welcome to the next lecture on descriptive statistics with our software you may recall that in the earlier lecture we had learned how to use this our software as a calculator and we had learned different types of mathematical operators addition subtraction multiplication division but all those were based on when we are trying to add or subtract only the numbers now in this lecture we are going to consider the vectors of the numbers or we call it as data vectors and we would like to see we would like to learn that how these mathematical operators addition subtraction division power etcetera they work with data vector so you will have here two options that one option when we are trying to work with data vector versus number and second option will be when we are trying to work with data vector versus data vector so let us start the course so now we are going to simply look into the aspect of the our software that how to handle the data vectors with respect to the different mathematical operators addition subtraction multiplication division etc so let me try to take care different types of examples and through those examples I am going to explain you how the things are happening so let me take her data vector consisting of 4 values 3 4 5 & 6 and as I told you earlier all these values have to be used with the C operator so I will try to write down here C and inside the bracket I will try to write down these four value 3 4 5 6 and now then I try to write down here hat and 2 what does this mean so now I come back to my problem what I really wanted to do suppose I want to find out the value of 3 square 4 square Phi B Square six square you have to notice that here the powers in each and every number this is the same tu-tu-tu-tu-tu so now this two is actually here and this three is here this 4 is here this five is here and this six is here so once I try to write down here this data vector C inside bracket three four five six had two then it is going to give me an outcome like three square for a square v square six square which have the values 9 16 25 and 36 respectively so what you have observed that once you are trying to use the power operator with the vector then the power is being operated on each and every number inside the data vector right so in case if you want to execute it on the our console I will show you but here is the, the screen shot what you will get here so let me try to show you here on the our console suppose if I run say 3 3 comma 4 comma 5 comma 6 and then here hat - this will give you a 9 16 25 36 similarly if you want to find out here cube you can make it here C 3 4 5 6 hat 3 and this will give you the value of 3 Q 4 Q 5 cube and 6 cube and instead of here hat you can also use here the operator save double star and this is the same thing you can see here so this is what you have to keep in mind that once you are trying to do the operation with a vector the power of this is getting distributed now I try to take another option where I am trying to use here two vectors that data is inside a vector and the power which I had taken earlier as a scalar - now this is this itself is a
vector so now that if you try to see
what is happening so here essentially we
wanted to find out the value of 3 square
for cube 5 square 6 cube so you can see
here that these powers are something
like 2 3 and then once again 2 & 3 right
so these powers are being repeated here
these powers are written here as a data
vector 2 3 2 3 and once they are
operated over the greater vector C 3 4 5
6 then 2 & 3

both operates pairwise that means two will come here and it will make it here 2 then 3 will come here and this will make it here 3 once again 2 will come here and it will make it here Phi B Square + 3 will come here and it will make it here 6 cube so this is here the value of 9 6425 2 1 6 which is the value of 3 squared 4 Q Phi B Square + 6 cube respectively and here is the screenshot of the outcome so what do you need to learn here that whenever we are trying to give the data vector and I have to operate a power operator then the powers are distributed over the data vector in the same sequence in which they are given and the data is given inside the data vector alright so let me try to show you here over the arc console how it happens so let me take here a vector 3 4 5 comma
six three four five six and I am operating here a power operator ch2 and here three you can see here the quiz is coming out to be like this
right and now let me take it another example on the similar lines where I want to compute this values one is square 2 squared 3 this power of 4 4 is square 5 cube and sixth with the power of here for we need to observe here that there are power say 2 3 4 and once again here 2 3 & 4 which are similar so these powers 2 3 & 4 and this power 2 3 & 4 they can be given inside a data vector here like as a SC 2 3 4 and these values here 1 2 3 4 5 & 6 they can be given here another vector here like this one so once they are operated you can see here that this 2 is coming to here in the first place this 3 is coming to here in the second place and this 4 is coming to coming here in the third place and similarly once again these three operators comes together to comes over here 3 comes over here and 4 comes over

here like this
so I can write down here 1 a square 2 Q 3 as powers of here 4 and so on and this is the value which has been obtained here 1 8 81 16 125 1 2 9 6 so you can just practice it yourself so what you have to learn here that whenever we are finding out the power of the vector where the powers itself are given in the form of a data vector then the power moves over on the data vector exactly in the same order now the next question comes that suppose if the number of powers
start to be operated it's not a multiple of the number of data vectors for example here you can see I have here six values 1 2 3 4 5 6 and the powers are ahead 2 3 4 right so this 2 3 4 is being operated on 1 2 3 4 5 6 and so on so what really happens if this is not a multiple so for example if I try to take care another example to show you the outcome you can see here what really happens and after that I will show you on the our console suppose I try to take here a vector here 2 3 4 5 this is my data vector using the operator C and my another data vector is containing here the value 3 4 5 so what's really happening once I try to use here a power operator so this 3 comes over here and it becomes here to cube this 4 comes here here and it becomes 3 is power of here 4 5 comes over here and this becomes here for its power of a or 5 and now after this 3 starts coming over here and this becomes here 5 Q but after that there is no place here for 4 and 5 to come
so what really will happen what are we going to compute we are going to compute here 2 cube 3 as power of here 4 4 is the power here 5 then after that 5u but after that there is no space for these powers 4 and 5 to come so in this case

this will compute the value on the basis
of whatever data is available but for
the remaining value it will give me a
warning message and it is clearly saying
that longer object length is not a
multiple of the shorted object length so
whenever in our you are getting a
warning warning minute is something like
a literal sense of warning it will not
harm you but you have to be careful
the second will be error messages that
means one is making a mistake and
without that the program will not run
but with warning the program will run
but it will give you a message that you
have to be careful while executing it so
let me try to show you here on the our
console first so suppose if I try to
take the same examples here suppose if I
take the same vector
you know quit a vector 3 4 5 6 and then
I try to multiply it here with here this
thing so now if I try to add here see
here for 2 or 3 4 so now you can see
here that this is not really a multiple
and it gives me here this value here is
9 here is 3 squared the 64 is 4 cube
this 625 is 5 less power of a f4 that is
205 1 2 5 is 25 25 into 25 is 625 and
the last value 36 here is the value of 6
with this square 36 but after that it is
telling you that in this thing the
longer object length is not a multiple
of the shorted object length and this is
giving you here a warning message so you
have to be careful ok so that was about
the power operator similarly if I try to
take other operators like a
multiplication addition division so
first let me take it here multiplication
so again I would try to take two
examples one with the multiplication of
a data vector with a scalar and then
with the vector so you can see here I
have taken here data vector of 2 3 4 5
and this is going to be multiplied by

here 6 in this case once you are trying to multiply I scalar value 6 with data vector then the scalar is going to be multiplied in each and every value of the data vector for example you can see here suppose I want to find out the value here 2 into 6 3 into 6 4 into 6 5 into 6 then in this case this 6 is going to be here common so this 6 is appearing here
and this guitar vector 2/3 full and here five this comes over here inside the data vector and the outcome is going to be here say 2 into 6 that is 12 3 into 6 is 18 4 into 6 is 24 and 5 into 6 is 30 right and this is the screen shortly I'll get around I will try to show you over the our console also right now what I am going to do here that I am trying to consider here to Decatur vectors so in this example there is one greater vector consisting of values 2 3 4 5 and another data vector is minus 2 minus 3 minus 4 and 6 and both these data vectors are getting multiplied over each other so essentially we are trying to find out here the value of 2 in 2 minus 2 3 into minus 3 4 into minus 4 and 5 into 6 so what you can see here that these values 2 3 4 and here 5 I am trying to combine in one Decatur vector 2 3 4 5 and this value here - 2 - 3 - 4 and 6 they are getting combined in say another value here - 2 - 3 4 and here 6 and this data vector is appearing here and this data vector is appearing here and so when this multiplication operator comes into picture then this value is going to be multiplied by this first value first value of data vector and first value of another data vector then second value of data vector and second value of data vector
third value of data vector 4 with - fourth which is the third value in the second data vector and 5 and here 6 with

the second pickett a vector so you can see here that there is an element-wise multiplication the first position is being multiplied with the first position second position is being multiplied by the second position and so on and this is the screenshot here of this same operation and here I can show you with this another example
we have the number of data points in the second vector are simply a multiple of the number of data points in the first vector but they are not equal so here there are four values in the first greater vector two three four five and there are two values in the second guitar vector which are the six and seven so essentially here we are trying to find out the value of 2 into 6 3 into 7 4 into 6 and 5 into 7 so you can see here that these two values 6 & 7 they are being here repeated and these values they are coming over here in the second data vector and this values 2 3 4 and here 5 they are coming here as a first data vector and this multiplication sign is being converted into the our operator which is say star so in this case this is 1 6 is beam will apply 2 2 3 3 x 7 and once again once this process is complete then once again 6 a multiplied 2 4 & 5 is more multiplied to 7 so this operation is going in this particular way so this is what you have to keep in mind right and say similarly here I would try to show you that in case if the number of data vector in the second vector is not a multiple of the number of data points in the first vector then what happens we have a similar outcome as in the case of power operator so here I try to take an example of 4 values 2 3 4 5 and the first data vector and value 6 7 8 in the second data vector and once they are getting multiplied then using the same rule this 6 gets multiplied

with this 2 7 gets multiplied by here 3
into 3 & 8 is being applied into here
for now after this once again this
process is repeated and this this 6 is
getting multiplied over here 5 but after
this there is no place to multiply the
number by 7 and 8 so in this case we are
simply trying to find out the value of 2
into 6 3 into 7 4 into 8 5 into 6 and
after this there has to be two more
values where I know that these
are going to be multiplied by seven and
eight but not present so that is why we
are getting here a warning message that
the longer object length is not a
multiple of the shorted object length so
now let us try to do this operation over
the arc console and you can see here
here is the screenshot of what we are
now going to do here but I would like to
show you over the our console so let me
try to clear by pressing ctrl L now if
you try to see here I will try to take
care data vector C two three four five
and I try to multiply it by here seven
so you can see here that this number is
coming out to be 2 into 7 3 into 7 4
into 7 and 5 into 7 which is 14 21 28
and 35 respectively
similarly in case if I try to multiply
this data vector C 2 3 4 5 which CA
let's see here another get our vectors
here 5 6 7 8 then I get to this thing so
what is happening this can is coming due
to 2 into 5 this 18 is coming due to 3
into 6 this 28 is coming by 4 into 7 and
this 40 is coming due to 5 into 8 so I
am getting here a value like this and
similarly if I try to make it here that
first data vector has 4 values whereas
the second data vector has only two
values so again I have a nice outcome
without any warning so this 10 is coming
because of 2 into 5 this 18 is coming
because of 3 into 6 this 20 is coming
because of this 4 into 5 and this 30 is

coming because of 5 into 6 now in case
if I try to add here one more number
here if I see here and that second
gaiter vector that's instead of 5 6 I
try to make it here 5 6 7 and if I try
to multiply it by the data vector 2 3 4
5 then you can see here I'm getting here
a warning message why because this 10 is
the outcome of this first value 2
multiplied by 5 first value
this 18 is the multiplication of three
with six please try to look into the
highlighted part this 28 is the outcome
of four multiplied by seven but after
this when I try to multiply here five
this will be multiplied by here five
this is 25 but then after that there is
no number there are no numbers two more
- mum - multiplied by six and seven so
that is why it is giving me a warning
message so you have to be careful in
this case now the same thing I would try
to do with addition here so once again I
am trying to take care a vector of four
values to go 3 4 5 and I am trying to
add here a scalar 20 so you can see here
that this 20 is being added to 220 is
being added to 320 is being added to 4
and 20 is being added to 5 so I am
getting here the value here 2 plus 20
which is here 22 + 3 + 20 23 4 + 20 24 5
+ 20 25 so essentially I wanted to add
the number 20 in the values 2 3 4 & 5 so
that is why this 20 here is being
written over here yes like this as the
common value and this value 2 3 4 & 5
they are written here as here say
another greater vector 3 2 3 4 5 and
this is here the the output of this
operation the screenshot of this
operation and similarly if you try to
take care of the vector with the see
here where the length of the vector is
not multiple then again we have the
similar outcome that if I try to take
here a vector of for value 2 3 4 5 and

say another vector of 3 value 6 7 & 8
COGO the number of values in the first
and second vector are not the same so in
this case this 6 is being added to 2 7
is being added to 3 8 is being added to
for every which is giving me an outcome
8 10 and 12 but then I try to add here 5
and
six this is giving me here eleven but
there are no numbers to add with seven
and eight so essentially I am getting
here the value 2 + 6 3 + 7 4 + 8 + 5 + 6
alright so this 6 7 8 they are combined
here in one vector here 6 7 & here 8
which is written over here and now this
number is left alone and so now we are
trying to mean means ideally there
should be here 7 & 8
but now here the data vector here is C 2
3 4 5 and so ideally if there would had
been two more here numbers then I would
not have got the warning so this is the
same style same operation that we are
getting over here and you can see here
this is a screenshot of the same
operation which you have just learned
and now but before going into the
further details
look at me try to show you here how
these things are happening right so let
me first clear the screen let me take
here data vectors J 2 3 4 and here 5 and
I try to add here a scalar number here
20 you can get here you can see here
that every number 2 3 4 5 is being added
with 20 and that is the outcome what we
are getting or here and similarly if I
try to take care another vector here the
same data vector C 2 3 4 5 and I try to
add here 6 7 8 and here 9 so you can see
here the outcome is this first 8 is
coming because of 2 plus 6 this 10 is
coming because of 3 plus 7 this 12 is
coming because of 4 + 8 4 plus 8 and
this is coming because of adding 5 and 9
together right and similarly in the same

operation if I try to add here if I try
to remove one number so that the length
of the vectors are not really multiple
then in this case means I will get a
similar outcome where I have a warning
message so this outcome is if
essentially it is because of 2 plus 6
this 10 is because of 3 plus 7 this tool
is because of 4 plus 7 and this 11th is
because of 5 plus 8 so the same thing
continues over here so what I will do
that I will try to simply take some
examples on the similar line for
subtraction and division and that will
give you a clear idea that how the
things are happening right so let me
come on the our console and let me take
the same example where the data vector
is consisting of 4 values 2 3 4 5 so I
try to subtract here a value here say 1
from 2 3 4 5 so that means each and
every value in that data vector 2 3 4 5
is being subtracted by 1 so the answer
what we expect is 2 minus 1 3 minus 1 4
minus 1 and 5 minus 1 and if I try to
enter I get the same outcome here 1 2 3
4 and similarly if I try to subtract two
vectors which are of the multiple
lengths same as I can say here 2 comma
this same in this second vector is C 2 3
so what I was saying that the outcome
will be here - - this - please try to
look onto the highlighted part 3 - this
3 then again 4 minus this 2 and finally
5 minus 3 so this answer comes out to be
0 0 2 & 2 and similarly if I try to
subtract here the vector of the same
length say the same vector say C 2 3 4 5
minus C 2 3 4 5 that means the outcome
will be 2 minus 2 3 minus 3 4 minus 4
and 5 minus 5 and this answer will come
out to be 0 0 0 0 and just for
illustration if I try to take here I say
here some other values just to make you
more comfortable
suppose if I try to write here 7 8 9 and

10 so
this means I am trying to subtract 2 & 7
that means 2 minus 7 and then 3 minus 8
then 4 minus 9 and 5 minus 10 so you can
see here the answer comes to to be minus
5 minus 5 minus 5 minus 5
this minus 5 is coming because of 2
minus 7 the second minus y breasts
coming here because of 3 minus 8 and
third minus 5 is coming out because of
here 4 minus 9 and last minus 5 is
coming out because of 5 minus here 10 so
similarly if you try to take here's some
other value here say 8 3 2 1 and 3 say C
2 3 4 5 - 8 - 1 3 so this value will be
minus 6 1 3 and 2 and similarly if you
try to take care another say some other
value which where the lengths are not
multiple so if I try to subtract C 2 3 4
5 - c 8 - 1 3 7 this value will come out
to be 2 minus 8 3 minus this 2 4 minus
this 1 5 - this 3 which is coming out to
be minus 6 1 3 2 right like this and
last value it is here say - and then
here - 7 so this is here - 5 but after
this there are no values the two vectors
are not of multiple lengths so that is
why I am getting here a warning warning
the message here so you can see here
that the same type of operations work
similarly I try to show you here how the
division operator works so let me take
here a data vector of say 5 10 15 and 24
values and if I try to divide each and
every physically by here 5 so I'm trying
to give here a scalar data vector
divided by F a scalar value 5 so you can
see here this value is coming out to be
1 2 3 4
this one is coming because five is being
divided by five this two is coming
because 10 is being divided by five this
three is coming because 15 is being
divided by five and this 4 is coming
because this 20 is being divided by 5
and similarly if I try to take the same

data vector but now instead I try to divide it by here say another data vector say here 5 and 10 to value so in this case you can see here both the data vectors are of multiple lengths so what will happen here that once I entered I get the outcome 1 1 3 2 this one is coming because I am trying to divide this 5 with the first value in the second data vector 5 which is 5 divided by 5 which is 1 this 1 this is highlighted 1 is the outcome of this 10 divided by this 10 which is here 1 the third value 3 this is an outcome of 15 divided by the first value 5 which is 3 15 divided by 5 is 3 and the last value tool here is an outcome of this 20 divided by 10 which is 2 so you can see here that the division operator also works exactly on the same lines as the power operator multiplication operator region operator and so on and similarly if I try to take the two vectors of save different lengths so for example I can say here I want to divide here 5 10 by here and say a 3 so now in this case the first ket vector has 4 values and the second gaiter vector has only here three values so in this case we expect that we will get a warning message and yeah that is what is happening you can see here there's these first 3 values 5 10 and 15 these are being divided by 5 10 and 3 for the first value 5 divided by 5 which is 1 the second value 1 this is here 10 divided by here this 10 third value here is 15 divided by here this value here 3 which is here 5 but now after this the fourth value 2020 is being divided by here this five is four but but after that there are no values because because the two vectors are not of multiple lengths so we are getting here a warning message so you can see here that the vector operation or the operation of data vector when the data vector has on

different types of outcome in comparison to other software's so here you have to be careful and but means I can assure you that these types of operations are going to be very very useful when we are going to start with the statistics part so in the next lecture I will try to take some other aspect on the computation of the values using our software and tickle then you please practice these operators try to take more example try to create more example yourself and then try to verify whatever you are getting is it really matching with the mathematical operation which you can do by your own hand manually practice and we will see you in the next lecture till then good bye
[Music]
[Music]
[Music]
English (auto-generated)