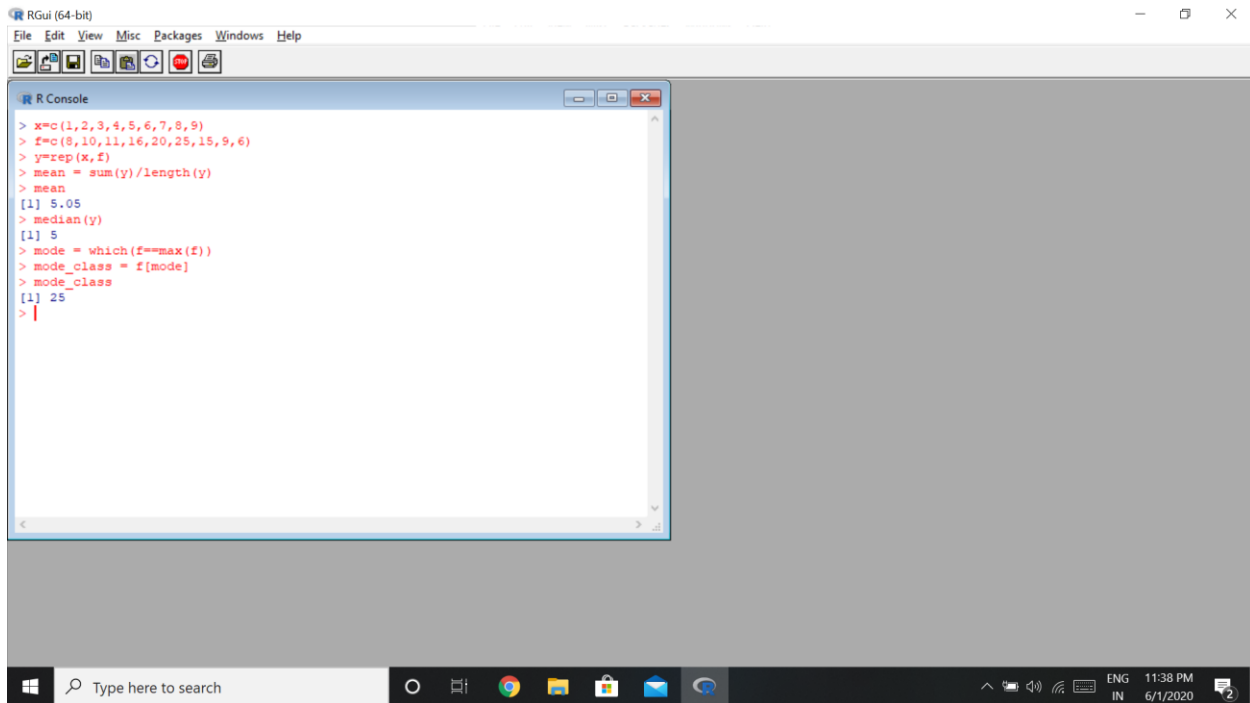Statistics DA 1

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Q1. Nine students, graduates and undergraduates, were enrolled in a statistics course. Their frequency distribution are given as follows: x: 1 2 3 4 5 6 7 8 9 f: 8 10 11 16 20 25 15 9 6 (i) Find Mean and Median of all students. (ii) Find median frequency of all students under 20. (iii) Find modal frequency of all students.

Q2. Compute Mean, Median and Mode for the following frequency distribution: Wages (in Rs.): 0 – 10 10 – 20 20 – 30 30 – 40 40 – 50 50 – 60 60 – 70 Frequency: 4 16 60 100 40 6 4

```
> mid=c(5,15,25,35,45,55,65)
> f=c(4,16,60,100,40,6,4)
> fr.distr=data.frame(mid,f)
> fr.distr
  mid   f
1   5   4
2  15  16
3  25  60
4  35 100
5  45  40
6  55   6
7  65   4
> mean = sum(mid*f)/sum(f)
> mean
[1] 33.26087
>
> fr.dist<-data.frame(mid,f)
> fr.dist
  mid   f
1   5   4
2  15  16
3  25  60
4  35 100
5  45  40
6  55   6
7  65   4
> cl=cumsum(f)
> cl
[1]   4  20  80 180 220 226 230
> n=sum(f)
> n
[1] 230
> ml=min(which(cl>=n/2))
> ml
[1] 4
```

```
> ml
[1] 4
> h=5
> freq=f[ml]
> c=cl[ml-1]
> l=mid[ml]-h/2
> median=l+(((n/2)-c)/freq)*h
> median
[1] 34.25
> m=which(f==max(f))
> fm=f[m]
> f1=f[m-1]
> f2=f[m+1]
> l=mid[m]-h/2
> mode=l+((fm-f1)/(2*fm-f1-f2))*h
> mode
[1] 34.5
>
```

Q3. An entomologist studying morphological variation in species of mosquito recorded the following data on body length: 1.5, 1.8, 1.2, 1.3, 1.9, 1.4, 1.3, 1.0, 1.8, 1.1 Compute all the measures of dispersion i.e. range, variance, standard deviation, coefficient of quartile deviation, mean deviation about mean, median and mode.

```
> x=c(1.5,1.8,1.2,1.3,1.9,1.4,1.3,1.0,1.8,1.1)
> summary(x)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.000   1.225   1.350   1.430   1.725   1.900
> range=1.9-1.0
> range
[1] 0.9
> var(x)
[1] 0.09788889
> sd=sqrt(var(x))
> sd
[1] 0.312872
> cqd=(1.725-1.225)/(1.725+1.225)
> cqd
[1] 0.1694915
> y=(x-mean(x))
> y
 [1]   0.07   0.37  -0.23  -0.13   0.47  -0.03  -0.13  -0.43   0.37  -0.33
> y=abs(y)
> y
 [1] 0.07 0.37 0.23 0.13 0.47 0.03 0.13 0.43 0.37 0.33
> md1=sum(y)/length(y)
> md1
[1] 0.256
> z=abs(x-median(x))
> md2=sum(z)/length(z)
> md2
[1] 0.25
> #in this problem, it is a bi-modal series(Mode is not possible)
```

Q4. A quality control engineer is interested in determining whether a machine is properly adjusted to dispense of sugar. Following data refer to the net weight (in ounces) packed in thirty one-pound bags after the machine was adjusted. Compute the measures skewness and kurtosis: 18.9, 19.2, 18.0, 19.6, 19.2, 18.9, 19.0, 18.6, 18.6, 19.0, 19.2, 18.6, 19.9, 18.2, 19.6, 18.2, 18.8, 19.0,18.8, 19.9, 18.2, 18.8, 18.8, 19.2, 19.0, 18.9, 19.2, 19.2, 19.0, 18.6.

```
> x=c(18.9, 19.2, 18.0, 19.6, 19.2, 18.9, 19.0, 18.6, 18.6, 19.0, 19.2, 18.6, 19.9, 18.2, 19.6,
+ 18.2, 18.8, 19.0,18.8, 19.9, 18.2, 18.8, 18.8, 19.2, 19.0, 18.9, 19.2, 19.2, 19.0, 18)
> x
 [1] 18.9 19.2 18.0 19.6 19.2 18.9 19.0 18.6 18.6 19.0 19.2 18.6 19.9 18.2
[15] 19.6 18.2 18.8 19.0 18.8 19.9 18.2 18.8 18.8 19.2 19.0 18.9 19.2 19.2
[29] 19.0 18.0
> n=length(x)
> n
[1] 30
> mean=mean(x)
> mean
[1] 18.91667
> m4=sum((x-mean)^4)/n
> m4
[1] 0.1526459
> m2=var(x)
> m2
[1] 0.2400575
> beta2=m4/(m2^2)
> beta2
[1] 2.648833
> gam2=beta2-3
> gam2
[1] -0.3511667
> |
```