

# 5-12a (20 values)

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# IndE 421
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# Xbar and R chart template program
# R does not come with any SPC software, so I program it myself

# setting up the graphics
par(ask=TRUE)

# the data table
thesedata<- read.table("Hw3prob5_12a.dat", header=TRUE)
attach(thesedata)

# the sample size
n<- 5

# defining constants to be used with the charts
# SEE TEXTBOOK for values and definitions
A2<- .577
D3<- 0
D4<- 2.115
L<- 3

# counting the number of samples --the length of the data vector.
no.samps<- nrow(thesedata)
samps<- paste("The number of samples is:",no.samps)
print(samps)

# getting x-double-bar --the grand average of the measurement values.
xdblbar<- mean(Xb)
cl.loc<- paste("The centerline for the Xbar chart is at:", xdblbar)
print(cl.loc)

# getting R-bar --the average range of the set of samples.
rbar<- mean(Rge)
r.loc<- paste("The centerline for the Range chart is at:", rbar)
print(r.loc)

# upper control limits for the x-bar chart
uclx<- xdblbar+A2*rbar
upperx<- paste("The upper control limit for the X-bar chart is at:", uclx)
print(upperx)

# lower control limits for the x-bar chart
lclx<- xdblbar-A2*rbar
lowerx<- paste("The lower control limit for the X-bar chart is at:", lclx)
print(lowerx)

# upper control limit for the range chart
uclr<- rbar*D4
upperr<- paste("The upper control limit for the R-chart is at:", uclr)
print(upperr)

# lower control limit for the range chart
lclr<- rbar*D3
lowerr<- paste("The lower control limit for the R-chart is at:", lclr)
print(lowerr)

# plotting the charts
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```
plot(Xb, ylim=c(lclx-1,uclx+1), type="o", xlab="Sample Number", main="X-bar chart for
problem 5-12a")
abline(h=uclx);text(3.5,uclx,"Upper Control Limit")
abline(h=xdblbar);text(2,xdblbar,"Centerline")
abline(h=lclx);text(3.5,lclx,"Lower Control Limit")

# second plot is the range chart
plot(Rge, ylim=c(lclr-1,uclr+1), type="o", xlab="Sample Number", main="Range chart
for problem 5-12a")
abline(h=uclr);text(3.5,uclr,"Upper Control Limit")
abline(h=rbar);text(1,rbar,"R-bar")
abline(h=lclr);text(3.5,lclr,"Lower Control Limit")

detach(thesedata)

# done
```

```
plot(Xb, ylim=c(lclx-1,uclx+1), type="o", xlab="Sample Number", main="X-bar chart for
problem 5-12a")
abline(h=uclx);text(3.5,uclx,"Upper Control Limit")
abline(h=xdblbar);text(2,xdblbar,"Centerline")
abline(h=lclx);text(3.5,lclx,"Lower Control Limit")

# second plot is the range chart
plot(Rge, ylim=c(lclr-1,uclr+1), type="o", xlab="Sample Number", main="Range chart
for problem 5-12a")
abline(h=uclr);text(3.5,uclr,"Upper Control Limit")
abline(h=rbar);text(1,rbar,"R-bar")
abline(h=lclr);text(3.5,lclr,"Lower Control Limit")

detach(thesedata)

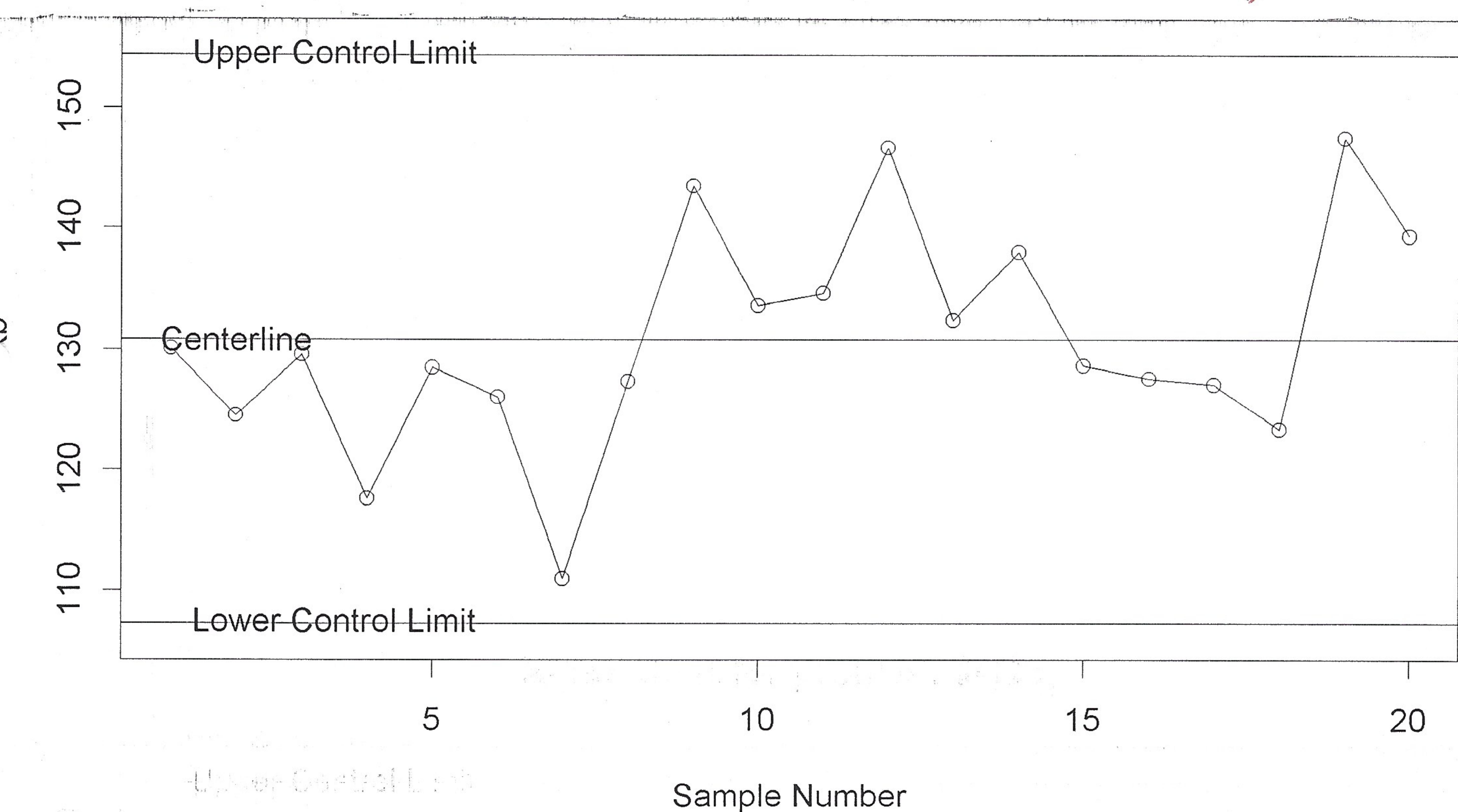
# done
```

Xb	Rge
130.1	27.9
124.5	57.0
129.6	39.1
117.6	30.0
128.5	42.7
126.1	43.0
111.0	36.1
127.4	46.0
143.5	46.9
133.6	33.7
134.6	40.6
146.7	39.8
132.4	50.0
138.1	9.2
128.7	54.8
127.6	53.3
127.1	42.9
123.4	53.2
147.5	38.3
139.4	32.2

"Set-up" Jax

```
> source("C:/My Documents/IndE421/Hw_3/XbarRchart5_12.R")
[1] "The number of samples is: 20"
[1] "The centerline for the Xbar chart is at: 130.87"
[1] "The centerline for the Range chart is at: 40.835"
[1] "The upper control limit for the X-bar chart is at: 154.431795"
[1] "The lower control limit for the X-bar chart is at: 107.308205"
[1] "The upper control limit for the R-chart is at: 86.366025"
[1] "The lower control limit for the R-chart is at: 0"
Hit <Return> to see next plot:
Hit <Return> to see next plot:
>
```

X-bar chart for problem 5-12a,



Range chart for problem 5-12a

