

# R Notebook

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DATA SCIENCE PROGRAMMING II (BSD2223)

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## Question 1

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```
##The two characteristics of data frame are:-  
##i) Data frame can store different types of data in each column, such as numeric, character, or logical.  
##ii) Data frame can be converted to a matrix or a list using as.matrix() or as.list() functions.
```

## Question 2

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```
#a.  
data("Seatbelts")  
sb <- Seatbelts  
head(sb,10); tail(sb,10)
```

```
DriversKilled drivers front rear kms PetrolPrice VanKilled law  
[1,]      107    1687   867  269  9059   0.1029718      12  0  
[2,]       97    1508   825  265  7685   0.1023630       6  0  
[3,]      102    1507   806  319  9963   0.1020625      12  0  
[4,]       87    1385   814  407 10955   0.1008733       8  0  
[5,]      119    1632   991  454 11823   0.1010197      10  0  
[6,]      106    1511   945  427 12391   0.1005812      13  0  
[7,]      110    1559  1004  522 13460   0.1037740      11  0  
[8,]      106    1630  1091  536 14055   0.1040764       6  0  
[9,]      107    1579   958  405 12106   0.1037740      10  0  
[10,]     134    1653   850  437 11372   0.1030264      16  0  
DriversKilled drivers front rear kms PetrolPrice VanKilled law  
[183,]      81    1282   513  349 18539   0.1157353       4  1  
[184,]      84    1110   548  375 19759   0.1153563       3  1  
[185,]      87    1297   586  441 19584   0.1148154       6  1  
[186,]      90    1185   522  465 19976   0.1147775       6  1  
[187,]      79    1222   601  472 21486   0.1149360       7  1  
[188,]      96    1284   644  521 21626   0.1147970       5  1  
[189,]     122    1444   643  429 20195   0.1140932       7  1  
[190,]     120    1575   641  408 19928   0.1164655       7  1  
[191,]     137    1737   711  490 18564   0.1160261       4  1  
[192,]     154    1763   721  491 18149   0.1160667       7  1
```

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```
df <- as.data.frame(sb)
```

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```
#b.  
str(df)
```

```
'data.frame':  192 obs. of  8 variables:  
 $ DriversKilled: num  107 97 102 87 119 106 110 106 107 134 ...  
 $ drivers      : num  1687 1508 1507 1385 1632 ...  
 $ front       : num  867 825 806 814 991 ...  
 $ rear        : num  269 265 319 407 454 427 522 536 405 437 ...  
 $ kms         : num  9059 7685 9963 10955 11823 ...  
 $ PetrolPrice : num  0.103 0.102 0.102 0.101 0.101 ...  
 $ VanKilled   : num  12 6 12 8 10 13 11 6 10 16 ...  
 $ law         : num  0 0 0 0 0 0 0 0 0 0 ...
```

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```
dim(df)
```

```
[1] 192  8
```

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```
ls(df)
```

```
[1] "drivers"      "DriversKilled" "front"          "kms"            "law"            "PetrolPric  
e"  "rear"        "VanKilled"
```

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```
#or  
names(df)
```

```
[1] "DriversKilled" "drivers"      "front"          "rear"            "kms"            "PetrolPric  
e"  "VanKilled"    "law"
```

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```
#c.  
dk <- df$DriversKilled  
dk
```

```
[1] 107 97 102 87 119 106 110 106 107 134 147 180 125 134 110 102 103 111 120 129 122 183 16
9 190 134 108 104 117 157 148 130 140 136 140 187
[36] 150 159 143 114 127 159 156 138 120 117 170 168 198 144 146 109 131 151 140 153 140 161 16
8 152 136 113 100 103 103 121 134 133 129 144 154
[71] 156 163 122 92 117 95 96 108 108 106 140 114 158 161 102 127 125 101 97 112 112 113 10
8 128 154 162 112 79 82 127 108 110 123 103 97
[106] 140 165 183 148 111 116 115 100 106 134 125 117 122 153 178 114 94 128 119 111 110 114 11
8 115 132 153 171 115 95 92 100 95 114 102 104
[141] 132 136 117 137 111 106 98 84 94 105 123 109 130 153 134 99 115 104 131 108 103 115 12
2 122 125 137 138 152 120 95 100 89 82 89 60
[176] 84 113 126 122 118 92 86 81 84 87 90 79 96 122 120 137 154
```

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```
law <- df$law
law
```

```
[1] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
[72] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
[143] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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 1
1 1 1 1 1 1
```

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```
#d.
sub <- df[df$kms >= 10000 & df$kms <= 15000 & df$VanKilled > 10, ]
sub
```

	DriversKilled <dbl>	drivers <dbl>	front <dbl>	rear <dbl>	kms <dbl>	PetrolPrice <dbl>	VanKilled <dbl>	law <dbl>
6	106	1511	945	427	12391	0.10058119	13	0
7	110	1559	1004	522	13460	0.10377398	11	0
10	134	1653	850	437	11372	0.10302640	16	0
16	102	1558	892	362	10733	0.09862110	11	0
18	111	1520	866	429	12926	0.09808018	13	0
19	120	1805	1095	551	13990	0.09727921	13	0
20	129	1800	1204	646	14926	0.09741062	11	0
21	122	1719	1029	456	12900	0.09742524	11	0
22	183	2008	1147	475	12034	0.09638063	14	0
23	169	2242	1171	456	10643	0.09573896	16	0

1-10 of 49 rows

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#OR

subset(df, (kms &gt;= 10000 &amp; kms &lt;= 15000) &amp; VanKilled&gt;10)

	DriversKilled <dbl>	drivers <dbl>	front <dbl>	rear <dbl>	kms <dbl>	PetrolPrice <dbl>	VanKilled <dbl>	law <dbl>
6	106	1511	945	427	12391	0.10058119	13	0
7	110	1559	1004	522	13460	0.10377398	11	0
10	134	1653	850	437	11372	0.10302640	16	0
16	102	1558	892	362	10733	0.09862110	11	0
18	111	1520	866	429	12926	0.09808018	13	0
19	120	1805	1095	551	13990	0.09727921	13	0
20	129	1800	1204	646	14926	0.09741062	11	0
21	122	1719	1029	456	12900	0.09742524	11	0
22	183	2008	1147	475	12034	0.09638063	14	0
23	169	2242	1171	456	10643	0.09573896	16	0

1-10 of 49 rows

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#e.

sapply(df, mean, na.rm = TRUE)

DriversKilled	drivers	front	rear	kms	PetrolPrice	VanKilled
d	law					
1.228021e+02	1.670307e+03	8.372188e+02	4.012083e+02	1.499360e+04	1.036240e-01	9.057292e+00
0	1.197917e-01					

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#OR

lapply(df, mean, na.rm = TRUE)

\$DriversKilled

[1] 122.8021

\$drivers

[1] 1670.307

\$front

[1] 837.2188

\$rear

[1] 401.2083

\$kms

[1] 14993.6

\$PetrolPrice

[1] 0.103624

\$VanKilled

[1] 9.057292

\$law

[1] 0.1197917