Statistics for Engineers

Lab assessment – 2

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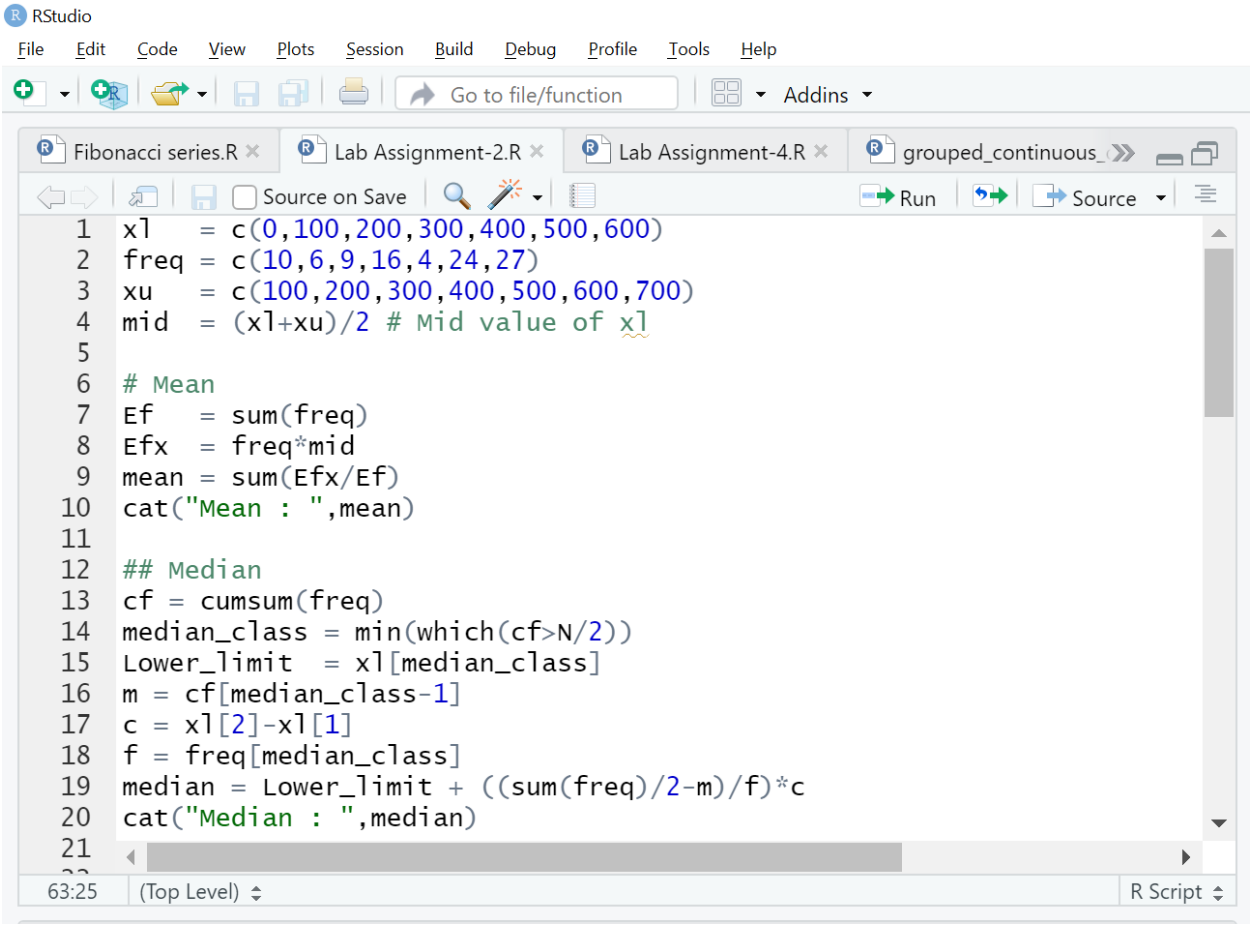
1. Write R code to compute mean, median, mode and all measures of dispersions for the following frequency distribution:

Expenditure	0-100	100-200	200-300	300-400	400-500	500-600	600-700
No. of families	10	6	9	16	4	24	27

Also calculate (i) Mean Deviation about mean (ii) Mean Deviation about median (iii) Mean Deviation about mode



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Fibonacci series.R | Lab Assignment-2.R | Lab Assignment-4.R | grouped_continuous_

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```
20 cat("Median : ",median)
21
22 # Mode
23 mode = (3*median) - (2*mean)
24
25 Mean_deviation_about_mean = sum(freq*abs(mid-mean))/sum(freq)
26 cat("Mean deviation about mean : ",Mean_deviation_about_mean)
27
28 Mean_deviation_about_median = sum(freq*abs(mid-median))/sum(freq)
29 cat('Mean deviation about median : ',Mean_deviation_about_median)
30
31 Mean_deviation_about_mode = sum(freq*abs(mid-mode))/sum(freq)
32 cat('Mean deviation about mode : ',Mean_deviation_about_mode)
33
34 cat('Coefficient of Mean deviation about mean/mean     : ',Mean_deviat
35 cat('Coefficient of Mean deviation about median/median : ',Mean_deviat
36 cat('Coefficient of Mean deviation about mode/mode     : ',Mean_deviat
37
38 ## Quartile deviation
39 q1 = min(which(cf>sum(freq)/4))
40
```

21:1 (Top Level) R Script

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Source on Save | Run | Source

```
35 cat('Coefficient of Mean deviation about median/median : ',Mean_deviat
36 cat('Coefficient of Mean deviation about mode/mode     : ',Mean_deviat
37
38 ## Quartile deviation
39 q1 = min(which(cf>sum(freq)/4))
40 fq1 = freq[q1]
41 cf1 = cf[q1-1]
42 l   = mid[q1]-c/2
43 quart = l+((sum(freq)/4 - cf1)/fq1)*c
44 q3  = min(which(cf>3*sum(freq)/4))
45 fq3 = freq[q3]
46 cf2 = cf[q3-1]
47 l   = mid[q3]-c/2
48 quart3 = l+(((3*sum(freq)/4)-cf2)/fq3)*c
49 qd = (quart3-quart)/2
50 cat('1st quartile : ',quart)
51 cat('3rd quartile : ',quart3)
52 cat('Quartile deviation : ',qd)
53
54 coefficient_quartile_deviation = (quart3-quart)/(quart3+quart)
55
```

21:1 (Top Level) R Script

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```
48 quart3 = l+(((3*sum(freq)/4)-cf2)/fq3)*c
49 qd = (quart3-quart)/2
50 cat('1st quartile : ',quart)
51 cat('3rd quartile : ',quart3)
52 cat('Quartile deviation : ',qd)
53
54 coefficient_quartile_deviation = (quart3-quart)/(quart3+quart)
55 cat('Coefficient of quartile deviation : ',coefficient_quartile_deviat
56
57 a  = c(mid-mean)
58 b  = a^2
59 F  = freq*b
60 c  = sum(F)
61 d = c/sum(freq)
62 e = sqrt(d)
63 cat('Standard deviation : ',e)
64
65
66
67
```

21:1 (Top Level) R Script

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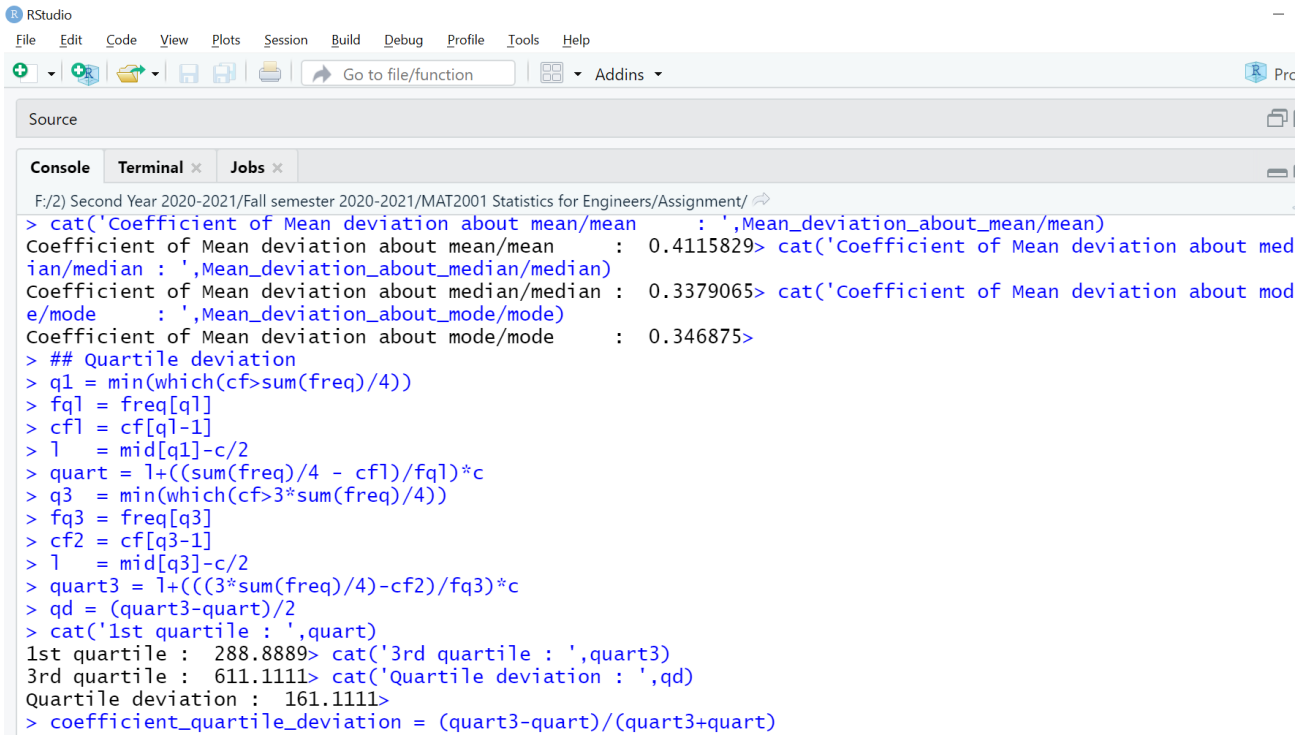
```
Mean :  435.4167>
> ## Median
> cf = cumsum(freq)
> median_class = min(which(cf>N/2))
> Lower_limit  = xl[median_class]
> m = cf[median_class-1]
> c = xl[2]-xl[1]
> f = freq[median_class]
> median = Lower_limit + ((sum(freq)/2-m)/f)*c
> cat("Median : ",median)
Median :  512.5>
> # Mode
> mode = (3*median) - (2*mean)
>
> Mean_deviation_about_mean = sum(freq*abs(mid-mean))/sum(freq)
> cat("Mean deviation about mean : ",Mean_deviation_about_mean)
Mean deviation about mean :  179.2101>
> Mean_deviation_about_median = sum(freq*abs(mid-median))/sum(freq)
> cat('Mean deviation about median : ',Mean_deviation_about_median)
Mean deviation about median :  173.1771>
> Mean_deviation_about_mode = sum(freq*abs(mid-mode))/sum(freq)
> cat('Mean deviation about mode : ',Mean_deviation_about_mode)
Mean deviation about mode :  231.25>
```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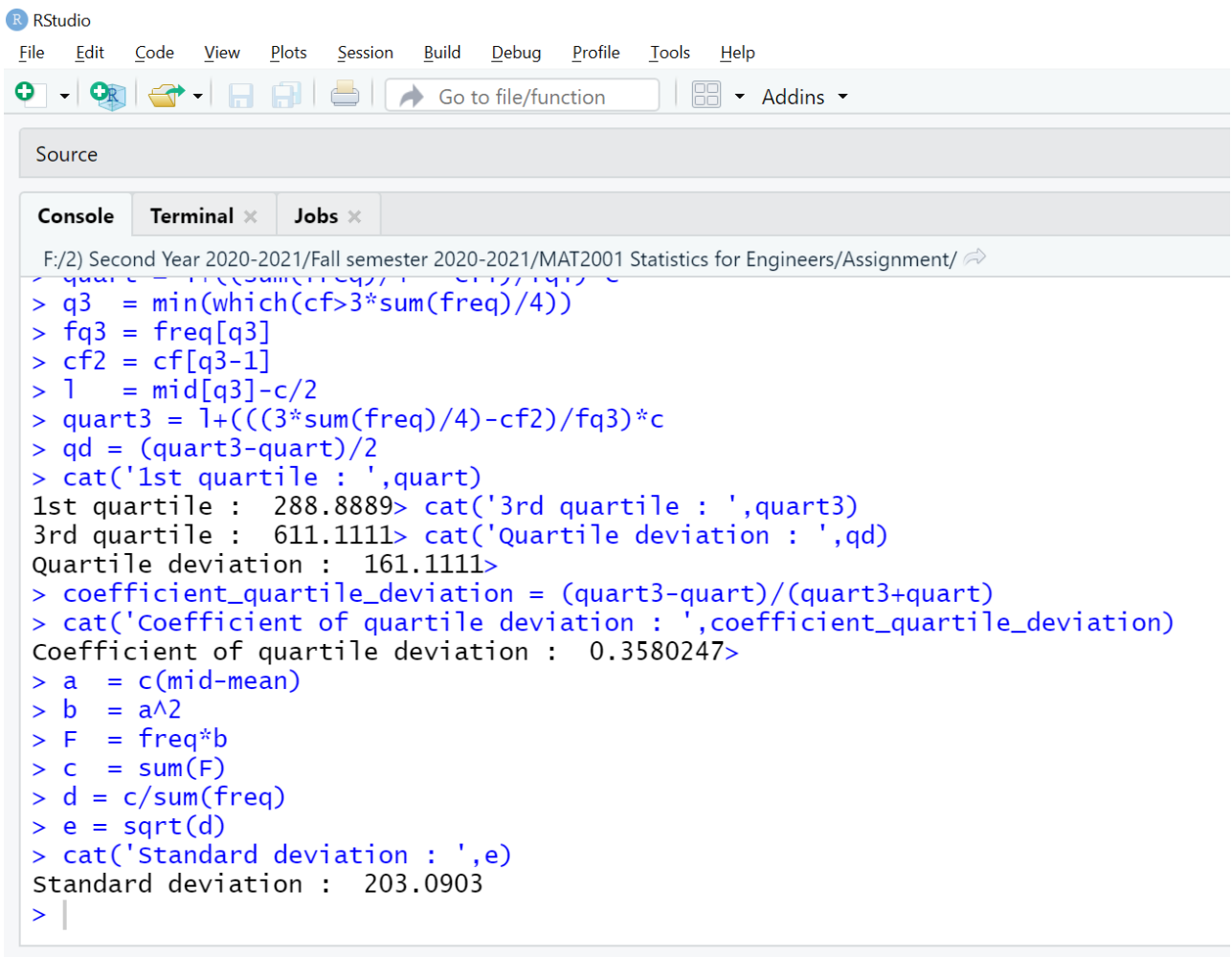
> cat('Coefficient of Mean deviation about mean/mean : ',Mean_deviation_about_mean/mean)
Coefficient of Mean deviation about mean/mean : 0.4115829> cat('Coefficient of Mean deviation about median/median : ',Mean_deviation_about_median/median)
Coefficient of Mean deviation about median/median : 0.3379065> cat('Coefficient of Mean deviation about mode/mode : ',Mean_deviation_about_mode/mode)
Coefficient of Mean deviation about mode/mode : 0.346875>
> ## Quartile deviation
> q1 = min(which(cf>sum(freq)/4))
> fq1 = freq[q1]
> cf1 = cf[q1-1]
> l = mid[q1]-c/2
> quart = l+((sum(freq)/4 - cf1)/fq1)*c
> q3 = min(which(cf>3*sum(freq)/4))
> fq3 = freq[q3]
> cf2 = cf[q3-1]
> l = mid[q3]-c/2
> quart3 = l+(((3*sum(freq)/4)-cf2)/fq3)*c
> qd = (quart3-quart)/2
> cat('1st quartile : ',quart)
1st quartile : 288.8889> cat('3rd quartile : ',quart3)
3rd quartile : 611.1111> cat('Quartile deviation : ',qd)
Quartile deviation : 161.1111>
> coefficient_quartile_deviation = (quart3-quart)/(quart3+quart)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> fq3 = freq[q3]
> cf2 = cf[q3-1]
> l = mid[q3]-c/2
> quart3 = l+(((3*sum(freq)/4)-cf2)/fq3)*c
> qd = (quart3-quart)/2
> cat('1st quartile : ',quart)
1st quartile : 288.8889> cat('3rd quartile : ',quart3)
3rd quartile : 611.1111> cat('Quartile deviation : ',qd)
Quartile deviation : 161.1111>
> coefficient_quartile_deviation = (quart3-quart)/(quart3+quart)
> cat('Coefficient of quartile deviation : ',coefficient_quartile_deviation)
Coefficient of quartile deviation : 0.3580247>
> a = c(mid-mean)
> b = a^2
> F = freq*b
> c = sum(F)
> d = c/sum(freq)
> e = sqrt(d)
> cat('Standard deviation : ',e)
Standard deviation : 203.0903
>