In [9]:

```
# Reading Training Data
train_data<-read.csv(file="~/Desktop/all/train.csv",stringsAsFactors = FALSE)
```

In [10]:

```
head(train_data)
```

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Ca
1	0	3	Braund, Mr. Owen Harris	male	22	1	0	A/5 21171	7.2500	
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Thayer)	female	38	1	0	PC 17599	71.2833	C
3	1	3	Heikkinen, Miss. Laina	female	26	0	0	STON/O2. 3101282	7.9250	
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35	1	0	113803	53.1000	C
5	0	3	Allen, Mr. William Henry	male	35	0	0	373450	8.0500	
6	0	3	Moran, Mr. James	male	NA	0	0	330877	8.4583	

In [11]:

```
# Total No of Rows
nrow(train_data)
```

891

In [64]:

```

```

Package	LibPath	Version	Priority	Depends	Imports	LinkingTo	Suggests	Enhances	Licen

In [67]:

```
```

```
Error: ggplot2 doesn't know how to deal with data of class uneval
Traceback:

1. ggplot(train_data = full[1:LT, ], aes(x = Sex, fill = Survived))
2. ggplot.default(train_data = full[1:LT, ], aes(x = Sex, fill = Sur
vived))
3. ggplot.data.frame(fortify(data, ...), mapping, environment = envi
ronment)
4. structure(list(data = data, layers = list(), scales = scales_list
(),
 .     mapping = mapping, theme = list(), coordinates = coord_cartes
ian(),
 .     facet = facet_null(), plot_env = environment), class = c("g
g",
 .     "ggplot"))
5. fortify(data, ...)
6. fortify.default(data, ...)
7. stop("ggplot2 doesn't know how to deal with data of class ",
 .     paste(class(model), collapse = "/"), call. = FALSE)
```

In [12]:

```
test_data<-read.csv(file="~/Desktop/all/test.csv",stringsAsFactors = FALSE)
```

In [13]:

```
#Columns Age, Embarked have NAs
summary(train_data)
```

```
  PassengerId       Survived          Pclass          Name
 Min.   :  1.0   Min.   :0.0000   Min.   :1.000   Length:891
 1st Qu.:223.5   1st Qu.:0.0000   1st Qu.:2.000   Class :character
 Median :446.0   Median :0.0000   Median :3.000   Mode  :character
 Mean   :446.0   Mean   :0.3838   Mean   :2.309
 3rd Qu.:668.5   3rd Qu.:1.0000   3rd Qu.:3.000
 Max.   :891.0   Max.   :1.0000   Max.   :3.000

     Sex                 Age            SibSp           Parch
 Length:891         Min.   : 0.42   Min.   :0.000   Min.   :0.0000
 Class :character   1st Qu.:20.12   1st Qu.:0.000   1st Qu.:0.0000
 Mode  :character   Median :28.00   Median :0.000   Median :0.0000
                    Mean   :29.70   Mean   :0.523   Mean   :0.3816
                    3rd Qu.:38.00   3rd Qu.:1.000   3rd Qu.:0.0000
                    Max.   :80.00   Max.   :8.000   Max.   :6.0000
                    NA's   :177
    Ticket              Fare           Cabin              Embarked
 Length:891         Min.   :  0.00   Length:891         Length:891
 Class :character   1st Qu.:  7.91   Class :character   Class :chara
cter
 Mode  :character   Median : 14.45   Mode  :character   Mode  :chara
cter
                    Mean   : 32.20
                    3rd Qu.: 31.00
                    Max.   :512.33
```

In [37]:

```
# Train Set
# Age - Replacing NAs with Median Age
# Embarked - Replacing NAs with Mode
train_data[is.na(train_data$Age),"Age"]<-median(train_data$Age,na.rm=TRUE)
Embarked_Dist<-(table(train_data$Embarked))
train_data[train_data$Embarked=='',"Embarked"]<-names(Embarked_Dist[which.max(Em
barked_Dist)])
train_data$Pclass<-ordered(train_data$Pclass, levels = c("1", "2", "3"))
cols<-c("Survived","Sex","Embarked")
train_data[cols] <- lapply(train_data[cols], factor)
str(train_data)
```

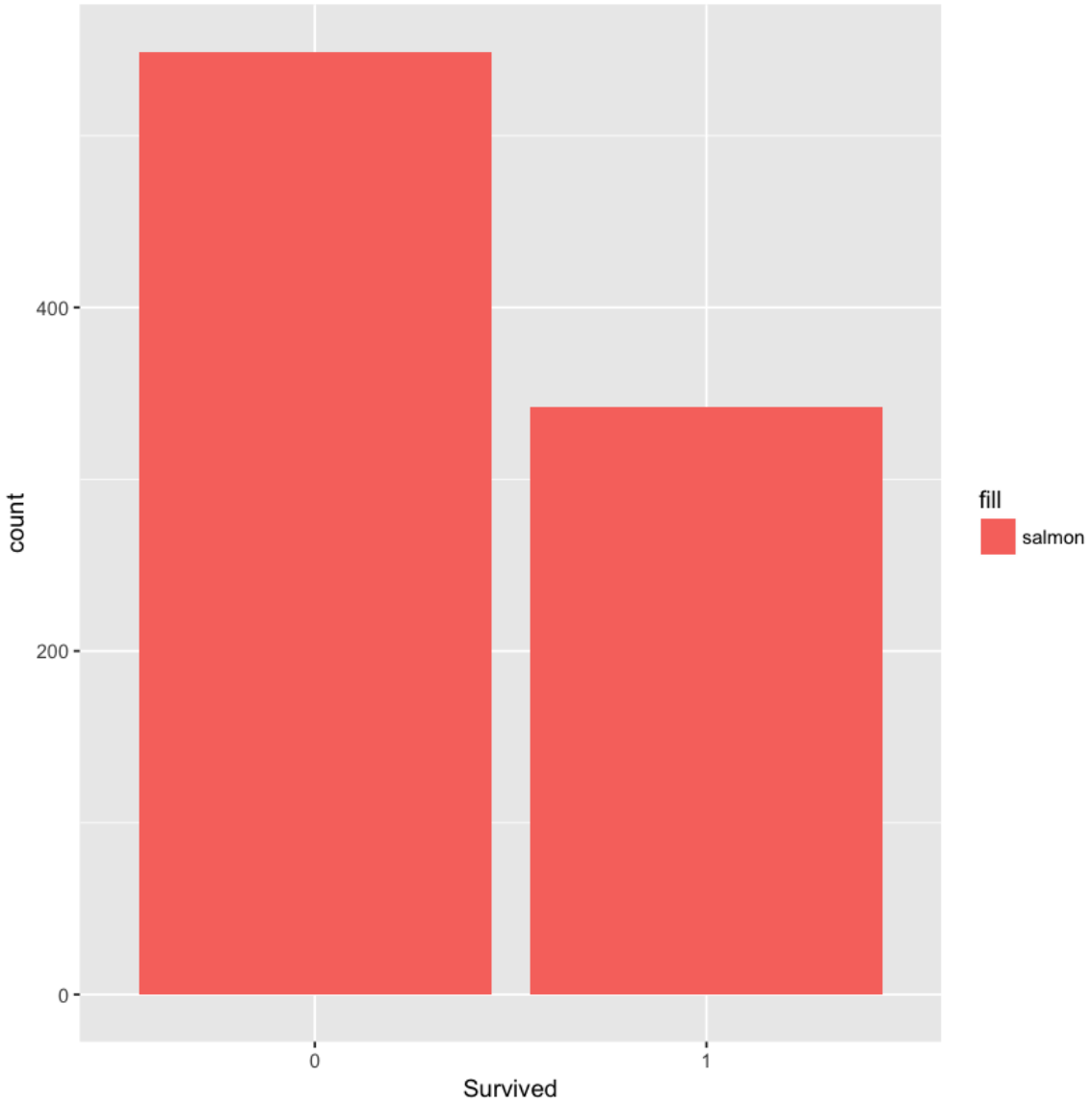
```
'data.frame':   891 obs. of  12 variables:
 $ PassengerId: int  1 2 3 4 5 6 7 8 9 10 ...
 $ Survived   : Factor w/ 2 levels "0","1": 1 2 2 2 1 1 1 1 2 2 ...
 $ Pclass     : Ord.factor w/ 3 levels "1"<"2"<"3": 3 1 3 1 3 3 1 3
3 2 ...
 $ Name       : chr  "Braund, Mr. Owen Harris" "Cumings, Mrs. John B
radley (Florence Briggs Thayer)" "Heikkinen, Miss. Laina" "Futrelle,
Mrs. Jacques Heath (Lily May Peel)" ...
 $ Sex        : Factor w/ 2 levels "female","male": 2 1 1 1 2 2 2 2
1 1 ...
 $ Age        : num  22 38 26 35 35 28 54 2 27 14 ...
 $ SibSp      : int  1 1 0 1 0 0 0 3 0 1 ...
 $ Parch      : int  0 0 0 0 0 0 0 1 2 0 ...
 $ Ticket     : chr  "A/5 21171" "PC 17599" "STON/O2. 3101282" "1138
03" ...
 $ Fare       : num  7.25 71.28 7.92 53.1 8.05 ...
 $ Cabin      : chr  "" "C85" "" "C123" ...
 $ Embarked   : Factor w/ 3 levels "C","Q","S": 3 1 3 3 3 2 3 3 3 1
...
```

In [72]:

```
library(ggplot2)
```

In [74]:

```
ggplot(train_data, aes(Survived, fill="salmon")) + geom_bar()
```



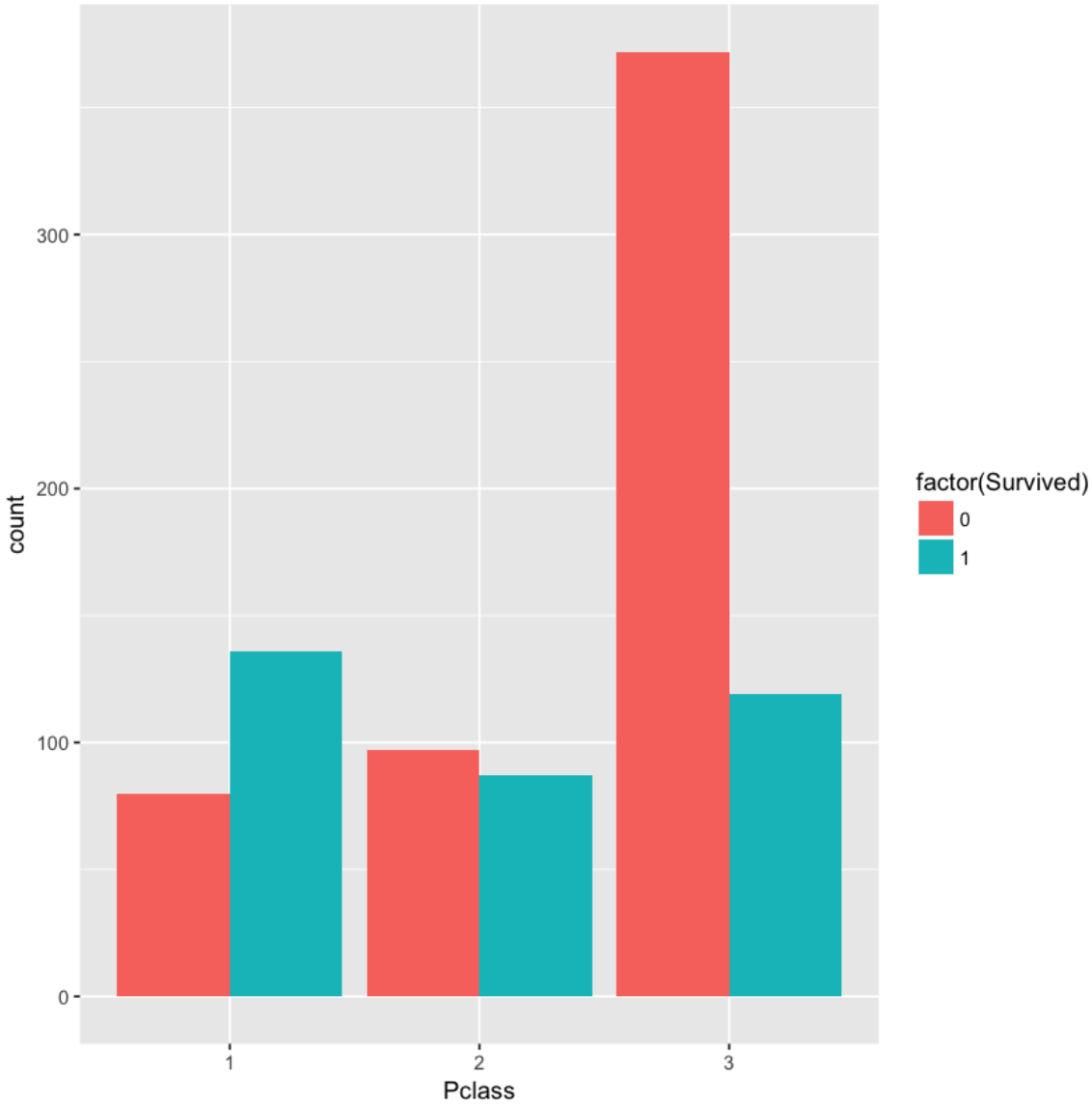
In [38]:

```
# Test Set
# Fare - Replacing NA with Median Fare
test_data[is.na(test_data$Fare),"Fare"]<-median(test_data$Fare,na.rm = TRUE)
cols<-c("Sex","Embarked")
test_data[cols] <- lapply(test_data[cols], factor)
test_data$Pclass<-ordered(test_data$Pclass, levels = c("1", "2", "3"))
str(test_data)
```

```
'data.frame':   418 obs. of  11 variables:
 $ PassengerId: int  892 893 894 895 896 897 898 899 900 901 ...
 $ Pclass     : Ord.factor w/ 3 levels "1"<"2"<"3": 3 3 2 3 3 3 3 2
3 3 ...
 $ Name       : chr  "Kelly, Mr. James" "Wilkes, Mrs. James (Ellen N
eeds)" "Myles, Mr. Thomas Francis" "Wirz, Mr. Albert" ...
 $ Sex        : Factor w/ 2 levels "female","male": 2 1 2 2 1 2 1 2
1 2 ...
 $ Age        : num  34.5 47 62 27 22 14 30 26 18 21 ...
 $ SibSp      : int  0 1 0 0 1 0 0 1 0 2 ...
 $ Parch      : int  0 0 0 0 1 0 0 1 0 0 ...
 $ Ticket     : chr  "330911" "363272" "240276" "315154" ...
 $ Fare       : num  7.83 7 9.69 8.66 12.29 ...
 $ Cabin      : chr  "" "" "" "" ...
 $ Embarked   : Factor w/ 3 levels "C","Q","S": 2 3 2 3 3 3 2 3 1 3
...
```

In [75]:

```
ggplot(train_data, aes(Pclass, ..count.., fill = factor(Survived))) + geom_bar(p
osition="dodge")
```

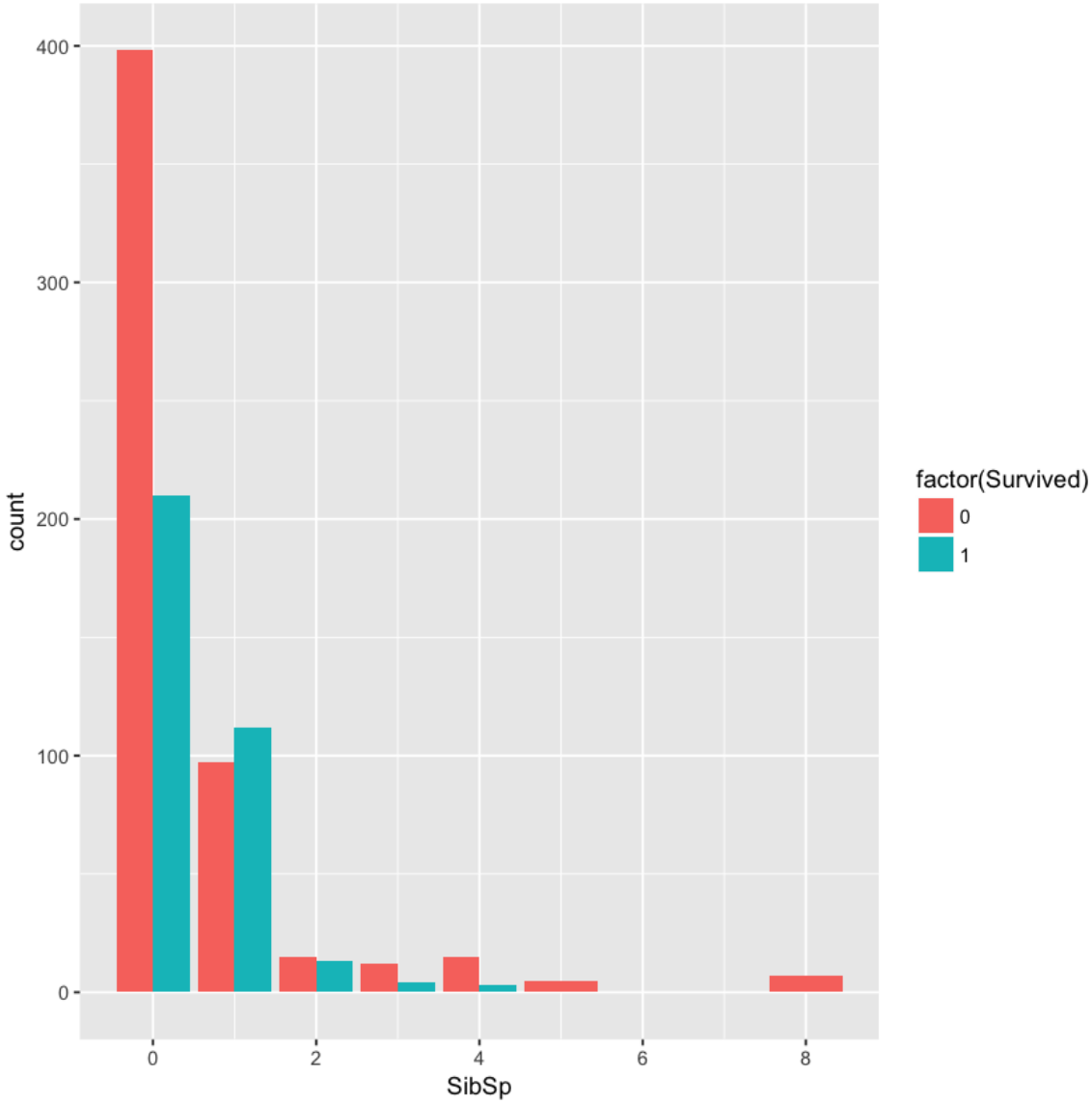

300
200
100
0
count
1
2
3
Pclass
factor(Survived)
0
1

In [ ]:

```
# Class played a major role in surviving
```

In [76]:

```
ggplot(train_data, aes(SibSp, ..count.., fill = factor(Survived))) + geom_bar(position="dodge")
```



In [ ]:

```
# Blood is thicker than wood
# Siblings Have helped each other in survival
```

In [39]:

```
# Splitting Train data in order to check which Model performs better later
install.packages("caTools")
library(caTools)
set.seed(40)
sample = sample.split(train_data$Survived, SplitRatio = .75)
train_data_1 = subset(train_data, sample == TRUE)
train_data_2 = subset(train_data, sample == FALSE)
```

```
The downloaded binary packages are in
        /var/folders/xp/1g05_jbx7yx3795j7klx40_40000gn/T//Rtmp4vkwJ
k/downloaded_packages
```

In [40]:

```
# Logistic Regression
logistic_model<-glm(Survived~Pclass+Sex+Age+Fare+Embarked,family=binomial(link=
'logit'),data=train_data_1)
```

In [41]:

```
summary(logistic_model)
```

```
Call:
glm(formula = Survived ~ Pclass + Sex + Age + Fare + Embarked,
    family = binomial(link = "logit"), data = train_data_1)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.5175  -0.6369  -0.3684   0.6252   2.5404

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept)  3.088904   0.439800   7.023 2.16e-12 ***
Pclass.L    -1.862275   0.245610  -7.582 3.40e-14 ***
Pclass.Q    -0.073246   0.212342  -0.345 0.730138
Sexmale     -2.689267   0.225362 -11.933  < 2e-16 ***
Age         -0.031164   0.008734  -3.568 0.000359 ***
Fare        -0.002444   0.002536  -0.964 0.335154
EmbarkedQ   -0.162255   0.432740  -0.375 0.707699
EmbarkedS   -0.817143   0.286787  -2.849 0.004381 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 889.27  on 667  degrees of freedom
Residual deviance: 581.09  on 660  degrees of freedom
AIC: 597.09

Number of Fisher Scoring iterations: 5
```

In [42]:

```
# Fitting the Model

logisitc_model_fitted<-predict(logistic_model, newdata=train_data_2, type="respo
nse")

logisitc_model_fitted<-ifelse(logisitc_model_fitted>0.5,1,0)
logisitc_model_fitted<-as.factor(logisitc_model_fitted)

# Confusion matrix
library(caret)
confusionMatrix(logisitc_model_fitted, train_data_2$Survived)
```

```
Confusion Matrix and Statistics

          Reference
Prediction   0   1
         0 115  25
         1  22  61

               Accuracy : 0.7892
                 95% CI : (0.7298, 0.8408)
    No Information Rate : 0.6143
    P-Value [Acc > NIR] : 1.714e-08

                  Kappa : 0.5523
 Mcnemar's Test P-Value : 0.7705

            Sensitivity : 0.8394
            Specificity : 0.7093
         Pos Pred Value : 0.8214
         Neg Pred Value : 0.7349
             Prevalence : 0.6143
         Detection Rate : 0.5157
   Detection Prevalence : 0.6278
      Balanced Accuracy : 0.7744

       'Positive' Class : 0


Loading required package: gplots

Attaching package: ‘gplots’

The following object is masked from ‘package:stats’:

    lowess


Error in prediction(logisitc_model_fitted, train_data_2$Survived): F
ormat of predictions is invalid.
Traceback:

1. prediction(logisitc_model_fitted, train_data_2$Survived)
2. stop("Format of predictions is invalid.")
```

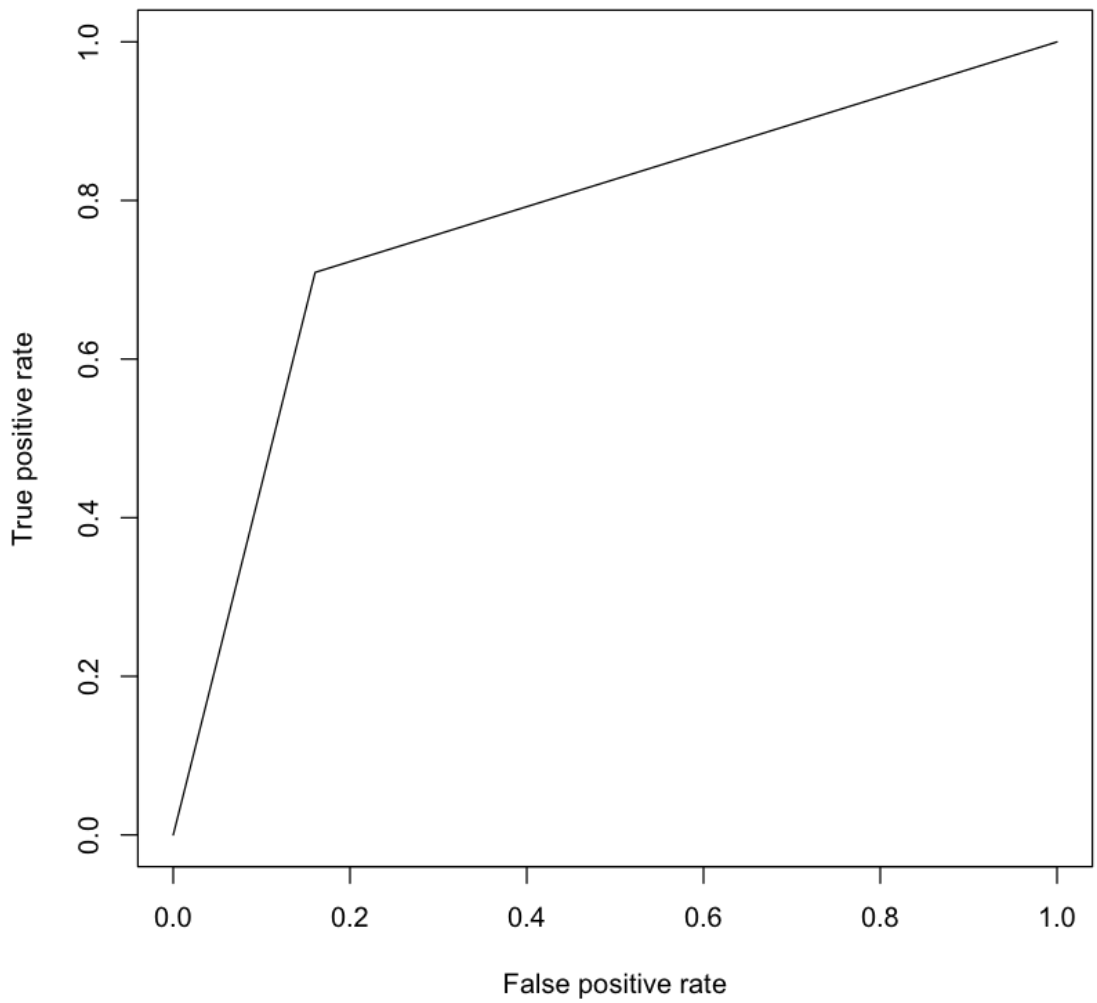
In [45]:

```
# Area under the curve
library(ROCR)

pr <- prediction(as.numeric(logisitc_model_fitted), as.numeric(train_data_2$Surv
ived))
```

In [46]:

```
prf <- performance(pr, measure = "tpr", x.measure = "fpr")
plot(prf)

auc <- performance(pr, measure = "auc")
auc <- auc@y.values[[1]]
auc
```

0.774359191987778



In [48]:

```
# Naive Bayes Model
library(e1071)
naive_bayes_model<-naiveBayes(Survived~Pclass+Sex+Age+Fare+Embarked,data=train_data_2)
```

In [52]:

```
navie_bayes_predict<-predict(naive_bayes_model, newdata=train_data_2, type="class")
```

```
Warning message in data.matrix(newdata):
“NAs introduced by coercion”Warning message in data.matrix(newdata):
“NAs introduced by coercion”Warning message in data.matrix(newdata):
“NAs introduced by coercion”
```

In [53]:

```
table(navie_bayes_predict, train_data_2$Survived,dnn=c("Prediction","Actual"))
```

```
          Actual
Prediction   0   1
         0 126  47
         1  11  39
```

In [ ]:

```
# Logistic Regressions has done better than Navive bayes
#So I am going to implement Logistic Regressions in test set
```

In [54]:

```
final_model<-glm(Survived~Pclass+Sex+Age+Fare+Embarked,family=binomial(link='logit'),data=test_data)
```

```
Error in eval(predvars, data, env): object 'Survived' not found
Traceback:

1. glm(Survived ~ Pclass + Sex + Age + Fare + Embarked, family = bin
omial(link = "logit"),
 .     data = test_data)
2. eval(mf, parent.frame())
3. eval(mf, parent.frame())
4. stats::model.frame(formula = Survived ~ Pclass + Sex + Age +
 .     Fare + Embarked, data = test_data, drop.unused.levels = TRUE)
5. model.frame.default(formula = Survived ~ Pclass + Sex + Age +
 .     Fare + Embarked, data = test_data, drop.unused.levels = TRUE)
6. eval(predvars, data, env)
7. eval(predvars, data, env)
```

In [56]:

```
survived_prediction<-predict(logistic_model, newdata=test_data, type="response")
```

In [58]:

```
survived_prediction<-ifelse(survived_prediction>0.5,1,0)
table(survived_prediction)
```

```
survived_prediction
  0   1
193 139
```

In [ ]:

```
# out of test set the model predict 193 will sink and 139 will survive
```