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| Student Name | **IMAAD IMRAN HAJWANE** |
| **SRN No** | 202101132 |
| **Roll No** | 23 |
| **Program** | Computer Engineering |
| **Year** | Third Year |
| **Division** | A |
| **Subject** | DMPM |
| **Assignment No** | 2 |

**DMPM Lab Assignment -2**

**Data Pre-processing & Data Cleaning Functions**

* Read the datasets given to you and clean the data as per the requirements.
* Test following data pre-processing and data cleaning functions
* You need to install following packages and use following libraries
  + install.packages("tidyverse"), install.packages("Hmisc")
  + library(tidyverse), library(dplyr), library(ggplot2), library(Hmisc)
* Save your R command file.
* Save your code and results in a word file and submit it on the VOLP.
* FUNCTIONS
  + rename() - for rename columns
  + select() - for selecting columns
  + slice() - for selecting rows
  + sample\_n() -- for sampling rows
  + arrange() -- for arranging rows by column values
  + filter() -- for filtering rows
  + mutate() -- for transforming values in a field
  + is.na() --- find missing data
  + sum(is.na()) -- find number of missing values
  + mean(is.na()) -- find % of missing values
  + na.omit() -- deleting incomplete observations
  + mean(<column>, na.rm = TRUE) -- find mean leaving records with missing data
  + complete.cases() --- to detect rows with complete data
  + clean=na.omit() --- to remove incomplete rows or data
  + glimpse(data) -- summarise dataset
  + boxplot.stats() - for detecting outlier stats
  + boxplot() - for comparing boxplots
  + boxplot.stats()$out -- for setting outlier detection limit

**Numerical imputation**

* + dirty$column[is.na(column)] <- mean(column, na.rm = TRUE) --- mean imputation
  + dirty$column <- impute(dirty$column, fun = mean) # mean imputation
  + dirty$column <- impute(dirty$column, fun = median) # median imputation

Code:

library(readxl)

Titanic\_dataset <- read\_excel("P:/College/SEM - 6/DMPM\_Lab/Titanic\_dataset.xlsx") View(Titanic\_dataset)

library(tidyverse) library(dplyr)

library(ggplot2) library(Hmisc)

DF <- data.frame(Titanic\_dataset) fare <- DF$fare

DF <- rename(DF, Gender = sex) View(DF$Gender)

DF$Gender

select\_DF <- select(DF, Gender) select\_DF

slice\_DF <- slice(DF, 1, 100) slice\_DF

sample\_DF <- sample\_n(DF, 10) sample\_DF

arrange\_DF <- arrange(DF, DF$Gender) arrange\_DF

filter\_DF <- filter(,DF$age < 20) filter\_DF

mutated\_DF <- mutate(DF, fare = fare \* 2) mutated\_DF$fare

missing\_DF <- sum(is.na(DF$boat)) missing\_DF

per\_missing\_DF <- mean(is.na(DF$boat)) \* 100 per\_missing\_DF

complete\_DF <- na.omit(DF$boat) complete\_DF

column\_mean <- mean(DF$survived, na.rm = TRUE) column\_mean

complete\_rows <- complete.cases(DF) complete\_rows

clean\_DF <- na.omit(DF) clean\_DF

glimpse(DF)

outlier\_stats <- boxplot.stats(DF$survived) outlier\_stats

boxplot(DF$survived, DF$age)

outlier\_limit <- boxplot.stats(DF$age)$out outlier\_limit

value\_imputed <- data.frame( original = DF$age,

imputed\_zero = replace(DF$age, is.na(DF$age), 0),

imputed\_mean = replace(DF$age, is.na(DF$age), mean(DF$age, na.rm = TRUE)),

imputed\_median = replace(DF$age, is.na(DF$age), median(DF$age, na.rm = TRUE))

)

value\_imputed

**Output:**

* library(readxl)
* Titanic\_dataset <- read\_excel("P:/College/SEM - 6/DMPM\_Lab/Titanic\_dataset.xlsx")
* View(Titanic\_dataset)
* library(tidyverse)
* library(dplyr)
* library(ggplot2)
* library(Hmisc)

Error: package or namespace load failed for ‘Hmisc’ in loadNamespace(j <- i[[1L]], c(l ib.loc, .libPaths()), versionCheck = vI[[j]]):

there is no package called ‘data.table’

* DF <- data.frame(Titanic\_dataset)
* fare <- DF$fare
* DF <- rename(DF, Gender = sex)
* View(DF$Gender)
* DF$Gender

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[ reached getOption("max.print") -- omitted 309 entries ]

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| 998 | female |
| 999 | male |
| 1000 | female |

[ reached 'max' / getOption("max.print") -- omitted 309 rows ]

* slice\_DF <- slice(DF, 1, 100)
* slice\_DF

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| pclass  nder age | | survived  sibsp parch | | | ticket | fare | cabin embarked boat | | name | | Ge |
| 1 | 1 |  | 1 |  |  | |  | Allen, Miss. Elisabeth Walton | | | fe |
| male | 29 | 0 |  | 0 | 24160 211.3375 | | B5 | S 2 | | |  |
| 2 | 1 |  | 1 Duff Gordon, Lady. | | | | (Lucille | Christiana Sutherland) | ("Mrs | Morgan") | fe |
| male | 48 | 1 | 0 11755 39.6000 | | | | A16 | C 1 |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * sample\_DF <- sample\_n(DF, * sample\_DF   pclass survived  fare cabin embarked boat | | | | | | 10) | name | | Gender | age | sibsp | parch | ticket | |
| 1 | 2 |  | 0 |  | | | Mack, Mrs. | (Mary) | female | 57 | 0 | 0 | S.O./P.P. 3 | |
| 10.5000 |  | E77 |  | S <NA> | | |  |  |  |  |  |  |  | |
| 2 | 2 |  | 1 | Herman, Mrs. | | | Samuel (Jane | Laver) | female | 48 | 1 | 2 | 220845 | |
| 65.0000 | <NA> | |  | S 9 | | | | |  |  |  |  |  |  |
| 3 | 2 | | 0 | Malachard, Mr. Noel | | | | | male | NA | 0 | 0 |  | 237735 |
| 15.0458 | D | |  | C <NA> | | | | |  |  |  |  |  |  |
| 4 | 1 | | 1 | Oliva y Ocana, Dona. Fermina | | | | | female | 39 | 0 | 0 | PC | 17758 |
| 108.9000 | C105 | |  | C 8 | | | | |  |  |  |  |  |  |
| 5 | 1 | | 0 | Baumann, Mr. John D | | | | | male | NA | 0 | 0 | PC | 17318 |
| 25.9250 | <NA> | |  | S <NA> | | | | |  |  |  |  |  |  |
| 6 | 1 | | 1 | Frolicher-Stehli, Mr. Maxmillian | | | | | male | 60 | 1 | 1 |  | 13567 |
| 79.2000 | B41 | |  | C | 5 |  | | |  |  |  |  |  |  |
| 7 | 1 | | 0 |  |  | Rothschild, Mr. Martin | | | male | 55 | 1 | 0 | PC | 17603 |
| 59.4000 | <NA> | |  | C | <NA> |  | | |  |  |  |  |  |  |
| 8 | 3 | | 0 |  |  | Yousseff, Mr. Gerious | | | male | NA | 0 | 0 |  | 2627 |
| 14.4583 | <NA> | |  | C | <NA> |  | | |  |  |  |  |  |  |

1. 3 1 Krekorian, Mr. Neshan

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| male | 25 | 0 | 0 | 2654 |
| female | 24 | 0 | 0 | 382653 |

7.2292 F E57 C 10

1. 3 1 Mulvihill, Miss. Bertha E

7.7500 <NA> Q 15

* arrange\_DF <- arrange(DF, DF$Gender)
* arrange\_DF

pclass survived name G

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| --- | --- | --- |
| ender | age | sibsp |
| 1 | 1 |  |
| emale | 29 | 0 |
| 2 | 1 |  |
| emale | 2 | 1 |
| 3 | 1 |  |
| emale | 25 | 1 |
| 4 | 1 |  |
| emale | 63 | 1 |
| 5 | 1 |  |
| emale | 53 | 2 |
| 6 | 1 |  |
| emale | 18 | 1 |
| 7 | 1 |  |
| emale | 24 | 0 |
| 8 | 1 |  |
| emale | 26 | 0 |
| 9 | 1 |  |
| emale | 50 | 0 |
| 10 | 1 |  |
| emale | 32 | 0 |
| 11 | 1 |  |
| emale | 47 | 1 |
| 12 | 1 |  |
| emale | 42 | 0 |
| 13 | 1 |  |
| emale | 29 | 0 |
| 14 | 1 |  |
| emale | 19 | 1 |
| 15 | 1 |  |
| emale | 35 | 0 |
| 16 | 1 |  |
| emale | 30 | 0 |
| 17 | 1 |  |
| emale | 58 | 0 |
| 18 | 1 |  |
| emale | 45 | 0 |
| 19 | 1 |  |
| emale | 22 | 0 |
| 20 | 1 |  |
| emale | 44 | 0 |
| 21 | 1 |  |
| emale | 59 | 2 |
| 22 | 1 |  |
| emale | 60 | 0 |
| 23 | 1 |  |
| emale | 41 | 0 |
| 24 | 1 |  |
| emale | 53 | 0 |
| 25 | 1 |  |
| emale | 58 | 0 |
| 26 | 1 |  |
| emale | 14 | 1 |
| 27 | 1 |  |
| emale | 36 | 1 |
| 28 | 1 |  |
| emale | NA | 0 |
| 29 | 1 |  |
| emale | 76 | 1 |
| 30 | 1 |  |
| emale | 47 | 1 |
| 31 | 1 |  |
| emale | 33 | 1 |
| 32 | 1 |  |
| emale | 36 | 0 |
| 33 | 1 |  |
| emale | 30 | 0 |
| 34 | 1 |  |
| emale | NA | 0 |

parch ticket fare cabin

1 Allen, Miss. Elisabeth Walton f

0 24160 211.3375 B5

0 Allison, Miss. Helen Loraine f

2 113781 151.5500 C22 C26

0 Allison, Mrs. Hudson J C (Bessie Waldo Daniels) f

2 113781 151.5500 C22 C26

1 Andrews, Miss. Kornelia Theodosia f

0 13502 77.9583 D7

1 Appleton, Mrs. Edward Dale (Charlotte Lamson) f

0 11769 51.4792 C101

1 Astor, Mrs. John Jacob (Madeleine Talmadge Force) f

|  |  |  |
| --- | --- | --- |
| PC | 17757 | 227.5250 |
| PC | 17477 | 69.3000 |
|  | 19877 | 78.8500 |

0 C62 C64

1 Aubart, Mme. Leontine Pauline f

0 B35

1 Barber, Miss. Ellen "Nellie" f

0 <NA>

1 Baxter, Mrs. James (Helene DeLaudeniere Chaput) f

1 PC 17558 247.5208 B58 B60

1 Bazzani, Miss. Albina f

0 11813 76.2917 D15

1 Beckwith, Mrs. Richard Leonard (Sallie Monypeny) f

1 11751 52.5542 D35

1 Bidois, Miss. Rosalie f

0 PC 17757 227.5250 <NA>

1 Bird, Miss. Ellen f

0 PC 17483 221.7792 C97

1 Bishop, Mrs. Dickinson H (Helen Walton) f

0 11967 91.0792 B49

1 Bissette, Miss. Amelia f

0 PC 17760 135.6333 C99

1 Bonnell, Miss. Caroline f

0 36928 164.8667 C7

1 Bonnell, Miss. Elizabeth f

0 113783 26.5500 C103

1 Bowen, Miss. Grace Scott f

0 PC 17608 262.3750 <NA>

1 Bowerman, Miss. Elsie Edith f

1 113505 55.0000 E33

1 Brown, Mrs. James Joseph (Margaret Tobin) f

0 PC 17610 27.7208 B4

1 Brown, Mrs. John Murray (Caroline Lane Lamson) f

0 11769 51.4792 C101

1 Bucknell, Mrs. William Robert (Emma Eliza Ward) f

0 11813 76.2917 D15

1 Burns, Miss. Elizabeth Margaret f

0 16966 134.5000 E40

1 Candee, Mrs. Edward (Helen Churchill Hungerford) f

0 PC 17606 27.4458 <NA>

1 Cardeza, Mrs. James Warburton Martinez (Charlotte Wardle Drake) f

1 PC 17755 512.3292 B51 B53 B55

1 Carter, Miss. Lucile Polk f

2 113760 120.0000 B96 B98

1 Carter, Mrs. William Ernest (Lucile Polk) f

2 113760 120.0000 B96 B98

1 Cassebeer, Mrs. Henry Arthur Jr (Eleanor Genevieve Fosdick) f

0 17770 27.7208 <NA>

1 Cavendish, Mrs. Tyrell William (Julia Florence Siegel) f

0 19877 78.8500 C46

1 Chaffee, Mrs. Herbert Fuller (Carrie Constance Toogood) f

0 W.E.P. 5734 61.1750 E31

1 Chambers, Mrs. Norman Campbell (Bertha Griggs) f

0 113806 53.1000 E8

1 Chaudanson, Miss. Victorine f

0 PC 17608 262.3750 B61

1 Cherry, Miss. Gladys f

0 110152 86.5000 B77

1 Chibnall, Mrs. (Edith Martha Bowerman) f

1 113505 55.0000 E33

35 1 1 Clark, Mrs. Walter Miller (Virginia McDowell) f C89

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| emale | 26 | 1 |  | 0 | 13508 | 136.7792 |
| 36 | 1 |  | 1 |  |  |  |
| emale | 22 | 0 |  | 0 | 113781 | 151.5500 |
| 37 | 1 |  | 1 |  |  |  |

<NA>

17756 83.1583 E49

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| emale | 39 | 1 |  | 1 | PC |
| 38 | 1 |  | 1 |  |  |
| emale | 64 | 0 |  | 2 | PC |
| 39 | 1 |  | 1 |  |  |

Cleaver, Miss. Alice f Compton, Miss. Sara Rebecca f

Compton, Mrs. Alexander Taylor (Mary Eliza Ingersoll) f 17756 83.1583 E45

Cornell, Mrs. Robert Clifford (Malvina Helen Lamson) f

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| --- | --- | --- | --- | --- | --- |
| emale | 55 | 2 |  | 0 | 11770 25.7000 |
| 40 | 1 |  | 1 |  |  |
| emale | 36 | 0 |  | 2 | WE/P 5735 71.0000 |

C101

Crosby, Miss. Harriet R f

B22

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| --- | --- | --- | --- | --- |
| 41 | 1 |  | 1 |  |
| emale | 64 | 1 |  | 1 |
| 42 | 1 |  | 1 |  |
| emale | 38 | 1 |  | 0 |

Crosby, Mrs. Edward Gifford (Catherine Elizabeth Halstead) f 112901 26.5500 B26

Cumings, Mrs. John Bradley (Florence Briggs Thayer) f PC 17599 71.2833 C85

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 43 | 1 |  | 1 |  | | | |
| emale | 33 | 0 |  | 0 |  | 113781 | 151.5500 |
| 44 | 1 |  | 1 |  |  |  |  |
| emale | 27 | 1 |  | 2 | F.C. | 12750 | 52.0000 |
| 45 | 1 |  | 1 |  |  |  |  |
| emale | 17 | 1 |  | 0 |  | 17474 | 57.0000 |
| 46 | 1 |  | 1 |  |  |  |  |
| emale | 54 | 1 |  | 1 |  | 33638 | 81.8583 |

Daniels, Miss. Sarah f

<NA>

Davidson, Mrs. Thornton (Orian Hays) f B71

Dick, Mrs. Albert Adrian (Vera Gillespie) f B20

Dodge, Mrs. Washington (Ruth Vidaver) f A34

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| --- | --- | --- | --- | --- | --- |
| 47 | 1 |  | 1 |  | Douglas, Mrs. |
| emale | 27 | 1 |  | 1 | PC 17558 247.5208 |
| 48 | 1 |  | 1 |  | Dougl |
| emale | 48 | 1 |  | 0 | PC 17761 106.4250 |
| 49 1 1 Duff Gordon, Lady. (Lucille | | | | | |

Frederick Charles (Mary Helene Baxter) f B58 B60

as, Mrs. Walter Donald (Mahala Dutton) f C86

Christiana Sutherland) ("Mrs Morgan") f A16

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| emale | 48 | 1 |  | 0 |  | 11755 | 39.6000 |  |
| 50 | 1 |  | 1 |  |  |  |  |
| emale | 23 | 0 |  | 1 |  | 11767 | 83.1583 |
| 51 | 1 |  | 1 |  |  |  |  |
| emale | 38 | 0 |  | 0 | PC | 17757 | 227.5250 |
| 52 | 1 |  | 1 |  |  |  |  |
| emale | 54 | 1 |  | 0 |  | 36947 | 78.2667 |
| 53 | 1 |  | 0 |  |  |  |  |
| emale | 36 | 0 |  | 0 | PC | 17531 | 31.6792 |
| 54 | 1 |  | 1 |  |  |  |  |
| emale | NA | 0 |  | 0 | PC | 17598 | 31.6833 |
| 55 | 1 |  | 1 |  |  |  |  |
| emale | NA | 0 |  | 0 |  | 17421 | 110.8833 |
| 56 | 1 |  | 1 |  |  |  |  |
| emale | 24 | 3 |  | 2 |  | 19950 | 263.0000 | C23 |
| 57 | 1 |  | 1 |  |  |  |  |  |
| emale | 28 | 3 |  | 2 |  | 19950 | 263.0000 | C23 |
| 58 | 1 |  | 1 |  |  |  |  |  |
| emale | 23 | 3 |  | 2 |  | 19950 | 263.0000 | C23 |
| 59 | 1 |  | 1 |  |  |  |  |  |
| emale | 60 | 1 |  | 4 |  | 19950 | 263.0000 | C23 |
| 60 | 1 |  | 1 |  |  |  |  |  |
| emale | 30 | 0 |  | 0 | PC | 17485 | 56.9292 |  |

Earnshaw, Mrs. Boulton (Olive Potter) f C54

Endres, Miss. Caroline Louise f

C45

Eustis, Miss. Elizabeth Mussey f D20

Evans, Miss. Edith Corse f

A29

Flegenheim, Mrs. Alfred (Antoinette) f

<NA>

Fleming, Miss. Margaret f

<NA>

Fortune, Miss. Alice Elizabeth f C25 C27

C25 C27 C25 C27

Fortune, Miss. Ethel Flora f Fortune, Miss. Mabel Helen f

Fortune, Mrs. Mark (Mary McDougald) f C25 C27

Francatelli, Miss. Laura Mabel f E36

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 61 | 1 |  | 1 Frauenthal, Mrs. Henry William (Clara Heinsheimer) f | | | | | | | |
| emale  62 | NA  1 | 1 | 1 | 0 | PC | 17611 | 133.6500 | <NA>  Frolicher, Miss. Hedwig Margaritha | | f |
| emale | 22 | 0 | 2 13568 49.5000 B39 | | | | | | | |
| 63 | 1 |  | 1 Frolicher-Stehli, Mrs. Maxmillian (Margaretha Emerentia Stehli) f | | | | | | | |
| emale | 48 | 1 |  | 1 | 13567 79.2000 B41 | | | | | |
| 64 | 1 |  | 1 |  | Futrelle, Mrs. Jacques Heath (Lily May Peel) f | | | | | |
| emale | 35 | 1 |  | 0 | 113803 53.1000 C123 | | | | | |
| 65 | 1 |  | 1 |  |  | | Geiger, Miss. Amalie f | | | |
| emale | 35 | 0 |  | 0 | 113503 | | 211.5000 C130 | | | |
| 66 | 1 |  | 1 |  |  | | Gibson, Miss. Dorothy Winifred f | | | |
| emale | 22 | 0 |  | 1 | 112378 | | 59.4000 <NA> | | | |
| 67 | 1 |  | 1 |  |  | | Gibson, Mrs. Leonard (Pauline C Boeson) f | | | |
| emale | 45 | 0 |  | 1 | 112378 | | 59.4000 <NA> | | | |
| 68 | 1 |  | 1 Goldenberg, Mrs. Samuel L (Edwiga Grabowska) f | | | | | | | |
| emale  69 | NA  1 | 1 | 1 | 0 | 17453 | | 89.1042 | C92 | Graham, Miss. Margaret Edith | f |
| emale | 19 | 0 | 0 | | 112053 30.0000 B42 | | | | | |
| 70 | 1 |  | 1 |  |  | Graham, Mrs. William Thompson (Edith Junkins) f | | | | |
| emale | 58 | 0 |  | 1 | PC | 17582 153.4625 C125 | | | | |
| 71 | 1 |  | 1 |  |  | Greenfield, Mrs. Leo David (Blanche Strouse) f | | | | |
| emale | 45 | 0 |  | 1 | PC | 17759 63.3583 D10 D12 | | | | |
| 72 | 1 |  | 1 |  |  | Harder, Mrs. George Achilles (Dorothy Annan) f | | | | |
| emale | 25 | 1 |  | 0 |  | 11765 55.4417 E50 | | | | |

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| 73 | 1 |  | 1 |  |  | Harper, Mrs. Henry Sleeper (Myna Haxtun) | | | | f |
| emale | 49 | 1 |  | 0 | PC 17572 76.7292 | D33 | | | |  |
| 74 | 1 | 1 | | Harris, Mrs. Henry Birkhardt (Irene Wallach) | | | | | | f |
| emale | 35 | 1 |  | 0 | 36973 83.4750 | | C83 | | |  |
| 75 | 1 |  | 1 |  |  | | Hays, Miss. Margaret Bechstein | | | f |
| emale | 24 | 0 |  | 0 | 11767 83.1583 | | C54 | | |  |
| 76 | 1 |  | 1 |  | Hays, Mrs. | | Charles Melville (Clara Jennings Gregg) | | | f |
| emale | 52 | 1 |  | 1 | 12749 93.5000 | | B69 | | |  |
| 77 | 1 |  | 1 |  |  | | Hippach, Miss. Jean Gertrude | | | f |
| emale | 16 | 0 |  | 1 | 111361 57.9792 | | B18 | | |  |
| 78 | 1 |  | 1 |  | Hippach, | | Mrs. Louis Albert (Ida Sophia Fischer) | | | f |
| emale | 44 | 0 |  | 1 | 111361 57.9792 | | B18 | | |  |
| 79 | 1 |  | 1 |  |  | | Hogeboom, Mrs. John C (Anna Andrews) | | | f |
| emale | 51 | 1 |  | 0 | 13502 77.9583 | | D11 | | |  |
| 80 | 1 |  | 1 |  | Holverson, Mrs. Alexander Oskar (Mary Aline Towner) | | | | | f |
| emale | 35 | 1 |  | 0 | 113789 52.0000 <NA> | | | | |  |
| 81 | 1 |  | 1 |  | Hoyt, Mrs. Frederick Maxfield (Jane Anne Forby) | | | | | f |
| emale | 35 | 1 |  | 0 | 19943 90.0000 | C93 | |  |  |  |
| 82 | 1 |  | 1 |  |  |  | |  | Icard, Miss. Amelie | f |
| emale | 38 | 0 |  | 0 | 113572 80.0000 | B28 | |  |  |  |
| 83 | 1 |  | 0 |  |  |  | | Isham, | Miss. Ann Elizabeth | f |
| emale | 50 | 0 |  | 0 | PC 17595 28.7125 | C49 | |  |  |  |

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|  | embarked | boat |
| 1 | S | 2 |
| 2 | S | <NA> |
| 3 | S | <NA> |
| 4 | S | 10 |
| 5 | S | D |
| 6 | C | 4 |
| 7 | C | 9 |
| 8 | S | 6 |
| 9 | C | 6 |
| 10 | C | 8 |
| 11 | S | 5 |
| 12 | C | 4 |
| 13 | S | 8 |
| 14 | C | 7 |
| 15 | S | 8 |
| 16 | S | 8 |
| 17 | S | 8 |
| 18 | C | 4 |
| 19 | S | 6 |
| 20 | C | 6 |
| 21 | S | D |
| 22 | C | 8 |
| 23 | C | 3 |
| 24 | C | 6 |
| 25 | C | 3 |
| 26 | S | 4 |
| 27 | S | 4 |
| 28 | C | 5 |
| 29 | S | 6 |
| 30 | S | 4 |
| 31 | S | 5 |
| 32 | C | 4 |
| 33 | S | 8 |
| 34 | S | 6 |
| 35 | C | 4 |
| 36 | S | 11 |
| 37 | C | 14 |
| 38 | C | 14 |
| 39 | S | 2 |
| 40 | S | 7 |
| 41 | S | 7 |
| 42 | C | 4 |
| 43 | S | 8 |
| 44 | S | 3 |
| 45 | S | 3 |
| 46 | S | 5 |
| 47 | C | 6 |
| 48 | C | 2 |
| 49 | C | 1 |
| 50 | C | 7 |
| 51 | C | 4 |
| 52 | C | 4 |
| 53 | C | <NA> |

|  |  |  |
| --- | --- | --- |
| 54 | S | 7 |
| 55 | C | 4 |
| 56 | S | 10 |
| 57 | S | 10 |
| 58 | S | 10 |
| 59 | S | 10 |
| 60 | C | 1 |
| 61 | S | 5 |
| 62 | C | 5 |
| 63 | C | 5 |
| 64 | S | D |
| 65 | C | 4 |
| 66 | C | 7 |
| 67 | C | 7 |
| 68 | C | 5 |
| 69 | S | 3 |
| 70 | S | 3 |
| 71 | C | 7 |
| 72 | C | 5 |
| 73 | C | 3 |
| 74 | S | D |
| 75 | C | 7 |
| 76 | S | 3 |
| 77 | C | 4 |
| 78 | C | 4 |
| 79 | S | 10 |
| 80 | S | 8 |
| 81 | S | D |
| 82 | <NA> | 6 |
| 83 | C | <NA> |

[ reached 'max' / getOption("max.print") -- omitted 1226 rows ]

* filter\_DF <- filter(DF, DF$age < 20)
* filter\_DF

pclass survived

name Gender age sibsp parch

1. 1 1 Allison, Master

. Hudson Trevor male 0.9167 1 2

1. 1 0 Allison, Miss

. Helen Loraine female 2.0000 1 2

1. 1 1 Astor, Mrs. John Jacob (Madeleine

Talmadge Force) female 18.0000 1 0

1. 1 1 Bishop, Mrs. Dickinson H

(Helen Walton) female 19.0000 1 0

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5  Mr. | 1  Jose Pedro | 0  male 17.0000 | | 0 | 0 | Carrau, | | |
| 6 | 1 | 1 | |  |  | Carter, Master. Will | | |
| iam Thornton II  7 1  ss. Lucile Polk | | male 1  female | 11.0000  14.0000 | 1  1 | 2  2 |  |  | Carter, Mi |
| 8 1  Vera Gillespie)  9 1  ter. Washington | | 1  female 1  male | 17.0000  4.0000 | 1  0 | 0  2 | Dick, | Mrs. | Albert Adrian (  Dodge, Mas |
| 10 1  arles Alexander | | 0  male | 19.0000 | 3 | 2 |  |  | Fortune, Mr. Ch |
| 11 1 | | 1 |  |  |  |  |  | Graham, Miss. |
| Margaret Edith  12 1 | | female 19.0000  1 | | 0 | 0 | Hippach, Miss | | |

. Jean Gertrude female 16.0000 0 1

1. 1 1 Lines, Mis

s. Mary Conover female 16.0000 0 1

1. 1 1 Madill, Miss. Geor

gette Alexandra female 15.0000 0 1

1. 1 1 Maioni

, Miss. Roberta female 16.0000 0 0

1. 1 0 Marvin, Mr

. Daniel Warner male 19.0000 1 0

1. 1 1 Marvin, Mrs. Daniel Warner (Mary Graham Carmich ael Farquarson) female 18.0000 1 0
2. 1 1 Newsom, Miss.

Helen Monypeny female 19.0000 0 2

1. 1 0 Penasco y Castellana, Mr. V

ictor de Satode male 18.0000 1 0

1. 1 1 Penasco y Castellana, Mrs. Victor de Satode (Maria Josefa Perez de Soto y Vallejo) female 17.0000 1 0
2. 1 1 Ryerson, Mas

ter. John Borie male 13.0000 2 2

1. 1 1 Ryerson, Mi

ss. Emily Borie female 18.0000 2 2

1. 1 1 Smith, Mrs. Lucien Philip (Mary

Eloise Hughes) female 18.0000 1 0

1. 1 1 Spedden, Master.

Robert Douglas male 6.0000 0 2

1. 1 1 Taus

sig, Miss. Ruth female 18.0000 0 2

1. 1 1 Thayer, Mr.

John Borland Jr male 17.0000 0 2

1. 2 0 Andrew, Mr.

Edgardo Samuel male 18.0000 0 0

1. 2 0 Bailey, M

r. Percy Andrew male 18.0000 0 0

1. 2 1 Beane, Mrs. Edward

(Ethel Clarke) female 19.0000 1 0

1. 2 1 Becker, Ma

ster. Richard F male 1.0000 2 1

1. 2 1 Becker, Miss

. Marion Louise female 4.0000 2 1

1. 2 1 Becker, Miss.

Ruth Elizabeth female 12.0000 2 1

1. 2 1 Bentham,

Miss. Lilian W female 19.0000 0 0

1. 2 1 Brown, Mis

|  |  |  |
| --- | --- | --- |
| 15.0000 | 0 | 2 |
| 0.8333 | 0 | 2 |
| 19.0000 | 0 | 0 |
| 8.0000 | 0 | 2 |
| 8.0000 | 1 | 1 |
| 18.0000 | 0 | 0 |
| 17.0000 | 0 | 0 |
| 18.0000 | 0 | 0 |
| 18.0000 | 0 | 1 |
| 8.0000 | 0 | 2 |

s. Edith Eileen female

1. 2 1 Caldwell, Mast

er. Alden Gates male

1. 2 0 Carbin

es, Mr. William male

1. 2 1 Collyer, Miss. Ma

rjorie "Lottie" female

1. 2 1 Davies, Master.

John Morgan Jr male

1. 2 0 Davies, Mr

. Charles Henry male

1. 2 0 Deacon, Mr

. Percy William male

1. 2 0 Dibd

en, Mr. William male

1. 2 1 Doli

ng, Miss. Elsie female

1. 2 1 Drew, Master.

Marshall Brines male

|  |  |  |  |
| --- | --- | --- | --- |
| 0 |  |  | Fahlstrom, |
| male 18.0000 | 0 | 0 |  |
| 0 |  |  | Fillbrook, Mr. |
| male 18.0000 | 0 | 0 |  |
| 0 |  |  | Gask |

1. 2

Mr. Arne Jonas

1. 2

Joseph Charles

1. 2

|  |  |  |
| --- | --- | --- |
| 16.0000 | 0 | 0 |
| 0.6667 | 1 | 1 |
| 6.0000 | 0 | 1 |
| 7.0000 | 0 | 2 |
| 18.0000 | 1 | 1 |
| 17.0000 | 0 | 0 |
| 1.0000 | 1 | 2 |
| 3.0000 | 1 | 2 |
| 17.0000 | 0 | 0 |
| 1.0000 | 0 | 2 |
| 13.0000 | 0 | 1 |
| 19.0000 | 0 | 0 |

ell, Mr. Alfred male

1. 2 1 Hamalainen

, Master. Viljo male

1. 2 1 Harper, Miss. Anni

e Jessie "Nina" female

1. 2 1 Hart, M

iss. Eva Miriam female

1. 2 0 Hiltun

en, Miss. Marta female

1. 2 1 Ilet

t, Miss. Bertha female

1. 2 1 Laroch

e, Miss. Louise female

1. 2 1 Laroche, Miss. Simonne Ma

rie Anne Andree female

1. 2 1 Lehman

n, Miss. Bertha female

1. 2 1 Mallet

, Master. Andre male

1. 2 1 Mellinger, Miss. M

adeleine Violet female

1. 2 1 Mellors, M

r. William John male

1. 2 0 Mudd, Mr.

Thomas Charles male 16.0000 0 0

1. 2 1 Nasser, Mrs. Nichola

s (Adele Achem) female 14.0000 1 0

1. 2 1 Navratil, Maste

r. Edmond Roger male 2.0000 1 1

1. 2 1 Navratil, M

aster. Michel M male 3.0000 1 1

1. 2 0 Nicholls, Mr.

Joseph Charles male 19.0000 1 1

1. 2 0 Pengelly, Mr. Fr

ederick William male 19.0000 0 0

1. 2 1 Phillips, Miss. Kate Florence ("Mrs Kate Louise Phil lips Marshall") female 19.0000 0 0
2. 2 1 Quick, Mi

ss. Phyllis May female 2.0000 1 1

1. 2 1 Quick, Miss

. Winifred Vera female 8.0000 1 1

1. 2 1 Richards, Master

. George Sibley male 0.8333 1 1

1. 2 1 Richards, Maste

r. William Rowe male 3.0000 1 1

1. 2 0 Rogers, Mr.

Reginald Harry male 19.0000 0 0

1. 2 1 Silven, Miss.

Lyyli Karoliina female 18.0000 0 2

1. 2 0 Sw

ane, Mr. George male 18.5000 0 0

1. 2 0 Sweet, Mr. G

eorge Frederick male 14.0000 0 0

1. 2 1 Watt,

Miss. Bertha J female 12.0000 0 0

1. 2 1 Wells, Maste

r. Ralph Lester male 2.0000 1 1

1. 2 1 We

lls, Miss. Joan female 4.0000 1 1

1. 2 1 West,

Miss. Barbara J female 0.9167 1 2

1. 2 1 West, Miss. C

onstance Mirium female 5.0000 1 2

1. 3 0 Abbott, Master

. Eugene Joseph male 13.0000 0 2

1. 3 0 Abbott, Mr.

Rossmore Edward male 16.0000 1 1

1. 3 1 Abelseth, Mi

ss. Karen Marie female 16.0000 0 0

1. 3 1 Abrahim, Mrs. Joseph (Soph

ie Halaut Easu) female 18.0000 0 0

1. 3 1 Aks, Maste

r. Philip Frank male 0.8333 0 1

1. 3 1 Aks, Mrs. S

am (Leah Rosen) female 18.0000 0 1

ticket fare cabin embarked boat

1 113781 151.5500 C22 C26 S 11

2 113781 151.5500 C22 C26 S <NA>

3 PC 17757 227.5250 C62 C64 C 4

4 11967 91.0792 B49 C 7

5 113059 47.1000 <NA> S <NA>

6 113760 120.0000 B96 B98 S 4

7 113760 120.0000 B96 B98 S 4

8 17474 57.0000 B20 S 3

9 33638 81.8583 A34 S 5

10 19950 263.0000 C23 C25 C27 S <NA>

11 112053 30.0000 B42 S 3

12 111361 57.9792 B18 C 4

13 PC 17592 39.4000 D28 S 9

14 24160 211.3375 B5 S 2

15 110152 86.5000 B79 S 8

16 113773 53.1000 D30 S <NA>

17 113773 53.1000 D30 S 10

18 11752 26.2833 D47 S 5

19 PC 17758 108.9000 C65 C <NA>

20 PC 17758 108.9000 C65 C 8

21 PC 17608 262.3750 B57 B59 B63 B66 C 4

22 PC 17608 262.3750 B57 B59 B63 B66 C 4

23 13695 60.0000 C31 S 6

24 16966 134.5000 E34 C 3

25 110413 79.6500 E68 S 8

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 26 | 17421 | 110.8833 | C70 | C | B |
| 27 | 231945 | 11.5000 | <NA> | S | <NA> |
| 28 | 29108 | 11.5000 | <NA> | S | <NA> |
| 29 | 2908 | 26.0000 | <NA> | S | 13 |
| 30 | 230136 | 39.0000 | F4 | S | 11 |
| 31 | 230136 | 39.0000 | F4 | S | 11 |
| 32 | 230136 | 39.0000 | F4 | S | 13 |
| 33 | 28404 | 13.0000 | <NA> | S | 12 |
| 34 | 29750 | 39.0000 | <NA> | S | 14 |
| 35 | 248738 | 29.0000 | <NA> | S | 13 |
| 36 | 28424 | 13.0000 | <NA> | S | <NA> |
| 37 | C.A. 31921 | 26.2500 | <NA> | S | 14 |
| 38 | C.A. 33112 | 36.7500 | <NA> | S | 14 |
| 39 | S.O.C. 14879 | 73.5000 | <NA> | S | <NA> |
| 40 | S.O.C. 14879 | 73.5000 | <NA> | S | <NA> |
| 41 | S.O.C. 14879 | 73.5000 | <NA> | S | <NA> |
| 42 | 231919 | 23.0000 | <NA> | S | <NA> |
| 43 | 28220 | 32.5000 | <NA> | S | 10 |
| 44 | 236171 | 13.0000 | <NA> | S | <NA> |
| 45 | C.A. 15185 | 10.5000 | <NA> | S | <NA> |
| 46 | 239865 | 26.0000 | <NA> | S | <NA> |
| 47 | 250649 | 14.5000 | <NA> | S | 4 |
| 48 | 248727 | 33.0000 | <NA> | S | 11 |
| 49 | F.C.C. 13529 | 26.2500 | <NA> | S | 14 |
| 50 | 250650 | 13.0000 | <NA> | S | <NA> |
| 51 | SO/C 14885 | 10.5000 | <NA> | S | <NA> |
| 52 | SC/Paris 2123 | 41.5792 | <NA> | C | 14 |
| 53 | SC/Paris 2123 | 41.5792 | <NA> | C | 14 |
| 54 | SC 1748 | 12.0000 | <NA> | C | 12 |
| 55 | S.C./PARIS 2079 | 37.0042 | <NA> | C | 10 |
| 56 | 250644 | 19.5000 | <NA> | S | 14 |
| 57 | SW/PP 751 | 10.5000 | <NA> | S | B |
| 58 | S.O./P.P. 3 | 10.5000 | <NA> | S | <NA> |
| 59 | 237736 | 30.0708 | <NA> | C | <NA> |
| 60 | 230080 | 26.0000 | F2 | S | D |
| 61 | 230080 | 26.0000 | F2 | S | D |
| 62 | C.A. 33112 | 36.7500 | <NA> | S | <NA> |
| 63 | 28665 | 10.5000 | <NA> | S | <NA> |
| 64 | 250655 | 26.0000 | <NA> | S | 11 |
| 65 | 26360 | 26.0000 | <NA> | S | 11 |
| 66 | 26360 | 26.0000 | <NA> | S | 11 |
| 67 | 29106 | 18.7500 | <NA> | S | 4 |
| 68 | 29106 | 18.7500 | <NA> | S | 4 |
| 69 | 28004 | 10.5000 | <NA> | S | <NA> |
| 70 | 250652 | 13.0000 | <NA> | S | 16 |
| 71 | 248734 | 13.0000 | F | S | <NA> |
| 72 | 220845 | 65.0000 | <NA> | S | <NA> |
| 73 | C.A. 33595 | 15.7500 | <NA> | S | 9 |
| 74 | 29103 | 23.0000 | <NA> | S | 14 |
| 75 | 29103 | 23.0000 | <NA> | S | 14 |
| 76 | C.A. 34651 | 27.7500 | <NA> | S | 10 |
| 77 | C.A. 34651 | 27.7500 | <NA> | S | 10 |
| 78 | C.A. 2673 | 20.2500 | <NA> | S | <NA> |
| 79 | C.A. 2673 | 20.2500 | <NA> | S | <NA> |
| 80 | 348125 | 7.6500 | <NA> | S | 16 |
| 81 | 2657 | 7.2292 | <NA> | C | C |
| 82 | 392091 | 9.3500 | <NA> | S | 11 |
| 83 | 392091 | 9.3500 | <NA> | S | 13 |

[ reached 'max' / getOption("max.print") -- omitted 142 rows ]

* mutated\_DF <- mutate(DF, fare = fare \* 2)
* mutated\_DF$fare

[1] 422.6750 303.1000 303.1000 303.1000 303.1000 53.1000 155.9166 0.0000

102.9584 99.0084 455.0500 455.0500 138.6000

[14] 157.7000 60.0000 51.8500 495.0416 495.0416 152.5834 150.4834 105.1084

105.1084 60.0000 455.0500 443.5584 52.0000

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| [27] | 182.1584 182.1584 | 271.2666 | 53.1000 | 71.0000 | 62.0000 | 329.7334 | 53.1000 |
| 53.1000 | 524.7500 110.0000 | 53.1000 | 61.0000 |  |  |  |  |
| [40] | 100.9916 79.2000 | 55.4416 | 102.9584 | 152.5834 | 269.0000 | 53.1000 | 62.0000 |
| 52.5750 | 54.8916 1024.6584 | 1024.6584 | 10.0000 |  |  |  |  |
| [53] | 94.2000 94.2000 | 240.0000 | 240.0000 | 240.0000 | 240.0000 | 52.0000 | 55.4416 |

157.7000 157.7000 122.3500 122.3500 106.2000

[66] 106.2000 524.7500 173.0000 59.4000 110.0000 0.0000 273.5584 273.5584

303.1000 104.0000 51.1750 166.3166 166.3166

[79] 166.3166 51.4000 53.1000 142.0000 142.0000 53.1000 142.5666 142.5666

53.1000 61.0000 303.1000 104.0000 104.0000

[92] 114.0000 114.0000 163.7166 163.7166 163.7166 212.8500 495.0416 212.8500

79.2000 113.8584 59.4000 166.3166 455.0500

[105] 156.5334 63.3584 443.5584 63.3666 221.7666 52.7750 55.5000 526.0000

526.0000 526.0000 526.0000 526.0000 526.0000

[118] 113.8584 53.1000 267.3000 55.4416 267.3000 99.0000 158.4000 158.4000

0.0000 106.2000 106.2000 77.0000 423.0000

[131] 118.8000 118.8000 158.4000 178.2084 178.2084 69.3084 57.0000 60.0000

306.9250 306.9250 126.7166 126.7166 158.4000

[144] 110.8834 110.8834 153.4584 153.4584 84.8000 166.9500 166.9500 0.0000

153.4584 60.0000 166.3166 187.0000 187.0000

[157] 85.0000 103.7250 100.0000 115.9584 115.9584 155.9166 104.0000 104.0000

53.1000 180.0000 61.3916 180.0000 160.0000

[170] 57.4250 0.0000 52.0000 52.0000 423.0000 59.4000 103.7250 103.7250

105.1084 105.1084 53.1000 422.6750 51.8584

[183] 212.8500 1024.6584 55.4416 53.1000 55.4416 78.8000 78.8000 60.0000

155.9166 91.0000 293.0416 422.6750 52.0000

[196] 173.0000 59.4000 106.2000 106.2000 99.0084 150.4834 103.7250 52.5750

164.3416 164.3416 53.1000 180.0000 180.0000

[209] 180.0000 115.5000 61.0000 84.8000 59.4000 226.5500 226.5500 226.5500

52.5666 52.0000 217.8000 51.4834 123.9584

[222] 123.9584 55.4416 0.0000 57.0000 187.0000 133.2000 133.2000 217.8000

217.8000 187.0000 61.0000 104.0000 166.3166

[235] 0.0000 79.2000 271.2666 455.0500 422.6750 100.9916 53.1000 100.0000

55.4416 158.4000 80.2500 173.0000 118.8000

[248] 118.8000 53.1000 524.7500 524.7500 524.7500 524.7500 524.7500 61.0000

138.6000 52.0000 115.5000 62.0000 53.1000

[261] 306.9250 52.5750 111.8000 111.8000 71.0000 71.0000 53.1000 61.3916

120.0000 52.0000 120.0000 164.5334 164.5334

[274] 269.0000 269.0000 269.0000 293.0416 293.0416 61.0000 53.1000 110.8834

110.8834 156.5334 55.4416 160.0000 443.5584

[287] 443.5584 64.6416 51.8584 159.3000 159.3000 159.3000 104.0000 104.0000

221.7666 221.7666 221.7666 158.4000 57.0750

[300] 55.4416 67.0000 68.0416 1024.6584 150.5000 150.5000 53.1000 154.5750

|  |  |
| --- | --- |
| 154.5750 271.2666 329.7334 329.7334 | 329.7334 |
| [313] 423.0000 423.0000 423.0000 | 53.1000 12 |
| 71.0000 53.1000 271.2666 48.0000 | 48.0000 |
| [326] 26.0000 23.0000 21.0000 | 52.0000 |
| 26.0000 21.0000 25.0500 52.0000 | 52.0000 |
| [339] 52.0000 78.0000 78.0000 | 78.0000 |
| 26.0000 26.0000 26.0000 26.0000 | 78.0000 |
| [352] 78.0000 78.0000 52.0000 | 52.0000 |
| 58.0000 58.0000 58.0000 42.0000 | 0.0000 |
| [365] 26.0000 52.0000 52.0000 | 27.0000 |
| 52.0000 52.0000 21.0000 26.0000 | 21.0000 |
| [378] 52.5000 52.5000 52.5000 | 21.0000 |
| 73.5000 147.0000 73.5000 26.0000 | 26.0000 |
| [391] 147.0000 55.4416 55.4416 | 63.0000 14 |
| 65.0000 65.0000 65.0000 27.7166 | 27.7166 |
| [404] 26.0000 26.0000 26.0000 | 52.0000 |
| 26.0000 52.0000 42.0000 42.0000 | 26.0000 |
| [417] 52.0000 21.0000 21.0000 | 23.0000 |
| 26.0000 26.0000 26.0000 29.0000 | 29.0000 |
| [430] 26.0000 66.0000 66.0000 | 21.0000 |
| 130.0000 130.0000 130.0000 130.0000 | 32.0000 |
| [443] 147.0000 147.0000 147.0000 | 26.0000 |
| 26.0000 52.0000 52.0000 147.0000 | 26.0000 |
| [456] 52.0000 52.0000 24.5500 | 21.0000 |
| 63.0000 21.0000 27.5834 52.0000 | 52.0000 |
| [469] 42.0000 24.7000 24.7000 | 27.0000 |
| 52.0000 21.4166 83.1584 83.1584 | 83.1584 |
| [482] 83.1584 24.0000 66.0000 | 21.0000 |
| 52.0000 21.0000 30.0916 74.0084 | 74.0084 |
| [495] 74.0084 31.1584 26.0000 | 32.0000 |
| 39.0000 21.0000 26.0000 26.0000 | 21.0000 |
| [508] 26.0000 28.0000 52.0000 | 21.0000 |
| 52.0000 52.0000 26.0000 73.5000 | 27.0000 |
| [521] 27.7250 21.0000 26.0000 | 21.0000 |
| 0.0000 52.0000 21.0000 30.1000 | 26.0000 |
| [534] 42.0000 52.0000 42.0000 | 26.0000 |
| 52.0000 52.0000 21.0000 42.0000 | 42.0000 |
| [547] 26.0000 30.0916 37.5000 | 37.5000 |
| 26.0000 26.0000 52.0000 52.0000 | 26.0000 |
| [560] 73.5000 26.0000 27.0000 | 24.7000 |
| 21.0000 26.0000 130.0000 21.0000 | 26.0000 |
| [573] 25.3000 21.0000 42.0000 | 42.0000 |
| 42.0000 0.0000 31.5000 31.5000 | 26.0000 |

2.7584 122.7584 70.0000 269.0000

52.0000 26.0000 23.0000 21.0000

78.0000 26.0000 26.0000 26.0000

26.0000 26.0000 26.0000 26.0000

52.0000 52.0000 60.0000 60.0000

26.0000 42.0000 23.0000 0.0000

7.0000 46.0000 46.0000 52.0000

52.0000 21.0000 26.0000 0.0000

23.0000 27.0000 26.0000 26.0000

21.0000 52.5000 52.5000 52.5000

46.0000 23.0000 26.0000 46.0000

54.0000 54.0000 30.0000 63.0000

24.7000 0.0000 21.0000 52.0000

25.7500 21.0000 24.7000 52.0000

27.0000 26.0000 52.0000 39.0000

19.3750 60.1416 60.1416 52.0000

27.7250 21.0000 27.7166 21.0000

26.0000 25.4750 30.0666 52.0000

37.5000 21.0000 21.0000 21.0000

21.0000 26.0000 26.0000 30.0916

26.0000 42.0000 42.0000 21.0000

46.0000 46.0000

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 46.0000 |  | 55.5000 | 55.5000 | 55.5000 |
| 40.5000 |  | 40.5000 | 15.3000 | 15.3000 |
| 15.8500 |  | 14.1000 | 14.1000 | 16.1000 |
| 62.5500 |  | 62.5500 | 15.5916 | 15.5500 |
| 62.7750 |  | 62.7750 | 62.7750 | 62.7750 |
| 14.4500 |  | 31.7000 | 31.7000 | 38.5166 |
| 15.7584 |  | 16.1000 | 16.1000 | 15.5500 |
| 14.4500 |  | 30.4916 | 15.5000 | 31.0000 |
| 15.6416 |  | 13.5000 | 15.7584 | 17.3250 |
| 28.9166 |  | 15.5916 | 15.7084 | 15.5000 |
| 16.1000 |  | 14.5000 | 14.9916 | 14.9916 |
| 16.1000 |  | 31.8000 | 31.8000 | 31.8000 |
| 13.9000 |  | 15.5000 | 28.8000 | 28.8000 |
| 34.8000 |  | 34.8000 | 19.0000 | 19.0000 |
| 15.7584 |  | 15.7916 | 17.3250 | 15.7916 |
| 27.8000 |  | 27.8000 | 15.5500 | 15.5500 |
| 15.5000 |  | 14.1000 | 15.5916 | 15.5000 |
| 68.7500 |  | 68.7500 | 15.5000 | 14.5000 |
| 41.0500 |  | 14.1000 | 93.8000 | 93.8000 |
| 19.6916 |  | 15.8500 | 15.8500 | 15.5500 |
| 15.7084 |  | 15.7084 | 28.2166 | 15.1000 |
| 17.9250 |  | 15.7916 | 15.5500 | 15.5000 |
| 14.4584 |  | 15.7916 | 15.8500 | 15.8500 |
| 12.9916 |  | 15.5500 | 15.5916 | 17.3084 |
| 46.9000 |  | 46.9000 | 46.9000 | 15.7916 |
| 15.7084 |  | 15.0416 | 26.8334 | 26.8334 |
| 28.9084 |  | 28.9084 | 15.5000 | 15.5000 |
| 15.7916 |  | 14.4584 | 14.4500 | 19.1750 |
| 14.4500 |  | 50.9334 | 50.9334 | 50.9334 |
| 15.5500 |  | 15.5000 | 31.1000 | 31.1000 |
| 14.1084 |  | 15.7084 | 15.1584 | 15.7916 |
| 15.5000 |  | 15.4750 | 14.4584 | 15.7916 |
| entries | ] |  |  |  |

|  |  |  |
| --- | --- | --- |
| [586] | 52.0000 | 52.0000 |
| 55.5000 | 21.0000 | 25.7500 |
| [599] | 27.0000 | 26.0000 |
| 15.8500 | 14.4584 | 14.5000 |
| [612] | 18.7000 | 18.7000 |
| 16.6000 | 45.0500 | 15.7084 |
| [625] | 62.5500 | 15.8500 |
| 62.5500 | 15.7084 | 15.7916 |
| [638] | 15.5500 | 14.1000 |
| 15.5916 | 62.7750 | 14.4500 |
| [651] | 28.9166 | 14.4500 |
| 38.5166 | 38.5166 | 38.5166 |
| [664] | 15.7916 | 14.4584 |
| 18.7000 | 14.4584 | 8.0250 |
| [677] | 15.5000 | 15.7916 |
| 31.0000 | 32.2000 | 15.4500 |
| [690] | 14.5000 | 15.5916 |
| 17.3250 | 17.3250 | 17.3250 |
| [703] | 15.5000 | 15.5000 |
| 15.5000 | 14.5000 | 16.1000 |
| [716] | 16.1000 | 28.9084 |
| 15.4666 | 15.5000 | 15.5000 |
| [729] | 16.1000 | 15.7916 |
| 14.5000 | 16.3166 | 32.2000 |
| [742] | 14.4500 | 16.1000 |
| 28.8000 | 15.7916 | 15.7916 |
| [755] | 48.3000 | 16.1000 |
| 41.1500 | 41.1500 | 41.1500 |
| [768] | 15.7916 | 15.7916 |
| 14.4584 | 15.5000 | 16.1000 |
| [781] | 16.1000 | 15.7916 |
| 13.9500 | 14.4500 | 14.4584 |
| [794] | 14.5000 | 24.9500 |
| 15.5000 | 13.9000 | 15.7584 |
| [807] | 68.7500 | 68.7500 |
| 15.4834 | 29.0000 | 15.7916 |
| [820] | 15.5000 | 41.0500 |
| 93.8000 | 93.8000 | 93.8000 |
| [833] | 93.8000 | 16.1000 |
| 17.7000 | 15.4666 | 39.9334 |
| [846] | 31.7000 | 19.0000 |
| 14.5000 | 13.7166 | 37.5750 |
| [859] | 112.9916 | 13.5000 |
| 24.5750 | 24.5750 | 12.9000 |
| [872] | 15.5000 | 16.1000 |
| 15.7916 | 15.7916 | 15.5916 |
| [885] | 15.7084 | 14.1084 |
| 15.5500 | 15.7084 | 22.2666 |
| [898] | 15.5500 | 0.0000 |
| 15.7084 | 15.7084 | 19.6500 |
| [911] | 14.2500 | 16.8666 |
| 14.4584 | 14.4584 | 15.5000 |
| [924] | 15.5000 | 15.6584 |
| 15.4750 | 17.3250 | 17.3250 |
| [937] | 44.0500 | 24.3666 |
| 15.7916 | 112.9916 | 112.9916 |
| [950] | 112.9916 | 18.9666 |
| 50.9334 | 50.9334 | 15.8500 |
| [963] | 31.0000 | 0.0000 |
| 15.8500 | 15.7584 | 112.9916 |
| [976] | 32.2000 | 15.7584 |
| 15.1000 | 15.5000 | 14.2834 |
| [989] | 15.5000 | 16.1000 |
| 15.7916 | 14.4500 | 15.7916 |

26.0000 26.0000

15.1000 40.5000

16.1000 18.9500

37.5750 15.7750

62.5500 62.5500

15.5500 62.5500

35.6000 35.6000

62.7750 62.7750

14.4500 14.1000

15.7084 14.4584

16.1000 14.4500

28.9084 28.9084

112.9916 15.5500

30.4916 30.4916

15.7084 14.0916

16.1000 14.5666

17.3250 17.3250

16.1000 28.9166

15.4666 112.9916

28.9084 14.1000

15.2584 15.5000

15.7916 15.7916

32.2000 17.3250

21.0334 20.3416

48.3000 16.1000

32.2000 32.2000

41.1500 15.7916

14.5000 14.5000

24.9500 15.5000

15.5000 15.1000

14.4584 14.4584

14.4500 30.2000

15.5000 112.9916

16.1000 68.7500

16.1000 15.4666

41.0500 15.7000

93.8000 93.8000

16.7250 16.1000

39.9334 31.7000

14.4584 28.2166

15.5000 13.9500

15.8500 15.8500

45.0500 15.8500

15.3000 15.7750

14.1000 15.7084

15.5000 16.2250

22.2666 0.0000

22.2666 46.9000

19.6500 15.8500

15.7916 15.5916

14.5000 15.5000

16.1000 15.5000

44.0500 44.0500

15.7084 24.3666

14.5000 15.5000

15.5500 15.5500

12.8750 31.0000

48.3000 19.0000

15.1000 32.2000

14.5000 17.3250

14.2500 15.7584

15.8500 14.4584

15.5000

[ reached getOption("max.print") -- omitted 309

* missing\_DF <- sum(is.na(DF$boat))
* missing\_DF

[1] 823

* per\_missing\_DF <- mean(is.na(DF$boat)) \* 100
* per\_missing\_DF

[1] 62.87242

* complete\_DF <- na.omit(DF$boat)
* complete\_DF

[1] "2" "11" "3" "10" "D" "4" "9" "6"

"B" "6" "8" "A" "5"

[14] "5" "5" "4" "8" "7" "7" "8" "D"

"7" "8" "8" "4" "6"

[27] "9" "6" "D" "8" "3" "5" "6" "3"

"3" "4" "4" "C" "4"

[40] "5" "6" "4" "5" "5" "4" "8" "7"

"6" "4" "11" "14" "14"

[53] "2" "7" "7" "4" "5 9" "3" "8" "3"

"3" "3" "13" "5" "5"

[66] "6" "2" "1" "1" "7" "4" "4" "7"

"4" "5" "10" "10" "10"

[79] "10" "1" "5" "5" "5" "5" "5" "5"

"D" "4" "7" "7" "5"

[92] "5" "B" "3" "3" "7" "7" "5" "5"

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[105] "7" "3" "4" "4" "10" "8" "15" "D"

"14" "D" "6" "C" "8"

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"9" "10" "2" "8" "7"

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"D" "D" "7" "11" "13"

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[287] "4" "4" "13" "12" "12" "16" "11" "10"

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[300] "10" "9" "9" "12" "10" "14" "14" "14"

"10" "10" "10" "9" "14"

[313] "9" "A" "16" "A" "15" "C" "11" "13"

"15" "16" "D" "A" "15"

[326] "15" "13" "15" "C" "C" "D" "C" "C" "C" "C" "C" "15" "C"

[339] "13" "13" "16" "C" "12" "13" "2" "2"

"2" "12" "15" "15" "13 15 B"

[352] "16" "15" "13" "11" "10" "10" "10" "C"

"B" "13" "D" "16" "13"

[365] "15" "13" "16" "13" "C D" "C D" "15" "11"

"B" "16" "15" "C" "C"

[378] "15" "15" "C" "C" "15" "A" "D" "13"

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[404] "14" "6" "A" "A" "15" "15" "10" "15"

"15" "13" "15" "16" "C"

[417] "15 16" "16" "16" "16" "13" "13" "15" "16"

"14" "14" "16" "B" "C"

[430] "C" "C" "16" "15" "16" "16" "16" "C" "C" "C" "C" "C" "C"

[443] "D" "13" "9" "13" "D" "C" "B" "13"

"13" "A" "15" "C" "D"

[456] "D" "9" "13" "C" "14" "C" "13" "13"

"13" "11" "11" "16" "13"

[469] "C" "9" "B" "15" "13" "13 15" "16" "14"

"10" "15" "C" "C" "C"

[482] "15" "15" "13 15" "C" "C"

attr(,"na.action")

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 11 16 | 17 26 | 31 | 35 | 39 | 40 | 41 | 46 | 47 |
| 71 72 | 75 76 78 |  |  |  |  |  |  |  |

[1] 3 4 5 8

52 53 54 59 61 63

[28] 81 82 85 90 97 102 106 107 111 115

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 116 | 119 | 126 | 127 | 129 | 133 |
| 192 | 193 | 195 | 198 | 201 | 202 |
| 244 | 245 | 247 | 249 | 253 | 263 |
| 314 | 317 | 319 | 322 | 324 | 326 |
| 367 | 368 | 369 | 370 | 373 | 375 |
| 410 | 411 | 412 | 413 | 414 | 415 |
| 449 | 451 | 452 | 454 | 456 | 457 |
| 490 | 491 | 492 | 494 | 496 | 497 |
| 529 | 531 | 532 | 533 | 536 | 538 |
| 580 | 582 | 586 | 593 | 595 | 596 |
| 632 | 633 | 634 | 635 | 636 | 637 |
| 672 | 673 | 674 | 676 | 677 | 678 |
| 702 | 703 | 704 | 705 | 706 | 707 |
| 733 | 737 | 738 | 740 | 741 | 742 |
| 775 | 776 | 777 | 780 | 781 | 782 |
| 809 | 810 | 811 | 812 | 813 | 814 |
| 840 | 841 | 842 | 843 | 844 | 845 |
| 878 | 879 | 880 | 883 | 884 | 885 |
| 916 | 919 | 920 | 921 | 925 | 926 |
| 956 | 957 | 958 | 959 | 960 | 961 |
| 991 | 993 | 995 | 996 | 997 | 999 |
| 1032 | 1033 | 1038 | 1039 | 1042 | 1046 |
| 1079 | 1084 | 1085 | 1086 | 1087 | 1088 |
| 1111 | 1112 | 1113 | 1114 | 1115 | 1116 |
| 1143 | 1144 | 1145 | 1146 | 1147 | 1148 |
| 1173 | 1174 | 1175 | 1176 | 1177 | 1178 |
| 1207 | 1208 | 1209 | 1210 | 1211 | 1212 |
| 1242 | 1243 | 1244 | 1246 | 1247 | 1249 |
| 1277 | 1279 | 1280 | 1281 | 1282 | 1283 |
| 1307 | 1308 | 1309 |  |  |  |

136 139 143 148 149 151 155 157 158 159 163

[55] 170 172 173 174 175 176 180 185 186 190

204 206 207 211 212 213 216 218 222 223 224

[82] 225 226 227 229 233 235 237 238 240 242

267 268 269 270 277 280 284 286 287 288 291

[109] 295 300 301 302 304 306 307 308 311 313

327 328 329 331 332 333 335 336 339 346 347

[136] 348 349 352 355 357 358 359 364 365 366

376 379 382 383 384 385 387 390 391 392 394

[163] 395 396 397 398 400 404 405 406 407 409

417 418 419 420 421 422 423 424 425 426 427

[190] 430 432 434 436 440 443 444 445 446 448

458 459 460 462 463 464 465 467 469 471 473

[217] 474 475 476 477 478 481 486 487 488 489

498 499 500 501 505 506 507 508 509 510 511

[244] 512 513 514 517 518 519 520 523 526 528

540 544 546 548 553 555 556 557 562 564 566

[271] 567 568 569 570 572 573 575 576 577 579

600 601 602 603 609 610 611 615 616 617 618

[298] 619 620 621 623 624 625 627 628 629 630

638 639 640 641 643 645 649 650 651 652 653

[325] 655 657 663 664 666 667 668 669 670 671

679 680 681 682 683 684 685 686 688 689 690

[352] 691 692 693 695 696 697 698 699 700 701

708 709 711 712 713 714 716 717 718 719 721

[379] 722 723 724 725 727 728 729 730 731 732

744 745 748 749 750 751 752 753 754 755 756

[406] 757 762 765 767 768 769 770 771 773 774

783 785 787 788 789 790 791 792 793 794 796

[433] 797 798 800 801 802 803 804 805 807 808

815 816 817 818 822 823 825 826 827 828 829

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847 848 849 850 851 853 855 856 860 861 862

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886 889 891 892 893 894 897 898 899 901 902

[514] 903 904 905 907 908 909 911 912 913 915

927 928 929 930 931 932 933 934 938 939 940

[541] 941 943 944 945 947 949 951 952 953 955

962 963 964 965 966 967 968 972 973 974 975

[568] 976 977 978 980 983 984 987 988 989 990

1001 1006 1008 1009 1010 1011 1012 1013 1014 1015 1016

[595] 1017 1019 1020 1021 1022 1023 1025 1028 1030 1031

1047 1052 1053 1054 1055 1056 1059 1060 1063 1064 1066

[622] 1067 1069 1070 1071 1072 1073 1074 1075 1076 1077

1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100

[649] 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110

1117 1118 1119 1120 1125 1126 1127 1128 1129 1130 1131

[676] 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142

1149 1151 1152 1153 1154 1155 1156 1157 1158 1159 1161

[703] 1162 1164 1165 1166 1167 1168 1169 1170 1171 1172

1179 1180 1181 1182 1184 1185 1186 1187 1192 1193 1194

[730] 1195 1196 1198 1199 1200 1201 1202 1203 1204 1205

1213 1214 1215 1216 1218 1219 1220 1221 1222 1223 1225

[757] 1226 1227 1228 1230 1231 1232 1235 1236 1238 1240

1250 1251 1252 1253 1254 1256 1260 1263 1264 1265 1266

[784] 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276

1284 1285 1286 1288 1289 1290 1291 1292 1293 1294 1295

[811] 1296 1297 1298 1299 1301 1302 1303 1304 1305 1306

attr(,"class")

1. "omit"
   * complete\_DF <- na.omit(DF$boat)
   * complete\_DF [1]

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| "2" | "11" | "3" | "10" | "D" | "4" | "9" | "6" |
| "6" | "8" | "A" | "5" |  |  |  |  |
| "5" | "5" | "4" | "8" | "7" | "7" | "8" | "D" |
| "8" | "8" | "4" | "6" |  |  |  |  |
| "9" | "6" | "D" | "8" | "3" | "5" | "6" | "3" |
| "4" | "4" | "C" | "4" |  |  |  |  |
| "5" | "6" | "4" | "5" | "5" | "4" | "8" | "7" |
| "4" | "11" | "14" | "14" |  |  |  |  |
| "2" | "7" | "7" | "4" | "5 9" | "3" | "8" | "3" |
| "3" | "13" | "5" | "5" |  |  |  |  |
| "6" | "2" | "1" | "1" | "7" | "4" | "4" | "7" |
| "5" | "10" | "10" | "10" |  |  |  |  |

"B"

[14]

"7"

[27]

"3"

[40]

"6"

[53]

"3"

[66]

"4"

[79] "10" "1" "5" "5" "5" "5" "5" "5"

"D" "4" "7" "7" "5"

[92] "5" "B" "3" "3" "7" "7" "5" "5"

"3" "3" "D" "3" "3"

[105] "7" "3" "4" "4" "10" "8" "15" "D"

"14" "D" "6" "C" "8"

[118] "5" "5" "2" "8" "2" "3" "6" "9"

"9" "10" "2" "8" "7"

[131] "10" "6" "7" "6" "14" "14" "11" "6"

"6" "5" "8" "7" "5"

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"11" "8" "6" "4" "4"

[157] "4" "4" "3" "9" "1" "11" "4" "7"

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[170] "6" "7" "7" "3" "3" "3" "6" "3"

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[183] "8" "8" "5 7" "5 7" "B" "4" "D" "7"

"3" "5" "8" "8" "8"

[196] "4" "8 10" "A" "3" "D" "8" "10" "11"

"10" "13" "13" "11" "11"

[209] "13" "11" "13" "12" "11" "14" "14" "12"

"9" "13" "13" "13" "14"

[222] "12" "12" "14" "9" "14" "14" "14" "14"

"14" "13" "12" "10" "10"

[235] "12" "12" "16" "12" "4" "4" "11" "15"

"14" "14" "9" "9" "9"

[248] "13" "4" "4" "10" "10" "12" "11" "12"

"10" "9" "14" "14" "14"

[261] "12" "11" "14" "10" "10" "14" "14" "B"

"D" "D" "7" "11" "13"

[274] "9" "9" "12" "12" "11" "9" "14" "11"

"11" "11" "12" "9" "4"

[287] "4" "4" "13" "12" "12" "16" "11" "10"

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[300] "10" "9" "9" "12" "10" "14" "14" "14"

"10" "10" "10" "9" "14"

[313] "9" "A" "16" "A" "15" "C" "11" "13"

"15" "16" "D" "A" "15"

[326] "15" "13" "15" "C" "C" "D" "C" "C" "C" "C" "C" "15" "C"

[339] "13" "13" "16" "C" "12" "13" "2" "2"

"2" "12" "15" "15" "13 15 B"

[352] "16" "15" "13" "11" "10" "10" "10" "C"

"B" "13" "D" "16" "13"

[365] "15" "13" "16" "13" "C D" "C D" "15" "11"

"B" "16" "15" "C" "C"

[378] "15" "15" "C" "C" "15" "A" "D" "13"

"15" "15" "15" "15" "15"

[391] "15" "13" "15" "15" "A" "16" "D" "2"

"2" "2" "10" "C" "13"

[404] "14" "6" "A" "A" "15" "15" "10" "15"

"15" "13" "15" "16" "C"

[417] "15 16" "16" "16" "16" "13" "13" "15" "16"

"14" "14" "16" "B" "C"

[430] "C" "C" "16" "15" "16" "16" "16" "C" "C" "C" "C" "C" "C"

[443] "D" "13" "9" "13" "D" "C" "B" "13"

"13" "A" "15" "C" "D"

[456] "D" "9" "13" "C" "14" "C" "13" "13"

"13" "11" "11" "16" "13"

[469] "C" "9" "B" "15" "13" "13 15" "16" "14"

"10" "15" "C" "C" "C"

[482] "15" "15" "13 15" "C" "C"

attr(,"na.action")

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 35 | 39 | 40 | 41 | 46 | 47 |
| 116 | 119 | 126 | 127 | 129 | 133 |
| 192 | 193 | 195 | 198 | 201 | 202 |
| 244 | 245 | 247 | 249 | 253 | 263 |
| 314 | 317 | 319 | 322 | 324 | 326 |

[1] 3 4 5 8 10 11 16 17 26 31

52 53 54 59 61 63 71 72 75 76 78

[28] 81 82 85 90 97 102 106 107 111 115

136 139 143 148 149 151 155 157 158 159 163

[55] 170 172 173 174 175 176 180 185 186 190

204 206 207 211 212 213 216 218 222 223 224

[82] 225 226 227 229 233 235 237 238 240 242

267 268 269 270 277 280 284 286 287 288 291

[109] 295 300 301 302 304 306 307 308 311 313

327 328 329 331 332 333 335 336 339 346 347

[136] 348 349 352 355 357 358 359 364 365 366

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 367 | 368 | 369 | 370 | 373 | 375 |
| 410 | 411 | 412 | 413 | 414 | 415 |
| 449 | 451 | 452 | 454 | 456 | 457 |
| 490 | 491 | 492 | 494 | 496 | 497 |
| 529 | 531 | 532 | 533 | 536 | 538 |
| 580 | 582 | 586 | 593 | 595 | 596 |
| 632 | 633 | 634 | 635 | 636 | 637 |
| 672 | 673 | 674 | 676 | 677 | 678 |
| 702 | 703 | 704 | 705 | 706 | 707 |
| 733 | 737 | 738 | 740 | 741 | 742 |
| 775 | 776 | 777 | 780 | 781 | 782 |
| 809 | 810 | 811 | 812 | 813 | 814 |
| 840 | 841 | 842 | 843 | 844 | 845 |
| 878 | 879 | 880 | 883 | 884 | 885 |
| 916 | 919 | 920 | 921 | 925 | 926 |
| 956 | 957 | 958 | 959 | 960 | 961 |
| 991 | 993 | 995 | 996 | 997 | 999 |
| 1032 | 1033 | 1038 | 1039 | 1042 | 1046 |
| 1079 | 1084 | 1085 | 1086 | 1087 | 1088 |
| 1111 | 1112 | 1113 | 1114 | 1115 | 1116 |
| 1143 | 1144 | 1145 | 1146 | 1147 | 1148 |
| 1173 | 1174 | 1175 | 1176 | 1177 | 1178 |
| 1207 | 1208 | 1209 | 1210 | 1211 | 1212 |
| 1242 | 1243 | 1244 | 1246 | 1247 | 1249 |
| 1277 | 1279 | 1280 | 1281 | 1282 | 1283 |
| 1307 | 1308 | 1309 |  |  |  |

376 379 382 383 384 385 387 390 391 392 394

[163] 395 396 397 398 400 404 405 406 407 409

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[757] 1226 1227 1228 1230 1231 1232 1235 1236 1238 1240

1250 1251 1252 1253 1254 1256 1260 1263 1264 1265 1266

[784] 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276

1284 1285 1286 1288 1289 1290 1291 1292 1293 1294 1295

[811] 1296 1297 1298 1299 1301 1302 1303 1304 1305 1306

attr(,"class")

1. "omit"
   * column\_mean <- mean(DF$survived, na.rm = TRUE)
   * column\_mean

[1] 0.381971

* + complete\_rows <- complete.cases(DF)
  + complete\_rows

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[990] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE

[ reached getOption("max.print") -- omitted 309 entries ]

* + clean\_DF <- na.omit(DF)
  + clean\_DF

pclass survived name

Gender age sibsp parch ticket fare

1. 1 1 Allen, Miss. Elisabeth Walton

female 29.0000 0 0 24160 211.3375

1. 1 1 Allison, Master. Hudson Trevor

male 0.9167 1 2 113781 151.5500

6 1 1 Anderson, Mr. Harry

male 48.0000 0 0 19952 26.5500

7 1 1 Andrews, Miss. Kornelia Theodosia

female 63.0000 1 0 13502 77.9583

9 1 1 Appleton, Mrs. Edward Dale (Charlotte Lamson)

female 53.0000 2 0 11769 51.4792

12 1 1 Astor, Mrs. John Jacob (Madeleine Talmadge Force) female 18.0000 1 0 PC 17757 227.5250

13 1 1 Aubart, Mme. Leontine Pauline

female 24.0000 0 0 PC 17477 69.3000

15 1 1 Barkworth, Mr. Algernon Henry Wilson

male 80.0000 0 0 27042 30.0000

1. 1 1 Baxter, Mrs. James (Helene DeLaudeniere Chaput)

female 50.0000 0 1 PC 17558 247.5208

1. 1 1 Bazzani, Miss. Albina

female 32.0000 0 0 11813 76.2917

1. 1 0 Beattie, Mr. Thomson

male 36.0000 0 0 13050 75.2417

1. 1 1 Beckwith, Mr. Richard Leonard

male 37.0000 1 1 11751 52.5542

1. 1 1 Beckwith, Mrs. Richard Leonard (Sallie Monypeny)

female 47.0000 1 1 11751 52.5542

1. 1 1 Behr, Mr. Karl Howell

male 26.0000 0 0 111369 30.0000

25 1 1 Bird, Miss. Ellen

female 29.0000 0 0 PC 17483 221.7792

1. 1 1 Bishop, Mr. Dickinson H

male 25.0000 1 0 11967 91.0792

1. 1 1 Bishop, Mrs. Dickinson H (Helen Walton)

female 19.0000 1 0 11967 91.0792

1. 1 1 Bissette, Miss. Amelia

female 35.0000 0 0 PC 17760 135.6333

1. 1 1 Bjornstrom-Steffansson, Mr. Mauritz Hakan

male 28.0000 0 0 110564 26.5500

32 1 1 Blank, Mr. Henry

male 40.0000 0 0 112277 31.0000

33 1 1 Bonnell, Miss. Caroline

female 30.0000 0 0 36928 164.8667

34 1 1 Bonnell, Miss. Elizabeth

female 58.0000 0 0 113783 26.5500

37 1 1 Bowerman, Miss. Elsie Edith

|  |  |  |
| --- | --- | --- |
| 1 | 113505 | |
| 0 | PC | 17610 |
| 0 |  | 11769 |

female 22.0000 0 55.0000

42 1 1 Brown, Mrs. James Joseph (Margaret Tobin)

female 44.0000 0 27.7208

43 1 1 Brown, Mrs. John Murray (Caroline Lane Lamson)

female 59.0000 2 51.4792

44 1 1 Bucknell, Mrs. William Robert (Emma Eliza Ward) female 60.0000 0 0 11813 76.2917

45 1 1 Burns, Miss. Elizabeth Margaret

female 41.0000 0 0 16966 134.5000

48 1 1 Calderhead, Mr. Edward Pennington

male 42.0000 0 0 PC 17476 26.2875

50 1 1 Cardeza, Mr. Thomas Drake Martinez

male 36.0000 0 1 PC 17755 512.3292

51 1 1 Cardeza, Mrs. James Warburton Martinez (Charlotte Wardle Drake) female 58.0000 0 1 PC 17755 512.3292

55 1 1 Carter, Master. William Thornton II

male 11.0000 1 2 113760 120.0000

56 1 1 Carter, Miss. Lucile Polk

female 14.0000 1 2 113760 120.0000

57 1 1 Carter, Mr. William Ernest

male 36.0000 1 2 113760 120.0000

58 1 1 Carter, Mrs. William Ernest (Lucile Polk)

female 36.0000 1 2 113760 120.0000

62 1 1 Cavendish, Mrs. Tyrell William (Julia Florence Siegel) female 76.0000 1 0 19877 78.8500

64 1 1 Chaffee, Mrs. Herbert Fuller (Carrie Constance Toogood) female 47.0000 1 0 W.E.P. 5734 61.1750

65 1 1 Chambers, Mr. Norman Campbell

male 27.0000 1 0 113806 53.1000

66 1 1 Chambers, Mrs. Norman Campbell (Bertha Griggs)

female 33.0000 1 0 113806 53.1000

67 1 1 Chaudanson, Miss. Victorine

female 36.0000 0 0 PC 17608 262.3750

68 1 1 Cherry, Miss. Gladys

female 30.0000 0 0 110152 86.5000

69 1 1 Chevre, Mr. Paul Romaine

male 45.0000 0 0 PC 17594 29.7000

73 1 1 Clark, Mrs. Walter Miller (Virginia McDowell)

female 26.0000 1 0 13508 136.7792

77 1 1 Compton, Miss. Sara Rebecca

female 39.0000 1 1 PC 17756 83.1583

1. 1 1 Compton, Mrs. Alexander Taylor (Mary Eliza Ingersoll) female 64.0000 0 2 PC 17756 83.1583
2. 1 1 Cornell, Mrs. Robert Clifford (Malvina Helen Lamson) female 55.0000 2 0 11770 25.7000
3. 1 1 Crosby, Miss. Harriet R

female 36.0000 0 2 WE/P 5735 71.0000

1. 1 1 Crosby, Mrs. Edward Gifford (Catherine Elizabeth Halstead) female 64.0000 1 1 112901 26.5500
2. 1 1 Cumings, Mrs. John Bradley (Florence Briggs Thayer) female 38.0000 1 0 PC 17599 71.2833
3. 1 1 Daly, Mr. Peter Denis

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| --- | --- | --- |
| 0 |  | 113055 26 |
|  | 2 | F.C. 12750 |
| 0 |  | 17474 57 |
|  | 0 | 17474 |

male 51.0000 0 .5500

1. 1 1 Davidson, Mrs. Thornton (Orian Hays)

female 27.0000 1 52.0000

1. 1 1 Dick, Mr. Albert Adrian

male 31.0000 1 .0000

1. 1 1 Dick, Mrs. Albert Adrian (Vera Gillespie)

female 17.0000 1 57.0000

1. 1 1 Dodge, Dr. Washington

male 53.0000 1 1 33638 81.8583

1. 1 1 Dodge, Master. Washington

male 4.0000 0 2 33638 81.8583

1. 1 1 Dodge, Mrs. Washington (Ruth Vidaver)

female 54.0000 1 1 33638 81.8583

1. 1 1 Douglas, Mrs. Frederick Charles (Mary Helene Baxter) female 27.0000 1 1 PC 17558 247.5208
2. 1 1 Douglas, Mrs. Walter Donald (Mahala Dutton)

female 48.0000 1 0 PC 17761 106.4250

1. 1 1 Duff Gordon, Lady. (Lucille Christiana Sutherland) ("Mrs Morgan") female 48.0000 1 0 11755 39.6000
2. 1 1 Duff Gordon, Sir. Cosmo Edmund ("Mr Morgan") male 49.0000 1 0 PC 17485 56.9292
3. 1 1 Earnshaw, Mrs. Boulton (Olive Potter)

female 23.0000 0 1 11767 83.1583

1. 1 1 Endres, Miss. Caroline Louise

female 38.0000 0 0 PC 17757 227.5250

1. 1 1 Eustis, Miss. Elizabeth Mussey

female 54.0000 1 0 36947 78.2667

110 1 1 Flynn, Mr. John Irwin ("Irving")

male 36.0000 0 0 PC 17474 26.3875

1. 1 1 Fortune, Miss. Alice Elizabeth

female 24.0000 3 2 19950 263.0000

1. 1 1 Fortune, Miss. Ethel Flora

female 28.0000 3 2 19950 263.0000

1. 1 1 Fortune, Miss. Mabel Helen

female 23.0000 3 2 19950 263.0000

1. 1 1 Fortune, Mrs. Mark (Mary McDougald)

female 60.0000 1 4 19950 263.0000

1. 1 1 Francatelli, Miss. Laura Mabel

female 30.0000 0 0 PC 17485 56.9292

121 1 1 Frauenthal, Mr. Isaac Gerald

male 43.0000 1 0 17765 27.7208

1. 1 1 Frolicher, Miss. Hedwig Margaritha

female 22.0000 0 2 13568 49.5000

1. 1 1 Frolicher-Stehli, Mr. Maxmillian

male 60.0000 1 1 13567 79.2000

1. 1 1 Frolicher-Stehli, Mrs. Maxmillian (Margaretha Emerentia Stehli)

female 48.0000 1 1 13567 79.2000

128 1 1 Futrelle, Mrs. Jacques Heath (Lily May Peel) female 35.0000 1 0 113803 53.1000

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| 130 | | 1 | 1 |  | |  | | | | Geiger, | | Miss. Amalie | |
| female | | 35.0000 | 0 | 0 | | 113503 211.5000 | | | |  | |  | |
| 134 | | 1 | 1 |  | |  | | | | Goldenberg, | | Mr. Samuel L | |
| male 49.0000 | | | 1 | 0 | 17453 | | | 89.1042 | |  | |  | |
| 137 1 | | | 1 |  |  | | |  | | Gracie, Col. | | Archibald IV | |
| male 53.0000 | | | 0 | 0 | 113780 | | | 28.5000 | |  | |  | |
| 138 | | 1 | 1 | Graham, Miss. Margaret Edith | | | | | | | | | |
| female 19.0000 | | | 0 |  | 0 | 112053 30.0000 | | | |  | | | |
| 140 1 | | | 1 |  |  | Graham, Mrs. | | | | William Thompson (Edith Junkins) | | | |
| female 58.0000 | | | 0 |  | 1 | PC 17582 153.4625 | | | |  | | | |
| 141 1 | | | 1 |  |  |  | | | | Greenfield, Mr. William Bertram | | | |
| male 23.0000 | | | 0 | 1 |  | PC 17759 63.3583 | | | |  | | | |
| 142 1 | | | 1 |  |  | Greenfield, | | | | Mrs. Leo David (Blanche Strouse) | | | |
| female 45.0000 | | | 0 |  | 1 | PC 17759 63.3583 | | | |  | | | |
| 144 1 | | | 1 |  |  |  | | | | Harder, Mr. George Achilles | | | |
| male 25.0000 | | | 1 | 0 |  | 11765 | | 55.4417 |  |  | | | |
| 145 1 | | | 1 |  |  |  | | Harder, | Mrs. | George Achilles (Dorothy Annan) | | | |
| female 25.0000 | | | 1 |  | 0 | 11765 | | 55.4417 |  |  | | | |
| 146 | 1 | | 1 |  |  | |  |  | Harper, | | Mr. | Henry | Sleeper |
| male | 48.0000 | | 1 | 0 | PC | | 17572 | 76.7292 |  | |  |  |  |
|  |  | cabin | embarked | | boat | | | | | | | | |
| 1 |  | B5 | S | | 2 | | | | | | | | |
| 2 |  | C22 C26 | S | | 11 | | | | | | | | |
| 6 |  | E12 | S | | 3 | | | | | | | | |
| 7 |  | D7 | S | | 10 | | | | | | | | |
| 9 |  | C101 | S | | D | | | | | | | | |
| 12 |  | C62 C64 | C | | 4 | | | | | | | | |
| 13 |  | B35 | C | | 9 | | | | | | | | |
| 15 |  | A23 | S | | B | | | | | | | | |
| 18 |  | B58 B60 | C | | 6 | | | | | | | | |
| 19 |  | D15 | C | | 8 | | | | | | | | |
| 20 |  | C6 | C | | A | | | | | | | | |
| 21 |  | D35 | S | | 5 | | | | | | | | |
| 22 |  | D35 | S | | 5 | | | | | | | | |
| 23 |  | C148 | C | | 5 | | | | | | | | |
| 25 |  | C97 | S | | 8 | | | | | | | | |
| 27 |  | B49 | C | | 7 | | | | | | | | |
| 28 |  | B49 | C | | 7 | | | | | | | | |
| 29 |  | C99 | S | | 8 | | | | | | | | |
| 30 |  | C52 | S | | D | | | | | | | | |
| 32 |  | A31 | C | | 7 | | | | | | | | |
| 33 |  | C7 | S | | 8 | | | | | | | | |
| 34 |  | C103 | S | | 8 | | | | | | | | |
| 37 |  | E33 | S | | 6 | | | | | | | | |
| 42 |  | B4 | C | | 6 | | | | | | | | |
| 43 |  | C101 | S | | D | | | | | | | | |
| 44 |  | D15 | C | | 8 | | | | | | | | |
| 45 |  | E40 | C | | 3 | | | | | | | | |
| 48 |  | E24 | S | | 5 | | | | | | | | |
| 50 | B51 | B53 B55 | C | | 3 | | | | | | | | |
| 51 | B51 | B53 B55 | C | | 3 | | | | | | | | |
| 55 |  | B96 B98 | S | | 4 | | | | | | | | |
| 56 |  | B96 B98 | S | | 4 | | | | | | | | |
| 57 |  | B96 B98 | S | | C | | | | | | | | |
| 58 |  | B96 B98 | S | | 4 | | | | | | | | |
| 62 |  | C46 | S | | 6 | | | | | | | | |
| 64 |  | E31 | S | | 4 | | | | | | | | |
| 65 |  | E8 | S | | 5 | | | | | | | | |
| 66 |  | E8 | S | | 5 | | | | | | | | |
| 67 |  | B61 | C | | 4 | | | | | | | | |
| 68 |  | B77 | S | | 8 | | | | | | | | |
| 69 |  | A9 | C | | 7 | | | | | | | | |
| 73 |  | C89 | C | | 4 | | | | | | | | |
| 77 |  | E49 | C | | 14 | | | | | | | | |
| 79 |  | E45 | C | | 14 | | | | | | | | |
| 80 |  | C101 | S | | 2 | | | | | | | | |
| 83 |  | B22 | S | | 7 | | | | | | | | |
| 84 |  | B26 | S | | 7 | | | | | | | | |
| 86 |  | C85 | C | | 4 | | | | | | | | |
| 87 |  | E17 | S | | 5 9 | | | | | | | | |
| 91 |  | B71 | S | | 3 | | | | | | | | |
| 92 |  | B20 | S | | 3 | | | | | | | | |
| 93 |  | B20 | S | | 3 | | | | | | | | |
| 94 |  | A34 | S | | 13 | | | | | | | | |
| 95 |  | A34 | S | | 5 | | | | | | | | |

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| --- | --- | --- | --- | --- | --- |
| 96 |  |  | A34 | S | 5 |
| 98 |  | B58 | B60 | C | 6 |
| 99 |  |  | C86 | C | 2 |
| 100 |  |  | A16 | C | 1 |
| 101 |  |  | A20 | C | 1 |
| 103 |  |  | C54 | C | 7 |
| 104 |  |  | C45 | C | 4 |
| 105 |  |  | D20 | C | 4 |
| 110 |  |  | E25 | S | 5 |
| 112 | C23 | C25 | C27 | S | 10 |
| 113 | C23 | C25 | C27 | S | 10 |
| 114 | C23 | C25 | C27 | S | 10 |
| 117 | C23 | C25 | C27 | S | 10 |
| 118 |  |  | E36 | C | 1 |
| 121 |  |  | D40 | C | 5 |
| 123 |  |  | B39 | C | 5 |
| 124 |  |  | B41 | C | 5 |
| 125 |  |  | B41 | C | 5 |
| 128 |  |  | C123 | S | D |
| 130 |  |  | C130 | C | 4 |
| 134 |  |  | C92 | C | 5 |
| 137 |  |  | C51 | C | B |
| 138 |  |  | B42 | S | 3 |
| 140 |  |  | C125 | S | 3 |
| 141 |  | D10 | D12 | C | 7 |
| 142 |  | D10 | D12 | C | 7 |
| 144 |  |  | E50 | C | 5 |
| 145 |  |  | E50 | C | 5 |
| 146 |  |  | D33 | C | 3 |

[ reached 'max' / getOption("max.print") -- omitted 97 rows ]

* glimpse(DF) Rows: 1,309

Columns: 12

$ pclass *<dbl>* 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,

1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,…

$ survived *<dbl>* 1, 1, 0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1,

1, 1, 0, 1, 1, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1,…

$ name *<chr>* "Allen, Miss. Elisabeth Walton", "Allison, Master. Hudson Trevor", " Allison, Miss. Helen Loraine", "Allison, Mr. Hudson Joshu…

$ Gender *<chr>* "female", "male", "female", "male", "female", "male", "female", "mal

e", "female", "male", "male", "female", "female", "female…

$ age *<dbl>* 29.0000, 0.9167, 2.0000, 30.0000, 25.0000, 48.0000, 63.0000, 39.0000

, 53.0000, 71.0000, 47.0000, 18.0000, 24.0000, 26.0000, 8…

$ sibsp *<dbl>* 0, 1, 1, 1, 1, 0, 1, 0, 2, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0,

0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,…

$ parch *<dbl>* 0, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0,

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,…

$ ticket *<chr>* "24160", "113781", "113781", "113781", "113781", "19952", "13502", "

112050", "11769", "PC 17609", "PC 17757", "PC 17757", "PC…

$ fare *<dbl>* 211.3375, 151.5500, 151.5500, 151.5500, 151.5500, 26.5500, 77.9583,

0.0000, 51.4792, 49.5042, 227.5250, 227.5250, 69.3000, 78…

$ cabin *<chr>* "B5", "C22 C26", "C22 C26", "C22 C26", "C22 C26", "E12", "D7", "A36"

, "C101", NA, "C62 C64", "C62 C64", "B35", NA, "A23", NA,…

$ embarked *<chr>* "S", "S", "S", "S", "S", "S", "S", "S", "S", "C", "C", "C", "C", "S"

, "S", "S", "C", "C", "C", "C", "S", "S", "C", "C", "S", …

$ boat *<chr>* "2", "11", NA, NA, NA, "3", "10", NA, "D", NA, NA, "4", "9", "6", "B

", NA, NA, "6", "8", "A", "5", "5", "5", "4", "8", NA, "7…

* outlier\_stats <- boxplot.stats(DF$survived)
* outlier\_stats

$stats

[1] 0 0 0 1 1

$n

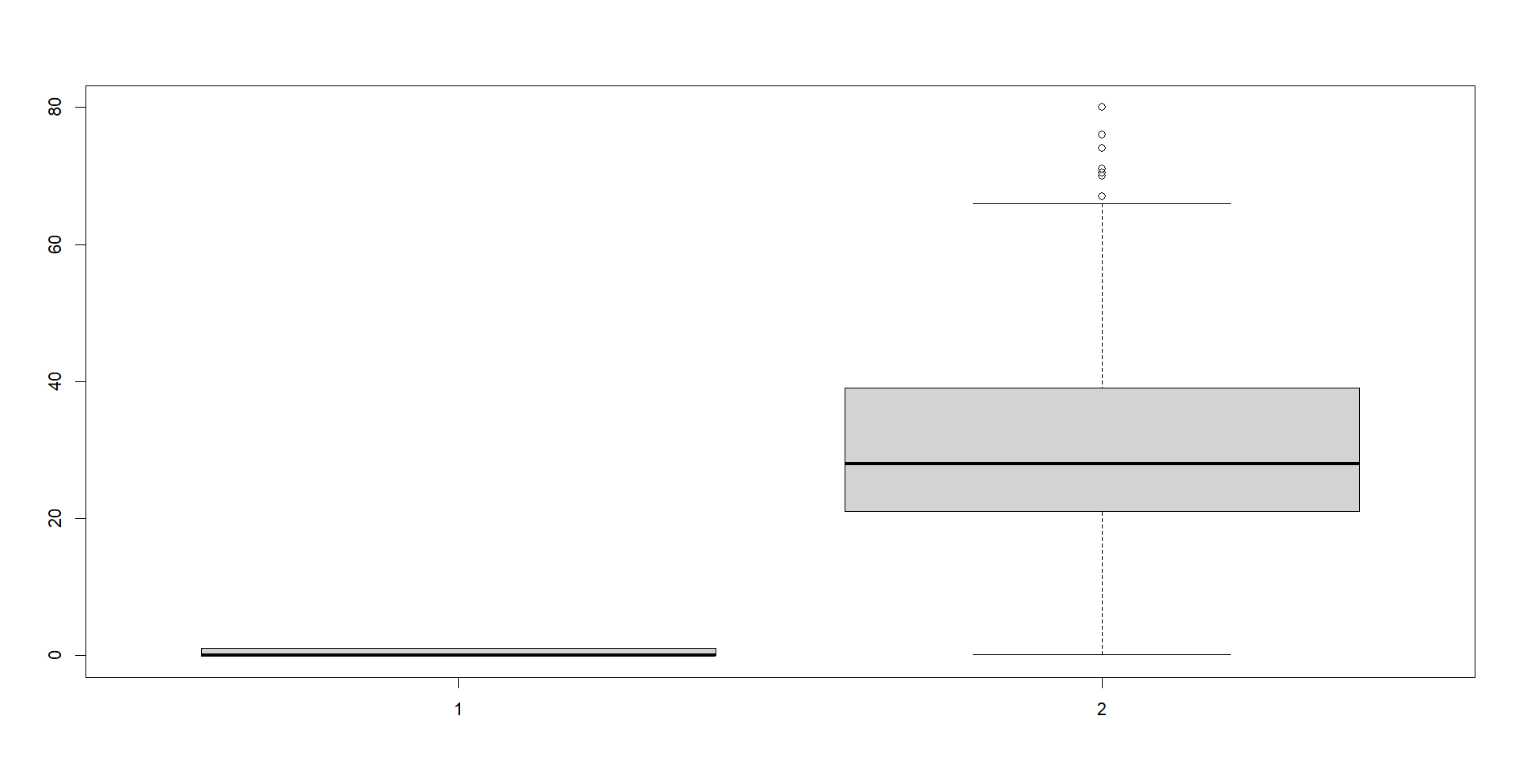
[1] 1309

$conf

[1] -0.04367041 0.04367041

$out numeric(0)

* + boxplot(DF$survived, DF$age)



* + outlier\_limit <- boxplot.stats(DF$age)$out
  + outlier\_limit

[1] 71.0 80.0 76.0 70.0 71.0 67.0 70.0 70.5 74.0

* + value\_imputed <- data.frame(

+ original = DF$age,

+ imputed\_zero = replace(DF$age, is.na(DF$age), 0),

+ imputed\_mean = replace(DF$age, is.na(DF$age), mean(DF$age, na.rm = TRUE)),

+ imputed\_median = replace(DF$age, is.na(DF$age), median(DF$age, na.rm = TRUE))

+ )

* + value\_imputed

original imputed\_zero imputed\_mean imputed\_median

1 29.0000 29.0000 29.00000 29.0000

2 0.9167 0.9167 0.91670 0.9167

3 2.0000 2.0000 2.00000 2.0000

4 30.0000 30.0000 30.00000 30.0000

5 25.0000 25.0000 25.00000 25.0000

6 48.0000 48.0000 48.00000 48.0000

7 63.0000 63.0000 63.00000 63.0000

8 39.0000 39.0000 39.00000 39.0000

9 53.0000 53.0000 53.00000 53.0000

10 71.0000 71.0000 71.00000 71.0000

11 47.0000 47.0000 47.00000 47.0000

12 18.0000 18.0000 18.00000 18.0000

13 24.0000 24.0000 24.00000 24.0000

14 26.0000 26.0000 26.00000 26.0000

15 80.0000 80.0000 80.00000 80.0000

16 NA 0.0000 29.88113 28.0000

17 24.0000 24.0000 24.00000 24.0000

18 50.0000 50.0000 50.00000 50.0000

19 32.0000 32.0000 32.00000 32.0000

20 36.0000 36.0000 36.00000 36.0000

21 37.0000 37.0000 37.00000 37.0000

22 47.0000 47.0000 47.00000 47.0000

23 26.0000 26.0000 26.00000 26.0000

24 42.0000 42.0000 42.00000 42.0000

25 29.0000 29.0000 29.00000 29.0000

26 25.0000 25.0000 25.00000 25.0000

27 25.0000 25.0000 25.00000 25.0000

28 19.0000 19.0000 19.00000 19.0000

29 35.0000 35.0000 35.00000 35.0000

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 30 | 28.0000 | 28.0000 | 28.00000 | 28.0000 |
| 31 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 32 | 40.0000 | 40.0000 | 40.00000 | 40.0000 |
| 33 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 34 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 35 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 36 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 37 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 38 | NA | 0.0000 | 29.88113 | 28.0000 |
| 39 | 41.0000 | 41.0000 | 41.00000 | 41.0000 |
| 40 | 48.0000 | 48.0000 | 48.00000 | 48.0000 |
| 41 | NA | 0.0000 | 29.88113 | 28.0000 |
| 42 | 44.0000 | 44.0000 | 44.00000 | 44.0000 |
| 43 | 59.0000 | 59.0000 | 59.00000 | 59.0000 |
| 44 | 60.0000 | 60.0000 | 60.00000 | 60.0000 |
| 45 | 41.0000 | 41.0000 | 41.00000 | 41.0000 |
| 46 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 47 | NA | 0.0000 | 29.88113 | 28.0000 |
| 48 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 49 | 53.0000 | 53.0000 | 53.00000 | 53.0000 |
| 50 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 51 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 52 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 53 | 28.0000 | 28.0000 | 28.00000 | 28.0000 |
| 54 | 17.0000 | 17.0000 | 17.00000 | 17.0000 |
| 55 | 11.0000 | 11.0000 | 11.00000 | 11.0000 |
| 56 | 14.0000 | 14.0000 | 14.00000 | 14.0000 |
| 57 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 58 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 59 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 60 | NA | 0.0000 | 29.88113 | 28.0000 |
| 61 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 62 | 76.0000 | 76.0000 | 76.00000 | 76.0000 |
| 63 | 46.0000 | 46.0000 | 46.00000 | 46.0000 |
| 64 | 47.0000 | 47.0000 | 47.00000 | 47.0000 |
| 65 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 66 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 67 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 68 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 69 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 70 | NA | 0.0000 | 29.88113 | 28.0000 |
| 71 | NA | 0.0000 | 29.88113 | 28.0000 |
| 72 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 73 | 26.0000 | 26.0000 | 26.00000 | 26.0000 |
| 74 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 75 | NA | 0.0000 | 29.88113 | 28.0000 |
| 76 | 47.0000 | 47.0000 | 47.00000 | 47.0000 |
| 77 | 39.0000 | 39.0000 | 39.00000 | 39.0000 |
| 78 | 37.0000 | 37.0000 | 37.00000 | 37.0000 |
| 79 | 64.0000 | 64.0000 | 64.00000 | 64.0000 |
| 80 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 81 | NA | 0.0000 | 29.88113 | 28.0000 |
| 82 | 70.0000 | 70.0000 | 70.00000 | 70.0000 |
| 83 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 84 | 64.0000 | 64.0000 | 64.00000 | 64.0000 |
| 85 | 39.0000 | 39.0000 | 39.00000 | 39.0000 |
| 86 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |
| 87 | 51.0000 | 51.0000 | 51.00000 | 51.0000 |
| 88 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 89 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 90 | 31.0000 | 31.0000 | 31.00000 | 31.0000 |
| 91 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 92 | 31.0000 | 31.0000 | 31.00000 | 31.0000 |
| 93 | 17.0000 | 17.0000 | 17.00000 | 17.0000 |
| 94 | 53.0000 | 53.0000 | 53.00000 | 53.0000 |
| 95 | 4.0000 | 4.0000 | 4.00000 | 4.0000 |
| 96 | 54.0000 | 54.0000 | 54.00000 | 54.0000 |
| 97 | 50.0000 | 50.0000 | 50.00000 | 50.0000 |
| 98 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 99 | 48.0000 | 48.0000 | 48.00000 | 48.0000 |
| 100 | 48.0000 | 48.0000 | 48.00000 | 48.0000 |
| 101 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 102 | 39.0000 | 39.0000 | 39.00000 | 39.0000 |
| 103 | 23.0000 | 23.0000 | 23.00000 | 23.0000 |
| 104 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 105 | 54.0000 | 54.0000 | 54.00000 | 54.0000 |
| 106 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 107 | NA | 0.0000 | 29.88113 | 28.0000 |
| 108 | NA | 0.0000 | 29.88113 | 28.0000 |
| 109 | NA | 0.0000 | 29.88113 | 28.0000 |
| 110 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 111 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 112 | 24.0000 | 24.0000 | 24.00000 | 24.0000 |
| 113 | 28.0000 | 28.0000 | 28.00000 | 28.0000 |
| 114 | 23.0000 | 23.0000 | 23.00000 | 23.0000 |
| 115 | 19.0000 | 19.0000 | 19.00000 | 19.0000 |
| 116 | 64.0000 | 64.0000 | 64.00000 | 64.0000 |
| 117 | 60.0000 | 60.0000 | 60.00000 | 60.0000 |
| 118 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 119 | NA | 0.0000 | 29.88113 | 28.0000 |
| 120 | 50.0000 | 50.0000 | 50.00000 | 50.0000 |
| 121 | 43.0000 | 43.0000 | 43.00000 | 43.0000 |
| 122 | NA | 0.0000 | 29.88113 | 28.0000 |
| 123 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 124 | 60.0000 | 60.0000 | 60.00000 | 60.0000 |
| 125 | 48.0000 | 48.0000 | 48.00000 | 48.0000 |
| 126 | NA | 0.0000 | 29.88113 | 28.0000 |
| 127 | 37.0000 | 37.0000 | 37.00000 | 37.0000 |
| 128 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 129 | 47.0000 | 47.0000 | 47.00000 | 47.0000 |
| 130 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 131 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 132 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 133 | 24.0000 | 24.0000 | 24.00000 | 24.0000 |
| 134 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 135 | NA | 0.0000 | 29.88113 | 28.0000 |
| 136 | 71.0000 | 71.0000 | 71.00000 | 71.0000 |
| 137 | 53.0000 | 53.0000 | 53.00000 | 53.0000 |
| 138 | 19.0000 | 19.0000 | 19.00000 | 19.0000 |
| 139 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |
| 140 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 141 | 23.0000 | 23.0000 | 23.00000 | 23.0000 |
| 142 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 143 | 46.0000 | 46.0000 | 46.00000 | 46.0000 |
| 144 | 25.0000 | 25.0000 | 25.00000 | 25.0000 |
| 145 | 25.0000 | 25.0000 | 25.00000 | 25.0000 |
| 146 | 48.0000 | 48.0000 | 48.00000 | 48.0000 |
| 147 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 148 | NA | 0.0000 | 29.88113 | 28.0000 |
| 149 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 150 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 151 | 40.0000 | 40.0000 | 40.00000 | 40.0000 |
| 152 | 27.0000 | 27.0000 | 27.00000 | 27.0000 |
| 153 | NA | 0.0000 | 29.88113 | 28.0000 |
| 154 | 24.0000 | 24.0000 | 24.00000 | 24.0000 |
| 155 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 156 | 52.0000 | 52.0000 | 52.00000 | 52.0000 |
| 157 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 158 | NA | 0.0000 | 29.88113 | 28.0000 |
| 159 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 160 | 16.0000 | 16.0000 | 16.00000 | 16.0000 |
| 161 | 44.0000 | 44.0000 | 44.00000 | 44.0000 |
| 162 | 51.0000 | 51.0000 | 51.00000 | 51.0000 |
| 163 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 164 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 165 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 166 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |
| 167 | NA | 0.0000 | 29.88113 | 28.0000 |
| 168 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 169 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |
| 170 | 50.0000 | 50.0000 | 50.00000 | 50.0000 |
| 171 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 172 | 46.0000 | 46.0000 | 46.00000 | 46.0000 |
| 173 | 50.0000 | 50.0000 | 50.00000 | 50.0000 |
| 174 | 32.5000 | 32.5000 | 32.50000 | 32.5000 |
| 175 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 176 | 41.0000 | 41.0000 | 41.00000 | 41.0000 |
| 177 | NA | 0.0000 | 29.88113 | 28.0000 |
| 178 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 179 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 180 | NA | 0.0000 | 29.88113 | 28.0000 |
| 181 | 39.0000 | 39.0000 | 39.00000 | 39.0000 |
| 182 | 49.0000 | 49.0000 | 49.00000 | 49.0000 |
| 183 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 184 | 35.0000 | 35.0000 | 35.00000 | 35.0000 |
| 185 | NA | 0.0000 | 29.88113 | 28.0000 |
| 186 | 42.0000 | 42.0000 | 42.00000 | 42.0000 |
| 187 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 188 | 16.0000 | 16.0000 | 16.00000 | 16.0000 |
| 189 | 51.0000 | 51.0000 | 51.00000 | 51.0000 |
| 190 | 29.0000 | 29.0000 | 29.00000 | 29.0000 |
| 191 | 21.0000 | 21.0000 | 21.00000 | 21.0000 |
| 192 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 193 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 194 | 15.0000 | 15.0000 | 15.00000 | 15.0000 |
| 195 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 196 | 16.0000 | 16.0000 | 16.00000 | 16.0000 |
| 197 | NA | 0.0000 | 29.88113 | 28.0000 |
| 198 | 19.0000 | 19.0000 | 19.00000 | 19.0000 |
| 199 | 18.0000 | 18.0000 | 18.00000 | 18.0000 |
| 200 | 24.0000 | 24.0000 | 24.00000 | 24.0000 |
| 201 | 46.0000 | 46.0000 | 46.00000 | 46.0000 |
| 202 | 54.0000 | 54.0000 | 54.00000 | 54.0000 |
| 203 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 204 | 28.0000 | 28.0000 | 28.00000 | 28.0000 |
| 205 | NA | 0.0000 | 29.88113 | 28.0000 |
| 206 | 65.0000 | 65.0000 | 65.00000 | 65.0000 |
| 207 | 44.0000 | 44.0000 | 44.00000 | 44.0000 |
| 208 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 209 | 37.0000 | 37.0000 | 37.00000 | 37.0000 |
| 210 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 211 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 212 | 47.0000 | 47.0000 | 47.00000 | 47.0000 |
| 213 | 37.0000 | 37.0000 | 37.00000 | 37.0000 |
| 214 | 31.0000 | 31.0000 | 31.00000 | 31.0000 |
| 215 | 23.0000 | 23.0000 | 23.00000 | 23.0000 |
| 216 | 58.0000 | 58.0000 | 58.00000 | 58.0000 |
| 217 | 19.0000 | 19.0000 | 19.00000 | 19.0000 |
| 218 | 64.0000 | 64.0000 | 64.00000 | 64.0000 |
| 219 | 39.0000 | 39.0000 | 39.00000 | 39.0000 |
| 220 | NA | 0.0000 | 29.88113 | 28.0000 |
| 221 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 222 | 65.0000 | 65.0000 | 65.00000 | 65.0000 |
| 223 | 28.5000 | 28.5000 | 28.50000 | 28.5000 |
| 224 | NA | 0.0000 | 29.88113 | 28.0000 |
| 225 | 45.5000 | 45.5000 | 45.50000 | 45.5000 |
| 226 | 23.0000 | 23.0000 | 23.00000 | 23.0000 |
| 227 | 29.0000 | 29.0000 | 29.00000 | 29.0000 |
| 228 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 229 | 18.0000 | 18.0000 | 18.00000 | 18.0000 |
| 230 | 17.0000 | 17.0000 | 17.00000 | 17.0000 |
| 231 | 30.0000 | 30.0000 | 30.00000 | 30.0000 |
| 232 | 52.0000 | 52.0000 | 52.00000 | 52.0000 |
| 233 | 47.0000 | 47.0000 | 47.00000 | 47.0000 |
| 234 | 56.0000 | 56.0000 | 56.00000 | 56.0000 |
| 235 | 38.0000 | 38.0000 | 38.00000 | 38.0000 |
| 236 | NA | 0.0000 | 29.88113 | 28.0000 |
| 237 | 22.0000 | 22.0000 | 22.00000 | 22.0000 |
| 238 | NA | 0.0000 | 29.88113 | 28.0000 |
| 239 | 43.0000 | 43.0000 | 43.00000 | 43.0000 |
| 240 | 31.0000 | 31.0000 | 31.00000 | 31.0000 |
| 241 | 45.0000 | 45.0000 | 45.00000 | 45.0000 |
| 242 | NA | 0.0000 | 29.88113 | 28.0000 |
| 243 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 244 | 46.0000 | 46.0000 | 46.00000 | 46.0000 |
| 245 | 36.0000 | 36.0000 | 36.00000 | 36.0000 |
| 246 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 247 | 55.0000 | 55.0000 | 55.00000 | 55.0000 |
| 248 | 54.0000 | 54.0000 | 54.00000 | 54.0000 |
| 249 | 33.0000 | 33.0000 | 33.00000 | 33.0000 |
| 250 | 13.0000 | 13.0000 | 13.00000 | 13.0000 |
| [ reached 'max' / getOption("max.print") -- omitted 1059 rows ] | | | | |