Tutorial 01 Answers

CM1606

2023-02-09

```
library(knitr)
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   0.3.5
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.5.0
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

01)

a) continuous
b) continuous
c) Discrete
d) Categorical (Ordinal)
e) Categorical (Ordinal)
f) Categorical (Ordinal)
g) Discrete
h) Categorical (Ordinal)
i) continuous
j) Categorical (Ordinal)
k) Categorical (Ordinal)
l) continuous

02)

```
positions <- c("Labourer", "Receptionist", "Management_Asst_1",
               "Management_Asst_2", "Junior_executive_1", "Junior_executive_2",
               "Accountant", "CEO")
salary <- c(10000,15000,25000,30000,40000,50000,100000,800000)
experiance <- c(1,1,1,2,2,3,2,3)

employee <- data.frame(positions,salary,experiance)

employee
```

```
##            positions salary experiance
## 1           Labourer  10000          1
```

```
## 2       Receptionist  15000          1
## 3  Management_Asst_1  25000          1
## 4  Management_Asst_2  30000          2
## 5 Junior_executive_1  40000          2
## 6 Junior_executive_2  50000          3
## 7         Accountant 100000          2
## 8                CEO 800000          3
```

```
view(employee) #one method to view the data set

employee %>% #viewing using pipe operator in Tidyverse
  view()
```

a)

```
mean(employee$salary)
```

```
## [1] 133750
```

b)

```
median(employee$salary)
```

```
## [1] 35000
```

c)

```
weighted.mean(employee$salary,employee$experiance)
```

```
## [1] 196000
```

03)

a)

```
summary(employee$salary)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   10000   22500   35000  133750   62500  800000
```

b)

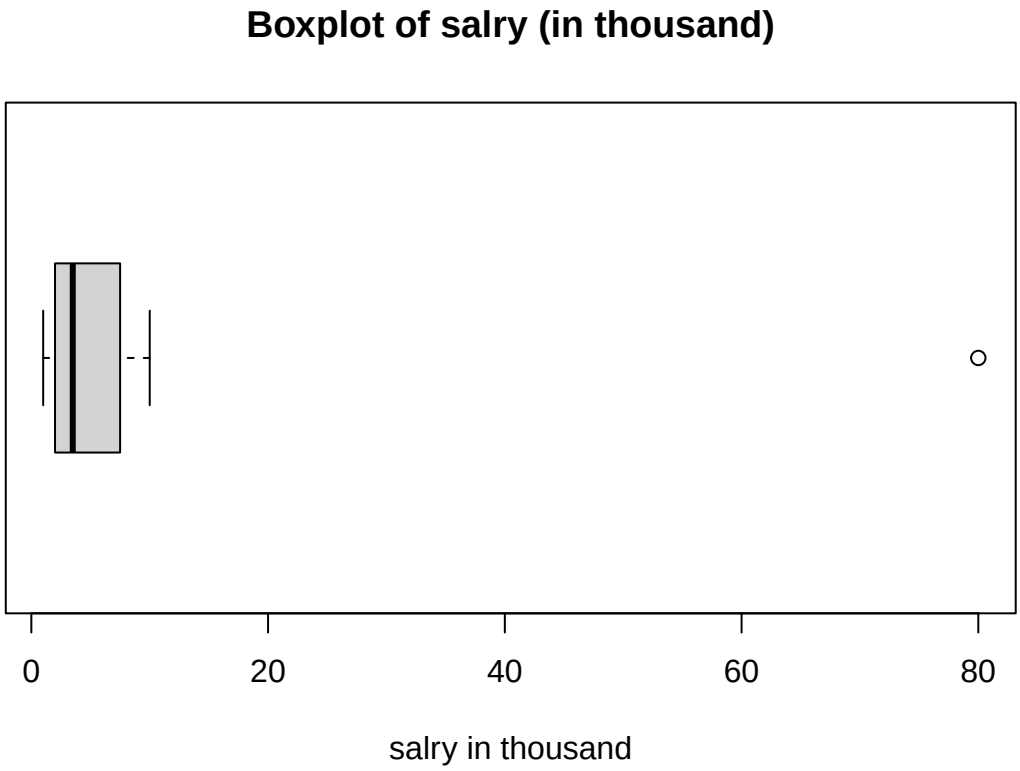
```
employee_new <- employee %>%
  mutate(salry_in_thousand=salary/10000)

employee_new
```

```
##            positions salary experiance salry_in_thousand
## 1           Labourer  10000          1               1.0
## 2       Receptionist  15000          1               1.5
## 3  Management_Asst_1  25000          1               2.5
## 4  Management_Asst_2  30000          2               3.0
## 5 Junior_executive_1  40000          2               4.0
```

```
## 6 Junior_executive_2  50000          3              5.0
## 7         Accountant 100000          2             10.0
## 8                CEO 800000          3             80.0
```

```
boxplot(employee_new$salry_in_thousand, horizontal = T, main="Boxplot of salry (in thousand)", xlab="sa
```



c)

Equation for MAD(Medain absolut deviation from the median)MAD = meadian of $|x_i - M_e|$

```
var(employee$salary) # variance
```

```
## [1] 73262500000
```

```
sd(employee$salary) # S.Deviation
```

```
## [1] 270670.5
```

```
IQR(employee$salary) # IQR
```

```
## [1] 40000
```

```
median(employee$salary) #median
```

```
## [1] 35000
```

```
employee$salary-median(employee$salary) #median deviation
```

```
## [1] -25000 -20000 -10000  -5000   5000  15000  65000 765000
```

```
abs(employee$salary-median(employee$salary)) # absolute median deviation
```

```
## [1]  25000  20000  10000   5000   5000  15000  65000 765000
```

```r
median(abs(employee$salary-median(employee$salary)))  # median of the absolute median deviation
```

```
## [1] 17500
```

04)

```r
set.seed(100)
normal <- rnorm(100,50,10)

b <- seq(from=min(normal),to=max(normal), length=11 )
b
```

```
##  [1] 27.28075 32.13463 36.98851 41.84240 46.69628 51.55017 56.40405 61.25794
##  [9] 66.11182 70.96570 75.81959
```

```r
f <- dnorm(b, mean = mean(normal),sd=sd(normal))
f
```

```
##  [1] 0.003261616 0.008406292 0.017280867 0.028334533 0.037055788 0.038653203
##  [7] 0.032159137 0.021340901 0.011295632 0.004768676 0.001605737
```

```r
hist(normal, breaks = b, probability = T, ylim = c(0, max(f)+0.01))
lines(density(normal), col="red", lwd=2)
```