71point4 Analyst Assignment

André le Roux

2024-08-21

Question 3

I was unsure of the level of difficulty that the question should be, so I decided to go for a question with two part that can be given individually or together.

Part A: You are a supplier of wood and own a 20km by 10km forest on which you plant trees. Assume that the trees are equally distributed and that the number of trees tends to infinity. As you want to monitor the forest you set up 158 microphones that each monitor a 1km by 1km area.

What is the probability of hearing at least one of every 2 trees that fall in the forest sequentially?

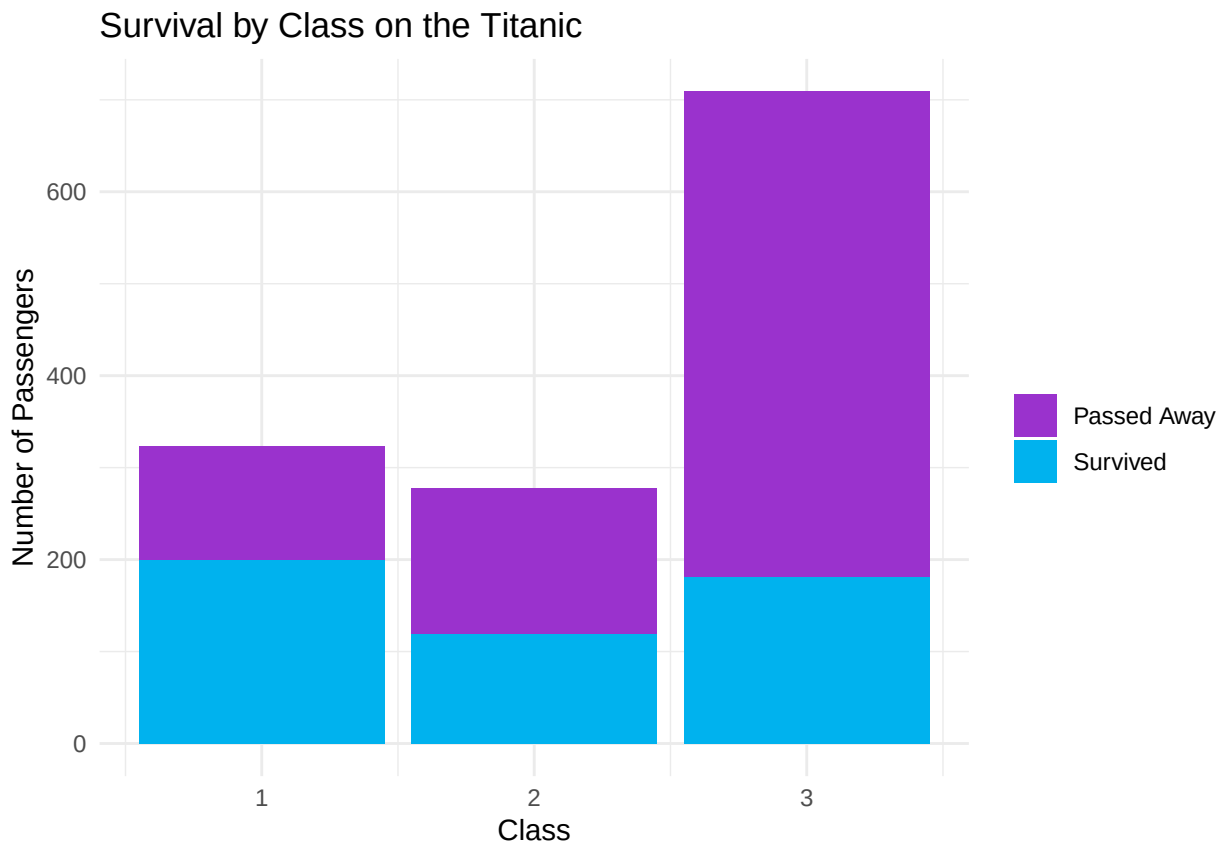
Part B: There exits a 4 digit number x, where each digit consists of a unique number. The number x has the following characteristics:

- The first two digits of x form a prime number.
- the second two digits are a square.
- x - 1 is also a prime number.
- It is divisible by the nearest rounded percentage of part A.

What number is x?

Question 4

Graph 4.1

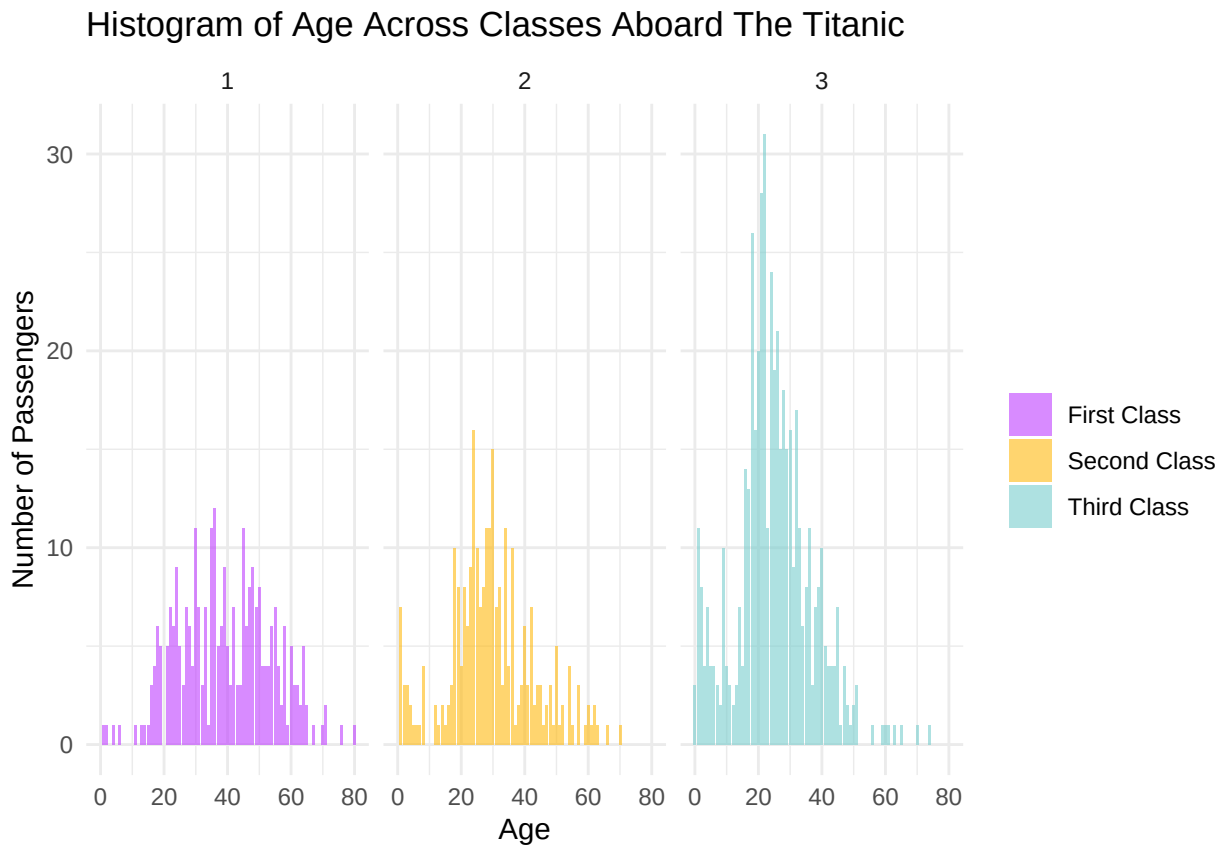


This first graph gives us a visual representation of the number of surviving passengers in different classes. As can be seen the chances of surviving is lowest for passengers in the lowest class (third), at slightly above 25%. While the passengers in first class had an approximately 62.5% chance of survival. It should also be noted that the number of passengers in the third class significantly outweigh the number of passengers in the first and second class.

Graph 4.2

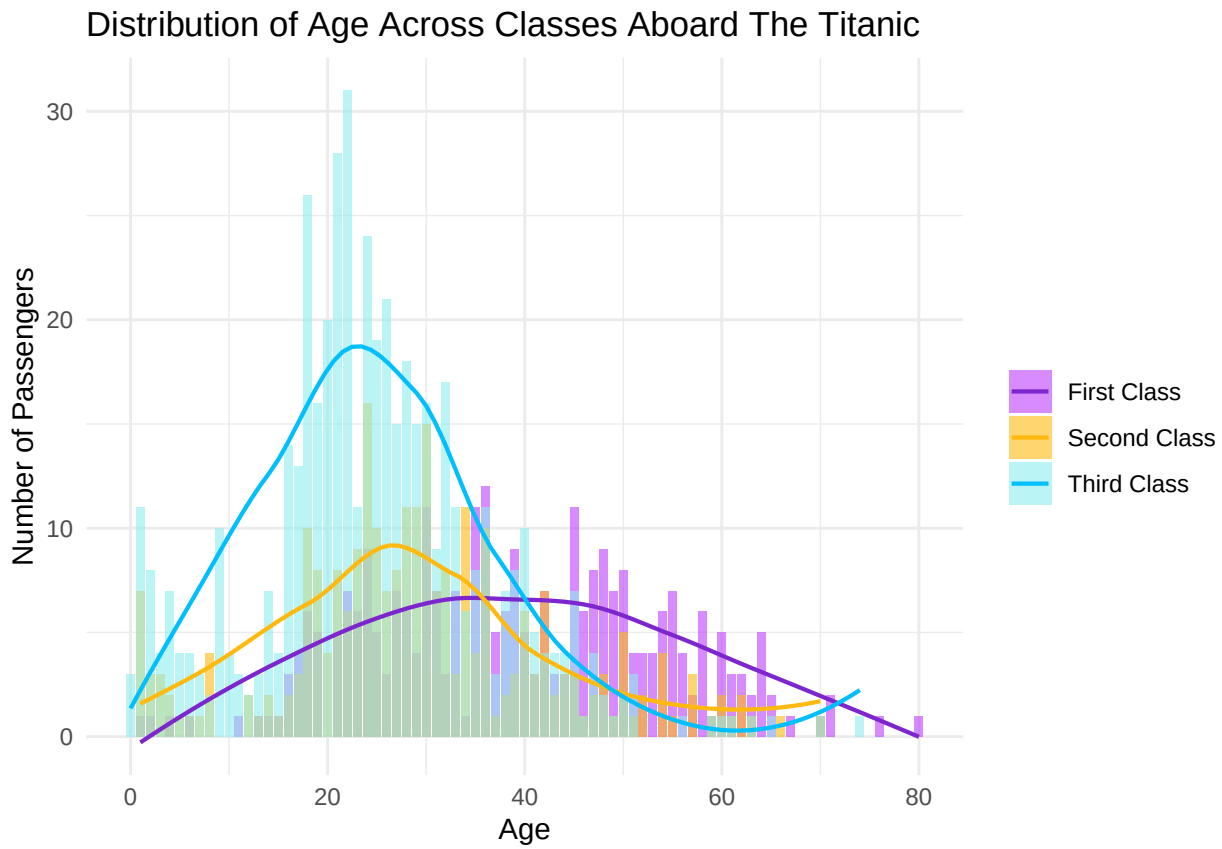
It is noticeable from this graph that the percentage of men differ between classes. With the composition becoming more male orientated the lower the class. In the first class it is only slightly male orientated, with 55.42% of the passengers being male. However, in the third class the male percentage rises to 69.53% of the passengers.

Graph 4.3



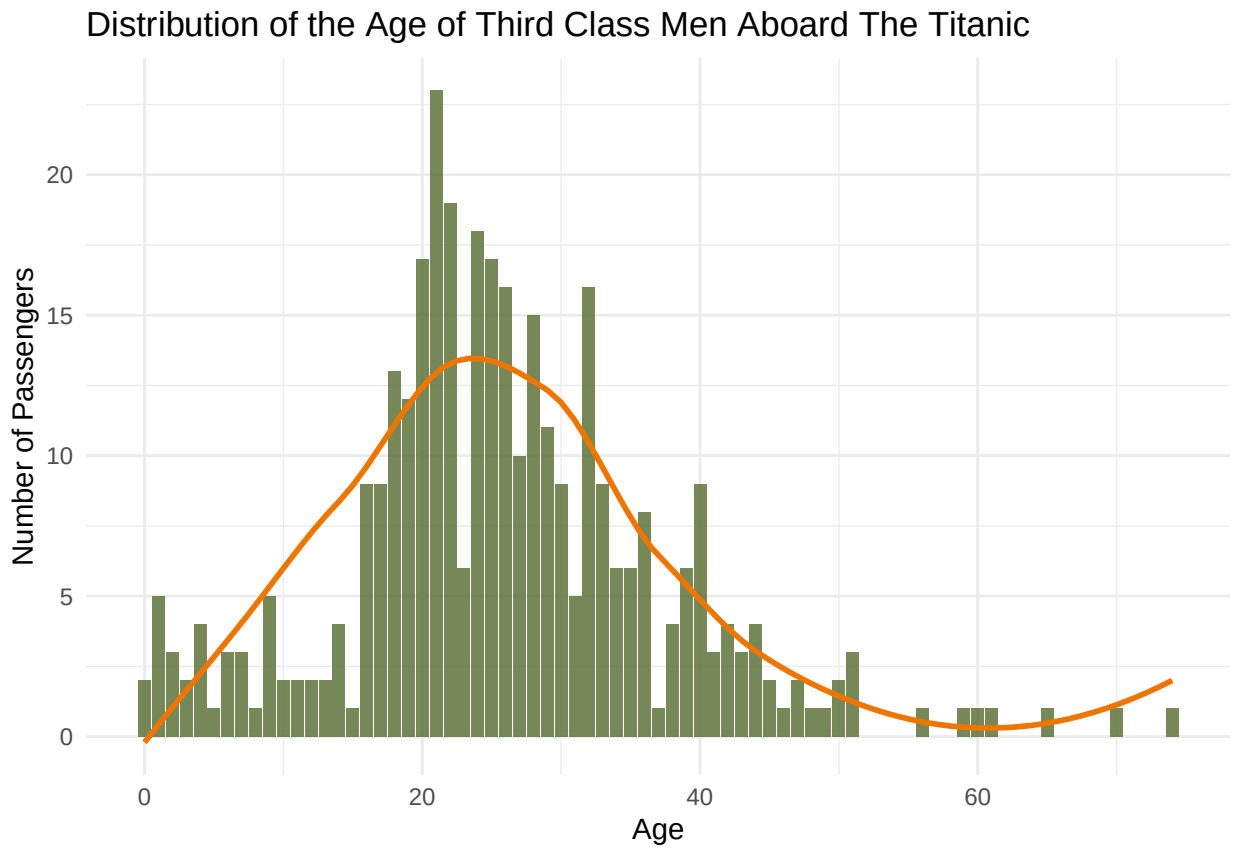
Here we can see a side by side comparisons of the age compositions of the different classes aboard the Titanic. From this comparison we can see that the third class was composed of a higher percentage of younger people than first or second class. With first class being the least skewed of the three classes.

Graph 4.4



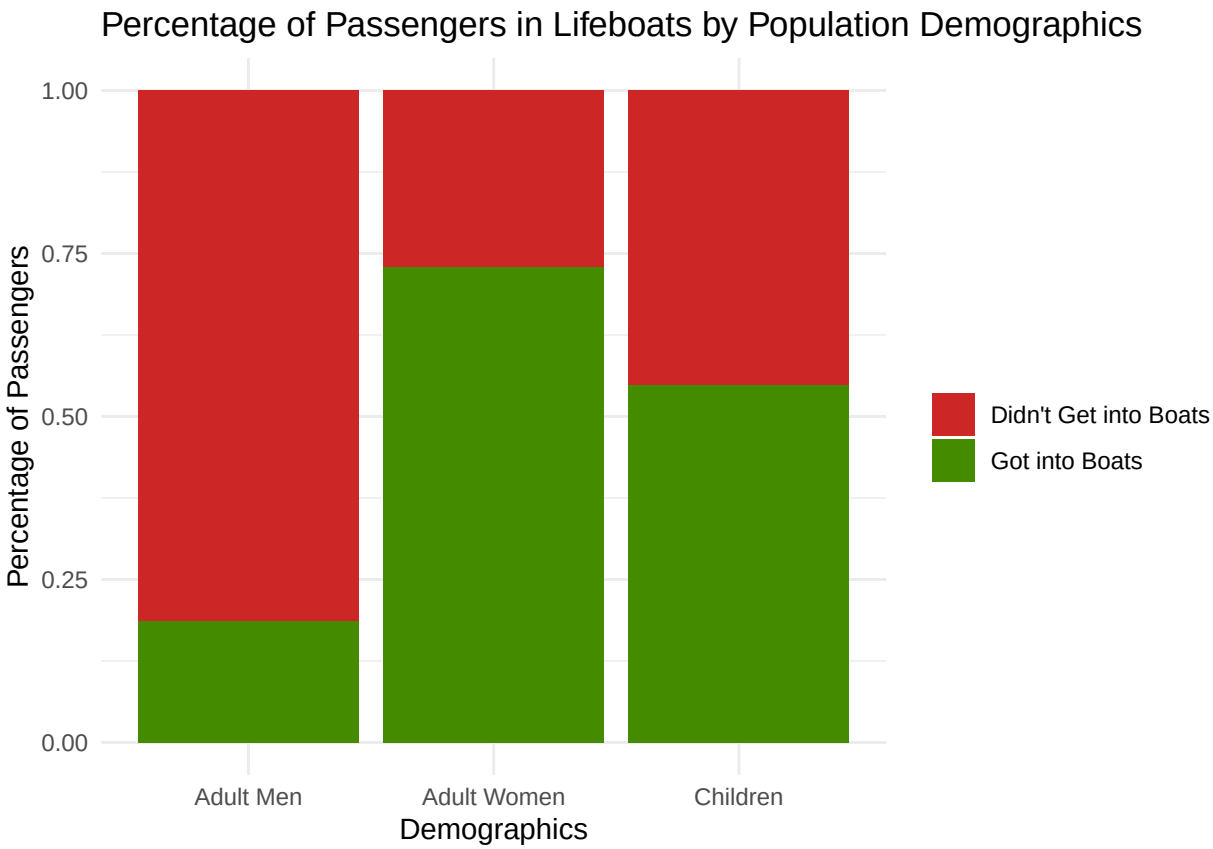
In this graph we overlap the histogram plots and add a smoothed line to represent the possible underlying distribution. By overlapping the plots we can easily compare the various distributions, from this we can see that the age of third class passengers is more right skewed than the other classes. The first class on the other hand, has a skewness value closer to 0.

Graph 4.5



We can see from this plot that the men in the third class on-board the titanic was mostly younger men from their teens to early thirties, with the mode age being 21. This suggests that they were passengers that were willing to forego a certain degree of comfort in order to be part of the first journey of the Titanic and to reach America. These are people that might not have been able to afford more expensive means of travel, but wanted to start a new life in America.

Graph 4.6

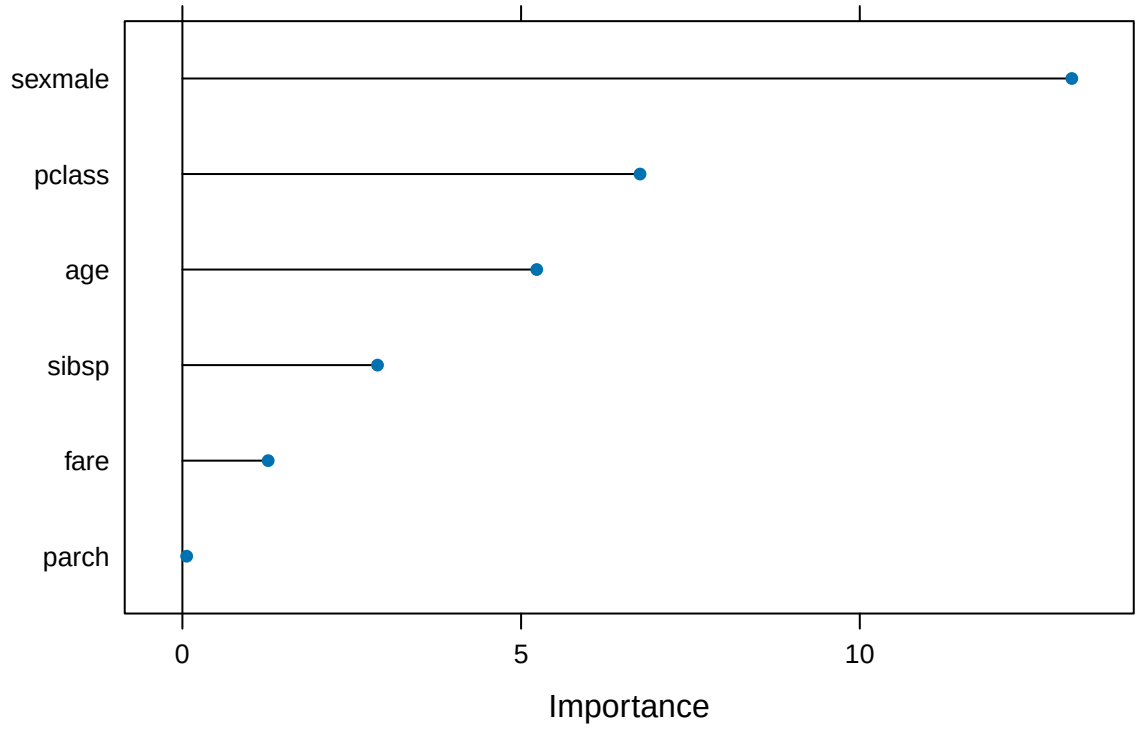


From this graph it becomes clear that women and children had priority when getting onto lifeboats. Less than 20% of adult men got into lifeboats, while more than 70% of adult women got into lifeboats. It should also be noted that barely more than 50% of children got into lifeboats. This might suggest that preferences might have also fallen along class lines with children from the second and third classes having a lower probability of getting into the lifeboats. This difference in class would also influence the percentage of passengers in the lifeboats as third and second class passenger classes consisted of more men.

Bonus Question

```
## Confusion Matrix and Statistics
##
##            Reference
## Prediction   0   1
```

```
##          0 104  21
##          1  24  60
##
##                Accuracy : 0.7847
##                  95% CI : (0.7227, 0.8384)
##     No Information Rate : 0.6124
##     P-Value [Acc > NIR] : 7.94e-08
##
##                   Kappa : 0.5495
##
##  Mcnemar's Test P-Value : 0.7656
##
##             Sensitivity : 0.8125
##             Specificity : 0.7407
##          Pos Pred Value : 0.8320
##          Neg Pred Value : 0.7143
##              Prevalence : 0.6124
##          Detection Rate : 0.4976
##    Detection Prevalence : 0.5981
##       Balanced Accuracy : 0.7766
##
##        'Positive' Class : 0
##
```




```
## Confusion Matrix and Statistics
##
##           Reference
## Prediction   0   1
##          0 128   3
##          1   0  78
##
##                Accuracy : 0.9856
##                  95% CI : (0.9586, 0.997)
##     No Information Rate : 0.6124
##     P-Value [Acc > NIR] : <2e-16
##
##                   Kappa : 0.9696
##
```

```
##  Mcnemar's Test P-Value : 0.2482
##
##             Sensitivity : 1.0000
##             Specificity : 0.9630
##          Pos Pred Value : 0.9771
##          Neg Pred Value : 1.0000
##              Prevalence : 0.6124
##          Detection Rate : 0.6124
##    Detection Prevalence : 0.6268
##       Balanced Accuracy : 0.9815
##
##        'Positive' Class : 0
##
```