.286 0.775059   
## Exter\_Cond\_Fair 0.003 0.997276   
## Exter\_Cond\_Excellent -0.460 0.645845   
## Exter\_Cond\_Poor NA NA   
## Foundation\_PConc -1.451 0.146853   
## Foundation\_Wood 1.306 0.191656   
## Foundation\_BrkTil -0.431 0.666712   
## Foundation\_Slab -0.002 0.998046   
## Foundation\_Stone 0.000 0.999626   
## Bsmt\_Qual\_Good 2.415 0.015731 \*   
## Bsmt\_Qual\_Excellent 1.298 0.194138   
## Bsmt\_Qual\_No\_Basement 0.000 0.999743   
## Bsmt\_Qual\_Fair -1.394 0.163412   
## Bsmt\_Qual\_Poor 0.000 0.999962   
## Bsmt\_Cond\_Typical 1.759 0.078643 .   
## Bsmt\_Cond\_Poor 0.000 0.999691   
## Bsmt\_Cond\_No\_Basement NA NA   
## Bsmt\_Cond\_Fair 0.087 0.930333   
## Bsmt\_Cond\_Excellent -0.378 0.705604   
## Bsmt\_Exposure\_No 1.540 0.123592   
## Bsmt\_Exposure\_Av 2.501 0.012372 \*   
## Bsmt\_Exposure\_Mn 1.206 0.227693   
## Bsmt\_Exposure\_No\_Basement -0.001 0.999537   
## BsmtFin\_Type\_1\_Rec -0.812 0.417005   
## BsmtFin\_Type\_1\_ALQ -1.038 0.299355   
## BsmtFin\_Type\_1\_GLQ -2.671 0.007560 \*\*   
## BsmtFin\_Type\_1\_Unf -0.190 0.849044   
## BsmtFin\_Type\_1\_LwQ NA NA   
## BsmtFin\_Type\_1\_No\_Basement NA NA   
## BsmtFin\_Type\_2\_LwQ 0.164 0.870036   
## BsmtFin\_Type\_2\_BLQ 0.151 0.880118   
## BsmtFin\_Type\_2\_Rec -0.214 0.830890   
## BsmtFin\_Type\_2\_GLQ -0.923 0.355879   
## BsmtFin\_Type\_2\_No\_Basement 0.000 0.999697   
## BsmtFin\_Type\_2\_ALQ -2.315 0.020606 \*   
## Heating\_GasW -0.321 0.748198   
## Heating\_Grav 0.000 0.999879   
## Heating\_Wall 0.001 0.999429   
## Heating\_Floor -0.001 0.999449   
## Heating\_OthW 0.000 0.999689   
## Heating\_QC\_Typical 1.713 0.086742 .   
## Heating\_QC\_Excellent 1.579 0.114273   
## Heating\_QC\_Good 1.755 0.079337 .   
## Heating\_QC\_Poor NA NA   
## Central\_Air\_N 0.373 0.708826   
## Electrical\_FuseA 0.888 0.374610   
## Electrical\_FuseF -0.054 0.956769   
## Electrical\_FuseP 0.001 0.999221   
## Electrical\_Unknown 0.000 0.999674   
## Kitchen\_Qual\_Good -0.441 0.659313   
## Kitchen\_Qual\_Excellent -1.908 0.056381 .   
## Kitchen\_Qual\_Fair 0.547 0.584633   
## Kitchen\_Qual\_Poor 0.000 0.999929   
## Functional\_Mod 0.014 0.988775   
## Functional\_Min2 1.238 0.215602   
## Functional\_Min1 0.416 0.677595   
## Functional\_Maj1 1.459 0.144458   
## Functional\_Maj2 0.003 0.997645   
## Functional\_Sev 0.001 0.999474   
## Functional\_Sal 0.000 0.999749   
## Fireplace\_Qu\_No\_Fireplace -1.872 0.061220 .   
## Fireplace\_Qu\_Typical -3.191 0.001418 \*\*   
## Fireplace\_Qu\_Poor -0.002 0.998277   
## Fireplace\_Qu\_Excellent -0.002 0.998497   
## Fireplace\_Qu\_Fair 0.091 0.927408   
## Garage\_Type\_BuiltIn -2.077 0.037785 \*   
## Garage\_Type\_Basment 0.163 0.870395   
## Garage\_Type\_Detchd 1.096 0.272995   
## Garage\_Type\_No\_Garage 0.000 0.999712   
## Garage\_Type\_CarPort 0.632 0.527601   
## Garage\_Type\_More\_Than\_Two\_Types 0.576 0.564707   
## Garage\_Finish\_Unf 0.863 0.388015   
## Garage\_Finish\_RFn -0.260 0.795120   
## Garage\_Finish\_No\_Garage 0.000 0.999738   
## Garage\_Qual\_No\_Garage NA NA   
## Garage\_Qual\_Fair 1.010 0.312444   
## Garage\_Qual\_Good 0.207 0.836204   
## Garage\_Qual\_Excellent 0.000 0.999780   
## Garage\_Qual\_Poor 0.000 0.999847   
## Garage\_Cond\_No\_Garage NA NA   
## Garage\_Cond\_Fair -0.729 0.466039   
## Garage\_Cond\_Excellent 0.000 0.999910   
## Garage\_Cond\_Poor 0.000 0.999780   
## Garage\_Cond\_Good 0.687 0.491996   
## Paved\_Drive\_Paved 0.604 0.545976   
## Paved\_Drive\_Dirt\_Gravel 0.088 0.930064   
## Pool\_QC\_Excellent 0.000 0.999772   
## Pool\_QC\_Typical 0.000 0.999731   
## Pool\_QC\_Fair 0.000 0.999780   
## Pool\_QC\_Good 0.000 0.999704   
## Fence\_Minimum\_Privacy -0.401 0.688404   
## Fence\_Good\_Privacy -0.905 0.365286   
## Fence\_Good\_Wood 1.503 0.132933   
## Fence\_Minimum\_Wood\_Wire 0.001 0.998824   
## Misc\_Feature\_Gar2 1.020 0.307718   
## Misc\_Feature\_Shed 1.761 0.078248 .   
## Misc\_Feature\_Othr -0.001 0.999109   
## Misc\_Feature\_Elev 0.002 0.998602   
## Sale\_Type\_New -1.708 0.087586 .   
## Sale\_Type\_COD 3.413 0.000643 \*\*\*  
## Sale\_Type\_Con 0.023 0.981835   
## Sale\_Type\_ConLD -1.109 0.267358   
## Sale\_Type\_Oth 0.001 0.999232   
## Sale\_Type\_ConLI 0.050 0.960047   
## Sale\_Type\_ConLw 0.003 0.997483   
## Sale\_Type\_CWD 2.440 0.014692 \*   
## Sale\_Type\_VWD 0.000 0.999763   
## Sale\_Condition\_Partial 1.912 0.055819 .   
## Sale\_Condition\_Family 2.778 0.005473 \*\*   
## Sale\_Condition\_Abnorml 1.708 0.087620 .   
## Sale\_Condition\_Alloca -1.041 0.297977   
## Sale\_Condition\_AdjLand 0.000 0.999829   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 2845.53 on 2052 degrees of freedom  
## Residual deviance: 324.49 on 1763 degrees of freedom  
## AIC: 904.49  
##   
## Number of Fisher Scoring iterations: 21

All predictors are not significant and not all coefficients make sense. Tried to merge levels into others, and see AIC reduced

ames\_model =   
 logistic\_reg() %>% #note the use of logistic\_reg  
 set\_engine("glm") #standard logistic regression engine is glm  
  
ames\_recipe2 = recipe(Above\_Median ~ ., ames) %>%  
 step\_other(Neighborhood, threshold = 0.01) %>% #collapses small Neighborhoods into an "Other" group   
 step\_other(Exterior\_1st, threshold = 0.01) %>% #collapses small Neighborhoods into an "Other" group   
 step\_other(Exterior\_2nd, threshold = 0.01) %>% #collapses small Neighborhoods into an "Other" group   
 step\_dummy(all\_nominal(), -all\_outcomes()) #exclude the response variable from being dummy converted   
  
logreg\_wf = workflow() %>%  
 add\_recipe(ames\_recipe2) %>%   
 add\_model(ames\_model)  
  
ames\_fit = fit(logreg\_wf, ames)

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

summary(ames\_fit$fit$fit$fit)

##   
## Call:  
## stats::glm(formula = ..y ~ ., family = stats::binomial, data = data)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -3.1721 -0.0035 0.0000 0.0069 4.2012   
##   
## Coefficients: (8 not defined because of singularities)  
## Estimate Std. Error  
## (Intercept) 1.982e+02 3.180e+02  
## Lot\_Frontage -7.688e-03 7.478e-03  
## Lot\_Area -2.392e-04 7.649e-05  
## Year\_Built -1.158e-01 2.902e-02  
## Year\_Remod\_Add -7.317e-03 1.595e-02  
## Mas\_Vnr\_Area -2.547e-03 2.128e-03  
## BsmtFin\_SF\_1 4.042e-01 5.385e-01  
## BsmtFin\_SF\_2 1.878e-04 2.089e-03  
## Bsmt\_Unf\_SF -2.013e-03 1.270e-03  
## Total\_Bsmt\_SF -3.646e-04 1.659e-03  
## First\_Flr\_SF -1.113e-02 2.125e-03  
## Second\_Flr\_SF -8.193e-03 2.301e-03  
## Low\_Qual\_Fin\_SF -2.830e-03 4.349e-03  
## Gr\_Liv\_Area NA NA  
## Bsmt\_Full\_Bath -1.073e+00 6.060e-01  
## Bsmt\_Half\_Bath -2.178e+00 8.645e-01  
## Full\_Bath -2.098e+00 6.549e-01  
## Half\_Bath -1.280e+00 6.751e-01  
## Bedroom\_AbvGr 1.219e-01 4.965e-01  
## Kitchen\_AbvGr 5.771e+00 2.623e+00  
## TotRms\_AbvGrd -3.102e-01 3.204e-01  
## Fireplaces -2.483e+00 8.386e-01  
## Garage\_Cars -2.891e+00 9.315e-01  
## Garage\_Area 4.747e-03 3.026e-03  
## Wood\_Deck\_SF -2.886e-03 1.869e-03  
## Open\_Porch\_SF 2.175e-03 4.016e-03  
## Enclosed\_Porch 2.992e-03 3.860e-03  
## Three\_season\_porch -2.407e-03 5.578e-03  
## Screen\_Porch -4.903e-03 3.073e-03  
## Pool\_Area -5.949e-02 4.251e+02  
## Misc\_Val -1.762e-03 1.315e-03  
## Mo\_Sold -3.796e-02 8.197e-02  
## Year\_Sold 2.752e-02 1.541e-01  
## MS\_SubClass\_Two\_Story\_1946\_and\_Newer -9.499e-01 3.053e+00  
## MS\_SubClass\_One\_Story\_PUD\_1946\_and\_Newer -1.421e+01 1.377e+03  
## MS\_SubClass\_One\_and\_Half\_Story\_Finished\_All\_Ages 7.114e-01 2.775e+00  
## MS\_SubClass\_Two\_Story\_PUD\_1946\_and\_Newer 1.516e+01 1.378e+03  
## MS\_SubClass\_Split\_or\_Multilevel -3.481e+00 1.462e+01  
## MS\_SubClass\_One\_Story\_1945\_and\_Older -3.074e+00 2.025e+00  
## MS\_SubClass\_Duplex\_All\_Styles\_and\_Ages 8.435e-01 2.849e+00  
## MS\_SubClass\_Split\_Foyer 1.161e+00 2.533e+00  
## MS\_SubClass\_Two\_Family\_conversion\_All\_Styles\_and\_Ages 1.517e+00 3.673e+01  
## MS\_SubClass\_Two\_Story\_1945\_and\_Older -4.044e+00 3.294e+00  
## MS\_SubClass\_One\_Story\_with\_Finished\_Attic\_All\_Ages 1.952e+01 1.140e+04  
## MS\_SubClass\_PUD\_Multilevel\_Split\_Level\_Foyer 7.369e+00 9.995e+03  
## MS\_SubClass\_One\_and\_Half\_Story\_Unfinished\_All\_Ages 2.171e+01 5.475e+04  
## MS\_SubClass\_Two\_and\_Half\_Story\_All\_Ages 2.562e+00 7.369e+00  
## MS\_SubClass\_One\_and\_Half\_Story\_PUD\_All\_Ages 1.500e+01 4.822e+04  
## MS\_Zoning\_Residential\_High\_Density -6.361e+00 2.193e+00  
## MS\_Zoning\_Floating\_Village\_Residential -3.314e+01 1.941e+03  
## MS\_Zoning\_Residential\_Medium\_Density 1.464e+00 1.298e+00  
## MS\_Zoning\_C\_all 1.932e+01 6.618e+03  
## MS\_Zoning\_A\_agr 3.660e+01 8.454e+04  
## MS\_Zoning\_I\_all 2.505e+01 5.437e+04  
## Street\_Grvl 1.677e+00 1.074e+02  
## Alley\_Paved -4.857e+00 1.431e+00  
## Alley\_Gravel -5.082e+00 1.488e+00  
## Lot\_Shape\_Regular 2.861e-01 5.624e-01  
## Lot\_Shape\_Moderately\_Irregular -3.720e-01 2.436e+00  
## Lot\_Shape\_Irregular -5.567e+00 7.080e+00  
## Land\_Contour\_HLS 1.736e+00 1.773e+00  
## Land\_Contour\_Bnk 5.158e-01 1.195e+00  
## Land\_Contour\_Low 4.116e+00 2.692e+00  
## Utilities\_NoSewr -1.773e+00 5.289e+04  
## Lot\_Config\_Inside -9.929e-02 5.726e-01  
## Lot\_Config\_CulDSac 5.580e-01 1.071e+00  
## Lot\_Config\_FR2 2.245e-01 1.289e+00  
## Lot\_Config\_FR3 -5.809e-01 2.402e+00  
## Land\_Slope\_Mod -2.125e+00 1.495e+00  
## Land\_Slope\_Sev 5.378e+00 4.072e+00  
## Neighborhood\_Gilbert -8.893e-01 1.587e+00  
## Neighborhood\_Stone\_Brook -3.919e+01 4.220e+03  
## Neighborhood\_Northwest\_Ames -2.685e-01 9.351e-01  
## Neighborhood\_Somerset 2.676e+00 2.555e+00  
## Neighborhood\_Briardale -1.726e+01 8.502e+03  
## Neighborhood\_Northridge\_Heights -2.440e+01 1.941e+03  
## Neighborhood\_Bloomington\_Heights 1.817e+00 1.973e+00  
## Neighborhood\_Northridge -4.306e+00 4.216e+03  
## Neighborhood\_Sawyer\_West -4.213e-01 1.441e+00  
## Neighborhood\_Sawyer 2.608e-01 1.019e+00  
## Neighborhood\_Old\_Town 6.353e-01 1.983e+00  
## Neighborhood\_Brookside -2.751e+00 1.885e+00  
## Neighborhood\_Iowa\_DOT\_and\_Rail\_Road -9.463e-01 2.439e+00  
## Neighborhood\_Clear\_Creek -3.509e+00 3.161e+00  
## Neighborhood\_South\_and\_West\_of\_Iowa\_State\_University -1.021e+00 1.896e+00  
## Neighborhood\_Edwards -3.071e-01 9.401e-01  
## Neighborhood\_College\_Creek 1.151e-01 1.337e+00  
## Neighborhood\_Crawford -6.394e+00 1.628e+00  
## Neighborhood\_Mitchell -1.001e+00 1.099e+00  
## Neighborhood\_Timberland 5.591e-01 1.650e+00  
## Neighborhood\_Meadow\_Village 1.130e+01 6.626e+03  
## Neighborhood\_other -4.152e+00 2.522e+00  
## Condition\_1\_Feedr 1.834e+00 8.716e-01  
## Condition\_1\_RRAe 5.723e+00 2.505e+00  
## Condition\_1\_PosA -2.740e+00 3.243e+00  
## Condition\_1\_Artery 1.359e+00 1.384e+00  
## Condition\_1\_PosN -6.233e+00 1.980e+00  
## Condition\_1\_RRAn -7.468e-01 2.039e+00  
## Condition\_1\_RRNn 1.011e+01 3.166e+00  
## Condition\_1\_RRNe -3.644e+00 2.746e+02  
## Condition\_2\_Feedr 4.212e-01 3.845e+00  
## Condition\_2\_PosA -7.603e+00 1.831e+04  
## Condition\_2\_PosN 3.055e+01 1.493e+04  
## Condition\_2\_Artery 1.938e+01 1.765e+04  
## Condition\_2\_RRNn -1.271e+00 4.820e+04  
## Condition\_2\_RRAe -3.161e+01 4.941e+04  
## Condition\_2\_RRAn 1.986e+01 4.820e+04  
## Bldg\_Type\_TwnhsE 1.496e+01 1.377e+03  
## Bldg\_Type\_Twnhs 1.369e+01 1.377e+03  
## Bldg\_Type\_Duplex NA NA  
## Bldg\_Type\_TwoFmCon -2.310e-01 3.676e+01  
## House\_Style\_Two\_Story 1.395e+00 3.551e+00  
## House\_Style\_One\_and\_Half\_Fin -2.767e+00 2.968e+00  
## House\_Style\_SLvl 3.195e+00 1.462e+01  
## House\_Style\_SFoyer -4.174e+00 2.385e+00  
## House\_Style\_One\_and\_Half\_Unf -8.362e+00 5.391e+04  
## House\_Style\_Two\_and\_Half\_Unf -5.636e+00 6.717e+00  
## House\_Style\_Two\_and\_Half\_Fin -7.968e+00 2.112e+01  
## Overall\_Qual\_Average 8.633e-01 5.745e-01  
## Overall\_Qual\_Good -1.390e+00 6.751e-01  
## Overall\_Qual\_Very\_Good -1.888e+00 1.976e+00  
## Overall\_Qual\_Excellent 1.116e+01 5.540e+00  
## Overall\_Qual\_Below\_Average 1.621e-01 1.636e+00  
## Overall\_Qual\_Fair 2.062e+01 5.729e+03  
## Overall\_Qual\_Poor -2.686e+00 2.344e+04  
## Overall\_Qual\_Very\_Excellent 2.100e+01 7.127e+03  
## Overall\_Qual\_Very\_Poor -1.756e+01 6.946e+04  
## Overall\_Cond\_Above\_Average -1.558e+00 6.689e-01  
## Overall\_Cond\_Good -2.506e+00 8.037e-01  
## Overall\_Cond\_Poor 2.105e+01 2.177e+04  
## Overall\_Cond\_Very\_Good -2.610e+00 1.232e+00  
## Overall\_Cond\_Below\_Average 1.173e-01 1.226e+00  
## Overall\_Cond\_Excellent -5.320e+00 2.555e+00  
## Overall\_Cond\_Fair 1.069e+01 6.746e+00  
## Overall\_Cond\_Very\_Poor -4.358e+00 2.516e+04  
## Roof\_Style\_Gable 6.187e-01 6.175e-01  
## Roof\_Style\_Mansard 4.663e+00 5.154e+00  
## Roof\_Style\_Gambrel -1.408e+00 2.359e+00  
## Roof\_Style\_Shed 2.043e+01 1.090e+04  
## Roof\_Style\_Flat 7.392e+00 1.398e+01  
## Roof\_Matl\_WdShake -5.476e+01 1.948e+04  
## Roof\_Matl\_Tar.Grv -7.673e+00 1.357e+01  
## Roof\_Matl\_WdShngl -3.031e+01 2.752e+04  
## Roof\_Matl\_Roll 9.181e+00 4.820e+04  
## Roof\_Matl\_Metal -3.565e+01 4.820e+04  
## Exterior\_1st\_VinylSd 1.168e+01 2.982e+00  
## Exterior\_1st\_Wd.Sdng 6.495e+00 1.679e+00  
## Exterior\_1st\_HdBoard 7.800e+00 2.220e+00  
## Exterior\_1st\_CemntBd 2.492e+00 4.304e+00  
## Exterior\_1st\_Plywood 9.201e+00 2.312e+00  
## Exterior\_1st\_MetalSd 1.088e+01 2.469e+00  
## Exterior\_1st\_AsbShng 5.939e+00 4.419e+00  
## Exterior\_1st\_WdShing 7.179e+00 2.496e+00  
## Exterior\_1st\_Stucco 1.047e+01 2.732e+00  
## Exterior\_1st\_other -2.336e+00 2.395e+01  
## Exterior\_2nd\_VinylSd -4.389e+00 2.195e+00  
## Exterior\_2nd\_Wd.Sdng 1.701e+00 1.554e+00  
## Exterior\_2nd\_BrkFace 8.326e+00 3.069e+00  
## Exterior\_2nd\_HdBoard -1.190e+00 1.005e+00  
## Exterior\_2nd\_CmentBd 7.362e+00 4.340e+00  
## Exterior\_2nd\_Wd.Shng -2.334e+00 1.748e+00  
## Exterior\_2nd\_MetalSd -1.684e+00 2.055e+00  
## Exterior\_2nd\_AsbShng 6.195e+00 4.796e+00  
## Exterior\_2nd\_Stucco -2.125e+00 2.661e+00  
## Exterior\_2nd\_other 3.730e-01 2.926e+00  
## Mas\_Vnr\_Type\_None 6.887e-01 1.172e+00  
## Mas\_Vnr\_Type\_BrkFace 8.034e-01 1.084e+00  
## Mas\_Vnr\_Type\_BrkCmn 4.579e-01 2.015e+00  
## Mas\_Vnr\_Type\_CBlock -1.630e+01 4.941e+04  
## Exter\_Qual\_Good -1.326e+00 8.075e-01  
## Exter\_Qual\_Excellent -2.597e+01 3.313e+03  
## Exter\_Qual\_Fair -5.705e+00 2.709e+00  
## Exter\_Cond\_Good 7.742e-02 7.472e-01  
## Exter\_Cond\_Fair -1.828e-02 1.868e+00  
## Exter\_Cond\_Excellent -1.283e+00 2.675e+00  
## Exter\_Cond\_Poor -4.344e+01 9.451e+04  
## Foundation\_PConc -1.185e+00 8.265e-01  
## Foundation\_Wood 4.619e+00 3.489e+00  
## Foundation\_BrkTil -5.135e-01 1.125e+00  
## Foundation\_Slab -2.438e+00 4.729e+00  
## Foundation\_Stone 2.108e+00 2.289e+01  
## Bsmt\_Qual\_Good 1.813e+00 7.685e-01  
## Bsmt\_Qual\_Excellent 2.234e+00 1.706e+00  
## Bsmt\_Qual\_No\_Basement -2.709e+00 5.145e+04  
## Bsmt\_Qual\_Fair -2.648e+00 1.961e+00  
## Bsmt\_Qual\_Poor -3.451e+00 7.264e+04  
## Bsmt\_Cond\_Typical 1.739e+00 1.078e+00  
## Bsmt\_Cond\_Poor 1.654e+01 4.323e+04  
## Bsmt\_Cond\_No\_Basement NA NA  
## Bsmt\_Cond\_Fair 2.322e-02 1.589e+00  
## Bsmt\_Cond\_Excellent -1.457e+00 2.811e+00  
## Bsmt\_Exposure\_No 1.998e+00 1.146e+00  
## Bsmt\_Exposure\_Av 3.083e+00 1.110e+00  
## Bsmt\_Exposure\_Mn 1.769e+00 1.270e+00  
## Bsmt\_Exposure\_No\_Basement -1.057e+01 1.790e+04  
## BsmtFin\_Type\_1\_Rec -1.458e+00 1.963e+00  
## BsmtFin\_Type\_1\_ALQ -1.208e+00 1.106e+00  
## BsmtFin\_Type\_1\_GLQ -2.775e+00 1.048e+00  
## BsmtFin\_Type\_1\_Unf -3.031e-01 2.583e+00  
## BsmtFin\_Type\_1\_LwQ NA NA  
## BsmtFin\_Type\_1\_No\_Basement NA NA  
## BsmtFin\_Type\_2\_LwQ 3.458e-01 1.347e+00  
## BsmtFin\_Type\_2\_BLQ 2.337e-01 1.670e+00  
## BsmtFin\_Type\_2\_Rec -3.260e-01 1.175e+00  
## BsmtFin\_Type\_2\_GLQ -2.735e+00 2.729e+00  
## BsmtFin\_Type\_2\_No\_Basement 1.934e+01 4.824e+04  
## BsmtFin\_Type\_2\_ALQ -4.366e+00 1.767e+00  
## Heating\_GasW -1.616e+00 4.752e+00  
## Heating\_Grav 6.642e+00 4.906e+04  
## Heating\_Wall 8.463e+00 1.179e+04  
## Heating\_Floor -1.828e+01 4.854e+04  
## Heating\_OthW 1.887e+01 4.820e+04  
## Heating\_QC\_Typical 2.376e+00 1.411e+00  
## Heating\_QC\_Excellent 2.167e+00 1.401e+00  
## Heating\_QC\_Good 2.504e+00 1.496e+00  
## Heating\_QC\_Poor NA NA  
## Central\_Air\_N 1.174e+00 2.421e+00  
## Electrical\_FuseA 8.327e-01 9.310e-01  
## Electrical\_FuseF 2.472e-01 2.081e+00  
## Electrical\_FuseP 9.733e+00 9.244e+03  
## Electrical\_Unknown -1.963e+01 4.820e+04  
## Kitchen\_Qual\_Good -1.831e-01 6.401e-01  
## Kitchen\_Qual\_Excellent -4.529e+00 2.201e+00  
## Kitchen\_Qual\_Fair 1.382e+00 2.511e+00  
## Kitchen\_Qual\_Poor -8.121e+00 4.820e+04  
## Functional\_Mod 4.238e-01 2.226e+00  
## Functional\_Min2 1.716e+00 1.410e+00  
## Functional\_Min1 4.768e-01 1.188e+00  
## Functional\_Maj1 9.395e+00 6.351e+00  
## Functional\_Maj2 3.909e+01 1.293e+04  
## Functional\_Sev 2.039e+01 2.650e+04  
## Functional\_Sal 1.990e+01 5.437e+04  
## Fireplace\_Qu\_No\_Fireplace -2.266e+00 1.154e+00  
## Fireplace\_Qu\_Typical -2.188e+00 6.915e-01  
## Fireplace\_Qu\_Poor 3.616e-01 1.798e+00  
## Fireplace\_Qu\_Excellent -1.053e+01 4.965e+03  
## Fireplace\_Qu\_Fair 1.987e-01 1.106e+00  
## Garage\_Type\_BuiltIn -3.624e+00 1.781e+00  
## Garage\_Type\_Basment 5.017e-01 2.048e+00  
## Garage\_Type\_Detchd 9.184e-01 7.585e-01  
## Garage\_Type\_No\_Garage 1.814e+01 4.820e+04  
## Garage\_Type\_CarPort 2.354e+00 3.455e+00  
## Garage\_Type\_More\_Than\_Two\_Types 1.405e+00 2.182e+00  
## Garage\_Finish\_Unf 5.737e-01 7.272e-01  
## Garage\_Finish\_RFn -1.605e-01 6.615e-01  
## Garage\_Finish\_No\_Garage -1.676e+01 4.820e+04  
## Garage\_Qual\_No\_Garage NA NA  
## Garage\_Qual\_Fair 1.394e+00 1.478e+00  
## Garage\_Qual\_Good 5.120e-01 2.871e+00  
## Garage\_Qual\_Excellent 1.829e+01 5.595e+04  
## Garage\_Qual\_Poor -1.237e+01 5.420e+04  
## Garage\_Cond\_No\_Garage NA NA  
## Garage\_Cond\_Fair -1.568e+00 1.968e+00  
## Garage\_Cond\_Excellent -1.126e+01 7.385e+04  
## Garage\_Cond\_Poor 9.377e+00 2.480e+04  
## Garage\_Cond\_Good 2.212e+00 2.954e+00  
## Paved\_Drive\_Paved 6.846e-01 1.424e+00  
## Paved\_Drive\_Dirt\_Gravel -1.162e-01 1.815e+00  
## Pool\_QC\_Excellent 1.053e+01 1.014e+05  
## Pool\_QC\_Typical 4.323e+01 2.235e+05  
## Pool\_QC\_Fair 2.190e+01 2.796e+05  
## Pool\_QC\_Good 5.875e+01 3.435e+05  
## Fence\_Minimum\_Privacy -2.936e-01 6.221e-01  
## Fence\_Good\_Privacy -8.699e-01 9.133e-01  
## Fence\_Good\_Wood 1.569e+00 1.030e+00  
## Fence\_Minimum\_Wood\_Wire 1.706e+01 1.131e+04  
## Misc\_Feature\_Gar2 1.857e+01 1.842e+01  
## Misc\_Feature\_Shed 2.404e+00 1.427e+00  
## Misc\_Feature\_Othr -8.717e+00 8.004e+03  
## Misc\_Feature\_Elev 8.635e+01 4.862e+04  
## Sale\_Type\_New -7.771e+00 3.985e+00  
## Sale\_Type\_COD 6.510e+00 1.921e+00  
## Sale\_Type\_Con 8.407e-01 3.915e+01  
## Sale\_Type\_ConLD -3.278e+00 2.625e+00  
## Sale\_Type\_Oth 1.377e+01 1.345e+04  
## Sale\_Type\_ConLI 6.765e+00 1.437e+02  
## Sale\_Type\_ConLw 5.364e+00 2.037e+03  
## Sale\_Type\_CWD 5.504e+00 2.173e+00  
## Sale\_Type\_VWD 1.392e+01 4.820e+04  
## Sale\_Condition\_Partial 8.790e+00 4.083e+00  
## Sale\_Condition\_Family 5.222e+00 1.767e+00  
## Sale\_Condition\_Abnorml 2.253e+00 1.252e+00  
## Sale\_Condition\_Alloca -3.008e+00 2.979e+00  
## Sale\_Condition\_AdjLand 8.754e+00 4.856e+04  
## z value Pr(>|z|)   
## (Intercept) 0.623 0.533148   
## Lot\_Frontage -1.028 0.303893   
## Lot\_Area -3.127 0.001768 \*\*   
## Year\_Built -3.991 6.59e-05 \*\*\*  
## Year\_Remod\_Add -0.459 0.646415   
## Mas\_Vnr\_Area -1.197 0.231399   
## BsmtFin\_SF\_1 0.751 0.452879   
## BsmtFin\_SF\_2 0.090 0.928350   
## Bsmt\_Unf\_SF -1.585 0.112960   
## Total\_Bsmt\_SF -0.220 0.826085   
## First\_Flr\_SF -5.240 1.61e-07 \*\*\*  
## Second\_Flr\_SF -3.561 0.000370 \*\*\*  
## Low\_Qual\_Fin\_SF -0.651 0.515203   
## Gr\_Liv\_Area NA NA   
## Bsmt\_Full\_Bath -1.771 0.076523 .   
## Bsmt\_Half\_Bath -2.520 0.011744 \*   
## Full\_Bath -3.203 0.001362 \*\*   
## Half\_Bath -1.896 0.057982 .   
## Bedroom\_AbvGr 0.246 0.805993   
## Kitchen\_AbvGr 2.200 0.027788 \*   
## TotRms\_AbvGrd -0.968 0.332924   
## Fireplaces -2.960 0.003074 \*\*   
## Garage\_Cars -3.103 0.001913 \*\*   
## Garage\_Area 1.569 0.116730   
## Wood\_Deck\_SF -1.545 0.122448   
## Open\_Porch\_SF 0.542 0.588088   
## Enclosed\_Porch 0.775 0.438286   
## Three\_season\_porch -0.432 0.666041   
## Screen\_Porch -1.596 0.110583   
## Pool\_Area 0.000 0.999888   
## Misc\_Val -1.341 0.180023   
## Mo\_Sold -0.463 0.643277   
## Year\_Sold 0.179 0.858215   
## MS\_SubClass\_Two\_Story\_1946\_and\_Newer -0.311 0.755733   
## MS\_SubClass\_One\_Story\_PUD\_1946\_and\_Newer -0.010 0.991763   
## MS\_SubClass\_One\_and\_Half\_Story\_Finished\_All\_Ages 0.256 0.797706   
## MS\_SubClass\_Two\_Story\_PUD\_1946\_and\_Newer 0.011 0.991223   
## MS\_SubClass\_Split\_or\_Multilevel -0.238 0.811834   
## MS\_SubClass\_One\_Story\_1945\_and\_Older -1.518 0.129050   
## MS\_SubClass\_Duplex\_All\_Styles\_and\_Ages 0.296 0.767189   
## MS\_SubClass\_Split\_Foyer 0.458 0.646649   
## MS\_SubClass\_Two\_Family\_conversion\_All\_Styles\_and\_Ages 0.041 0.967056   
## MS\_SubClass\_Two\_Story\_1945\_and\_Older -1.228 0.219496   
## MS\_SubClass\_One\_Story\_with\_Finished\_Attic\_All\_Ages 0.002 0.998634   
## MS\_SubClass\_PUD\_Multilevel\_Split\_Level\_Foyer 0.001 0.999412   
## MS\_SubClass\_One\_and\_Half\_Story\_Unfinished\_All\_Ages 0.000 0.999684   
## MS\_SubClass\_Two\_and\_Half\_Story\_All\_Ages 0.348 0.728140   
## MS\_SubClass\_One\_and\_Half\_Story\_PUD\_All\_Ages 0.000 0.999752   
## MS\_Zoning\_Residential\_High\_Density -2.901 0.003721 \*\*   
## MS\_Zoning\_Floating\_Village\_Residential -0.017 0.986380   
## MS\_Zoning\_Residential\_Medium\_Density 1.128 0.259499   
## MS\_Zoning\_C\_all 0.003 0.997671   
## MS\_Zoning\_A\_agr 0.000 0.999655   
## MS\_Zoning\_I\_all 0.000 0.999632   
## Street\_Grvl 0.016 0.987539   
## Alley\_Paved -3.393 0.000690 \*\*\*  
## Alley\_Gravel -3.414 0.000640 \*\*\*  
## Lot\_Shape\_Regular 0.509 0.610948   
## Lot\_Shape\_Moderately\_Irregular -0.153 0.878639   
## Lot\_Shape\_Irregular -0.786 0.431707   
## Land\_Contour\_HLS 0.979 0.327413   
## Land\_Contour\_Bnk 0.432 0.666038   
## Land\_Contour\_Low 1.529 0.126182   
## Utilities\_NoSewr 0.000 0.999973   
## Lot\_Config\_Inside -0.173 0.862340   
## Lot\_Config\_CulDSac 0.521 0.602356   
## Lot\_Config\_FR2 0.174 0.861773   
## Lot\_Config\_FR3 -0.242 0.808904   
## Land\_Slope\_Mod -1.422 0.155110   
## Land\_Slope\_Sev 1.321 0.186582   
## Neighborhood\_Gilbert -0.560 0.575145   
## Neighborhood\_Stone\_Brook -0.009 0.992591   
## Neighborhood\_Northwest\_Ames -0.287 0.773981   
## Neighborhood\_Somerset 1.048 0.294850   
## Neighborhood\_Briardale -0.002 0.998380   
## Neighborhood\_Northridge\_Heights -0.013 0.989971   
## Neighborhood\_Bloomington\_Heights 0.921 0.357117   
## Neighborhood\_Northridge -0.001 0.999185   
## Neighborhood\_Sawyer\_West -0.292 0.770043   
## Neighborhood\_Sawyer 0.256 0.798102   
## Neighborhood\_Old\_Town 0.320 0.748634   
## Neighborhood\_Brookside -1.460 0.144405   
## Neighborhood\_Iowa\_DOT\_and\_Rail\_Road -0.388 0.698066   
## Neighborhood\_Clear\_Creek -1.110 0.266893   
## Neighborhood\_South\_and\_West\_of\_Iowa\_State\_University -0.539 0.590199   
## Neighborhood\_Edwards -0.327 0.743920   
## Neighborhood\_College\_Creek 0.086 0.931397   
## Neighborhood\_Crawford -3.927 8.60e-05 \*\*\*  
## Neighborhood\_Mitchell -0.912 0.361983   
## Neighborhood\_Timberland 0.339 0.734758   
## Neighborhood\_Meadow\_Village 0.002 0.998640   
## Neighborhood\_other -1.647 0.099609 .   
## Condition\_1\_Feedr 2.104 0.035344 \*   
## Condition\_1\_RRAe 2.285 0.022331 \*   
## Condition\_1\_PosA -0.845 0.398282   
## Condition\_1\_Artery 0.982 0.326295   
## Condition\_1\_PosN -3.148 0.001643 \*\*   
## Condition\_1\_RRAn -0.366 0.714230   
## Condition\_1\_RRNn 3.194 0.001401 \*\*   
## Condition\_1\_RRNe -0.013 0.989411   
## Condition\_2\_Feedr 0.110 0.912778   
## Condition\_2\_PosA 0.000 0.999669   
## Condition\_2\_PosN 0.002 0.998367   
## Condition\_2\_Artery 0.001 0.999124   
## Condition\_2\_RRNn 0.000 0.999979   
## Condition\_2\_RRAe -0.001 0.999490   
## Condition\_2\_RRAn 0.000 0.999671   
## Bldg\_Type\_TwnhsE 0.011 0.991328   
## Bldg\_Type\_Twnhs 0.010 0.992066   
## Bldg\_Type\_Duplex NA NA   
## Bldg\_Type\_TwoFmCon -0.006 0.994986   
## House\_Style\_Two\_Story 0.393 0.694385   
## House\_Style\_One\_and\_Half\_Fin -0.932 0.351143   
## House\_Style\_SLvl 0.218 0.827054   
## House\_Style\_SFoyer -1.750 0.080098 .   
## House\_Style\_One\_and\_Half\_Unf 0.000 0.999876   
## House\_Style\_Two\_and\_Half\_Unf -0.839 0.401414   
## House\_Style\_Two\_and\_Half\_Fin -0.377 0.705982   
## Overall\_Qual\_Average 1.503 0.132912   
## Overall\_Qual\_Good -2.059 0.039523 \*   
## Overall\_Qual\_Very\_Good -0.955 0.339330   
## Overall\_Qual\_Excellent 2.014 0.043964 \*   
## Overall\_Qual\_Below\_Average 0.099 0.921077   
## Overall\_Qual\_Fair 0.004 0.997128   
## Overall\_Qual\_Poor 0.000 0.999909   
## Overall\_Qual\_Very\_Excellent 0.003 0.997649   
## Overall\_Qual\_Very\_Poor 0.000 0.999798   
## Overall\_Cond\_Above\_Average -2.329 0.019868 \*   
## Overall\_Cond\_Good -3.118 0.001821 \*\*   
## Overall\_Cond\_Poor 0.001 0.999229   
## Overall\_Cond\_Very\_Good -2.118 0.034199 \*   
## Overall\_Cond\_Below\_Average 0.096 0.923736   
## Overall\_Cond\_Excellent -2.082 0.037342 \*   
## Overall\_Cond\_Fair 1.585 0.112952   
## Overall\_Cond\_Very\_Poor 0.000 0.999862   
## Roof\_Style\_Gable 1.002 0.316336   
## Roof\_Style\_Mansard 0.905 0.365683   
## Roof\_Style\_Gambrel -0.597 0.550745   
## Roof\_Style\_Shed 0.002 0.998504   
## Roof\_Style\_Flat 0.529 0.597059   
## Roof\_Matl\_WdShake -0.003 0.997757   
## Roof\_Matl\_Tar.Grv -0.566 0.571653   
## Roof\_Matl\_WdShngl -0.001 0.999121   
## Roof\_Matl\_Roll 0.000 0.999848   
## Roof\_Matl\_Metal -0.001 0.999410   
## Exterior\_1st\_VinylSd 3.917 8.95e-05 \*\*\*  
## Exterior\_1st\_Wd.Sdng 3.869 0.000109 \*\*\*  
## Exterior\_1st\_HdBoard 3.513 0.000442 \*\*\*  
## Exterior\_1st\_CemntBd 0.579 0.562606   
## Exterior\_1st\_Plywood 3.980 6.90e-05 \*\*\*  
## Exterior\_1st\_MetalSd 4.407 1.05e-05 \*\*\*  
## Exterior\_1st\_AsbShng 1.344 0.178997   
## Exterior\_1st\_WdShing 2.876 0.004032 \*\*   
## Exterior\_1st\_Stucco 3.834 0.000126 \*\*\*  
## Exterior\_1st\_other -0.098 0.922307   
## Exterior\_2nd\_VinylSd -1.999 0.045601 \*   
## Exterior\_2nd\_Wd.Sdng 1.094 0.273754   
## Exterior\_2nd\_BrkFace 2.713 0.006671 \*\*   
## Exterior\_2nd\_HdBoard -1.185 0.235976   
## Exterior\_2nd\_CmentBd 1.696 0.089860 .   
## Exterior\_2nd\_Wd.Shng -1.335 0.181802   
## Exterior\_2nd\_MetalSd -0.820 0.412493   
## Exterior\_2nd\_AsbShng 1.292 0.196491   
## Exterior\_2nd\_Stucco -0.799 0.424545   
## Exterior\_2nd\_other 0.128 0.898540   
## Mas\_Vnr\_Type\_None 0.588 0.556862   
## Mas\_Vnr\_Type\_BrkFace 0.741 0.458552   
## Mas\_Vnr\_Type\_BrkCmn 0.227 0.820256   
## Mas\_Vnr\_Type\_CBlock 0.000 0.999737   
## Exter\_Qual\_Good -1.642 0.100497   
## Exter\_Qual\_Excellent -0.008 0.993745   
## Exter\_Qual\_Fair -2.106 0.035216 \*   
## Exter\_Cond\_Good 0.104 0.917486   
## Exter\_Cond\_Fair -0.010 0.992193   
## Exter\_Cond\_Excellent -0.480 0.631560   
## Exter\_Cond\_Poor 0.000 0.999633   
## Foundation\_PConc -1.434 0.151490   
## Foundation\_Wood 1.324 0.185533   
## Foundation\_BrkTil -0.457 0.647914   
## Foundation\_Slab -0.516 0.606130   
## Foundation\_Stone 0.092 0.926621   
## Bsmt\_Qual\_Good 2.360 0.018291 \*   
## Bsmt\_Qual\_Excellent 1.309 0.190478   
## Bsmt\_Qual\_No\_Basement 0.000 0.999958   
## Bsmt\_Qual\_Fair -1.350 0.176871   
## Bsmt\_Qual\_Poor 0.000 0.999962   
## Bsmt\_Cond\_Typical 1.613 0.106788   
## Bsmt\_Cond\_Poor 0.000 0.999695   
## Bsmt\_Cond\_No\_Basement NA NA   
## Bsmt\_Cond\_Fair 0.015 0.988338   
## Bsmt\_Cond\_Excellent -0.518 0.604173   
## Bsmt\_Exposure\_No 1.744 0.081167 .   
## Bsmt\_Exposure\_Av 2.777 0.005483 \*\*   
## Bsmt\_Exposure\_Mn 1.392 0.163783   
## Bsmt\_Exposure\_No\_Basement -0.001 0.999529   
## BsmtFin\_Type\_1\_Rec -0.743 0.457670   
## BsmtFin\_Type\_1\_ALQ -1.092 0.274614   
## BsmtFin\_Type\_1\_GLQ -2.648 0.008094 \*\*   
## BsmtFin\_Type\_1\_Unf -0.117 0.906595   
## BsmtFin\_Type\_1\_LwQ NA NA   
## BsmtFin\_Type\_1\_No\_Basement NA NA   
## BsmtFin\_Type\_2\_LwQ 0.257 0.797393   
## BsmtFin\_Type\_2\_BLQ 0.140 0.888704   
## BsmtFin\_Type\_2\_Rec -0.277 0.781408   
## BsmtFin\_Type\_2\_GLQ -1.002 0.316317   
## BsmtFin\_Type\_2\_No\_Basement 0.000 0.999680   
## BsmtFin\_Type\_2\_ALQ -2.471 0.013465 \*   
## Heating\_GasW -0.340 0.733885   
## Heating\_Grav 0.000 0.999892   
## Heating\_Wall 0.001 0.999427   
## Heating\_Floor 0.000 0.999699   
## Heating\_OthW 0.000 0.999688   
## Heating\_QC\_Typical 1.683 0.092302 .   
## Heating\_QC\_Excellent 1.546 0.122071   
## Heating\_QC\_Good 1.674 0.094130 .   
## Heating\_QC\_Poor NA NA   
## Central\_Air\_N 0.485 0.627829   
## Electrical\_FuseA 0.894 0.371094   
## Electrical\_FuseF 0.119 0.905451   
## Electrical\_FuseP 0.001 0.999160   
## Electrical\_Unknown 0.000 0.999675   
## Kitchen\_Qual\_Good -0.286 0.774899   
## Kitchen\_Qual\_Excellent -2.058 0.039579 \*   
## Kitchen\_Qual\_Fair 0.551 0.581966   
## Kitchen\_Qual\_Poor 0.000 0.999866   
## Functional\_Mod 0.190 0.848991   
## Functional\_Min2 1.217 0.223640   
## Functional\_Min1 0.401 0.688232   
## Functional\_Maj1 1.479 0.139079   
## Functional\_Maj2 0.003 0.997589   
## Functional\_Sev 0.001 0.999386   
## Functional\_Sal 0.000 0.999708   
## Fireplace\_Qu\_No\_Fireplace -1.963 0.049659 \*   
## Fireplace\_Qu\_Typical -3.164 0.001557 \*\*   
## Fireplace\_Qu\_Poor 0.201 0.840633   
## Fireplace\_Qu\_Excellent -0.002 0.998309   
## Fireplace\_Qu\_Fair 0.180 0.857420   
## Garage\_Type\_BuiltIn -2.034 0.041913 \*   
## Garage\_Type\_Basment 0.245 0.806506   
## Garage\_Type\_Detchd 1.211 0.225979   
## Garage\_Type\_No\_Garage 0.000 0.999700   
## Garage\_Type\_CarPort 0.681 0.495676   
## Garage\_Type\_More\_Than\_Two\_Types 0.644 0.519530   
## Garage\_Finish\_Unf 0.789 0.430183   
## Garage\_Finish\_RFn -0.243 0.808261   
## Garage\_Finish\_No\_Garage 0.000 0.999723   
## Garage\_Qual\_No\_Garage NA NA   
## Garage\_Qual\_Fair 0.943 0.345429   
## Garage\_Qual\_Good 0.178 0.858434   
## Garage\_Qual\_Excellent 0.000 0.999739   
## Garage\_Qual\_Poor 0.000 0.999818   
## Garage\_Cond\_No\_Garage NA NA   
## Garage\_Cond\_Fair -0.797 0.425494   
## Garage\_Cond\_Excellent 0.000 0.999878   
## Garage\_Cond\_Poor 0.000 0.999698   
## Garage\_Cond\_Good 0.749 0.453979   
## Paved\_Drive\_Paved 0.481 0.630700   
## Paved\_Drive\_Dirt\_Gravel -0.064 0.948932   
## Pool\_QC\_Excellent 0.000 0.999917   
## Pool\_QC\_Typical 0.000 0.999846   
## Pool\_QC\_Fair 0.000 0.999938   
## Pool\_QC\_Good 0.000 0.999864   
## Fence\_Minimum\_Privacy -0.472 0.636921   
## Fence\_Good\_Privacy -0.952 0.340869   
## Fence\_Good\_Wood 1.523 0.127689   
## Fence\_Minimum\_Wood\_Wire 0.002 0.998797   
## Misc\_Feature\_Gar2 1.008 0.313358   
## Misc\_Feature\_Shed 1.684 0.092105 .   
## Misc\_Feature\_Othr -0.001 0.999131   
## Misc\_Feature\_Elev 0.002 0.998583   
## Sale\_Type\_New -1.950 0.051156 .   
## Sale\_Type\_COD 3.389 0.000701 \*\*\*  
## Sale\_Type\_Con 0.021 0.982869   
## Sale\_Type\_ConLD -1.249 0.211710   
## Sale\_Type\_Oth 0.001 0.999183   
## Sale\_Type\_ConLI 0.047 0.962456   
## Sale\_Type\_ConLw 0.003 0.997899   
## Sale\_Type\_CWD 2.533 0.011297 \*   
## Sale\_Type\_VWD 0.000 0.999770   
## Sale\_Condition\_Partial 2.153 0.031344 \*   
## Sale\_Condition\_Family 2.955 0.003131 \*\*   
## Sale\_Condition\_Abnorml 1.799 0.072049 .   
## Sale\_Condition\_Alloca -1.010 0.312696   
## Sale\_Condition\_AdjLand 0.000 0.999856   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 2845.53 on 2052 degrees of freedom  
## Residual deviance: 327.31 on 1777 degrees of freedom  
## AIC: 879.31  
##   
## Number of Fisher Scoring iterations: 21

Using logistic regression on train data

set.seed(123)   
ames\_split = initial\_split(ames, prob = 0.70, strata = Above\_Median)  
train = training(ames\_split)  
test = testing(ames\_split)

amest\_model =   
 logistic\_reg(mode = "classification") %>% #note the use of logistic\_reg and mode = "classification"  
 set\_engine("glm") #standard logistic regression engine is glm  
  
ames\_recipe3 = recipe(Above\_Median ~., train)  
  
logreg\_wf = workflow() %>%  
 add\_recipe(ames\_recipe3) %>%   
 add\_model(amest\_model)  
  
ames\_fit2 = fit(logreg\_wf, train)

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

summary(ames\_fit2$fit$fit$fit)

##   
## Call:  
## stats::glm(formula = ..y ~ ., family = stats::binomial, data = data)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -8.49 -8.49 0.00 0.00 8.49   
##   
## Coefficients: (10 not defined because of singularities)  
## Estimate Std. Error  
## (Intercept) -1.181e+32 3.053e+09  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer 4.722e+31 2.306e+07  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer -8.398e+30 3.735e+07  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages 1.596e+31 2.484e+07  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer -2.072e+31 4.531e+07  
## MS\_SubClassSplit\_or\_Multilevel -2.865e+31 3.503e+07  
## MS\_SubClassOne\_Story\_1945\_and\_Older -1.194e+31 1.349e+07  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages -3.818e+31 2.226e+07  
## MS\_SubClassSplit\_Foyer -1.270e+31 3.085e+07  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages -1.477e+31 5.854e+07  
## MS\_SubClassTwo\_Story\_1945\_and\_Older -1.567e+31 2.482e+07  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages -9.466e+30 5.063e+07  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer -2.276e+31 5.233e+07  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages -2.781e+31 7.191e+07  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages -9.560e+30 4.527e+07  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages -4.241e+31 9.399e+07  
## MS\_ZoningResidential\_High\_Density 1.511e+31 2.167e+07  
## MS\_ZoningFloating\_Village\_Residential -1.890e+31 1.890e+07  
## MS\_ZoningResidential\_Medium\_Density -6.929e+30 1.063e+07  
## MS\_ZoningC\_all -1.584e+31 2.827e+07  
## MS\_ZoningA\_agr -5.841e+30 1.399e+08  
## MS\_ZoningI\_all 6.364e+29 1.027e+08  
## Lot\_Frontage -2.038e+29 7.125e+04  
## Lot\_Area 6.001e+26 4.647e+02  
## StreetGrvl -4.009e+30 4.037e+07  
## AlleyPaved -3.791e+30 1.448e+07  
## AlleyGravel -2.320e+31 1.138e+07  
## Lot\_ShapeRegular 2.686e+30 4.799e+06  
## Lot\_ShapeModerately\_Irregular -2.332e+31 1.420e+07  
## Lot\_ShapeIrregular -1.115e+31 3.130e+07  
## Land\_ContourHLS 4.249e+30 1.152e+07  
## Land\_ContourBnk -9.471e+30 1.143e+07  
## Land\_ContourLow 1.865e+31 1.982e+07  
## UtilitiesNoSewr 1.903e+31 9.363e+07  
## Lot\_ConfigInside 1.565e+31 5.255e+06  
## Lot\_ConfigCulDSac -1.793e+30 9.542e+06  
## Lot\_ConfigFR2 4.515e+30 1.276e+07  
## Lot\_ConfigFR3 1.737e+31 2.849e+07  
## Land\_SlopeMod -1.046e+31 1.231e+07  
## Land\_SlopeSev -2.516e+31 4.477e+07  
## NeighborhoodGilbert -1.569e+31 1.418e+07  
## NeighborhoodStone\_Brook -1.554e+31 2.035e+07  
## NeighborhoodNorthwest\_Ames -1.444e+31 1.167e+07  
## NeighborhoodSomerset -4.889e+30 1.954e+07  
## NeighborhoodBriardale -2.134e+30 2.723e+07  
## NeighborhoodNorthpark\_Villa -4.747e+30 4.336e+07  
## NeighborhoodNorthridge\_Heights -1.296e+31 1.543e+07  
## NeighborhoodBloomington\_Heights -8.187e+30 2.284e+07  
## NeighborhoodNorthridge 6.069e+29 1.715e+07  
## NeighborhoodSawyer\_West -9.174e+29 1.341e+07  
## NeighborhoodSawyer -1.263e+29 1.056e+07  
## NeighborhoodGreens -4.230e+30 3.838e+07  
## NeighborhoodOld\_Town 1.358e+31 1.512e+07  
## NeighborhoodBrookside -2.963e+30 1.551e+07  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road -5.868e+30 2.005e+07  
## NeighborhoodClear\_Creek 1.640e+30 2.006e+07  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University 8.824e+30 1.865e+07  
## NeighborhoodEdwards -1.329e+31 1.029e+07  
## NeighborhoodCollege\_Creek -1.192e+30 1.178e+07  
## NeighborhoodCrawford -6.191e+30 1.392e+07  
## NeighborhoodMitchell 1.367e+30 1.288e+07  
## NeighborhoodTimberland -2.236e+30 1.495e+07  
## NeighborhoodMeadow\_Village -5.117e+30 2.936e+07  
## NeighborhoodVeenker 2.201e+30 2.827e+07  
## NeighborhoodBlueste -2.702e+30 3.657e+07  
## NeighborhoodLandmark 7.852e+30 7.467e+07  
## Condition\_1Feedr 1.353e+30 9.507e+06  
## Condition\_1RRAe -3.542e+30 2.018e+07  
## Condition\_1PosA -1.547e+30 2.385e+07  
## Condition\_1Artery 1.540e+30 1.192e+07  
## Condition\_1PosN 1.436e+30 2.161e+07  
## Condition\_1RRAn 1.062e+29 1.594e+07  
## Condition\_1RRNn -5.069e+30 3.655e+07  
## Condition\_1RRNe 1.182e+31 8.591e+07  
## Condition\_2Feedr 6.745e+30 2.760e+07  
## Condition\_2PosA 4.893e+30 5.201e+07  
## Condition\_2PosN 6.242e+30 7.610e+07  
## Condition\_2Artery 1.036e+31 5.601e+07  
## Condition\_2RRNn 1.634e+30 7.349e+07  
## Condition\_2RRAe 4.453e+30 1.043e+08  
## Condition\_2RRAn 4.712e+30 7.226e+07  
## Bldg\_TypeTwnhsE 3.094e+30 3.757e+07  
## Bldg\_TypeTwnhs 8.144e+29 3.989e+07  
## Bldg\_TypeDuplex NA NA  
## Bldg\_TypeTwoFmCon -2.117e+31 5.935e+07  
## House\_StyleTwo\_Story 5.566e+30 2.597e+07  
## House\_StyleOne\_and\_Half\_Fin 4.341e+30 2.549e+07  
## House\_StyleSLvl 1.432e+31 3.380e+07  
## House\_StyleSFoyer -6.547e+29 2.722e+07  
## House\_StyleOne\_and\_Half\_Unf 7.499e+30 6.752e+07  
## House\_StyleTwo\_and\_Half\_Unf 2.261e+30 4.398e+07  
## House\_StyleTwo\_and\_Half\_Fin -9.528e+30 5.645e+07  
## Overall\_QualAverage -2.140e+30 6.082e+06  
## Overall\_QualGood 3.327e+29 6.737e+06  
## Overall\_QualVery\_Good -2.818e+29 1.008e+07  
## Overall\_QualExcellent -2.617e+30 1.935e+07  
## Overall\_QualBelow\_Average -4.115e+30 9.726e+06  
## Overall\_QualFair -5.672e+30 1.976e+07  
## Overall\_QualPoor -2.362e+30 4.068e+07  
## Overall\_QualVery\_Excellent -3.423e+30 3.152e+07  
## Overall\_QualVery\_Poor -1.013e+31 1.131e+08  
## Overall\_CondAbove\_Average -1.278e+29 5.914e+06  
## Overall\_CondGood -5.053e+29 7.498e+06  
## Overall\_CondPoor -1.849e+31 5.304e+07  
## Overall\_CondVery\_Good -1.577e+30 1.110e+07  
## Overall\_CondBelow\_Average -2.079e+30 1.164e+07  
## Overall\_CondExcellent -3.491e+30 2.169e+07  
## Overall\_CondFair -2.440e+30 1.873e+07  
## Overall\_CondVery\_Poor -3.079e+31 5.249e+07  
## Year\_Built 5.644e+28 2.372e+05  
## Year\_Remod\_Add -1.348e+27 1.567e+05  
## Roof\_StyleGable 1.135e+30 5.644e+06  
## Roof\_StyleMansard 3.476e+30 4.285e+07  
## Roof\_StyleGambrel -2.049e+29 2.485e+07  
## Roof\_StyleShed -8.613e+29 6.071e+07  
## Roof\_StyleFlat 1.524e+31 4.147e+07  
## Roof\_MatlWdShake 2.165e+30 3.696e+07  
## Roof\_MatlTar&Grv -5.330e+30 3.245e+07  
## Roof\_MatlWdShngl 1.714e+31 8.940e+07  
## Roof\_MatlRoll -8.291e+30 7.659e+07  
## Roof\_MatlMetal -1.161e+31 9.348e+07  
## Exterior\_1stVinylSd 4.159e+30 2.736e+07  
## Exterior\_1stWd Sdng 2.435e+30 1.731e+07  
## Exterior\_1stHdBoard -9.995e+29 2.049e+07  
## Exterior\_1stCemntBd -1.835e+29 4.256e+07  
## Exterior\_1stPlywood -8.316e+29 2.077e+07  
## Exterior\_1stMetalSd 5.656e+30 2.415e+07  
## Exterior\_1stAsbShng -1.670e+30 3.393e+07  
## Exterior\_1stWdShing 1.198e+30 2.454e+07  
## Exterior\_1stStucco -1.785e+30 2.782e+07  
## Exterior\_1stAsphShn 1.344e+31 1.140e+08  
## Exterior\_1stBrkComm 5.678e+30 7.100e+07  
## Exterior\_1stImStucc -1.529e+30 8.030e+07  
## Exterior\_1stCBlock NA NA  
## Exterior\_2ndVinylSd -7.053e+30 2.518e+07  
## Exterior\_2ndWd Sdng -5.875e+30 1.579e+07  
## Exterior\_2ndBrkFace -2.942e+30 2.613e+07  
## Exterior\_2ndHdBoard -7.562e+29 1.301e+07  
## Exterior\_2ndCmentBd -3.518e+30 4.157e+07  
## Exterior\_2ndWd Shng -4.990e+30 1.905e+07  
## Exterior\_2ndMetalSd -6.400e+30 2.425e+07  
## Exterior\_2ndImStucc 1.245e+30 3.320e+07  
## Exterior\_2ndBrk Cmn 2.336e+29 4.912e+07  
## Exterior\_2ndAsbShng -2.485e+29 3.294e+07  
## Exterior\_2ndStucco -4.984e+30 2.736e+07  
## Exterior\_2ndAsphShn -7.664e+30 8.360e+07  
## Exterior\_2ndCBlock -3.545e+31 8.841e+07  
## Exterior\_2ndStone -7.203e+30 5.044e+07  
## Exterior\_2ndOther -7.923e+30 7.547e+07  
## Mas\_Vnr\_TypeNone -1.658e+30 9.046e+06  
## Mas\_Vnr\_TypeBrkFace -4.540e+29 8.350e+06  
## Mas\_Vnr\_TypeBrkCmn -1.552e+30 2.272e+07  
## Mas\_Vnr\_TypeCBlock -1.058e+30 9.863e+07  
## Mas\_Vnr\_Area -1.853e+27 1.653e+04  
## Exter\_QualGood 1.932e+30 7.828e+06  
## Exter\_QualExcellent 1.773e+30 1.948e+07  
## Exter\_QualFair -7.296e+30 2.364e+07  
## Exter\_CondGood 6.077e+29 6.692e+06  
## Exter\_CondFair 2.988e+30 1.680e+07  
## Exter\_CondExcellent 2.794e+30 3.715e+07  
## FoundationPConc 2.130e+30 7.293e+06  
## FoundationWood 2.003e+30 5.428e+07  
## FoundationBrkTil 9.326e+29 9.203e+06  
## FoundationSlab 7.389e+29 2.820e+07  
## FoundationStone 2.368e+30 3.726e+07  
## Bsmt\_QualGood -2.480e+30 7.641e+06  
## Bsmt\_QualExcellent -1.543e+30 1.206e+07  
## Bsmt\_QualNo\_Basement -2.961e+30 8.970e+07  
## Bsmt\_QualFair 3.082e+30 1.296e+07  
## Bsmt\_QualPoor -8.236e+30 1.099e+08  
## Bsmt\_CondTypical 1.027e+29 9.932e+06  
## Bsmt\_CondPoor 9.916e+30 4.510e+07  
## Bsmt\_CondNo\_Basement NA NA  
## Bsmt\_CondFair 1.128e+30 1.530e+07  
## Bsmt\_CondExcellent -3.216e+28 5.661e+07  
## Bsmt\_ExposureNo 1.400e+29 8.832e+06  
## Bsmt\_ExposureAv -1.138e+30 8.787e+06  
## Bsmt\_ExposureMn 9.623e+28 1.017e+07  
## Bsmt\_ExposureNo\_Basement 1.290e+30 4.105e+07  
## BsmtFin\_Type\_1Rec -1.280e+30 8.373e+06  
## BsmtFin\_Type\_1ALQ -1.939e+30 8.320e+06  
## BsmtFin\_Type\_1GLQ -3.671e+30 8.890e+06  
## BsmtFin\_Type\_1Unf -4.963e+30 8.860e+06  
## BsmtFin\_Type\_1LwQ -3.970e+30 1.051e+07  
## BsmtFin\_Type\_1No\_Basement NA NA  
## BsmtFin\_SF\_1 NA NA  
## BsmtFin\_Type\_2LwQ -1.687e+30 1.297e+07  
## BsmtFin\_Type\_2BLQ -2.714e+30 1.520e+07  
## BsmtFin\_Type\_2Rec 1.132e+29 1.278e+07  
## BsmtFin\_Type\_2GLQ -3.359e+30 2.371e+07  
## BsmtFin\_Type\_2No\_Basement -8.192e+29 7.185e+07  
## BsmtFin\_Type\_2ALQ -1.238e+30 1.727e+07  
## BsmtFin\_SF\_2 2.576e+27 1.980e+04  
## Bsmt\_Unf\_SF 2.035e+27 9.072e+03  
## Total\_Bsmt\_SF -6.430e+26 1.411e+04  
## HeatingGasW -1.431e+30 2.093e+07  
## HeatingGrav -2.247e+31 4.372e+07  
## HeatingWall -1.223e+30 5.139e+07  
## HeatingFloor -3.492e+30 7.765e+07  
## HeatingOthW -5.647e+29 7.934e+07  
## Heating\_QCTypical 1.573e+30 1.368e+07  
## Heating\_QCExcellent 6.325e+29 1.413e+07  
## Heating\_QCGood 8.989e+29 1.415e+07  
## Central\_AirN 1.403e+29 1.109e+07  
## ElectricalFuseA 3.325e+29 8.827e+06  
## ElectricalFuseF 5.333e+29 1.674e+07  
## ElectricalFuseP -3.231e+30 5.173e+07  
## ElectricalUnknown 3.944e+30 7.032e+07  
## First\_Flr\_SF 1.082e+27 1.457e+04  
## Second\_Flr\_SF -2.003e+27 1.685e+04  
## Low\_Qual\_Fin\_SF -4.590e+27 4.344e+04  
## Gr\_Liv\_Area NA NA  
## Bsmt\_Full\_Bath 5.081e+29 5.689e+06  
## Bsmt\_Half\_Bath 6.359e+28 8.868e+06  
## Full\_Bath -5.868e+29 6.410e+06  
## Half\_Bath 7.409e+29 6.108e+06  
## Bedroom\_AbvGr 2.354e+29 4.124e+06  
## Kitchen\_AbvGr -3.509e+30 1.840e+07  
## Kitchen\_QualGood -5.547e+29 6.331e+06  
## Kitchen\_QualExcellent 1.079e+30 1.307e+07  
## Kitchen\_QualFair -2.073e+30 1.418e+07  
## Kitchen\_QualPoor 3.416e+30 7.993e+07  
## TotRms\_AbvGrd 4.093e+29 2.686e+06  
## FunctionalMod 2.285e+28 1.839e+07  
## FunctionalMin2 -2.779e+30 1.316e+07  
## FunctionalMin1 1.711e+30 1.328e+07  
## FunctionalMaj1 4.186e+30 2.567e+07  
## FunctionalMaj2 -1.489e+31 3.705e+07  
## FunctionalSev -4.945e+30 8.750e+07  
## FunctionalSal 4.615e+31 9.376e+07  
## Fireplaces -7.412e+29 7.407e+06  
## Fireplace\_QuNo\_Fireplace -6.772e+29 9.970e+06  
## Fireplace\_QuTypical 1.085e+30 6.419e+06  
## Fireplace\_QuPoor 1.078e+30 1.555e+07  
## Fireplace\_QuExcellent 1.115e+30 2.225e+07  
## Fireplace\_QuFair 1.083e+30 1.257e+07  
## Garage\_TypeBuiltIn 2.626e+30 9.785e+06  
## Garage\_TypeBasment 7.479e+30 1.757e+07  
## Garage\_TypeDetchd 1.121e+31 6.955e+06  
## Garage\_TypeNo\_Garage 7.112e+31 1.021e+08  
## Garage\_TypeCarPort 2.069e+30 2.445e+07  
## Garage\_TypeMore\_Than\_Two\_Types 2.478e+29 2.161e+07  
## Garage\_FinishUnf -6.549e+28 7.013e+06  
## Garage\_FinishRFn -2.085e+29 5.810e+06  
## Garage\_FinishNo\_Garage -3.971e+31 1.015e+08  
## Garage\_Cars -2.751e+29 6.528e+06  
## Garage\_Area -1.078e+27 2.224e+04  
## Garage\_QualNo\_Garage NA NA  
## Garage\_QualFair -2.085e+29 1.160e+07  
## Garage\_QualGood -6.191e+29 2.504e+07  
## Garage\_QualExcellent NA NA  
## Garage\_QualPoor -8.778e+30 8.290e+07  
## Garage\_CondNo\_Garage NA NA  
## Garage\_CondFair 1.012e+29 1.522e+07  
## Garage\_CondPoor 2.430e+30 4.114e+07  
## Garage\_CondGood 7.526e+29 2.740e+07  
## Paved\_DrivePaved -1.545e+29 1.408e+07  
## Paved\_DriveDirt\_Gravel -8.604e+29 1.579e+07  
## Wood\_Deck\_SF -7.923e+26 1.798e+04  
## Open\_Porch\_SF 6.090e+26 3.105e+04  
## Enclosed\_Porch -1.760e+27 3.914e+04  
## Three\_season\_porch 1.353e+27 7.884e+04  
## Screen\_Porch 2.504e+27 3.342e+04  
## Pool\_Area 3.817e+27 1.110e+05  
## Pool\_QCExcellent -1.146e+30 8.867e+07  
## Pool\_QCTypical -3.231e+30 1.036e+08  
## Pool\_QCFair -1.873e+30 1.019e+08  
## Pool\_QCGood NA NA  
## FenceMinimum\_Privacy 4.781e+28 6.591e+06  
## FenceGood\_Privacy 2.172e+29 1.026e+07  
## FenceGood\_Wood 8.397e+28 1.032e+07  
## FenceMinimum\_Wood\_Wire -1.554e+29 2.574e+07  
## Misc\_FeatureGar2 -1.188e+30 6.633e+07  
## Misc\_FeatureShed -4.026e+29 1.281e+07  
## Misc\_FeatureOthr -1.775e+30 6.044e+07  
## Misc\_FeatureElev -9.981e+29 1.380e+08  
## Misc\_Val 1.355e+26 6.316e+03  
## Mo\_Sold 2.794e+28 7.187e+05  
## Year\_Sold 1.126e+28 1.499e+06  
## Sale\_TypeNew -8.771e+29 4.661e+07  
## Sale\_TypeCOD -1.314e+30 1.202e+07  
## Sale\_TypeCon 2.811e+29 5.650e+07  
## Sale\_TypeConLD -2.031e+30 2.432e+07  
## Sale\_TypeOth 4.520e+30 3.352e+07  
## Sale\_TypeConLI 1.759e+29 2.788e+07  
## Sale\_TypeConLw -1.472e+30 4.318e+07  
## Sale\_TypeCWD 5.803e+28 3.206e+07  
## Sale\_ConditionPartial 8.270e+29 4.608e+07  
## Sale\_ConditionFamily 1.621e+30 1.597e+07  
## Sale\_ConditionAbnorml 7.828e+29 9.216e+06  
## Sale\_ConditionAlloca 2.408e+29 2.382e+07  
## Sale\_ConditionAdjLand -3.330e+30 5.214e+07  
## z value Pr(>|z|)   
## (Intercept) -3.868e+22 <2e-16 \*\*\*  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer 2.048e+24 <2e-16 \*\*\*  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer -2.249e+23 <2e-16 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages 6.423e+23 <2e-16 \*\*\*  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer -4.573e+23 <2e-16 \*\*\*  
## MS\_SubClassSplit\_or\_Multilevel -8.179e+23 <2e-16 \*\*\*  
## MS\_SubClassOne\_Story\_1945\_and\_Older -8.848e+23 <2e-16 \*\*\*  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages -1.715e+24 <2e-16 \*\*\*  
## MS\_SubClassSplit\_Foyer -4.117e+23 <2e-16 \*\*\*  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages -2.522e+23 <2e-16 \*\*\*  
## MS\_SubClassTwo\_Story\_1945\_and\_Older -6.314e+23 <2e-16 \*\*\*  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages -1.870e+23 <2e-16 \*\*\*  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer -4.349e+23 <2e-16 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages -3.867e+23 <2e-16 \*\*\*  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages -2.112e+23 <2e-16 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages -4.513e+23 <2e-16 \*\*\*  
## MS\_ZoningResidential\_High\_Density 6.973e+23 <2e-16 \*\*\*  
## MS\_ZoningFloating\_Village\_Residential -9.998e+23 <2e-16 \*\*\*  
## MS\_ZoningResidential\_Medium\_Density -6.521e+23 <2e-16 \*\*\*  
## MS\_ZoningC\_all -5.603e+23 <2e-16 \*\*\*  
## MS\_ZoningA\_agr -4.176e+22 <2e-16 \*\*\*  
## MS\_ZoningI\_all 6.196e+21 <2e-16 \*\*\*  
## Lot\_Frontage -2.861e+24 <2e-16 \*\*\*  
## Lot\_Area 1.292e+24 <2e-16 \*\*\*  
## StreetGrvl -9.931e+22 <2e-16 \*\*\*  
## AlleyPaved -2.618e+23 <2e-16 \*\*\*  
## AlleyGravel -2.039e+24 <2e-16 \*\*\*  
## Lot\_ShapeRegular 5.597e+23 <2e-16 \*\*\*  
## Lot\_ShapeModerately\_Irregular -1.642e+24 <2e-16 \*\*\*  
## Lot\_ShapeIrregular -3.562e+23 <2e-16 \*\*\*  
## Land\_ContourHLS 3.687e+23 <2e-16 \*\*\*  
## Land\_ContourBnk -8.288e+23 <2e-16 \*\*\*  
## Land\_ContourLow 9.409e+23 <2e-16 \*\*\*  
## UtilitiesNoSewr 2.033e+23 <2e-16 \*\*\*  
## Lot\_ConfigInside 2.978e+24 <2e-16 \*\*\*  
## Lot\_ConfigCulDSac -1.879e+23 <2e-16 \*\*\*  
## Lot\_ConfigFR2 3.539e+23 <2e-16 \*\*\*  
## Lot\_ConfigFR3 6.095e+23 <2e-16 \*\*\*  
## Land\_SlopeMod -8.494e+23 <2e-16 \*\*\*  
## Land\_SlopeSev -5.620e+23 <2e-16 \*\*\*  
## NeighborhoodGilbert -1.106e+24 <2e-16 \*\*\*  
## NeighborhoodStone\_Brook -7.635e+23 <2e-16 \*\*\*  
## NeighborhoodNorthwest\_Ames -1.238e+24 <2e-16 \*\*\*  
## NeighborhoodSomerset -2.501e+23 <2e-16 \*\*\*  
## NeighborhoodBriardale -7.839e+22 <2e-16 \*\*\*  
## NeighborhoodNorthpark\_Villa -1.095e+23 <2e-16 \*\*\*  
## NeighborhoodNorthridge\_Heights -8.401e+23 <2e-16 \*\*\*  
## NeighborhoodBloomington\_Heights -3.585e+23 <2e-16 \*\*\*  
## NeighborhoodNorthridge 3.538e+22 <2e-16 \*\*\*  
## NeighborhoodSawyer\_West -6.840e+22 <2e-16 \*\*\*  
## NeighborhoodSawyer -1.196e+22 <2e-16 \*\*\*  
## NeighborhoodGreens -1.102e+23 <2e-16 \*\*\*  
## NeighborhoodOld\_Town 8.978e+23 <2e-16 \*\*\*  
## NeighborhoodBrookside -1.910e+23 <2e-16 \*\*\*  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road -2.927e+23 <2e-16 \*\*\*  
## NeighborhoodClear\_Creek 8.176e+22 <2e-16 \*\*\*  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University 4.732e+23 <2e-16 \*\*\*  
## NeighborhoodEdwards -1.291e+24 <2e-16 \*\*\*  
## NeighborhoodCollege\_Creek -1.012e+23 <2e-16 \*\*\*  
## NeighborhoodCrawford -4.448e+23 <2e-16 \*\*\*  
## NeighborhoodMitchell 1.061e+23 <2e-16 \*\*\*  
## NeighborhoodTimberland -1.496e+23 <2e-16 \*\*\*  
## NeighborhoodMeadow\_Village -1.743e+23 <2e-16 \*\*\*  
## NeighborhoodVeenker 7.785e+22 <2e-16 \*\*\*  
## NeighborhoodBlueste -7.389e+22 <2e-16 \*\*\*  
## NeighborhoodLandmark 1.052e+23 <2e-16 \*\*\*  
## Condition\_1Feedr 1.423e+23 <2e-16 \*\*\*  
## Condition\_1RRAe -1.755e+23 <2e-16 \*\*\*  
## Condition\_1PosA -6.484e+22 <2e-16 \*\*\*  
## Condition\_1Artery 1.292e+23 <2e-16 \*\*\*  
## Condition\_1PosN 6.645e+22 <2e-16 \*\*\*  
## Condition\_1RRAn 6.664e+21 <2e-16 \*\*\*  
## Condition\_1RRNn -1.387e+23 <2e-16 \*\*\*  
## Condition\_1RRNe 1.376e+23 <2e-16 \*\*\*  
## Condition\_2Feedr 2.444e+23 <2e-16 \*\*\*  
## Condition\_2PosA 9.407e+22 <2e-16 \*\*\*  
## Condition\_2PosN 8.203e+22 <2e-16 \*\*\*  
## Condition\_2Artery 1.850e+23 <2e-16 \*\*\*  
## Condition\_2RRNn 2.223e+22 <2e-16 \*\*\*  
## Condition\_2RRAe 4.270e+22 <2e-16 \*\*\*  
## Condition\_2RRAn 6.521e+22 <2e-16 \*\*\*  
## Bldg\_TypeTwnhsE 8.235e+22 <2e-16 \*\*\*  
## Bldg\_TypeTwnhs 2.042e+22 <2e-16 \*\*\*  
## Bldg\_TypeDuplex NA NA   
## Bldg\_TypeTwoFmCon -3.567e+23 <2e-16 \*\*\*  
## House\_StyleTwo\_Story 2.143e+23 <2e-16 \*\*\*  
## House\_StyleOne\_and\_Half\_Fin 1.703e+23 <2e-16 \*\*\*  
## House\_StyleSLvl 4.238e+23 <2e-16 \*\*\*  
## House\_StyleSFoyer -2.405e+22 <2e-16 \*\*\*  
## House\_StyleOne\_and\_Half\_Unf 1.111e+23 <2e-16 \*\*\*  
## House\_StyleTwo\_and\_Half\_Unf 5.141e+22 <2e-16 \*\*\*  
## House\_StyleTwo\_and\_Half\_Fin -1.688e+23 <2e-16 \*\*\*  
## Overall\_QualAverage -3.518e+23 <2e-16 \*\*\*  
## Overall\_QualGood 4.939e+22 <2e-16 \*\*\*  
## Overall\_QualVery\_Good -2.795e+22 <2e-16 \*\*\*  
## Overall\_QualExcellent -1.353e+23 <2e-16 \*\*\*  
## Overall\_QualBelow\_Average -4.231e+23 <2e-16 \*\*\*  
## Overall\_QualFair -2.870e+23 <2e-16 \*\*\*  
## Overall\_QualPoor -5.806e+22 <2e-16 \*\*\*  
## Overall\_QualVery\_Excellent -1.086e+23 <2e-16 \*\*\*  
## Overall\_QualVery\_Poor -8.956e+22 <2e-16 \*\*\*  
## Overall\_CondAbove\_Average -2.161e+22 <2e-16 \*\*\*  
## Overall\_CondGood -6.738e+22 <2e-16 \*\*\*  
## Overall\_CondPoor -3.485e+23 <2e-16 \*\*\*  
## Overall\_CondVery\_Good -1.421e+23 <2e-16 \*\*\*  
## Overall\_CondBelow\_Average -1.786e+23 <2e-16 \*\*\*  
## Overall\_CondExcellent -1.609e+23 <2e-16 \*\*\*  
## Overall\_CondFair -1.303e+23 <2e-16 \*\*\*  
## Overall\_CondVery\_Poor -5.866e+23 <2e-16 \*\*\*  
## Year\_Built 2.380e+23 <2e-16 \*\*\*  
## Year\_Remod\_Add -8.600e+21 <2e-16 \*\*\*  
## Roof\_StyleGable 2.012e+23 <2e-16 \*\*\*  
## Roof\_StyleMansard 8.113e+22 <2e-16 \*\*\*  
## Roof\_StyleGambrel -8.245e+21 <2e-16 \*\*\*  
## Roof\_StyleShed -1.419e+22 <2e-16 \*\*\*  
## Roof\_StyleFlat 3.676e+23 <2e-16 \*\*\*  
## Roof\_MatlWdShake 5.858e+22 <2e-16 \*\*\*  
## Roof\_MatlTar&Grv -1.643e+23 <2e-16 \*\*\*  
## Roof\_MatlWdShngl 1.917e+23 <2e-16 \*\*\*  
## Roof\_MatlRoll -1.082e+23 <2e-16 \*\*\*  
## Roof\_MatlMetal -1.241e+23 <2e-16 \*\*\*  
## Exterior\_1stVinylSd 1.520e+23 <2e-16 \*\*\*  
## Exterior\_1stWd Sdng 1.406e+23 <2e-16 \*\*\*  
## Exterior\_1stHdBoard -4.878e+22 <2e-16 \*\*\*  
## Exterior\_1stCemntBd -4.312e+21 <2e-16 \*\*\*  
## Exterior\_1stPlywood -4.003e+22 <2e-16 \*\*\*  
## Exterior\_1stMetalSd 2.342e+23 <2e-16 \*\*\*  
## Exterior\_1stAsbShng -4.920e+22 <2e-16 \*\*\*  
## Exterior\_1stWdShing 4.881e+22 <2e-16 \*\*\*  
## Exterior\_1stStucco -6.416e+22 <2e-16 \*\*\*  
## Exterior\_1stAsphShn 1.178e+23 <2e-16 \*\*\*  
## Exterior\_1stBrkComm 7.996e+22 <2e-16 \*\*\*  
## Exterior\_1stImStucc -1.905e+22 <2e-16 \*\*\*  
## Exterior\_1stCBlock NA NA   
## Exterior\_2ndVinylSd -2.801e+23 <2e-16 \*\*\*  
## Exterior\_2ndWd Sdng -3.721e+23 <2e-16 \*\*\*  
## Exterior\_2ndBrkFace -1.126e+23 <2e-16 \*\*\*  
## Exterior\_2ndHdBoard -5.814e+22 <2e-16 \*\*\*  
## Exterior\_2ndCmentBd -8.465e+22 <2e-16 \*\*\*  
## Exterior\_2ndWd Shng -2.620e+23 <2e-16 \*\*\*  
## Exterior\_2ndMetalSd -2.639e+23 <2e-16 \*\*\*  
## Exterior\_2ndImStucc 3.749e+22 <2e-16 \*\*\*  
## Exterior\_2ndBrk Cmn 4.755e+21 <2e-16 \*\*\*  
## Exterior\_2ndAsbShng -7.543e+21 <2e-16 \*\*\*  
## Exterior\_2ndStucco -1.821e+23 <2e-16 \*\*\*  
## Exterior\_2ndAsphShn -9.168e+22 <2e-16 \*\*\*  
## Exterior\_2ndCBlock -4.010e+23 <2e-16 \*\*\*  
## Exterior\_2ndStone -1.428e+23 <2e-16 \*\*\*  
## Exterior\_2ndOther -1.050e+23 <2e-16 \*\*\*  
## Mas\_Vnr\_TypeNone -1.833e+23 <2e-16 \*\*\*  
## Mas\_Vnr\_TypeBrkFace -5.437e+22 <2e-16 \*\*\*  
## Mas\_Vnr\_TypeBrkCmn -6.833e+22 <2e-16 \*\*\*  
## Mas\_Vnr\_TypeCBlock -1.073e+22 <2e-16 \*\*\*  
## Mas\_Vnr\_Area -1.121e+23 <2e-16 \*\*\*  
## Exter\_QualGood 2.468e+23 <2e-16 \*\*\*  
## Exter\_QualExcellent 9.101e+22 <2e-16 \*\*\*  
## Exter\_QualFair -3.086e+23 <2e-16 \*\*\*  
## Exter\_CondGood 9.081e+22 <2e-16 \*\*\*  
## Exter\_CondFair 1.779e+23 <2e-16 \*\*\*  
## Exter\_CondExcellent 7.521e+22 <2e-16 \*\*\*  
## FoundationPConc 2.920e+23 <2e-16 \*\*\*  
## FoundationWood 3.691e+22 <2e-16 \*\*\*  
## FoundationBrkTil 1.013e+23 <2e-16 \*\*\*  
## FoundationSlab 2.620e+22 <2e-16 \*\*\*  
## FoundationStone 6.355e+22 <2e-16 \*\*\*  
## Bsmt\_QualGood -3.246e+23 <2e-16 \*\*\*  
## Bsmt\_QualExcellent -1.280e+23 <2e-16 \*\*\*  
## Bsmt\_QualNo\_Basement -3.301e+22 <2e-16 \*\*\*  
## Bsmt\_QualFair 2.378e+23 <2e-16 \*\*\*  
## Bsmt\_QualPoor -7.496e+22 <2e-16 \*\*\*  
## Bsmt\_CondTypical 1.034e+22 <2e-16 \*\*\*  
## Bsmt\_CondPoor 2.199e+23 <2e-16 \*\*\*  
## Bsmt\_CondNo\_Basement NA NA   
## Bsmt\_CondFair 7.374e+22 <2e-16 \*\*\*  
## Bsmt\_CondExcellent -5.680e+20 <2e-16 \*\*\*  
## Bsmt\_ExposureNo 1.585e+22 <2e-16 \*\*\*  
## Bsmt\_ExposureAv -1.296e+23 <2e-16 \*\*\*  
## Bsmt\_ExposureMn 9.461e+21 <2e-16 \*\*\*  
## Bsmt\_ExposureNo\_Basement 3.144e+22 <2e-16 \*\*\*  
## BsmtFin\_Type\_1Rec -1.529e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_1ALQ -2.331e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_1GLQ -4.129e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_1Unf -5.602e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_1LwQ -3.778e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_1No\_Basement NA NA   
## BsmtFin\_SF\_1 NA NA   
## BsmtFin\_Type\_2LwQ -1.301e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_2BLQ -1.786e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_2Rec 8.861e+21 <2e-16 \*\*\*  
## BsmtFin\_Type\_2GLQ -1.417e+23 <2e-16 \*\*\*  
## BsmtFin\_Type\_2No\_Basement -1.140e+22 <2e-16 \*\*\*  
## BsmtFin\_Type\_2ALQ -7.165e+22 <2e-16 \*\*\*  
## BsmtFin\_SF\_2 1.301e+23 <2e-16 \*\*\*  
## Bsmt\_Unf\_SF 2.243e+23 <2e-16 \*\*\*  
## Total\_Bsmt\_SF -4.556e+22 <2e-16 \*\*\*  
## HeatingGasW -6.840e+22 <2e-16 \*\*\*  
## HeatingGrav -5.140e+23 <2e-16 \*\*\*  
## HeatingWall -2.379e+22 <2e-16 \*\*\*  
## HeatingFloor -4.497e+22 <2e-16 \*\*\*  
## HeatingOthW -7.118e+21 <2e-16 \*\*\*  
## Heating\_QCTypical 1.150e+23 <2e-16 \*\*\*  
## Heating\_QCExcellent 4.475e+22 <2e-16 \*\*\*  
## Heating\_QCGood 6.352e+22 <2e-16 \*\*\*  
## Central\_AirN 1.265e+22 <2e-16 \*\*\*  
## ElectricalFuseA 3.766e+22 <2e-16 \*\*\*  
## ElectricalFuseF 3.186e+22 <2e-16 \*\*\*  
## ElectricalFuseP -6.247e+22 <2e-16 \*\*\*  
## ElectricalUnknown 5.610e+22 <2e-16 \*\*\*  
## First\_Flr\_SF 7.429e+22 <2e-16 \*\*\*  
## Second\_Flr\_SF -1.189e+23 <2e-16 \*\*\*  
## Low\_Qual\_Fin\_SF -1.057e+23 <2e-16 \*\*\*  
## Gr\_Liv\_Area NA NA   
## Bsmt\_Full\_Bath 8.930e+22 <2e-16 \*\*\*  
## Bsmt\_Half\_Bath 7.171e+21 <2e-16 \*\*\*  
## Full\_Bath -9.154e+22 <2e-16 \*\*\*  
## Half\_Bath 1.213e+23 <2e-16 \*\*\*  
## Bedroom\_AbvGr 5.707e+22 <2e-16 \*\*\*  
## Kitchen\_AbvGr -1.907e+23 <2e-16 \*\*\*  
## Kitchen\_QualGood -8.762e+22 <2e-16 \*\*\*  
## Kitchen\_QualExcellent 8.262e+22 <2e-16 \*\*\*  
## Kitchen\_QualFair -1.462e+23 <2e-16 \*\*\*  
## Kitchen\_QualPoor 4.274e+22 <2e-16 \*\*\*  
## TotRms\_AbvGrd 1.524e+23 <2e-16 \*\*\*  
## FunctionalMod 1.243e+21 <2e-16 \*\*\*  
## FunctionalMin2 -2.113e+23 <2e-16 \*\*\*  
## FunctionalMin1 1.288e+23 <2e-16 \*\*\*  
## FunctionalMaj1 1.631e+23 <2e-16 \*\*\*  
## FunctionalMaj2 -4.018e+23 <2e-16 \*\*\*  
## FunctionalSev -5.651e+22 <2e-16 \*\*\*  
## FunctionalSal 4.922e+23 <2e-16 \*\*\*  
## Fireplaces -1.001e+23 <2e-16 \*\*\*  
## Fireplace\_QuNo\_Fireplace -6.793e+22 <2e-16 \*\*\*  
## Fireplace\_QuTypical 1.691e+23 <2e-16 \*\*\*  
## Fireplace\_QuPoor 6.935e+22 <2e-16 \*\*\*  
## Fireplace\_QuExcellent 5.009e+22 <2e-16 \*\*\*  
## Fireplace\_QuFair 8.618e+22 <2e-16 \*\*\*  
## Garage\_TypeBuiltIn 2.684e+23 <2e-16 \*\*\*  
## Garage\_TypeBasment 4.256e+23 <2e-16 \*\*\*  
## Garage\_TypeDetchd 1.612e+24 <2e-16 \*\*\*  
## Garage\_TypeNo\_Garage 6.966e+23 <2e-16 \*\*\*  
## Garage\_TypeCarPort 8.461e+22 <2e-16 \*\*\*  
## Garage\_TypeMore\_Than\_Two\_Types 1.147e+22 <2e-16 \*\*\*  
## Garage\_FinishUnf -9.339e+21 <2e-16 \*\*\*  
## Garage\_FinishRFn -3.588e+22 <2e-16 \*\*\*  
## Garage\_FinishNo\_Garage -3.912e+23 <2e-16 \*\*\*  
## Garage\_Cars -4.213e+22 <2e-16 \*\*\*  
## Garage\_Area -4.848e+22 <2e-16 \*\*\*  
## Garage\_QualNo\_Garage NA NA   
## Garage\_QualFair -1.798e+22 <2e-16 \*\*\*  
## Garage\_QualGood -2.472e+22 <2e-16 \*\*\*  
## Garage\_QualExcellent NA NA   
## Garage\_QualPoor -1.059e+23 <2e-16 \*\*\*  
## Garage\_CondNo\_Garage NA NA   
## Garage\_CondFair 6.652e+21 <2e-16 \*\*\*  
## Garage\_CondPoor 5.908e+22 <2e-16 \*\*\*  
## Garage\_CondGood 2.747e+22 <2e-16 \*\*\*  
## Paved\_DrivePaved -1.097e+22 <2e-16 \*\*\*  
## Paved\_DriveDirt\_Gravel -5.451e+22 <2e-16 \*\*\*  
## Wood\_Deck\_SF -4.406e+22 <2e-16 \*\*\*  
## Open\_Porch\_SF 1.961e+22 <2e-16 \*\*\*  
## Enclosed\_Porch -4.497e+22 <2e-16 \*\*\*  
## Three\_season\_porch 1.717e+22 <2e-16 \*\*\*  
## Screen\_Porch 7.494e+22 <2e-16 \*\*\*  
## Pool\_Area 3.437e+22 <2e-16 \*\*\*  
## Pool\_QCExcellent -1.292e+22 <2e-16 \*\*\*  
## Pool\_QCTypical -3.117e+22 <2e-16 \*\*\*  
## Pool\_QCFair -1.839e+22 <2e-16 \*\*\*  
## Pool\_QCGood NA NA   
## FenceMinimum\_Privacy 7.253e+21 <2e-16 \*\*\*  
## FenceGood\_Privacy 2.117e+22 <2e-16 \*\*\*  
## FenceGood\_Wood 8.139e+21 <2e-16 \*\*\*  
## FenceMinimum\_Wood\_Wire -6.039e+21 <2e-16 \*\*\*  
## Misc\_FeatureGar2 -1.792e+22 <2e-16 \*\*\*  
## Misc\_FeatureShed -3.142e+22 <2e-16 \*\*\*  
## Misc\_FeatureOthr -2.937e+22 <2e-16 \*\*\*  
## Misc\_FeatureElev -7.232e+21 <2e-16 \*\*\*  
## Misc\_Val 2.146e+22 <2e-16 \*\*\*  
## Mo\_Sold 3.888e+22 <2e-16 \*\*\*  
## Year\_Sold 7.507e+21 <2e-16 \*\*\*  
## Sale\_TypeNew -1.881e+22 <2e-16 \*\*\*  
## Sale\_TypeCOD -1.093e+23 <2e-16 \*\*\*  
## Sale\_TypeCon 4.976e+21 <2e-16 \*\*\*  
## Sale\_TypeConLD -8.349e+22 <2e-16 \*\*\*  
## Sale\_TypeOth 1.348e+23 <2e-16 \*\*\*  
## Sale\_TypeConLI 6.312e+21 <2e-16 \*\*\*  
## Sale\_TypeConLw -3.408e+22 <2e-16 \*\*\*  
## Sale\_TypeCWD 1.810e+21 <2e-16 \*\*\*  
## Sale\_ConditionPartial 1.795e+22 <2e-16 \*\*\*  
## Sale\_ConditionFamily 1.015e+23 <2e-16 \*\*\*  
## Sale\_ConditionAbnorml 8.494e+22 <2e-16 \*\*\*  
## Sale\_ConditionAlloca 1.011e+22 <2e-16 \*\*\*  
## Sale\_ConditionAdjLand -6.387e+22 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 2133.1 on 1538 degrees of freedom  
## Residual deviance: 58246.5 on 1257 degrees of freedom  
## AIC: 58811  
##   
## Number of Fisher Scoring iterations: 17

All predictors looks okay except Bldg\_TypeDuplex , Exterior\_1stCBlock, Bsmt\_CondNo\_Basement, BsmtFin\_Type\_1No\_Basement, BsmtFin\_SF\_1, AIC is also high

options(scipen = 999)  
summary(ames\_fit2$fit$fit$fit)

##   
## Call:  
## stats::glm(formula = ..y ~ ., family = stats::binomial, data = data)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -8.49 -8.49 0.00 0.00 8.49   
##   
## Coefficients: (10 not defined because of singularities)  
## Estimate  
## (Intercept) -118114843674961719182904333959168.0  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer 47219571082141002600934142902272.0  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer -8397814815524937846008957632512.0  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages 15956349395080281918546217271296.0  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer -20718263435343556797985479196672.0  
## MS\_SubClassSplit\_or\_Multilevel -28649040811028122544252175515648.0  
## MS\_SubClassOne\_Story\_1945\_and\_Older -11938903307931879110049022345216.0  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages -38176609052365318411661581746176.0  
## MS\_SubClassSplit\_Foyer -12701383103682145651761317150720.0  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages -14766266448197145704547670294528.0  
## MS\_SubClassTwo\_Story\_1945\_and\_Older -15669346740919730647513857785856.0  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages -9466467151605484444959920619520.0  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer -22758352199935967345733485461504.0  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages -27811262194159808328641286242304.0  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages -9560256571575280694369483489280.0  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages -42411918996633528154373134221312.0  
## MS\_ZoningResidential\_High\_Density 15113210885452617282559319998464.0  
## MS\_ZoningFloating\_Village\_Residential -18895116290353236242217010462720.0  
## MS\_ZoningResidential\_Medium\_Density -6928753734920122711875969351680.0  
## MS\_ZoningC\_all -15840227471759096030269062250496.0  
## MS\_ZoningA\_agr -5840917020904786939736225742848.0  
## MS\_ZoningI\_all 636431396034620461751489003520.0  
## Lot\_Frontage -203809969558670604458528866304.0  
## Lot\_Area 600146644740616483690774528.0  
## StreetGrvl -4009143441920120574609094344704.0  
## AlleyPaved -3791344531808564500586779639808.0  
## AlleyGravel -23201863228829082950528810352640.0  
## Lot\_ShapeRegular 2685808306748344146853284020224.0  
## Lot\_ShapeModerately\_Irregular -23318555992988145963498580475904.0  
## Lot\_ShapeIrregular -11149431627281492854537378070528.0  
## Land\_ContourHLS 4248612049278800931866378502144.0  
## Land\_ContourBnk -9470815102779290087353311297536.0  
## Land\_ContourLow 18650232535223380172111702130688.0  
## UtilitiesNoSewr 19034624060970654373475835183104.0  
## Lot\_ConfigInside 15648999616028736798159515156480.0  
## Lot\_ConfigCulDSac -1793042745577475330617081069568.0  
## Lot\_ConfigFR2 4515185670921850650249297657856.0  
## Lot\_ConfigFR3 17365488634855190322794129784832.0  
## Land\_SlopeMod -10456308478217693102133989081088.0  
## Land\_SlopeSev -25160248343842503656422110134272.0  
## NeighborhoodGilbert -15685792036240541897480330018816.0  
## NeighborhoodStone\_Brook -15535152797096880979847531200512.0  
## NeighborhoodNorthwest\_Ames -14443572064790406433343990136832.0  
## NeighborhoodSomerset -4888691176401147677839479275520.0  
## NeighborhoodBriardale -2134218581599780707681712472064.0  
## NeighborhoodNorthpark\_Villa -4747298949173281162810842152960.0  
## NeighborhoodNorthridge\_Heights -12960746421425232130543382953984.0  
## NeighborhoodBloomington\_Heights -8187036623392784870040846467072.0  
## NeighborhoodNorthridge 606923503910553151835455094784.0  
## NeighborhoodSawyer\_West -917380154980013374825669066752.0  
## NeighborhoodSawyer -126329616978828721897162670080.0  
## NeighborhoodGreens -4230365782543520316741858099200.0  
## NeighborhoodOld\_Town 13577878220807300268334853914624.0  
## NeighborhoodBrookside -2963410766094290058259816513536.0  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road -5867646992982334876744582955008.0  
## NeighborhoodClear\_Creek 1639895666500882595166394777600.0  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University 8823621598831492074395379171328.0  
## NeighborhoodEdwards -13285384429194743967088390438912.0  
## NeighborhoodCollege\_Creek -1191677090275623495303400783872.0  
## NeighborhoodCrawford -6190674837263901523851364794368.0  
## NeighborhoodMitchell 1366876290769277483814452461568.0  
## NeighborhoodTimberland -2236443699073741889210568146944.0  
## NeighborhoodMeadow\_Village -5116602303718139117860686921728.0  
## NeighborhoodVeenker 2200609381364930288386914123776.0  
## NeighborhoodBlueste -2702473486151717251551793774592.0  
## NeighborhoodLandmark 7851663752562227129491208011776.0  
## Condition\_1Feedr 1352877481640963051636641497088.0  
## Condition\_1RRAe -3541908129657485235295382142976.0  
## Condition\_1PosA -1546792082606501142407451508736.0  
## Condition\_1Artery 1539581620978376654193176870912.0  
## Condition\_1PosN 1436111651583028382803819495424.0  
## Condition\_1RRAn 106240413014526571467419680768.0  
## Condition\_1RRNn -5068831415033173337961004007424.0  
## Condition\_1RRNe 11822277050778244064776103657472.0  
## Condition\_2Feedr 6745151960655184435848205565952.0  
## Condition\_2PosA 4892564577798256082414334902272.0  
## Condition\_2PosN 6242095498025349385530799816704.0  
## Condition\_2Artery 10364801392559533713335638818816.0  
## Condition\_2RRNn 1633651959950981754239640928256.0  
## Condition\_2RRAe 4452877460812951967448847876096.0  
## Condition\_2RRAn 4712271529739134317332900347904.0  
## Bldg\_TypeTwnhsE 3094217360234408996328934735872.0  
## Bldg\_TypeTwnhs 814413361387338585107842727936.0  
## Bldg\_TypeDuplex NA  
## Bldg\_TypeTwoFmCon -21167233286326617982640676929536.0  
## House\_StyleTwo\_Story 5565635337074882548476812460032.0  
## House\_StyleOne\_and\_Half\_Fin 4341400426354603891610949255168.0  
## House\_StyleSLvl 14323732872679313765847061757952.0  
## House\_StyleSFoyer -654698547601712390006187753472.0  
## House\_StyleOne\_and\_Half\_Unf 7498947840413434320264892514304.0  
## House\_StyleTwo\_and\_Half\_Unf 2261244442406355303916917227520.0  
## House\_StyleTwo\_and\_Half\_Fin -9527539520601336722549758754816.0  
## Overall\_QualAverage -2139773246056018795197112516608.0  
## Overall\_QualGood 332742946254512439290002145280.0  
## Overall\_QualVery\_Good -281768891511705609359656484864.0  
## Overall\_QualExcellent -2617153211773567647944076689408.0  
## Overall\_QualBelow\_Average -4115029545298691257118119428096.0  
## Overall\_QualFair -5671566591426331562838914498560.0  
## Overall\_QualPoor -2361982609612647407349909159936.0  
## Overall\_QualVery\_Excellent -3423434213173241181966983757824.0  
## Overall\_QualVery\_Poor -10129908997136686913587020562432.0  
## Overall\_CondAbove\_Average -127796375363937014051963404288.0  
## Overall\_CondGood -505260810590614460306429050880.0  
## Overall\_CondPoor -18487184977051919702914110586880.0  
## Overall\_CondVery\_Good -1577246278448422402892931006464.0  
## Overall\_CondBelow\_Average -2079498144445835863606517825536.0  
## Overall\_CondExcellent -3490723381848959315067694743552.0  
## Overall\_CondFair -2439805409595158065583973466112.0  
## Overall\_CondVery\_Poor -30791251431208701703119580430336.0  
## Year\_Built 56444234635120620876507119616.0  
## Year\_Remod\_Add -1347503763092692324338106368.0  
## Roof\_StyleGable 1135321676776011484318444552192.0  
## Roof\_StyleMansard 3476141922747242329351821197312.0  
## Roof\_StyleGambrel -204887114969419982640657727488.0  
## Roof\_StyleShed -861280538836077610931473874944.0  
## Roof\_StyleFlat 15243148548292055586469476040704.0  
## Roof\_MatlWdShake 2165405309043485501417064497152.0  
## Roof\_MatlTar&Grv -5329676079452732454403454271488.0  
## Roof\_MatlWdShngl 17138989557892280823056785473536.0  
## Roof\_MatlRoll -8290616068618063887821300563968.0  
## Roof\_MatlMetal -11605180426577494175196251160576.0  
## Exterior\_1stVinylSd 4158538734846644142650752499712.0  
## Exterior\_1stWd Sdng 2434578540934171395782529253376.0  
## Exterior\_1stHdBoard -999460165558169055642305691648.0  
## Exterior\_1stCemntBd -183509625111909419274123345920.0  
## Exterior\_1stPlywood -831617615686203723894545711104.0  
## Exterior\_1stMetalSd 5656187927603237692531990855680.0  
## Exterior\_1stAsbShng -1669556326186451440029665329152.0  
## Exterior\_1stWdShing 1198139383341160517281018544128.0  
## Exterior\_1stStucco -1785100739293638962143809241088.0  
## Exterior\_1stAsphShn 13435368733123119651214258601984.0  
## Exterior\_1stBrkComm 5677615460085993326613729640448.0  
## Exterior\_1stImStucc -1529260695500900816478491639808.0  
## Exterior\_1stCBlock NA  
## Exterior\_2ndVinylSd -7052596946544334944269787725824.0  
## Exterior\_2ndWd Sdng -5875184913709417428724039548928.0  
## Exterior\_2ndBrkFace -2941685870045285345721139068928.0  
## Exterior\_2ndHdBoard -756200721491115648432778248192.0  
## Exterior\_2ndCmentBd -3518408756146333197654298722304.0  
## Exterior\_2ndWd Shng -4990362294240216097042722717696.0  
## Exterior\_2ndMetalSd -6400461015002230925400876253184.0  
## Exterior\_2ndImStucc 1244754371247298969359012069376.0  
## Exterior\_2ndBrk Cmn 233589042430824551926313517056.0  
## Exterior\_2ndAsbShng -248483400466683676836671520768.0  
## Exterior\_2ndStucco -4983871398555416689469420470272.0  
## Exterior\_2ndAsphShn -7664199055995817722327825645568.0  
## Exterior\_2ndCBlock -35449465067737187423330754363392.0  
## Exterior\_2ndStone -7203468815631989276931073769472.0  
## Exterior\_2ndOther -7922829571271387878241240875008.0  
## Mas\_Vnr\_TypeNone -1658140591988031554258930237440.0  
## Mas\_Vnr\_TypeBrkFace -453965288071347390749031268352.0  
## Mas\_Vnr\_TypeBrkCmn -1552030131884306168125346283520.0  
## Mas\_Vnr\_TypeCBlock -1058122985769010673006833303552.0  
## Mas\_Vnr\_Area -1853184269796581583177646080.0  
## Exter\_QualGood 1932068685201594290120339488768.0  
## Exter\_QualExcellent 1773180990345036178092221005824.0  
## Exter\_QualFair -7296111547981685656447763873792.0  
## Exter\_CondGood 607716293806218470618776469504.0  
## Exter\_CondFair 2987589018035730436515562520576.0  
## Exter\_CondExcellent 2794206944775232951912398585856.0  
## FoundationPConc 2129604120851727112386407038976.0  
## FoundationWood 2003267758960518826590323343360.0  
## FoundationBrkTil 932601259793800874041850986496.0  
## FoundationSlab 738900647485878496112819568640.0  
## FoundationStone 2367742595284620584051403653120.0  
## Bsmt\_QualGood -2480225170080366787818430660608.0  
## Bsmt\_QualExcellent -1543477906727597118009206898688.0  
## Bsmt\_QualNo\_Basement -2961080246801550583761618337792.0  
## Bsmt\_QualFair 3082174003195404942510636662784.0  
## Bsmt\_QualPoor -8236291128894455562955875418112.0  
## Bsmt\_CondTypical 102738173603571476454354976768.0  
## Bsmt\_CondPoor 9916128950644173346580381827072.0  
## Bsmt\_CondNo\_Basement NA  
## Bsmt\_CondFair 1128052686902769251469137805312.0  
## Bsmt\_CondExcellent -32157460401015986564192272384.0  
## Bsmt\_ExposureNo 139975927126190336424873558016.0  
## Bsmt\_ExposureAv -1138354463754166680084673462272.0  
## Bsmt\_ExposureMn 96227156563485879438686552064.0  
## Bsmt\_ExposureNo\_Basement 1290271313179829408892389949440.0  
## BsmtFin\_Type\_1Rec -1279939034571372124322110898176.0  
## BsmtFin\_Type\_1ALQ -1939313599805593638678705471488.0  
## BsmtFin\_Type\_1GLQ -3670578990224037442696624734208.0  
## BsmtFin\_Type\_1Unf -4962982823222986346617154568192.0  
## BsmtFin\_Type\_1LwQ -3969515622007480293066092314624.0  
## BsmtFin\_Type\_1No\_Basement NA  
## BsmtFin\_SF\_1 NA  
## BsmtFin\_Type\_2LwQ -1686858484725989848058177781760.0  
## BsmtFin\_Type\_2BLQ -2714083479682217625691153760256.0  
## BsmtFin\_Type\_2Rec 113240824446295166595675193344.0  
## BsmtFin\_Type\_2GLQ -3359229576960537601117710712832.0  
## BsmtFin\_Type\_2No\_Basement -819170707988377212241645142016.0  
## BsmtFin\_Type\_2ALQ -1237564199094642523142134693888.0  
## BsmtFin\_SF\_2 2576402060393390456157765632.0  
## Bsmt\_Unf\_SF 2035406918127928177265213440.0  
## Total\_Bsmt\_SF -643001266762271838573690880.0  
## HeatingGasW -1431411544140649920571799240704.0  
## HeatingGrav -22469715650374019175186413125632.0  
## HeatingWall -1222555534142920779086136606720.0  
## HeatingFloor -3492371473092055742673544282112.0  
## HeatingOthW -564713116472208396030694129664.0  
## Heating\_QCTypical 1573030904167325723710894112768.0  
## Heating\_QCExcellent 632488476834768201797951553536.0  
## Heating\_QCGood 898943769285377288219681357824.0  
## Central\_AirN 140335101456149415557584650240.0  
## ElectricalFuseA 332460742908099155388172075008.0  
## ElectricalFuseF 533320310838824117457993596928.0  
## ElectricalFuseP -3231493958112556371148078579712.0  
## ElectricalUnknown 3944469802578616428886514204672.0  
## First\_Flr\_SF 1082132877196159927971741696.0  
## Second\_Flr\_SF -2003294643996804057015517184.0  
## Low\_Qual\_Fin\_SF -4589867511899336829411786752.0  
## Gr\_Liv\_Area NA  
## Bsmt\_Full\_Bath 508056404095596351166579998720.0  
## Bsmt\_Half\_Bath 63593107546624242993193811968.0  
## Full\_Bath -586789805167409121458361729024.0  
## Half\_Bath 740924619308317689219995664384.0  
## Bedroom\_AbvGr 235371156471453564601355993088.0  
## Kitchen\_AbvGr -3508611307915663500104291057664.0  
## Kitchen\_QualGood -554680191799795100450847457280.0  
## Kitchen\_QualExcellent 1079482150865632756744000110592.0  
## Kitchen\_QualFair -2073224796700446802366315888640.0  
## Kitchen\_QualPoor 3415912162379482678766564540416.0  
## TotRms\_AbvGrd 409295990472840794811993686016.0  
## FunctionalMod 22854572222573729721712902144.0  
## FunctionalMin2 -2779279527032364513465737412608.0  
## FunctionalMin1 1710877900660377014065520705536.0  
## FunctionalMaj1 4185622839648091401000761425920.0  
## FunctionalMaj2 -14888618753943809048674608087040.0  
## FunctionalSev -4944917746365162261310601166848.0  
## FunctionalSal 46153538598765596741296864624640.0  
## Fireplaces -741246759029753362667364417536.0  
## Fireplace\_QuNo\_Fireplace -677246876366676415871103008768.0  
## Fireplace\_QuTypical 1085286034222972082972298051584.0  
## Fireplace\_QuPoor 1078427514344610315237586894848.0  
## Fireplace\_QuExcellent 1114699241767453999993620267008.0  
## Fireplace\_QuFair 1083035812877775715103917735936.0  
## Garage\_TypeBuiltIn 2626212995003462267981258555392.0  
## Garage\_TypeBasment 7479058619876669561459536035840.0  
## Garage\_TypeDetchd 11214014551671437826907128725504.0  
## Garage\_TypeNo\_Garage 71118667665072625770878625382400.0  
## Garage\_TypeCarPort 2069020441934909062878702075904.0  
## Garage\_TypeMore\_Than\_Two\_Types 247818294904497676667999748096.0  
## Garage\_FinishUnf -65489585019901571090935185408.0  
## Garage\_FinishRFn -208467189456683207866370228224.0  
## Garage\_FinishNo\_Garage -39707751366969146486934896377856.0  
## Garage\_Cars -275061413543918499763836682240.0  
## Garage\_Area -1078052624612058827684052992.0  
## Garage\_QualNo\_Garage NA  
## Garage\_QualFair -208503813106559963494476677120.0  
## Garage\_QualGood -619089277543387978020000104448.0  
## Garage\_QualExcellent NA  
## Garage\_QualPoor -8778133098744283410403178840064.0  
## Garage\_CondNo\_Garage NA  
## Garage\_CondFair 101227250427638192141573816320.0  
## Garage\_CondPoor 2430499991842414804847472672768.0  
## Garage\_CondGood 752626678864504921725113204736.0  
## Paved\_DrivePaved -154507552702324256362245128192.0  
## Paved\_DriveDirt\_Gravel -860447144385207408560057614336.0  
## Wood\_Deck\_SF -792261366414908411971895296.0  
## Open\_Porch\_SF 609020020247559808372178944.0  
## Enclosed\_Porch -1760228802942916160007438336.0  
## Three\_season\_porch 1353447060134925732457480192.0  
## Screen\_Porch 2504362033047024170287759360.0  
## Pool\_Area 3817147150563742733727432704.0  
## Pool\_QCExcellent -1145751402886501465255103692800.0  
## Pool\_QCTypical -3230755925243304923409466523648.0  
## Pool\_QCFair -1872762482334226792263643561984.0  
## Pool\_QCGood NA  
## FenceMinimum\_Privacy 47806600163331441746407063552.0  
## FenceGood\_Privacy 217242234271274566407812022272.0  
## FenceGood\_Wood 83969922138435588360482324480.0  
## FenceMinimum\_Wood\_Wire -155430165185014667066986201088.0  
## Misc\_FeatureGar2 -1188281123936311018406037946368.0  
## Misc\_FeatureShed -402640309049423784837270994944.0  
## Misc\_FeatureOthr -1774980030527835245375154814976.0  
## Misc\_FeatureElev -998093469388294242993283530752.0  
## Misc\_Val 135509210522417355529650176.0  
## Mo\_Sold 27938876019953156152111398912.0  
## Year\_Sold 11256239860271729454805417984.0  
## Sale\_TypeNew -877051155123177712840014299136.0  
## Sale\_TypeCOD -1314155314472979167404424691712.0  
## Sale\_TypeCon 281140179409976125327121842176.0  
## Sale\_TypeConLD -2030786797974542343881575366656.0  
## Sale\_TypeOth 4519827427765764337946312310784.0  
## Sale\_TypeConLI 175940672023592447951180398592.0  
## Sale\_TypeConLw -1471651220526172621750314991616.0  
## Sale\_TypeCWD 58027137262209683885410746368.0  
## Sale\_ConditionPartial 827014708487454968293401559040.0  
## Sale\_ConditionFamily 1620758308139358723766424174592.0  
## Sale\_ConditionAbnorml 782784242866454825549965557760.0  
## Sale\_ConditionAlloca 240770052489923584047634710528.0  
## Sale\_ConditionAdjLand -3330161289035448916697927385088.0  
## Std. Error  
## (Intercept) 3053302698.3  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer 23057548.8  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer 37346132.4  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages 24842458.8  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer 45308304.0  
## MS\_SubClassSplit\_or\_Multilevel 35029192.7  
## MS\_SubClassOne\_Story\_1945\_and\_Older 13493361.6  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages 22256153.7  
## MS\_SubClassSplit\_Foyer 30848092.3  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages 58542089.2  
## MS\_SubClassTwo\_Story\_1945\_and\_Older 24818635.8  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages 50626500.1  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer 52331288.0  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages 71912271.3  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages 45272518.0  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages 93987146.6  
## MS\_ZoningResidential\_High\_Density 21672349.1  
## MS\_ZoningFloating\_Village\_Residential 18899399.3  
## MS\_ZoningResidential\_Medium\_Density 10625407.8  
## MS\_ZoningC\_all 28271023.1  
## MS\_ZoningA\_agr 139863413.6  
## MS\_ZoningI\_all 102721453.5  
## Lot\_Frontage 71247.8  
## Lot\_Area 464.7  
## StreetGrvl 40369196.4  
## AlleyPaved 14479492.2  
## AlleyGravel 11378017.5  
## Lot\_ShapeRegular 4799049.7  
## Lot\_ShapeModerately\_Irregular 14197552.1  
## Lot\_ShapeIrregular 31301107.6  
## Land\_ContourHLS 11522341.3  
## Land\_ContourBnk 11427257.4  
## Land\_ContourLow 19822360.7  
## UtilitiesNoSewr 93633811.2  
## Lot\_ConfigInside 5255317.9  
## Lot\_ConfigCulDSac 9542492.5  
## Lot\_ConfigFR2 12756611.3  
## Lot\_ConfigFR3 28492796.5  
## Land\_SlopeMod 12310153.6  
## Land\_SlopeSev 44766416.7  
## NeighborhoodGilbert 14177648.3  
## NeighborhoodStone\_Brook 20346202.5  
## NeighborhoodNorthwest\_Ames 11665551.6  
## NeighborhoodSomerset 19544815.4  
## NeighborhoodBriardale 27225813.2  
## NeighborhoodNorthpark\_Villa 43357194.1  
## NeighborhoodNorthridge\_Heights 15427578.3  
## NeighborhoodBloomington\_Heights 22835452.3  
## NeighborhoodNorthridge 17153102.0  
## NeighborhoodSawyer\_West 13412464.4  
## NeighborhoodSawyer 10564768.1  
## NeighborhoodGreens 38382065.1  
## NeighborhoodOld\_Town 15123269.1  
## NeighborhoodBrookside 15511424.9  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road 20046236.8  
## NeighborhoodClear\_Creek 20058027.6  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University 18646821.0  
## NeighborhoodEdwards 10292591.4  
## NeighborhoodCollege\_Creek 11777395.8  
## NeighborhoodCrawford 13917009.0  
## NeighborhoodMitchell 12879803.3  
## NeighborhoodTimberland 14952684.5  
## NeighborhoodMeadow\_Village 29360391.2  
## NeighborhoodVeenker 28266621.1  
## NeighborhoodBlueste 36572121.3  
## NeighborhoodLandmark 74665319.4  
## Condition\_1Feedr 9507430.9  
## Condition\_1RRAe 20178812.4  
## Condition\_1PosA 23854811.5  
## Condition\_1Artery 11916904.5  
## Condition\_1PosN 21613364.4  
## Condition\_1RRAn 15942762.4  
## Condition\_1RRNn 36545317.5  
## Condition\_1RRNe 85905396.7  
## Condition\_2Feedr 27601690.5  
## Condition\_2PosA 52007117.3  
## Condition\_2PosN 76096000.2  
## Condition\_2Artery 56011950.9  
## Condition\_2RRNn 73492165.2  
## Condition\_2RRAe 104287028.4  
## Condition\_2RRAn 72259550.2  
## Bldg\_TypeTwnhsE 37573080.5  
## Bldg\_TypeTwnhs 39887188.6  
## Bldg\_TypeDuplex NA  
## Bldg\_TypeTwoFmCon 59345783.8  
## House\_StyleTwo\_Story 25966084.1  
## House\_StyleOne\_and\_Half\_Fin 25491108.1  
## House\_StyleSLvl 33795197.5  
## House\_StyleSFoyer 27223458.5  
## House\_StyleOne\_and\_Half\_Unf 67517137.4  
## House\_StyleTwo\_and\_Half\_Unf 43981185.9  
## House\_StyleTwo\_and\_Half\_Fin 56445804.0  
## Overall\_QualAverage 6081839.5  
## Overall\_QualGood 6736963.3  
## Overall\_QualVery\_Good 10082207.7  
## Overall\_QualExcellent 19346865.5  
## Overall\_QualBelow\_Average 9726369.3  
## Overall\_QualFair 19758718.4  
## Overall\_QualPoor 40680134.2  
## Overall\_QualVery\_Excellent 31518794.2  
## Overall\_QualVery\_Poor 113105933.1  
## Overall\_CondAbove\_Average 5913939.1  
## Overall\_CondGood 7498301.6  
## Overall\_CondPoor 53043848.7  
## Overall\_CondVery\_Good 11100803.4  
## Overall\_CondBelow\_Average 11642473.5  
## Overall\_CondExcellent 21689636.7  
## Overall\_CondFair 18728899.7  
## Overall\_CondVery\_Poor 52492636.8  
## Year\_Built 237174.8  
## Year\_Remod\_Add 156679.6  
## Roof\_StyleGable 5644033.9  
## Roof\_StyleMansard 42848127.5  
## Roof\_StyleGambrel 24850678.7  
## Roof\_StyleShed 60714559.6  
## Roof\_StyleFlat 41467924.9  
## Roof\_MatlWdShake 36963089.6  
## Roof\_MatlTar&Grv 32447070.1  
## Roof\_MatlWdShngl 89395259.4  
## Roof\_MatlRoll 76589425.7  
## Roof\_MatlMetal 93484675.4  
## Exterior\_1stVinylSd 27361187.4  
## Exterior\_1stWd Sdng 17311106.6  
## Exterior\_1stHdBoard 20489321.9  
## Exterior\_1stCemntBd 42559189.3  
## Exterior\_1stPlywood 20774801.9  
## Exterior\_1stMetalSd 24151145.8  
## Exterior\_1stAsbShng 33932340.3  
## Exterior\_1stWdShing 24544875.5  
## Exterior\_1stStucco 27822167.5  
## Exterior\_1stAsphShn 114025311.5  
## Exterior\_1stBrkComm 71003716.8  
## Exterior\_1stImStucc 80296438.7  
## Exterior\_1stCBlock NA  
## Exterior\_2ndVinylSd 25179120.3  
## Exterior\_2ndWd Sdng 15791131.9  
## Exterior\_2ndBrkFace 26125582.9  
## Exterior\_2ndHdBoard 13007063.4  
## Exterior\_2ndCmentBd 41565796.0  
## Exterior\_2ndWd Shng 19049948.6  
## Exterior\_2ndMetalSd 24252539.9  
## Exterior\_2ndImStucc 33199463.1  
## Exterior\_2ndBrk Cmn 49122386.7  
## Exterior\_2ndAsbShng 32944314.1  
## Exterior\_2ndStucco 27364786.6  
## Exterior\_2ndAsphShn 83598934.2  
## Exterior\_2ndCBlock 88413555.9  
## Exterior\_2ndStone 50441730.0  
## Exterior\_2ndOther 75467570.7  
## Mas\_Vnr\_TypeNone 9046390.4  
## Mas\_Vnr\_TypeBrkFace 8349851.5  
## Mas\_Vnr\_TypeBrkCmn 22715187.6  
## Mas\_Vnr\_TypeCBlock 98627982.8  
## Mas\_Vnr\_Area 16533.9  
## Exter\_QualGood 7827544.5  
## Exter\_QualExcellent 19482809.9  
## Exter\_QualFair 23638788.3  
## Exter\_CondGood 6692223.9  
## Exter\_CondFair 16797535.8  
## Exter\_CondExcellent 37151626.3  
## FoundationPConc 7293448.3  
## FoundationWood 54279468.8  
## FoundationBrkTil 9203168.0  
## FoundationSlab 28197446.2  
## FoundationStone 37260142.8  
## Bsmt\_QualGood 7640510.1  
## Bsmt\_QualExcellent 12059486.7  
## Bsmt\_QualNo\_Basement 89702886.5  
## Bsmt\_QualFair 12960464.2  
## Bsmt\_QualPoor 109882844.3  
## Bsmt\_CondTypical 9931604.8  
## Bsmt\_CondPoor 45100185.0  
## Bsmt\_CondNo\_Basement NA  
## Bsmt\_CondFair 15298422.0  
## Bsmt\_CondExcellent 56610637.4  
## Bsmt\_ExposureNo 8831848.7  
## Bsmt\_ExposureAv 8786742.8  
## Bsmt\_ExposureMn 10171433.8  
## Bsmt\_ExposureNo\_Basement 41045251.9  
## BsmtFin\_Type\_1Rec 8372936.8  
## BsmtFin\_Type\_1ALQ 8320003.5  
## BsmtFin\_Type\_1GLQ 8889580.6  
## BsmtFin\_Type\_1Unf 8859697.7  
## BsmtFin\_Type\_1LwQ 10505741.2  
## BsmtFin\_Type\_1No\_Basement NA  
## BsmtFin\_SF\_1 NA  
## BsmtFin\_Type\_2LwQ 12970192.2  
## BsmtFin\_Type\_2BLQ 15198817.9  
## BsmtFin\_Type\_2Rec 12779535.5  
## BsmtFin\_Type\_2GLQ 23713726.9  
## BsmtFin\_Type\_2No\_Basement 71850630.8  
## BsmtFin\_Type\_2ALQ 17271481.7  
## BsmtFin\_SF\_2 19798.9  
## Bsmt\_Unf\_SF 9072.5  
## Total\_Bsmt\_SF 14112.4  
## HeatingGasW 20926068.8  
## HeatingGrav 43716381.4  
## HeatingWall 51392622.3  
## HeatingFloor 77652549.3  
## HeatingOthW 79338448.7  
## Heating\_QCTypical 13678290.5  
## Heating\_QCExcellent 14134486.1  
## Heating\_QCGood 14151954.5  
## Central\_AirN 11094771.1  
## ElectricalFuseA 8827148.5  
## ElectricalFuseF 16737683.9  
## ElectricalFuseP 51729008.0  
## ElectricalUnknown 70317377.2  
## First\_Flr\_SF 14565.9  
## Second\_Flr\_SF 16850.1  
## Low\_Qual\_Fin\_SF 43438.1  
## Gr\_Liv\_Area NA  
## Bsmt\_Full\_Bath 5689229.2  
## Bsmt\_Half\_Bath 8868415.8  
## Full\_Bath 6410393.5  
## Half\_Bath 6107918.7  
## Bedroom\_AbvGr 4124060.7  
## Kitchen\_AbvGr 18396270.4  
## Kitchen\_QualGood 6330507.0  
## Kitchen\_QualExcellent 13065087.0  
## Kitchen\_QualFair 14183146.8  
## Kitchen\_QualPoor 79929269.8  
## TotRms\_AbvGrd 2685622.8  
## FunctionalMod 18385556.7  
## FunctionalMin2 13155637.0  
## FunctionalMin1 13280386.7  
## FunctionalMaj1 25667104.2  
## FunctionalMaj2 37052419.4  
## FunctionalSev 87501462.3  
## FunctionalSal 93763285.5  
## Fireplaces 7406605.2  
## Fireplace\_QuNo\_Fireplace 9969801.5  
## Fireplace\_QuTypical 6419280.0  
## Fireplace\_QuPoor 15549443.4  
## Fireplace\_QuExcellent 22254759.3  
## Fireplace\_QuFair 12567853.8  
## Garage\_TypeBuiltIn 9785070.1  
## Garage\_TypeBasment 17571744.1  
## Garage\_TypeDetchd 6954869.7  
## Garage\_TypeNo\_Garage 102092894.4  
## Garage\_TypeCarPort 24453457.9  
## Garage\_TypeMore\_Than\_Two\_Types 21612807.8  
## Garage\_FinishUnf 7012649.0  
## Garage\_FinishRFn 5810079.3  
## Garage\_FinishNo\_Garage 101511129.9  
## Garage\_Cars 6528449.5  
## Garage\_Area 22236.7  
## Garage\_QualNo\_Garage NA  
## Garage\_QualFair 11595204.3  
## Garage\_QualGood 25039525.0  
## Garage\_QualExcellent NA  
## Garage\_QualPoor 82901970.0  
## Garage\_CondNo\_Garage NA  
## Garage\_CondFair 15217902.5  
## Garage\_CondPoor 41138509.3  
## Garage\_CondGood 27402199.2  
## Paved\_DrivePaved 14079927.6  
## Paved\_DriveDirt\_Gravel 15786426.2  
## Wood\_Deck\_SF 17981.4  
## Open\_Porch\_SF 31051.9  
## Enclosed\_Porch 39144.2  
## Three\_season\_porch 78840.1  
## Screen\_Porch 33420.3  
## Pool\_Area 111047.3  
## Pool\_QCExcellent 88666964.6  
## Pool\_QCTypical 103642950.7  
## Pool\_QCFair 101854065.7  
## Pool\_QCGood NA  
## FenceMinimum\_Privacy 6591186.7  
## FenceGood\_Privacy 10263219.6  
## FenceGood\_Wood 10316740.9  
## FenceMinimum\_Wood\_Wire 25739543.4  
## Misc\_FeatureGar2 66327016.4  
## Misc\_FeatureShed 12814480.8  
## Misc\_FeatureOthr 60441315.4  
## Misc\_FeatureElev 138001498.7  
## Misc\_Val 6315.5  
## Mo\_Sold 718652.8  
## Year\_Sold 1499361.1  
## Sale\_TypeNew 46614962.9  
## Sale\_TypeCOD 12022378.3  
## Sale\_TypeCon 56503522.5  
## Sale\_TypeConLD 24322774.3  
## Sale\_TypeOth 33521370.5  
## Sale\_TypeConLI 27875679.5  
## Sale\_TypeConLw 43182496.7  
## Sale\_TypeCWD 32059319.6  
## Sale\_ConditionPartial 46082506.5  
## Sale\_ConditionFamily 15971208.2  
## Sale\_ConditionAbnorml 9215908.7  
## Sale\_ConditionAlloca 23815334.3  
## Sale\_ConditionAdjLand 52140470.4  
## z value  
## (Intercept) -38684288898018693873664  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer 2047900732817762234138624  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer -224864377575687319453696  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages 642301534731307237507072  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer -457272985244948534132736  
## MS\_SubClassSplit\_or\_Multilevel -817861863618773772140544  
## MS\_SubClassOne\_Story\_1945\_and\_Older -884798291679171368189952  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages -1715328244148906798088192  
## MS\_SubClassSplit\_Foyer -411739662770610248876032  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages -252233335727927410556928  
## MS\_SubClassTwo\_Story\_1945\_and\_Older -631354071252013653426176  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages -186986403099713439006720  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer -434889968941200540958720  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages -386738753900814102691840  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages -211171301973796541431808  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages -451252331310917598838784  
## MS\_ZoningResidential\_High\_Density 697349917573689519374336  
## MS\_ZoningFloating\_Village\_Residential -999773380499827188563968  
## MS\_ZoningResidential\_Medium\_Density -652092973224333022330880  
## MS\_ZoningC\_all -560299053037522765479936  
## MS\_ZoningA\_agr -41761579189406944722944  
## MS\_ZoningI\_all 6195700843792808542208  
## Lot\_Frontage -2860578662085835783929856  
## Lot\_Area 1291541357847648437010432  
## StreetGrvl -99311945789673306062848  
## AlleyPaved -261842367823497423486976  
## AlleyGravel -2039183292528683240128512  
## Lot\_ShapeRegular 559654192341100099796992  
## Lot\_ShapeModerately\_Irregular -1642434966889312525746176  
## Lot\_ShapeIrregular -356199268083989544435712  
## Land\_ContourHLS 368728188406407184252928  
## Land\_ContourBnk -828791612055642676658176  
## Land\_ContourLow 940868388553280918126592  
## UtilitiesNoSewr 203287934405191170785280  
## Lot\_ConfigInside 2977745585190334457970688  
## Lot\_ConfigCulDSac -187900879890006444867584  
## Lot\_ConfigFR2 353948675627293591207936  
## Lot\_ConfigFR3 609469436303860767391744  
## Land\_SlopeMod -849405199110440249982976  
## Land\_SlopeSev -562034001675573604122624  
## NeighborhoodGilbert -1106374746774944207601664  
## NeighborhoodStone\_Brook -763540656389667443179520  
## NeighborhoodNorthwest\_Ames -1238138802180590028193792  
## NeighborhoodSomerset -250127262141656879595520  
## NeighborhoodBriardale -78389525486069824356352  
## NeighborhoodNorthpark\_Villa -109492762393592310267904  
## NeighborhoodNorthridge\_Heights -840102456469960414724096  
## NeighborhoodBloomington\_Heights -358523077000506860634112  
## NeighborhoodNorthridge 35382725794022721323008  
## NeighborhoodSawyer\_West -68397583408454357221376  
## NeighborhoodSawyer -11957632728142998142976  
## NeighborhoodGreens -110217253065446851084288  
## NeighborhoodOld\_Town 897813701627386093633536  
## NeighborhoodBrookside -191046971882176413433856  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road -292705661430511794388992  
## NeighborhoodClear\_Creek 81757573684359122124800  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University 473197099441379858186240  
## NeighborhoodEdwards -1290771582159317521924096  
## NeighborhoodCollege\_Creek -101183411889863095484416  
## NeighborhoodCrawford -444827968577722558447616  
## NeighborhoodMitchell 106125556157718829465600  
## NeighborhoodTimberland -149568038922161028595712  
## NeighborhoodMeadow\_Village -174268873714603497881600  
## NeighborhoodVeenker 77851872396058837385216  
## NeighborhoodBlueste -73894359786238202871808  
## NeighborhoodLandmark 105158108398323452870656  
## Condition\_1Feedr 142296850981029997969408  
## Condition\_1RRAe -175526094786571725176832  
## Condition\_1PosA -64841932859770341949440  
## Condition\_1Artery 129193081906589383786496  
## Condition\_1PosN 66445539273488770007040  
## Condition\_1RRAn 6663864807179245584384  
## Condition\_1RRNn -138699887129094720061440  
## Condition\_1RRNe 137619724834110418452480  
## Condition\_2Feedr 244374595508714516512768  
## Condition\_2PosA 94074904232212782120960  
## Condition\_2PosN 82029219391804727623680  
## Condition\_2Artery 185046248605501404217344  
## Condition\_2RRNn 22228926786453125464064  
## Condition\_2RRAe 42698286922474926899200  
## Condition\_2RRAn 65213131254154171252736  
## Bldg\_TypeTwnhsE 82351974341651569049600  
## Bldg\_TypeTwnhs 20417918377461461024768  
## Bldg\_TypeDuplex NA  
## Bldg\_TypeTwoFmCon -356676277947211125358592  
## House\_StyleTwo\_Story 214342498653266279137280  
## House\_StyleOne\_and\_Half\_Fin 170310384351366122307584  
## House\_StyleSLvl 423839300627406679703552  
## House\_StyleSFoyer -24049058594501804687360  
## House\_StyleOne\_and\_Half\_Unf 111067324885541847040000  
## House\_StyleTwo\_and\_Half\_Unf 51413903358998291152896  
## House\_StyleTwo\_and\_Half\_Fin -168790925850484611743744  
## Overall\_QualAverage -351829944760822851960832  
## Overall\_QualGood 49390642633595441643520  
## Overall\_QualVery\_Good -27947142101076818264064  
## Overall\_QualExcellent -135275309094303348817920  
## Overall\_QualBelow\_Average -423079715387078413910016  
## Overall\_QualFair -287041218118019268476928  
## Overall\_QualPoor -58062311200256111411200  
## Overall\_QualVery\_Excellent -108615646532404655423488  
## Overall\_QualVery\_Poor -89561252194810670874624  
## Overall\_CondAbove\_Average -21609349345625994428416  
## Overall\_CondGood -67383367453325207273472  
## Overall\_CondPoor -348526463025663369543680  
## Overall\_CondVery\_Good -142083974989537658011648  
## Overall\_CondBelow\_Average -178613087931862056173568  
## Overall\_CondExcellent -160939689219025983766528  
## Overall\_CondFair -130269553593445343297536  
## Overall\_CondVery\_Poor -586582295794991998435328  
## Year\_Built 237985802326118011764736  
## Year\_Remod\_Add -8600375775731495469056  
## Roof\_StyleGable 201154298117504184090624  
## Roof\_StyleMansard 81127044021078217195520  
## Roof\_StyleGambrel -8244729132447040536576  
## Roof\_StyleShed -14185733105955817652224  
## Roof\_StyleFlat 367588891935045519933440  
## Roof\_MatlWdShake 58582908923031444258816  
## Roof\_MatlTar&Grv -164257545144367029682176  
## Roof\_MatlWdShngl 191721459080746258923520  
## Roof\_MatlRoll -108247528887468465061888  
## Roof\_MatlMetal -124139923222735804694528  
## Exterior\_1stVinylSd 151986778712236829442048  
## Exterior\_1stWd Sdng 140636794248282805108736  
## Exterior\_1stHdBoard -48779562891621938757632  
## Exterior\_1stCemntBd -4311868438827847122944  
## Exterior\_1stPlywood -40030110531481289883648  
## Exterior\_1stMetalSd 234199568267524597350400  
## Exterior\_1stAsbShng -49202510440437420916736  
## Exterior\_1stWdShing 48814237483021203668992  
## Exterior\_1stStucco -64161095158554312048640  
## Exterior\_1stAsphShn 117827950253247750471680  
## Exterior\_1stBrkComm 79962228993242628620288  
## Exterior\_1stImStucc -19045187064719986393088  
## Exterior\_1stCBlock NA  
## Exterior\_2ndVinylSd -280097034818202405699584  
## Exterior\_2ndWd Sdng -372055971816378661339136  
## Exterior\_2ndBrkFace -112597903650374224445440  
## Exterior\_2ndHdBoard -58137697631126733979648  
## Exterior\_2ndCmentBd -84646731051793452630016  
## Exterior\_2ndWd Shng -261961982102994843336704  
## Exterior\_2ndMetalSd -263908895467957842345984  
## Exterior\_2ndImStucc 37493207905994025205760  
## Exterior\_2ndBrk Cmn 4755246190055000113152  
## Exterior\_2ndAsbShng -7542527652912689053696  
## Exterior\_2ndStucco -182127179545307684798464  
## Exterior\_2ndAsphShn -91678190942085103747072  
## Exterior\_2ndCBlock -400950563799249262215168  
## Exterior\_2ndStone -142807727280879021588480  
## Exterior\_2ndOther -104983233123485835329536  
## Mas\_Vnr\_TypeNone -183293061430977199341568  
## Mas\_Vnr\_TypeBrkFace -54368067532836378247168  
## Mas\_Vnr\_TypeBrkCmn -68325657687676317335552  
## Mas\_Vnr\_TypeCBlock -10728425702000747872256  
## Mas\_Vnr\_Area -112084052786503753924608  
## Exter\_QualGood 246829472361672274345984  
## Exter\_QualExcellent 91012590179552046612480  
## Exter\_QualFair -308649980879850677731328  
## Exter\_CondGood 90809319127084112543744  
## Exter\_CondFair 177858767753877716467712  
## Exter\_CondExcellent 75210891776367351824384  
## FoundationPConc 291988651222279345143808  
## FoundationWood 36906546849286497239040  
## FoundationBrkTil 101334808064194324201472  
## FoundationSlab 26204523726137081200640  
## FoundationStone 63546256547089668374528  
## Bsmt\_QualGood -324615127341308867248128  
## Bsmt\_QualExcellent -127988690123534360379392  
## Bsmt\_QualNo\_Basement -33009865819530576527360  
## Bsmt\_QualFair 237813550029728804503552  
## Bsmt\_QualPoor -74955205095328069976064  
## Bsmt\_CondTypical 10344569270366111793152  
## Bsmt\_CondPoor 219868919490528239681536  
## Bsmt\_CondNo\_Basement NA  
## Bsmt\_CondFair 73736538554444093063168  
## Bsmt\_CondExcellent -568046252365824720896  
## Bsmt\_ExposureNo 15848995215870040997888  
## Bsmt\_ExposureAv -129553634917042773557248  
## Bsmt\_ExposureMn 9460530229931442962432  
## Bsmt\_ExposureNo\_Basement 31435336705360682549248  
## BsmtFin\_Type\_1Rec -152866200105652297138176  
## BsmtFin\_Type\_1ALQ -233090477532276494172160  
## BsmtFin\_Type\_1GLQ -412908003550733010993152  
## BsmtFin\_Type\_1Unf -560175189167209487269888  
## BsmtFin\_Type\_1LwQ -377842508025783453220864  
## BsmtFin\_Type\_1No\_Basement NA  
## BsmtFin\_SF\_1 NA  
## BsmtFin\_Type\_2LwQ -130056552933057466728448  
## BsmtFin\_Type\_2BLQ -178572011680933624152064  
## BsmtFin\_Type\_2Rec 8861106434918344294400  
## BsmtFin\_Type\_2GLQ -141657597466804934934528  
## BsmtFin\_Type\_2No\_Basement -11401023184582706462720  
## BsmtFin\_Type\_2ALQ -71653620929016430067712  
## BsmtFin\_SF\_2 130128509430054757859328  
## Bsmt\_Unf\_SF 224347981594792954953728  
## Total\_Bsmt\_SF -45562941801037106774016  
## HeatingGasW -68403270513398651027456  
## HeatingGrav -513988461753728139001856  
## HeatingWall -23788541625004896288768  
## HeatingFloor -44974331238885181358080  
## HeatingOthW -7117773611163913814016  
## Heating\_QCTypical 115002010287247741419520  
## Heating\_QCExcellent 44747893489114923663360  
## Heating\_QCGood 63520820876088480628736  
## Central\_AirN 12648760368279343595520  
## ElectricalFuseA 37663436127355008974848  
## ElectricalFuseF 31863447337612479561728  
## ElectricalFuseP -62469668057778350981120  
## ElectricalUnknown 56095235037529141936128  
## First\_Flr\_SF 74292194749941601533952  
## Second\_Flr\_SF -118889251801737944104960  
## Low\_Qual\_Fin\_SF -105664467356657253351424  
## Gr\_Liv\_Area NA  
## Bsmt\_Full\_Bath 89301448191873057292288  
## Bsmt\_Half\_Bath 7170740387575294328832  
## Full\_Bath -91537251734424018485248  
## Half\_Bath 121305580373848390369280  
## Bedroom\_AbvGr 57072669830565507104768  
## Kitchen\_AbvGr -190724056308395949424640  
## Kitchen\_QualGood -87620185182197377925120  
## Kitchen\_QualExcellent 82623418720802538782720  
## Kitchen\_QualFair -146175233131224684822528  
## Kitchen\_QualPoor 42736686706314306387968  
## TotRms\_AbvGrd 152402632718342506414080  
## FunctionalMod 1243072080779258626048  
## FunctionalMin2 -211261494387451384299520  
## FunctionalMin1 128827416303680383614976  
## FunctionalMaj1 163073434708361877651456  
## FunctionalMaj2 -401825818433782164750336  
## FunctionalSev -56512401258451486900224  
## FunctionalSal 492234656084265420193792  
## Fireplaces -100079150801383206158336  
## Fireplace\_QuNo\_Fireplace -67929825181167349923840  
## Fireplace\_QuTypical 169066628850451971309568  
## Fireplace\_QuPoor 69354734055550812684288  
## Fireplace\_QuExcellent 50088128423750711377920  
## Fireplace\_QuFair 86175080443371652644864  
## Garage\_TypeBuiltIn 268389798042371543269376  
## Garage\_TypeBasment 425629839412172528025600  
## Garage\_TypeDetchd 1612397493527332597530624  
## Garage\_TypeNo\_Garage 696607419137161626124288  
## Garage\_TypeCarPort 84610546820848073834496  
## Garage\_TypeMore\_Than\_Two\_Types 11466270263108918312960  
## Garage\_FinishUnf -9338779831063627694080  
## Garage\_FinishRFn -35880265628928232652800  
## Garage\_FinishNo\_Garage -391166479848334077984768  
## Garage\_Cars -42132731941772668698624  
## Garage\_Area -48480858699903461752832  
## Garage\_QualNo\_Garage NA  
## Garage\_QualFair -17981900691215751315456  
## Garage\_QualGood -24724481667126007955456  
## Garage\_QualExcellent NA  
## Garage\_QualPoor -105885699699030701899776  
## Garage\_CondNo\_Garage NA  
## Garage\_CondFair 6651853014906755350528  
## Garage\_CondPoor 59080896125876408680448  
## Garage\_CondGood 27465922492428139364352  
## Paved\_DrivePaved -10973604188252627009536  
## Paved\_DriveDirt\_Gravel -54505505873628156133376  
## Wood\_Deck\_SF -44059935239067374977024  
## Open\_Porch\_SF 19612943279049773416448  
## Enclosed\_Porch -44967753539786035429376  
## Three\_season\_porch 17166994239281973690368  
## Screen\_Porch 74935354102009097617408  
## Pool\_Area 34374074770686482579456  
## Pool\_QCExcellent -12921964880874103111680  
## Pool\_QCTypical -31171979423556512514048  
## Pool\_QCFair -18386722907143129792512  
## Pool\_QCGood NA  
## FenceMinimum\_Privacy 7253109682757339971584  
## FenceGood\_Privacy 21167064788391767834624  
## FenceGood\_Wood 8139190785329813520384  
## FenceMinimum\_Wood\_Wire -6038575070572510707712  
## Misc\_FeatureGar2 -17915491874350057914368  
## Misc\_FeatureShed -31420727561315900456960  
## Misc\_FeatureOthr -29366998710860109578240  
## Misc\_FeatureElev -7232482824774970507264  
## Misc\_Val 21456627911238625525760  
## Mo\_Sold 38876734953250625683456  
## Year\_Sold 7507357361508046602240  
## Sale\_TypeNew -18814798971518540840960  
## Sale\_TypeCOD -109309096831786900520960  
## Sale\_TypeCon 4975622176774280970240  
## Sale\_TypeConLD -83493222047645085728768  
## Sale\_TypeOth 134834207660148686585856  
## Sale\_TypeConLI 6311619119836264660992  
## Sale\_TypeConLw -34079808586927235399680  
## Sale\_TypeCWD 1809992786132095991808  
## Sale\_ConditionPartial 17946391629840934502400  
## Sale\_ConditionFamily 101480006089427958890496  
## Sale\_ConditionAbnorml 84938367404314942504960  
## Sale\_ConditionAlloca 10109874979265371439104  
## Sale\_ConditionAdjLand -63869030421460257079296  
## Pr(>|z|)   
## (Intercept) <0.0000000000000002 \*\*\*  
## MS\_SubClassTwo\_Story\_1946\_and\_Newer <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_Story\_PUD\_1946\_and\_Newer <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_Finished\_All\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassTwo\_Story\_PUD\_1946\_and\_Newer <0.0000000000000002 \*\*\*  
## MS\_SubClassSplit\_or\_Multilevel <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_Story\_1945\_and\_Older <0.0000000000000002 \*\*\*  
## MS\_SubClassDuplex\_All\_Styles\_and\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassSplit\_Foyer <0.0000000000000002 \*\*\*  
## MS\_SubClassTwo\_Family\_conversion\_All\_Styles\_and\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassTwo\_Story\_1945\_and\_Older <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_Story\_with\_Finished\_Attic\_All\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassPUD\_Multilevel\_Split\_Level\_Foyer <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_Unfinished\_All\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassTwo\_and\_Half\_Story\_All\_Ages <0.0000000000000002 \*\*\*  
## MS\_SubClassOne\_and\_Half\_Story\_PUD\_All\_Ages <0.0000000000000002 \*\*\*  
## MS\_ZoningResidential\_High\_Density <0.0000000000000002 \*\*\*  
## MS\_ZoningFloating\_Village\_Residential <0.0000000000000002 \*\*\*  
## MS\_ZoningResidential\_Medium\_Density <0.0000000000000002 \*\*\*  
## MS\_ZoningC\_all <0.0000000000000002 \*\*\*  
## MS\_ZoningA\_agr <0.0000000000000002 \*\*\*  
## MS\_ZoningI\_all <0.0000000000000002 \*\*\*  
## Lot\_Frontage <0.0000000000000002 \*\*\*  
## Lot\_Area <0.0000000000000002 \*\*\*  
## StreetGrvl <0.0000000000000002 \*\*\*  
## AlleyPaved <0.0000000000000002 \*\*\*  
## AlleyGravel <0.0000000000000002 \*\*\*  
## Lot\_ShapeRegular <0.0000000000000002 \*\*\*  
## Lot\_ShapeModerately\_Irregular <0.0000000000000002 \*\*\*  
## Lot\_ShapeIrregular <0.0000000000000002 \*\*\*  
## Land\_ContourHLS <0.0000000000000002 \*\*\*  
## Land\_ContourBnk <0.0000000000000002 \*\*\*  
## Land\_ContourLow <0.0000000000000002 \*\*\*  
## UtilitiesNoSewr <0.0000000000000002 \*\*\*  
## Lot\_ConfigInside <0.0000000000000002 \*\*\*  
## Lot\_ConfigCulDSac <0.0000000000000002 \*\*\*  
## Lot\_ConfigFR2 <0.0000000000000002 \*\*\*  
## Lot\_ConfigFR3 <0.0000000000000002 \*\*\*  
## Land\_SlopeMod <0.0000000000000002 \*\*\*  
## Land\_SlopeSev <0.0000000000000002 \*\*\*  
## NeighborhoodGilbert <0.0000000000000002 \*\*\*  
## NeighborhoodStone\_Brook <0.0000000000000002 \*\*\*  
## NeighborhoodNorthwest\_Ames <0.0000000000000002 \*\*\*  
## NeighborhoodSomerset <0.0000000000000002 \*\*\*  
## NeighborhoodBriardale <0.0000000000000002 \*\*\*  
## NeighborhoodNorthpark\_Villa <0.0000000000000002 \*\*\*  
## NeighborhoodNorthridge\_Heights <0.0000000000000002 \*\*\*  
## NeighborhoodBloomington\_Heights <0.0000000000000002 \*\*\*  
## NeighborhoodNorthridge <0.0000000000000002 \*\*\*  
## NeighborhoodSawyer\_West <0.0000000000000002 \*\*\*  
## NeighborhoodSawyer <0.0000000000000002 \*\*\*  
## NeighborhoodGreens <0.0000000000000002 \*\*\*  
## NeighborhoodOld\_Town <0.0000000000000002 \*\*\*  
## NeighborhoodBrookside <0.0000000000000002 \*\*\*  
## NeighborhoodIowa\_DOT\_and\_Rail\_Road <0.0000000000000002 \*\*\*  
## NeighborhoodClear\_Creek <0.0000000000000002 \*\*\*  
## NeighborhoodSouth\_and\_West\_of\_Iowa\_State\_University <0.0000000000000002 \*\*\*  
## NeighborhoodEdwards <0.0000000000000002 \*\*\*  
## NeighborhoodCollege\_Creek <0.0000000000000002 \*\*\*  
## NeighborhoodCrawford <0.0000000000000002 \*\*\*  
## NeighborhoodMitchell <0.0000000000000002 \*\*\*  
## NeighborhoodTimberland <0.0000000000000002 \*\*\*  
## NeighborhoodMeadow\_Village <0.0000000000000002 \*\*\*  
## NeighborhoodVeenker <0.0000000000000002 \*\*\*  
## NeighborhoodBlueste <0.0000000000000002 \*\*\*  
## NeighborhoodLandmark <0.0000000000000002 \*\*\*  
## Condition\_1Feedr <0.0000000000000002 \*\*\*  
## Condition\_1RRAe <0.0000000000000002 \*\*\*  
## Condition\_1PosA <0.0000000000000002 \*\*\*  
## Condition\_1Artery <0.0000000000000002 \*\*\*  
## Condition\_1PosN <0.0000000000000002 \*\*\*  
## Condition\_1RRAn <0.0000000000000002 \*\*\*  
## Condition\_1RRNn <0.0000000000000002 \*\*\*  
## Condition\_1RRNe <0.0000000000000002 \*\*\*  
## Condition\_2Feedr <0.0000000000000002 \*\*\*  
## Condition\_2PosA <0.0000000000000002 \*\*\*  
## Condition\_2PosN <0.0000000000000002 \*\*\*  
## Condition\_2Artery <0.0000000000000002 \*\*\*  
## Condition\_2RRNn <0.0000000000000002 \*\*\*  
## Condition\_2RRAe <0.0000000000000002 \*\*\*  
## Condition\_2RRAn <0.0000000000000002 \*\*\*  
## Bldg\_TypeTwnhsE <0.0000000000000002 \*\*\*  
## Bldg\_TypeTwnhs <0.0000000000000002 \*\*\*  
## Bldg\_TypeDuplex NA   
## Bldg\_TypeTwoFmCon <0.0000000000000002 \*\*\*  
## House\_StyleTwo\_Story <0.0000000000000002 \*\*\*  
## House\_StyleOne\_and\_Half\_Fin <0.0000000000000002 \*\*\*  
## House\_StyleSLvl <0.0000000000000002 \*\*\*  
## House\_StyleSFoyer <0.0000000000000002 \*\*\*  
## House\_StyleOne\_and\_Half\_Unf <0.0000000000000002 \*\*\*  
## House\_StyleTwo\_and\_Half\_Unf <0.0000000000000002 \*\*\*  
## House\_StyleTwo\_and\_Half\_Fin <0.0000000000000002 \*\*\*  
## Overall\_QualAverage <0.0000000000000002 \*\*\*  
## Overall\_QualGood <0.0000000000000002 \*\*\*  
## Overall\_QualVery\_Good <0.0000000000000002 \*\*\*  
## Overall\_QualExcellent <0.0000000000000002 \*\*\*  
## Overall\_QualBelow\_Average <0.0000000000000002 \*\*\*  
## Overall\_QualFair <0.0000000000000002 \*\*\*  
## Overall\_QualPoor <0.0000000000000002 \*\*\*  
## Overall\_QualVery\_Excellent <0.0000000000000002 \*\*\*  
## Overall\_QualVery\_Poor <0.0000000000000002 \*\*\*  
## Overall\_CondAbove\_Average <0.0000000000000002 \*\*\*  
## Overall\_CondGood <0.0000000000000002 \*\*\*  
## Overall\_CondPoor <0.0000000000000002 \*\*\*  
## Overall\_CondVery\_Good <0.0000000000000002 \*\*\*  
## Overall\_CondBelow\_Average <0.0000000000000002 \*\*\*  
## Overall\_CondExcellent <0.0000000000000002 \*\*\*  
## Overall\_CondFair <0.0000000000000002 \*\*\*  
## Overall\_CondVery\_Poor <0.0000000000000002 \*\*\*  
## Year\_Built <0.0000000000000002 \*\*\*  
## Year\_Remod\_Add <0.0000000000000002 \*\*\*  
## Roof\_StyleGable <0.0000000000000002 \*\*\*  
## Roof\_StyleMansard <0.0000000000000002 \*\*\*  
## Roof\_StyleGambrel <0.0000000000000002 \*\*\*  
## Roof\_StyleShed <0.0000000000000002 \*\*\*  
## Roof\_StyleFlat <0.0000000000000002 \*\*\*  
## Roof\_MatlWdShake <0.0000000000000002 \*\*\*  
## Roof\_MatlTar&Grv <0.0000000000000002 \*\*\*  
## Roof\_MatlWdShngl <0.0000000000000002 \*\*\*  
## Roof\_MatlRoll <0.0000000000000002 \*\*\*  
## Roof\_MatlMetal <0.0000000000000002 \*\*\*  
## Exterior\_1stVinylSd <0.0000000000000002 \*\*\*  
## Exterior\_1stWd Sdng <0.0000000000000002 \*\*\*  
## Exterior\_1stHdBoard <0.0000000000000002 \*\*\*  
## Exterior\_1stCemntBd <0.0000000000000002 \*\*\*  
## Exterior\_1stPlywood <0.0000000000000002 \*\*\*  
## Exterior\_1stMetalSd <0.0000000000000002 \*\*\*  
## Exterior\_1stAsbShng <0.0000000000000002 \*\*\*  
## Exterior\_1stWdShing <0.0000000000000002 \*\*\*  
## Exterior\_1stStucco <0.0000000000000002 \*\*\*  
## Exterior\_1stAsphShn <0.0000000000000002 \*\*\*  
## Exterior\_1stBrkComm <0.0000000000000002 \*\*\*  
## Exterior\_1stImStucc <0.0000000000000002 \*\*\*  
## Exterior\_1stCBlock NA   
## Exterior\_2ndVinylSd <0.0000000000000002 \*\*\*  
## Exterior\_2ndWd Sdng <0.0000000000000002 \*\*\*  
## Exterior\_2ndBrkFace <0.0000000000000002 \*\*\*  
## Exterior\_2ndHdBoard <0.0000000000000002 \*\*\*  
## Exterior\_2ndCmentBd <0.0000000000000002 \*\*\*  
## Exterior\_2ndWd Shng <0.0000000000000002 \*\*\*  
## Exterior\_2ndMetalSd <0.0000000000000002 \*\*\*  
## Exterior\_2ndImStucc <0.0000000000000002 \*\*\*  
## Exterior\_2ndBrk Cmn <0.0000000000000002 \*\*\*  
## Exterior\_2ndAsbShng <0.0000000000000002 \*\*\*  
## Exterior\_2ndStucco <0.0000000000000002 \*\*\*  
## Exterior\_2ndAsphShn <0.0000000000000002 \*\*\*  
## Exterior\_2ndCBlock <0.0000000000000002 \*\*\*  
## Exterior\_2ndStone <0.0000000000000002 \*\*\*  
## Exterior\_2ndOther <0.0000000000000002 \*\*\*  
## Mas\_Vnr\_TypeNone <0.0000000000000002 \*\*\*  
## Mas\_Vnr\_TypeBrkFace <0.0000000000000002 \*\*\*  
## Mas\_Vnr\_TypeBrkCmn <0.0000000000000002 \*\*\*  
## Mas\_Vnr\_TypeCBlock <0.0000000000000002 \*\*\*  
## Mas\_Vnr\_Area <0.0000000000000002 \*\*\*  
## Exter\_QualGood <0.0000000000000002 \*\*\*  
## Exter\_QualExcellent <0.0000000000000002 \*\*\*  
## Exter\_QualFair <0.0000000000000002 \*\*\*  
## Exter\_CondGood <0.0000000000000002 \*\*\*  
## Exter\_CondFair <0.0000000000000002 \*\*\*  
## Exter\_CondExcellent <0.0000000000000002 \*\*\*  
## FoundationPConc <0.0000000000000002 \*\*\*  
## FoundationWood <0.0000000000000002 \*\*\*  
## FoundationBrkTil <0.0000000000000002 \*\*\*  
## FoundationSlab <0.0000000000000002 \*\*\*  
## FoundationStone <0.0000000000000002 \*\*\*  
## Bsmt\_QualGood <0.0000000000000002 \*\*\*  
## Bsmt\_QualExcellent <0.0000000000000002 \*\*\*  
## Bsmt\_QualNo\_Basement <0.0000000000000002 \*\*\*  
## Bsmt\_QualFair <0.0000000000000002 \*\*\*  
## Bsmt\_QualPoor <0.0000000000000002 \*\*\*  
## Bsmt\_CondTypical <0.0000000000000002 \*\*\*  
## Bsmt\_CondPoor <0.0000000000000002 \*\*\*  
## Bsmt\_CondNo\_Basement NA   
## Bsmt\_CondFair <0.0000000000000002 \*\*\*  
## Bsmt\_CondExcellent <0.0000000000000002 \*\*\*  
## Bsmt\_ExposureNo <0.0000000000000002 \*\*\*  
## Bsmt\_ExposureAv <0.0000000000000002 \*\*\*  
## Bsmt\_ExposureMn <0.0000000000000002 \*\*\*  
## Bsmt\_ExposureNo\_Basement <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1Rec <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1ALQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1GLQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1Unf <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1LwQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_1No\_Basement NA   
## BsmtFin\_SF\_1 NA   
## BsmtFin\_Type\_2LwQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_2BLQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_2Rec <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_2GLQ <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_2No\_Basement <0.0000000000000002 \*\*\*  
## BsmtFin\_Type\_2ALQ <0.0000000000000002 \*\*\*  
## BsmtFin\_SF\_2 <0.0000000000000002 \*\*\*  
## Bsmt\_Unf\_SF <0.0000000000000002 \*\*\*  
## Total\_Bsmt\_SF <0.0000000000000002 \*\*\*  
## HeatingGasW <0.0000000000000002 \*\*\*  
## HeatingGrav <0.0000000000000002 \*\*\*  
## HeatingWall <0.0000000000000002 \*\*\*  
## HeatingFloor <0.0000000000000002 \*\*\*  
## HeatingOthW <0.0000000000000002 \*\*\*  
## Heating\_QCTypical <0.0000000000000002 \*\*\*  
## Heating\_QCExcellent <0.0000000000000002 \*\*\*  
## Heating\_QCGood <0.0000000000000002 \*\*\*  
## Central\_AirN <0.0000000000000002 \*\*\*  
## ElectricalFuseA <0.0000000000000002 \*\*\*  
## ElectricalFuseF <0.0000000000000002 \*\*\*  
## ElectricalFuseP <0.0000000000000002 \*\*\*  
## ElectricalUnknown <0.0000000000000002 \*\*\*  
## First\_Flr\_SF <0.0000000000000002 \*\*\*  
## Second\_Flr\_SF <0.0000000000000002 \*\*\*  
## Low\_Qual\_Fin\_SF <0.0000000000000002 \*\*\*  
## Gr\_Liv\_Area NA   
## Bsmt\_Full\_Bath <0.0000000000000002 \*\*\*  
## Bsmt\_Half\_Bath <0.0000000000000002 \*\*\*  
## Full\_Bath <0.0000000000000002 \*\*\*  
## Half\_Bath <0.0000000000000002 \*\*\*  
## Bedroom\_AbvGr <0.0000000000000002 \*\*\*  
## Kitchen\_AbvGr <0.0000000000000002 \*\*\*  
## Kitchen\_QualGood <0.0000000000000002 \*\*\*  
## Kitchen\_QualExcellent <0.0000000000000002 \*\*\*  
## Kitchen\_QualFair <0.0000000000000002 \*\*\*  
## Kitchen\_QualPoor <0.0000000000000002 \*\*\*  
## TotRms\_AbvGrd <0.0000000000000002 \*\*\*  
## FunctionalMod <0.0000000000000002 \*\*\*  
## FunctionalMin2 <0.0000000000000002 \*\*\*  
## FunctionalMin1 <0.0000000000000002 \*\*\*  
## FunctionalMaj1 <0.0000000000000002 \*\*\*  
## FunctionalMaj2 <0.0000000000000002 \*\*\*  
## FunctionalSev <0.0000000000000002 \*\*\*  
## FunctionalSal <0.0000000000000002 \*\*\*  
## Fireplaces <0.0000000000000002 \*\*\*  
## Fireplace\_QuNo\_Fireplace <0.0000000000000002 \*\*\*  
## Fireplace\_QuTypical <0.0000000000000002 \*\*\*  
## Fireplace\_QuPoor <0.0000000000000002 \*\*\*  
## Fireplace\_QuExcellent <0.0000000000000002 \*\*\*  
## Fireplace\_QuFair <0.0000000000000002 \*\*\*  
## Garage\_TypeBuiltIn <0.0000000000000002 \*\*\*  
## Garage\_TypeBasment <0.0000000000000002 \*\*\*  
## Garage\_TypeDetchd <0.0000000000000002 \*\*\*  
## Garage\_TypeNo\_Garage <0.0000000000000002 \*\*\*  
## Garage\_TypeCarPort <0.0000000000000002 \*\*\*  
## Garage\_TypeMore\_Than\_Two\_Types <0.0000000000000002 \*\*\*  
## Garage\_FinishUnf <0.0000000000000002 \*\*\*  
## Garage\_FinishRFn <0.0000000000000002 \*\*\*  
## Garage\_FinishNo\_Garage <0.0000000000000002 \*\*\*  
## Garage\_Cars <0.0000000000000002 \*\*\*  
## Garage\_Area <0.0000000000000002 \*\*\*  
## Garage\_QualNo\_Garage NA   
## Garage\_QualFair <0.0000000000000002 \*\*\*  
## Garage\_QualGood <0.0000000000000002 \*\*\*  
## Garage\_QualExcellent NA   
## Garage\_QualPoor <0.0000000000000002 \*\*\*  
## Garage\_CondNo\_Garage NA   
## Garage\_CondFair <0.0000000000000002 \*\*\*  
## Garage\_CondPoor <0.0000000000000002 \*\*\*  
## Garage\_CondGood <0.0000000000000002 \*\*\*  
## Paved\_DrivePaved <0.0000000000000002 \*\*\*  
## Paved\_DriveDirt\_Gravel <0.0000000000000002 \*\*\*  
## Wood\_Deck\_SF <0.0000000000000002 \*\*\*  
## Open\_Porch\_SF <0.0000000000000002 \*\*\*  
## Enclosed\_Porch <0.0000000000000002 \*\*\*  
## Three\_season\_porch <0.0000000000000002 \*\*\*  
## Screen\_Porch <0.0000000000000002 \*\*\*  
## Pool\_Area <0.0000000000000002 \*\*\*  
## Pool\_QCExcellent <0.0000000000000002 \*\*\*  
## Pool\_QCTypical <0.0000000000000002 \*\*\*  
## Pool\_QCFair <0.0000000000000002 \*\*\*  
## Pool\_QCGood NA   
## FenceMinimum\_Privacy <0.0000000000000002 \*\*\*  
## FenceGood\_Privacy <0.0000000000000002 \*\*\*  
## FenceGood\_Wood <0.0000000000000002 \*\*\*  
## FenceMinimum\_Wood\_Wire <0.0000000000000002 \*\*\*  
## Misc\_FeatureGar2 <0.0000000000000002 \*\*\*  
## Misc\_FeatureShed <0.0000000000000002 \*\*\*  
## Misc\_FeatureOthr <0.0000000000000002 \*\*\*  
## Misc\_FeatureElev <0.0000000000000002 \*\*\*  
## Misc\_Val <0.0000000000000002 \*\*\*  
## Mo\_Sold <0.0000000000000002 \*\*\*  
## Year\_Sold <0.0000000000000002 \*\*\*  
## Sale\_TypeNew <0.0000000000000002 \*\*\*  
## Sale\_TypeCOD <0.0000000000000002 \*\*\*  
## Sale\_TypeCon <0.0000000000000002 \*\*\*  
## Sale\_TypeConLD <0.0000000000000002 \*\*\*  
## Sale\_TypeOth <0.0000000000000002 \*\*\*  
## Sale\_TypeConLI <0.0000000000000002 \*\*\*  
## Sale\_TypeConLw <0.0000000000000002 \*\*\*  
## Sale\_TypeCWD <0.0000000000000002 \*\*\*  
## Sale\_ConditionPartial <0.0000000000000002 \*\*\*  
## Sale\_ConditionFamily <0.0000000000000002 \*\*\*  
## Sale\_ConditionAbnorml <0.0000000000000002 \*\*\*  
## Sale\_ConditionAlloca <0.0000000000000002 \*\*\*  
## Sale\_ConditionAdjLand <0.0000000000000002 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 2133.1 on 1538 degrees of freedom  
## Residual deviance: 58246.5 on 1257 degrees of freedom  
## AIC: 58811  
##   
## Number of Fisher Scoring iterations: 17

options(scipen = 0)

All predictors are significant and coefficients make sense except for Bldg\_TypeDuplex , Exterior\_1stCBlock, Bsmt\_CondNo\_Basement, BsmtFin\_Type\_1No\_Basement, BsmtFin\_SF\_1

lasso on logistic regression

set.seed(123)  
folds = vfold\_cv(train, v = 5)

ames\_recipe4 <-   
 recipe(Above\_Median ~., train) %>%   
 step\_dummy(all\_nominal(), -all\_outcomes()) %>%   
 step\_normalize(all\_predictors(), -all\_nominal())   
  
ames\_spec <-   
 logistic\_reg(penalty = tune(), mixture = 1) %>%   
 set\_mode("classification") %>%   
 set\_engine("glmnet")   
  
ames\_workflow <-   
 workflow() %>%   
 add\_recipe(ames\_recipe4) %>%   
 add\_model(ames\_spec)   
  
ames\_grid = grid\_regular(penalty(), levels = 100)  
  
#note the use of alternative metric (min log loss)  
ames\_tune <-   
 tune\_grid(ames\_workflow, resamples = folds,   
 grid = ames\_grid, metrics = metric\_set(mn\_log\_loss))

## ! Fold1: preprocessor 1/1: Column(s) have zero variance so scaling cannot be used: `Neighborhood\_La...

## ! Fold2: preprocessor 1/1: Column(s) have zero variance so scaling cannot be used: `Neighborhood\_Gr...

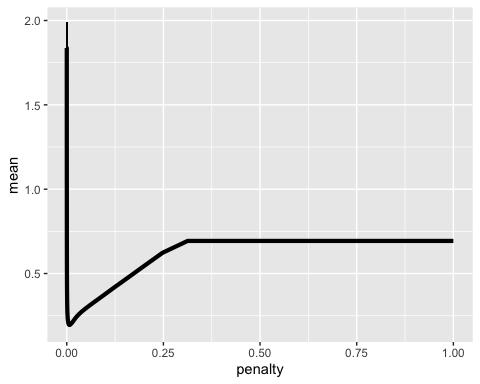
## ! Fold3: preprocessor 1/1: Column(s) have zero variance so scaling cannot be used: `MS\_Zoning\_A\_agr...

## ! Fold4: preprocessor 1/1: Column(s) have zero variance so scaling cannot be used: `MS\_Zoning\_I\_all...

## ! Fold5: preprocessor 1/1: Column(s) have zero variance so scaling cannot be used: `MS\_SubClass\_One...

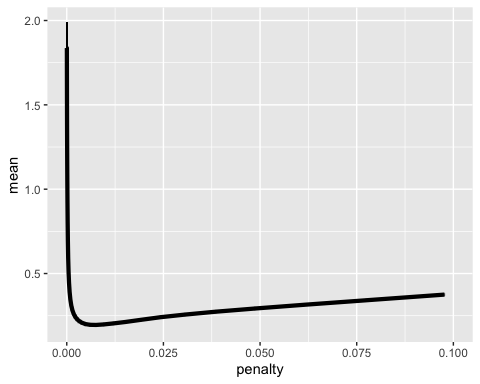
ames\_tune %>%  
 collect\_metrics() %>%  
 ggplot(aes(penalty, mean)) +  
 geom\_errorbar(aes(  
 ymin = mean - std\_err,  
 ymax = mean + std\_err  
 ),  
 alpha = 0.5  
 ) +  
 geom\_line(size = 1.5) +  
 theme(legend.position = "none")

## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.  
## ℹ Please use `linewidth` instead.



ames\_tune %>%  
 collect\_metrics() %>%  
 ggplot(aes(penalty, mean)) +  
 geom\_errorbar(aes(  
 ymin = mean - std\_err,  
 ymax = mean + std\_err  
 ),  
 alpha = 0.5  
 ) +  
 geom\_line(size = 1.5) +  
 theme(legend.position = "none") +   
 xlim(0,0.1)

## Warning: Removed 10 rows containing missing values (`geom\_line()`).



best\_mnlog = ames\_tune %>%  
 select\_best("mn\_log\_loss")  
best\_mnlog

## # A tibble: 1 × 2  
## penalty .config   
## <dbl> <chr>   
## 1 0.00756 Preprocessor1\_Model079

final\_lasso = ames\_workflow %>% finalize\_workflow(best\_mnlog)

lasso\_fit = fit(final\_lasso, ames)

options(scipen = 999)  
lasso\_fit %>%  
 extract\_fit\_parsnip() %>%  
 pluck("fit") %>%   
 coef(s = best\_mnlog$penalty) #show the coefficients for our selected lambda value

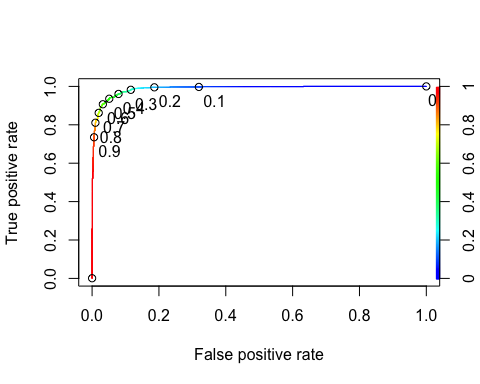
## 300 x 1 sparse Matrix of class "dgCMatrix"  
## s1  
## (Intercept) -0.2888460617  
## Lot\_Frontage .   
## Lot\_Area -0.0406412473  
## Year\_Built -0.2785783795  
## Year\_Remod\_Add -0.1628627543  
## Mas\_Vnr\_Area .   
## BsmtFin\_SF\_1 0.0951920673  
## BsmtFin\_SF\_2 .   
## Bsmt\_Unf\_SF .   
## Total\_Bsmt\_SF -0.4479360860  
## First\_Flr\_SF .   
## Second\_Flr\_SF .   
## Low\_Qual\_Fin\_SF 0.0449952940  
## Gr\_Liv\_Area -1.1593859575  
## Bsmt\_Full\_Bath -0.0338063097  
## Bsmt\_Half\_Bath .   
## Full\_Bath -0.5055060604  
## Half\_Bath -0.1333181740  
## Bedroom\_AbvGr .   
## Kitchen\_AbvGr 0.3835983214  
## TotRms\_AbvGrd .   
## Fireplaces -0.4665284717  
## Garage\_Cars -0.4822397704  
## Garage\_Area .   
## Wood\_Deck\_SF -0.1354754450  
## Open\_Porch\_SF .   
## Enclosed\_Porch .   
## Three\_season\_porch .   
## Screen\_Porch -0.0764796299  
## Pool\_Area .   
## Misc\_Val -0.0265536160  
## Mo\_Sold .   
## Year\_Sold .   
## MS\_SubClass\_Two\_Story\_1946\_and\_Newer -0.0321499648  
## MS\_SubClass\_One\_Story\_PUD\_1946\_and\_Newer .   
## MS\_SubClass\_One\_and\_Half\_Story\_Finished\_All\_Ages .   
## MS\_SubClass\_Two\_Story\_PUD\_1946\_and\_Newer 0.2038087963  
## MS\_SubClass\_Split\_or\_Multilevel -0.0678710374  
## MS\_SubClass\_One\_Story\_1945\_and\_Older .   
## MS\_SubClass\_Duplex\_All\_Styles\_and\_Ages .   
## MS\_SubClass\_Split\_Foyer -0.0198072181  
## MS\_SubClass\_Two\_Family\_conversion\_All\_Styles\_and\_Ages .   
## MS\_SubClass\_Two\_Story\_1945\_and\_Older .   
## MS\_SubClass\_One\_Story\_with\_Finished\_Attic\_All\_Ages .   
## MS\_SubClass\_PUD\_Multilevel\_Split\_Level\_Foyer .   
## MS\_SubClass\_One\_and\_Half\_Story\_Unfinished\_All\_Ages .   
## MS\_SubClass\_Two\_and\_Half\_Story\_All\_Ages .   
## MS\_SubClass\_One\_and\_Half\_Story\_PUD\_All\_Ages 0.0519290449  
## MS\_Zoning\_Residential\_High\_Density .   
## MS\_Zoning\_Floating\_Village\_Residential .   
## MS\_Zoning\_Residential\_Medium\_Density 0.2499510006  
## MS\_Zoning\_C\_all .   
## MS\_Zoning\_A\_agr .   
## MS\_Zoning\_I\_all .   
## Street\_Grvl .   
## Alley\_Paved -0.1476162555  
## Alley\_Gravel .   
## Lot\_Shape\_Regular 0.1025841538  
## Lot\_Shape\_Moderately\_Irregular .   
## Lot\_Shape\_Irregular .   
## Land\_Contour\_HLS .   
## Land\_Contour\_Bnk .   
## Land\_Contour\_Low .   
## Utilities\_NoSewr 0.0241384897  
## Lot\_Config\_Inside .   
## Lot\_Config\_CulDSac .   
## Lot\_Config\_FR2 .   
## Lot\_Config\_FR3 .   
## Land\_Slope\_Mod -0.1184087593  
## Land\_Slope\_Sev .   
## Neighborhood\_Gilbert -0.0695275042  
## Neighborhood\_Stone\_Brook .   
## Neighborhood\_Northwest\_Ames -0.0038322931  
## Neighborhood\_Somerset .   
## Neighborhood\_Briardale .   
## Neighborhood\_Northpark\_Villa 0.1710518624  
## Neighborhood\_Northridge\_Heights .   
## Neighborhood\_Bloomington\_Heights .   
## Neighborhood\_Northridge .   
## Neighborhood\_Sawyer\_West .   
## Neighborhood\_Sawyer 0.0085577119  
## Neighborhood\_Greens .   
## Neighborhood\_Old\_Town 0.0015100655  
## Neighborhood\_Brookside .   
## Neighborhood\_Iowa\_DOT\_and\_Rail\_Road .   
## Neighborhood\_Clear\_Creek -0.0005293173  
## Neighborhood\_South\_and\_West\_of\_Iowa\_State\_University .   
## Neighborhood\_Edwards 0.0016342199  
## Neighborhood\_College\_Creek .   
## Neighborhood\_Crawford -0.2098272271  
## Neighborhood\_Mitchell .   
## Neighborhood\_Timberland -0.0816747388  
## Neighborhood\_Meadow\_Village .   
## Neighborhood\_Veenker .   
## Neighborhood\_Blueste .   
## Neighborhood\_Landmark .   
## Neighborhood\_Green\_Hills -0.0473796286  
## Condition\_1\_Feedr 0.0426942981  
## Condition\_1\_RRAe 0.1201792345  
## Condition\_1\_PosA .   
## Condition\_1\_Artery .   
## Condition\_1\_PosN -0.0646376512  
## Condition\_1\_RRAn .   
## Condition\_1\_RRNn 0.0672202473  
## Condition\_1\_RRNe .   
## Condition\_2\_Feedr .   
## Condition\_2\_PosA .   
## Condition\_2\_PosN .   
## Condition\_2\_Artery .   
## Condition\_2\_RRNn .   
## Condition\_2\_RRAe .   
## Condition\_2\_RRAn .   
## Bldg\_Type\_TwnhsE .   
## Bldg\_Type\_Twnhs .   
## Bldg\_Type\_Duplex .   
## Bldg\_Type\_TwoFmCon .   
## House\_Style\_Two\_Story .   
## House\_Style\_One\_and\_Half\_Fin .   
## House\_Style\_SLvl .   
## House\_Style\_SFoyer .   
## House\_Style\_One\_and\_Half\_Unf .   
## House\_Style\_Two\_and\_Half\_Unf .   
## House\_Style\_Two\_and\_Half\_Fin .   
## Overall\_Qual\_Average 0.3168344880  
## Overall\_Qual\_Good -0.2287205377  
## Overall\_Qual\_Very\_Good -0.2393878249  
## Overall\_Qual\_Excellent .   
## Overall\_Qual\_Below\_Average 0.2099166342  
## Overall\_Qual\_Fair .   
## Overall\_Qual\_Poor .   
## Overall\_Qual\_Very\_Excellent .   
## Overall\_Qual\_Very\_Poor .   
## Overall\_Cond\_Above\_Average .   
## Overall\_Cond\_Good .   
## Overall\_Cond\_Poor .   
## Overall\_Cond\_Very\_Good .   
## Overall\_Cond\_Below\_Average .   
## Overall\_Cond\_Excellent .   
## Overall\_Cond\_Fair 0.2206834147  
## Overall\_Cond\_Very\_Poor .   
## Roof\_Style\_Gable .   
## Roof\_Style\_Mansard 0.0060535315  
## Roof\_Style\_Gambrel -0.0003850516  
## Roof\_Style\_Shed .   
## Roof\_Style\_Flat .   
## Roof\_Matl\_WdShake .   
## Roof\_Matl\_Tar.Grv .   
## Roof\_Matl\_WdShngl .   
## Roof\_Matl\_Roll .   
## Roof\_Matl\_Metal -0.0120826212  
## Exterior\_1st\_VinylSd .   
## Exterior\_1st\_Wd.Sdng .   
## Exterior\_1st\_HdBoard -0.0286576231  
## Exterior\_1st\_CemntBd .   
## Exterior\_1st\_Plywood 0.0109497664  
## Exterior\_1st\_MetalSd .   
## Exterior\_1st\_AsbShng .   
## Exterior\_1st\_WdShing .   
## Exterior\_1st\_Stucco .   
## Exterior\_1st\_AsphShn .   
## Exterior\_1st\_BrkComm -0.0088877921  
## Exterior\_1st\_PreCast -0.0122917037  
## Exterior\_1st\_ImStucc .   
## Exterior\_1st\_Stone .   
## Exterior\_1st\_CBlock .   
## Exterior\_2nd\_VinylSd .   
## Exterior\_2nd\_Wd.Sdng .   
## Exterior\_2nd\_BrkFace .   
## Exterior\_2nd\_HdBoard -0.0256303102  
## Exterior\_2nd\_CmentBd .   
## Exterior\_2nd\_Wd.Shng .   
## Exterior\_2nd\_MetalSd .   
## Exterior\_2nd\_ImStucc .   
## Exterior\_2nd\_Brk.Cmn .   
## Exterior\_2nd\_AsbShng .   
## Exterior\_2nd\_Stucco -0.0241299656  
## Exterior\_2nd\_AsphShn .   
## Exterior\_2nd\_CBlock -0.0295122921  
## Exterior\_2nd\_Stone .   
## Exterior\_2nd\_PreCast -0.0001259873  
## Exterior\_2nd\_Other .   
## Mas\_Vnr\_Type\_None .   
## Mas\_Vnr\_Type\_BrkFace .   
## Mas\_Vnr\_Type\_BrkCmn .   
## Mas\_Vnr\_Type\_CBlock .   
## Exter\_Qual\_Good -0.1460212021  
## Exter\_Qual\_Excellent .   
## Exter\_Qual\_Fair .   
## Exter\_Cond\_Good .   
## Exter\_Cond\_Fair .   
## Exter\_Cond\_Excellent .   
## Exter\_Cond\_Poor .   
## Foundation\_PConc -0.2904721956  
## Foundation\_Wood .   
## Foundation\_BrkTil .   
## Foundation\_Slab .   
## Foundation\_Stone .   
## Bsmt\_Qual\_Good .   
## Bsmt\_Qual\_Excellent .   
## Bsmt\_Qual\_No\_Basement .   
## Bsmt\_Qual\_Fair .   
## Bsmt\_Qual\_Poor .   
## Bsmt\_Cond\_Typical .   
## Bsmt\_Cond\_Poor .   
## Bsmt\_Cond\_No\_Basement .   
## Bsmt\_Cond\_Fair .   
## Bsmt\_Cond\_Excellent -0.0064348983  
## Bsmt\_Exposure\_No .   
## Bsmt\_Exposure\_Av .   
## Bsmt\_Exposure\_Mn .   
## Bsmt\_Exposure\_No\_Basement .   
## BsmtFin\_Type\_1\_Rec .   
## BsmtFin\_Type\_1\_ALQ -0.0682552835  
## BsmtFin\_Type\_1\_GLQ -0.1650932758  
## BsmtFin\_Type\_1\_Unf .   
## BsmtFin\_Type\_1\_LwQ .   
## BsmtFin\_Type\_1\_No\_Basement .   
## BsmtFin\_Type\_2\_LwQ .   
## BsmtFin\_Type\_2\_BLQ .   
## BsmtFin\_Type\_2\_Rec .   
## BsmtFin\_Type\_2\_GLQ .   
## BsmtFin\_Type\_2\_No\_Basement .   
## BsmtFin\_Type\_2\_ALQ -0.0688812912  
## Heating\_GasW .   
## Heating\_Grav .   
## Heating\_Wall .   
## Heating\_Floor .   
## Heating\_OthW .   
## Heating\_QC\_Typical 0.1203940026  
## Heating\_QC\_Excellent .   
## Heating\_QC\_Good .   
## Heating\_QC\_Poor .   
## Central\_Air\_N .   
## Electrical\_FuseA 0.0076385456  
## Electrical\_FuseF .   
## Electrical\_FuseP .   
## Electrical\_Unknown .   
## Kitchen\_Qual\_Good -0.0699270572  
## Kitchen\_Qual\_Excellent .   
## Kitchen\_Qual\_Fair .   
## Kitchen\_Qual\_Poor .   
## Functional\_Mod 0.0008217493  
## Functional\_Min2 .   
## Functional\_Min1 .   
## Functional\_Maj1 0.1216232381  
## Functional\_Maj2 0.0358296742  
## Functional\_Sev 0.0752510723  
## Functional\_Sal .   
## Fireplace\_Qu\_No\_Fireplace .   
## Fireplace\_Qu\_Typical -0.1313993403  
## Fireplace\_Qu\_Poor .   
## Fireplace\_Qu\_Excellent .   
## Fireplace\_Qu\_Fair .   
## Garage\_Type\_BuiltIn .   
## Garage\_Type\_Basment .   
## Garage\_Type\_Detchd 0.1604704443  
## Garage\_Type\_No\_Garage .   
## Garage\_Type\_CarPort .   
## Garage\_Type\_More\_Than\_Two\_Types .   
## Garage\_Finish\_Unf 0.1406531987  
## Garage\_Finish\_RFn .   
## Garage\_Finish\_No\_Garage .   
## Garage\_Qual\_No\_Garage .   
## Garage\_Qual\_Fair .   
## Garage\_Qual\_Good .   
## Garage\_Qual\_Excellent .   
## Garage\_Qual\_Poor .   
## Garage\_Cond\_No\_Garage .   
## Garage\_Cond\_Fair .   
## Garage\_Cond\_Excellent .   
## Garage\_Cond\_Poor .   
## Garage\_Cond\_Good .   
## Paved\_Drive\_Paved .   
## Paved\_Drive\_Dirt\_Gravel .   
## Pool\_QC\_Excellent .   
## Pool\_QC\_Typical 0.0380912020  
## Pool\_QC\_Fair .   
## Pool\_QC\_Good .   
## Fence\_Minimum\_Privacy 0.0098745205  
## Fence\_Good\_Privacy .   
## Fence\_Good\_Wood 0.1036914867  
## Fence\_Minimum\_Wood\_Wire .   
## Misc\_Feature\_Gar2 .   
## Misc\_Feature\_Shed .   
## Misc\_Feature\_Othr .   
## Misc\_Feature\_Elev .   
## Sale\_Type\_New .   
## Sale\_Type\_COD 0.1739958539  
## Sale\_Type\_Con .   
## Sale\_Type\_ConLD .   
## Sale\_Type\_Oth .   
## Sale\_Type\_ConLI .   
## Sale\_Type\_ConLw .   
## Sale\_Type\_CWD .   
## Sale\_Type\_VWD .   
## Sale\_Condition\_Partial .   
## Sale\_Condition\_Family 0.1556518917  
## Sale\_Condition\_Abnorml 0.0951677184  
## Sale\_Condition\_Alloca -0.0425210166  
## Sale\_Condition\_AdjLand .

options(scipen = 0)

tidy(lasso\_fit)

## # A tibble: 300 × 3  
## term estimate penalty  
## <chr> <dbl> <dbl>  
## 1 (Intercept) -0.289 0.00756  
## 2 Lot\_Frontage 0 0.00756  
## 3 Lot\_Area -0.0406 0.00756  
## 4 Year\_Built -0.279 0.00756  
## 5 Year\_Remod\_Add -0.163 0.00756  
## 6 Mas\_Vnr\_Area 0 0.00756  
## 7 BsmtFin\_SF\_1 0.0952 0.00756  
## 8 BsmtFin\_SF\_2 0 0.00756  
## 9 Bsmt\_Unf\_SF 0 0.00756  
## 10 Total\_Bsmt\_SF -0.448 0.00756  
## # … with 290 more rows

predictions = predict(lasso\_fit, ames, type="prob")[1]  
  
ROCRpred = prediction(predictions, ames$Above\_Median)   
  
###You shouldn't need to ever change the next two lines:  
ROCRperf = performance(ROCRpred, "tpr", "fpr")  
plot(ROCRperf, colorize=TRUE, print.cutoffs.at=seq(0,1,by=0.1), text.adj=c(-0.2,1.7))



#Determine threshold to balance sensitivity and specificity  
#DO NOT modify this code  
opt.cut = function(perf, pred){  
 cut.ind = mapply(FUN=function(x, y, p){  
 d = (x - 0)^2 + (y-1)^2  
 ind = which(d == min(d))  
 c(sensitivity = y[[ind]], specificity = 1-x[[ind]],   
 cutoff = p[[ind]])  
 }, perf@x.values, perf@y.values, pred@cutoffs)  
}  
print(opt.cut(ROCRperf, ROCRpred))

## [,1]  
## sensitivity 0.9415149  
## specificity 0.9465347  
## cutoff 0.4918981

Lasso on logistic regression looks good

Create training and test splits for tress

set.seed(123)   
ames\_split = initial\_split(ames, prop = 0.7, strata = Above\_Median) #70% in training  
train = training(ames\_split)  
test = testing(ames\_split)

Set-up our folds

set.seed(123)  
folds = vfold\_cv(train, v = 5)

We have already created logistic regression model, Let’s build three models: A classification tree, a random forest, and an XGB model. First, some preliminaries.

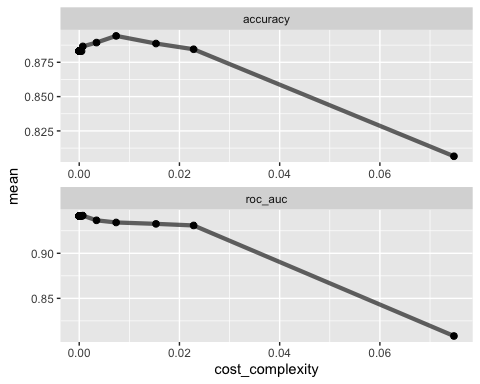
ames\_recipe5 = recipe(Above\_Median ~., train) #set-up a basic recipe, we can add to it as needed  
  
ctrl\_grid = control\_stack\_grid() #necessary for working with the stacks package  
ctrl\_res = control\_stack\_resamples() #necessary for working with the stacks package

### Tree Model

Set-up the classification tree

tree\_model = decision\_tree(cost\_complexity = tune()) %>%   
 set\_engine("rpart", model = TRUE) %>%   
 set\_mode("classification")  
  
tree\_recipe = ames\_recipe5 %>%  
 step\_dummy(all\_nominal(),-all\_outcomes())  
  
tree\_workflow = workflow() %>%  
 add\_model(tree\_model) %>%  
 add\_recipe(tree\_recipe)  
  
set.seed(1234)  
tree\_res =   
 tree\_workflow %>%   
 tune\_grid(  
 resamples = folds,  
 grid = 25, #try 25 reasonable values for cp  
 control = ctrl\_grid #needed for stacking  
 )

tree\_res %>%  
 collect\_metrics() %>%  
 ggplot(aes(cost\_complexity, mean)) +  
 geom\_line(size = 1.5, alpha = 0.6) +  
 geom\_point(size = 2) +  
 facet\_wrap(~ .metric, scales = "free", nrow = 2)



best\_tree = tree\_res %>%  
 select\_best("accuracy")  
  
best\_tree

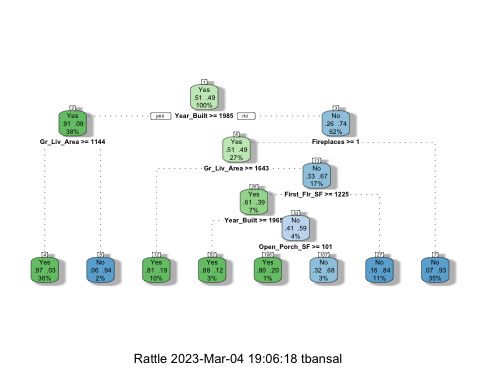
## # A tibble: 1 × 2  
## cost\_complexity .config   
## <dbl> <chr>   
## 1 0.00737 Preprocessor1\_Model20

final\_wf =   
 tree\_workflow %>%   
 finalize\_workflow(best\_tree)

final\_fit = fit(final\_wf, train)  
  
tree = final\_fit %>%   
 pull\_workflow\_fit() %>%   
 pluck("fit")

## Warning: `pull\_workflow\_fit()` was deprecated in workflows 0.2.3.  
## ℹ Please use `extract\_fit\_parsnip()` instead.

fancyRpartPlot(tree, tweak = 1.5)



treepred = predict(final\_fit, train, type = "class")  
head(treepred)

## # A tibble: 6 × 1  
## .pred\_class  
## <fct>   
## 1 No   
## 2 No   
## 3 No   
## 4 No   
## 5 No   
## 6 No

confusionMatrix(treepred$.pred\_class,train$Above\_Median,positive="Yes") #predictions first then actual

## Confusion Matrix and Statistics  
##   
## Reference  
## Prediction Yes No  
## Yes 656 49  
## No 74 658  
##   
## Accuracy : 0.9144   
## 95% CI : (0.8987, 0.9284)  
## No Information Rate : 0.508   
## P-Value [Acc > NIR] : < 2e-16   
##   
## Kappa : 0.8289   
##   
## Mcnemar's Test P-Value : 0.03046   
##   
## Sensitivity : 0.8986   
## Specificity : 0.9307   
## Pos Pred Value : 0.9305   
## Neg Pred Value : 0.8989   
## Prevalence : 0.5080   
## Detection Rate : 0.4565   
## Detection Prevalence : 0.4906   
## Balanced Accuracy : 0.9147   
##   
## 'Positive' Class : Yes   
##

Predictions on testing set

treepred\_test = predict(final\_fit, test, type = "class")  
head(treepred\_test)

## # A tibble: 6 × 1  
## .pred\_class  
## <fct>   
## 1 No   
## 2 Yes   
## 3 Yes   
## 4 Yes   
## 5 Yes   
## 6 Yes

confusionMatrix(treepred\_test$.pred\_class,test$Above\_Median,positive="Yes") #predictions first then actual

## Confusion Matrix and Statistics  
##   
## Reference  
## Prediction Yes No  
## Yes 274 29  
## No 39 274  
##   
## Accuracy : 0.8896   
## 95% CI : (0.8622, 0.9133)  
## No Information Rate : 0.5081   
## P-Value [Acc > NIR] : <2e-16   
##   
## Kappa : 0.7793   
##   
## Mcnemar's Test P-Value : 0.2751   
##   
## Sensitivity : 0.8754   
## Specificity : 0.9043   
## Pos Pred Value : 0.9043   
## Neg Pred Value : 0.8754   
## Prevalence : 0.5081   
## Detection Rate : 0.4448   
## Detection Prevalence : 0.4919   
## Balanced Accuracy : 0.8898   
##   
## 'Positive' Class : Yes   
##

### Random Forest Model

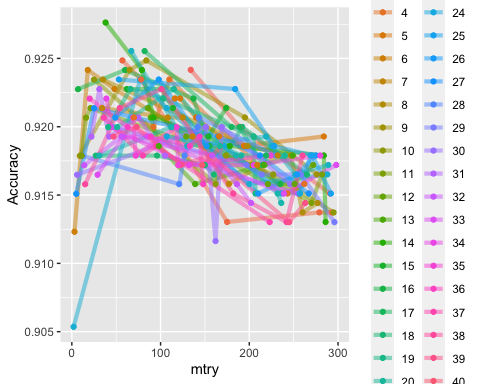
rf\_recipe = tree\_recipe %>%  
 step\_dummy(all\_nominal(), -all\_outcomes())  
   
 rf\_model = rand\_forest(mtry = tune(), min\_n = tune(), trees = 200) %>% #add tuning of mtry and min\_n parameters  
 set\_engine("ranger", importance = "permutation") %>% #added importance metric  
 set\_mode("classification")  
   
 rf\_wflow =   
 workflow() %>%   
 add\_model(rf\_model) %>%   
 add\_recipe(rf\_recipe)  
   
 set.seed(1234)  
 rf\_res = tune\_grid(  
 rf\_wflow,  
 resamples = folds,  
 grid = 200,   
 control = ctrl\_grid  
)

## i Creating pre-processing data to finalize unknown parameter: mtry

saveRDS(rf\_res,"rf\_res.rds")

rf\_res = readRDS("rf\_res.rds")

rf\_res %>%  
 collect\_metrics() %>%  
 filter(.metric == "accuracy") %>%  
 mutate(min\_n = factor(min\_n)) %>%  
 ggplot(aes(mtry, mean, color = min\_n)) +  
 geom\_line(alpha = 0.5, size = 1.5) +  
 geom\_point() +  
 labs(y = "Accuracy")



nn\_recipe = ames\_recipe5 %>%  
 step\_normalize(all\_predictors(), -all\_nominal()) #normalize the numeric predictors, not needed for categorical  
   
 nn\_model =  
 mlp(hidden\_units = tune(), penalty = tune(),  
 epochs = tune()) %>%  
 set\_mode("classification") %>%  
 set\_engine("nnet", verbose = 0) #verbose = 0 reduces output from the model  
   
 nn\_workflow <-  
 workflow() %>%  
 add\_recipe(nn\_recipe) %>%  
 add\_model(nn\_model)  
   
 set.seed(1234)  
 neural\_res <-  
 tune\_grid(nn\_workflow,  
 resamples = folds,  
 grid = 200,  
 control = ctrl\_grid)

## x Fold1: preprocessor 1/1, model 1/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 2/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 3/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 5/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 6/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 7/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 8/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 10/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 11/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 13/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 14/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 15/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 16/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 17/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 20/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 22/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 23/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 24/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 28/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 29/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 30/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 31/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 32/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 35/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 37/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 38/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 39/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 40/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 41/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 42/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 43/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 45/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 46/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 48/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 49/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 50/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 51/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 52/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 53/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 54/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 55/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 56/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 58/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 59/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 60/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 62/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 63/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 64/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 66/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 67/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 68/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 69/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 70/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 72/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 73/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 74/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 75/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 76/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 78/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 79/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 81/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 82/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 84/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 86/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 87/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 88/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 89/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 90/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 91/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 92/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 93/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 94/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 97/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 98/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 100/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 102/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 104/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 107/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 108/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 109/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 110/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 111/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 115/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 117/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 118/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 119/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 120/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 121/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 122/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 123/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 124/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 125/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 126/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 127/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 129/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 130/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 131/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 135/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 137/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 138/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 139/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 140/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 141/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 142/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 143/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 145/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 146/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 147/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 148/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 149/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 150/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 152/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 154/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 155/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 157/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 158/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 159/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 160/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 161/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 164/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 165/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 167/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 168/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 169/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 170/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 171/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 172/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 173/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 174/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 176/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 177/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 180/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold1: preprocessor 1/1, model 181/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 182/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 184/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 185/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 186/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold1: preprocessor 1/1, model 187/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold1: preprocessor 1/1, model 188/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 190/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold1: preprocessor 1/1, model 192/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold1: preprocessor 1/1, model 197/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold1: preprocessor 1/1, model 199/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold1: preprocessor 1/1, model 200/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 1/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 2/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 3/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 5/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 6/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 7/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 8/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 10/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 11/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 13/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 14/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 15/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 16/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 17/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 20/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 22/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 23/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 24/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 28/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 29/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 30/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 31/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 32/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 35/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 37/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 38/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 39/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 40/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 41/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 42/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 43/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 45/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 46/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 48/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 49/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 50/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 51/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 52/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 53/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 54/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 55/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 56/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 58/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 59/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 60/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 62/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 63/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 64/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 66/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 67/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 68/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 69/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 70/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 72/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 73/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 74/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 75/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 76/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 78/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 79/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 81/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 82/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 84/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 86/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 87/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 88/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 89/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 90/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 91/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 92/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 93/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 94/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 97/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 98/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 100/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 102/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 104/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 107/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 108/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 109/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 110/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 111/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 115/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 117/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 118/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 119/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 120/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 121/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 122/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 123/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 124/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 125/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 126/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 127/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 129/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 130/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 131/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 135/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 137/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 138/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 139/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 140/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 141/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 142/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 143/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 145/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 146/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 147/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 148/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 149/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 150/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 152/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 154/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 155/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 157/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 158/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 159/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 160/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 161/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 164/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 165/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 167/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 168/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 169/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 170/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 171/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 172/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 173/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 174/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 176/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 177/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 180/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold2: preprocessor 1/1, model 181/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 182/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 184/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 185/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 186/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold2: preprocessor 1/1, model 187/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold2: preprocessor 1/1, model 188/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 190/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold2: preprocessor 1/1, model 192/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold2: preprocessor 1/1, model 197/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold2: preprocessor 1/1, model 199/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold2: preprocessor 1/1, model 200/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 1/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 2/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 3/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 5/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 6/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 7/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 8/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 10/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 11/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 13/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 14/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 15/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 16/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 17/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 20/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 22/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 23/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 24/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 28/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 29/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 30/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 31/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 32/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 35/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 37/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 38/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 39/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 40/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 41/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 42/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 43/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 45/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 46/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 48/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 49/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 50/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 51/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 52/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 53/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 54/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 55/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 56/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 58/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 59/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 60/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 62/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 63/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 64/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 66/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 67/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 68/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 69/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 70/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 72/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 73/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 74/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 75/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 76/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 78/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 79/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 81/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 82/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 84/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 86/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 87/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 88/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 89/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 90/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 91/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 92/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 93/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 94/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 97/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 98/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 100/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 102/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 104/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 107/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 108/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 109/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 110/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 111/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 115/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 117/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 118/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 119/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 120/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 121/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 122/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 123/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 124/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 125/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 126/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 127/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 129/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 130/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 131/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 135/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 137/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 138/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 139/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 140/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 141/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 142/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 143/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 145/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 146/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 147/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 148/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 149/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 150/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 152/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 154/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 155/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 157/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 158/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 159/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 160/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 161/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 164/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 165/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 167/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 168/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 169/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 170/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 171/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 172/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 173/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 174/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 176/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 177/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 180/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold3: preprocessor 1/1, model 181/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 182/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 184/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 185/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 186/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold3: preprocessor 1/1, model 187/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold3: preprocessor 1/1, model 188/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 190/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold3: preprocessor 1/1, model 192/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold3: preprocessor 1/1, model 197/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold3: preprocessor 1/1, model 199/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold3: preprocessor 1/1, model 200/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 1/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 2/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 3/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 5/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 6/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 7/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 8/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 10/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 11/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 13/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 14/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 15/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 16/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 17/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 20/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 22/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 23/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 24/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 28/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 29/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 30/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 31/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 32/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 35/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 37/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 38/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 39/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 40/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 41/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 42/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 43/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 45/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 46/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 48/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 49/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 50/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 51/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 52/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 53/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 54/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 55/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 56/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 58/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 59/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 60/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 62/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 63/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 64/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 66/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 67/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 68/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 69/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 70/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 72/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 73/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 74/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 75/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 76/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 78/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 79/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 81/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 82/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 84/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 86/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 87/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 88/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 89/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 90/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 91/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 92/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 93/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 94/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 97/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 98/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 100/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 102/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 104/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 107/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 108/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 109/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 110/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 111/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 115/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 117/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 118/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 119/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 120/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 121/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 122/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 123/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 124/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 125/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 126/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 127/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 129/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 130/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 131/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 135/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 137/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 138/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 139/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 140/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 141/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 142/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 143/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 145/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 146/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 147/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 148/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 149/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 150/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 152/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 154/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 155/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 157/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 158/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 159/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 160/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 161/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 164/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 165/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 167/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 168/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 169/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 170/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 171/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 172/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 173/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 174/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 176/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 177/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 180/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold4: preprocessor 1/1, model 181/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 182/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 184/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 185/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 186/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold4: preprocessor 1/1, model 187/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold4: preprocessor 1/1, model 188/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 190/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold4: preprocessor 1/1, model 192/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold4: preprocessor 1/1, model 197/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold4: preprocessor 1/1, model 199/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold4: preprocessor 1/1, model 200/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 1/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 2/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 3/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 5/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 6/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 7/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 8/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 10/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 11/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 13/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 14/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 15/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 16/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 17/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 20/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 22/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 23/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 24/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 28/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 29/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 30/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 31/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 32/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 35/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 37/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 38/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 39/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 40/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 41/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 42/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 43/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 45/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 46/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 48/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 49/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 50/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 51/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 52/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 53/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 54/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 55/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 56/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 58/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 59/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 60/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 62/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 63/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 64/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 66/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 67/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 68/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 69/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 70/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 72/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 73/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 74/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 75/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 76/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 78/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 79/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 81/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 82/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 84/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 86/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 87/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 88/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 89/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 90/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 91/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 92/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 93/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 94/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 97/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 98/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 100/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 102/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 104/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 107/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 108/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 109/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 110/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 111/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 115/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 117/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 118/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 119/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 120/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 121/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 122/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 123/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 124/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 125/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 126/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 127/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 129/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 130/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 131/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 135/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 137/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 138/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 139/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 140/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 141/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 142/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 143/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 145/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 146/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 147/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 148/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 149/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 150/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 152/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 154/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 155/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 157/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 158/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 159/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 160/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 161/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 164/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 165/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 167/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 168/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 169/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 170/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 171/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 172/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 173/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 174/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 176/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 177/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

## x Fold5: preprocessor 1/1, model 180/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2108) wei...

## x Fold5: preprocessor 1/1, model 181/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 182/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 184/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 185/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 186/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

## x Fold5: preprocessor 1/1, model 187/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (3011) wei...

## x Fold5: preprocessor 1/1, model 188/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 190/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1205) wei...

## x Fold5: preprocessor 1/1, model 192/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1807) wei...

## x Fold5: preprocessor 1/1, model 197/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (1506) wei...

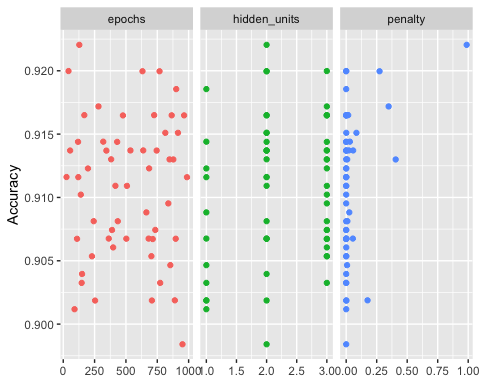
## x Fold5: preprocessor 1/1, model 199/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2710) wei...

## x Fold5: preprocessor 1/1, model 200/200: Error in nnet.default(x, y, w, entropy = TRUE, ...): too many (2409) wei...

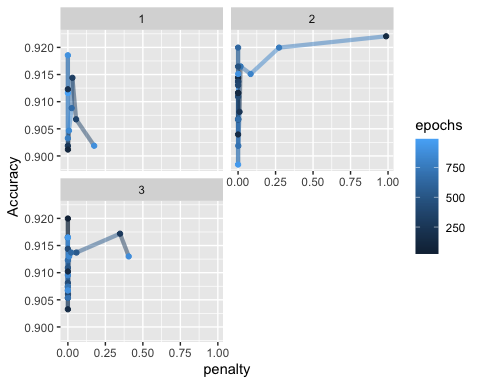
saveRDS(neural\_res,"neural\_res.rds")

neural\_res = readRDS("neural\_res.rds")

neural\_res %>%  
 collect\_metrics() %>%  
 filter(.metric == "accuracy") %>%  
 select(mean, hidden\_units, penalty, epochs) %>%  
 pivot\_longer(hidden\_units:epochs,  
 values\_to = "value",  
 names\_to = "parameter"  
 ) %>%  
 ggplot(aes(value, mean, color = parameter)) +  
 geom\_point(show.legend = FALSE) +  
 facet\_wrap(~parameter, scales = "free\_x") +  
 labs(x = NULL, y = "Accuracy")



neural\_res %>%  
 collect\_metrics() %>%  
 filter(.metric == "accuracy") %>%  
 mutate(hidden\_units = factor(hidden\_units)) %>%  
 ggplot(aes(penalty, mean, color = epochs)) +  
 geom\_line(alpha = 0.5, size = 1.5) +  
 geom\_point() +  
 facet\_wrap(~hidden\_units, ncol =2 ) +   
 labs(y = "Accuracy")



### XGB

start\_time = Sys.time() #for timing  
  
tgrid = expand.grid(  
 trees = 100, #50, 100, and 150 in default   
 min\_n = 1, #fixed at 1 as default   
 tree\_depth = c(1,2,3,4), #1, 2, and 3 in default   
 learn\_rate = c(0.01, 0.1, 0.2, 0.3, 0.4), #0.3 and 0.4 in default   
 loss\_reduction = 0, #fixed at 0 in default   
 sample\_size = c(0.5, 0.8, 1)) #0.5, 0.75, and 1 in default,   
  
xgboost\_recipe <-   
 recipe(formula = Above\_Median ~ ., data = train) %>%   
 #step\_novel(all\_nominal(), -all\_outcomes()) %>%   
 step\_dummy(all\_nominal(), -all\_outcomes(), one\_hot = TRUE) %>%   
 step\_zv(all\_predictors())   
  
xgboost\_spec <-   
 boost\_tree(trees = tune(), min\_n = tune(), tree\_depth = tune(), learn\_rate = tune(),   
 loss\_reduction = tune(), sample\_size = tune()) %>%   
 set\_mode("classification") %>%   
 set\_engine("xgboost")   
  
xgboost\_workflow <-   
 workflow() %>%   
 add\_recipe(xgboost\_recipe) %>%   
 add\_model(xgboost\_spec)   
  
set.seed(1234)  
xgb\_res <-  
 tune\_grid(xgboost\_workflow,   
 resamples = folds,   
 grid = tgrid,  
 control = ctrl\_grid)  
  
end\_time = Sys.time()  
end\_time-start\_time

## Time difference of 5.961686 mins

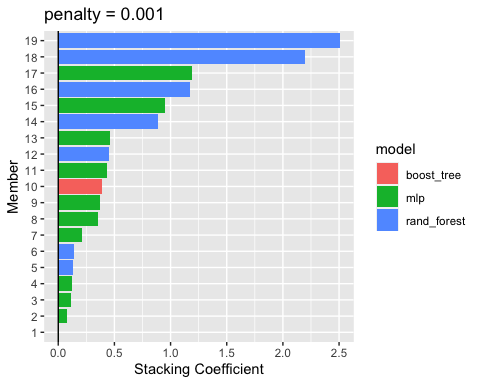
ames\_stacks = stacks() %>%  
 add\_candidates(tree\_res) %>%  
 add\_candidates(rf\_res) %>%   
 add\_candidates(neural\_res) %>%  
 add\_candidates(xgb\_res)

## Warning: Predictions from 36 candidates were identical to those from existing candidates  
## and were removed from the data stack.

## Warning: The inputted `candidates` argument `neural\_res` generated notes during  
## tuning/resampling. Model stacking may fail due to these issues; see  
## ]8;;ide:help:tune::collect\_notes`collect\_notes()`]8;; if so.

ames\_blend =   
 ames\_stacks %>%   
 blend\_predictions(metric = metric\_set(accuracy)) #fits a Lasso model to the stack   
 #setting the metric in the above line is extremely important!!

autoplot(ames\_blend, type = "weights")

 Fit the stack to training data

#Fit the stack on the training set  
ames\_blend <-  
 ames\_blend %>%  
 fit\_members()

Predictions

trainpredstack = predict(ames\_blend, train)  
head(trainpredstack)

## # A tibble: 6 × 1  
## .pred\_class  
## <fct>   
## 1 No   
## 2 No   
## 3 No   
## 4 No   
## 5 No   
## 6 No

Confusion matrix

confusionMatrix(trainpredstack$.pred\_class, train$Above\_Median,   
 positive = "Yes")

## Confusion Matrix and Statistics  
##   
## Reference  
## Prediction Yes No  
## Yes 726 8  
## No 4 699  
##   
## Accuracy : 0.9916   
## 95% CI : (0.9855, 0.9957)  
## No Information Rate : 0.508   
## P-Value [Acc > NIR] : <2e-16   
##   
## Kappa : 0.9833   
##   
## Mcnemar's Test P-Value : 0.3865   
##   
## Sensitivity : 0.9945   
## Specificity : 0.9887   
## Pos Pred Value : 0.9891   
## Neg Pred Value : 0.9943   
## Prevalence : 0.5080   
## Detection Rate : 0.5052   
## Detection Prevalence : 0.5108   
## Balanced Accuracy : 0.9916   
##   
## 'Positive' Class : Yes   
##

Predictions

testpredstack = predict(ames\_blend, test)  
head(testpredstack)

## # A tibble: 6 × 1  
## .pred\_class  
## <fct>   
## 1 No   
## 2 Yes   
## 3 Yes   
## 4 Yes   
## 5 Yes   
## 6 Yes

Confusion matrix

confusionMatrix(testpredstack$.pred\_class, test$Above\_Median,   
 positive = "Yes")

## Confusion Matrix and Statistics  
##   
## Reference  
## Prediction Yes No  
## Yes 282 23  
## No 31 280  
##   
## Accuracy : 0.9123   
## 95% CI : (0.8872, 0.9335)  
## No Information Rate : 0.5081   
## P-Value [Acc > NIR] : <2e-16   
##   
## Kappa : 0.8247   
##   
## Mcnemar's Test P-Value : 0.3408   
##   
## Sensitivity : 0.9010   
## Specificity : 0.9241   
## Pos Pred Value : 0.9246   
## Neg Pred Value : 0.9003   
## Prevalence : 0.5081   
## Detection Rate : 0.4578   
## Detection Prevalence : 0.4951   
## Balanced Accuracy : 0.9125   
##   
## 'Positive' Class : Yes   
##

Compare model performance on test set

test = test %>% bind\_cols(predict(ames\_blend,.))

#compare the results of the stacked model to the constituent models  
member\_testpreds =   
 test %>%  
 select(Above\_Median) %>%  
 bind\_cols(predict(ames\_blend, test, members = TRUE))

map\_dfr(member\_testpreds, accuracy, truth = Above\_Median, data = member\_testpreds) %>%  
 mutate(member = colnames(member\_testpreds))

## # A tibble: 21 × 4  
## .metric .estimator .estimate member   
## <chr> <chr> <dbl> <chr>   
## 1 accuracy binary 1 Above\_Median   
## 2 accuracy binary 0.912 .pred\_class   
## 3 accuracy binary 0.893 .pred\_class\_rf\_res\_1\_066   
## 4 accuracy binary 0.898 .pred\_class\_rf\_res\_1\_076   
## 5 accuracy binary 0.901 .pred\_class\_rf\_res\_1\_009   
## 6 accuracy binary 0.907 .pred\_class\_rf\_res\_1\_032   
## 7 accuracy binary 0.907 .pred\_class\_rf\_res\_1\_086   
## 8 accuracy binary 0.911 .pred\_class\_rf\_res\_1\_178   
## 9 accuracy binary 0.904 .pred\_class\_rf\_res\_1\_158   
## 10 accuracy binary 0.885 .pred\_class\_neural\_res\_1\_077  
## # … with 11 more rows