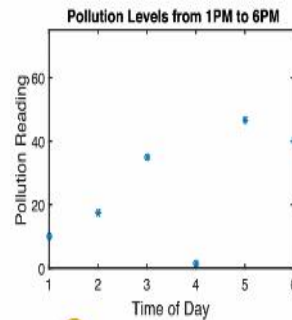


Accessing Elements of a Vector

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Structural Dynamics

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```
data = [18, 25, 43, 0, 55, 48]
```

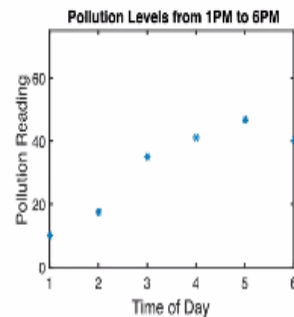
1 2 3 4 5 6

When analyzing data we often need to fix an incorrect point or analyze different subsets of our data. How do we access and modify elements of a vector after we have created it take for example these hourly pollution readings, we would like to compare pollution levels before and during rush hour.

But first notice anything strange it seems unlikely that pollution would be trending up and then be non-existent for an hour let us deal with this issue first by accessing the incorrect reading in our data vector and modifying it with an average. In MATLAB elements are numbered sequentially starting with 1 this number is called an index. For example, our problem element has index 4 since it is the 4th element of the vector.

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```
MATLAB Commands
>> data(4)
ans =
     0
>> x = data([3 5])
x =
    43    55
>> data(4) = mean(x);
```



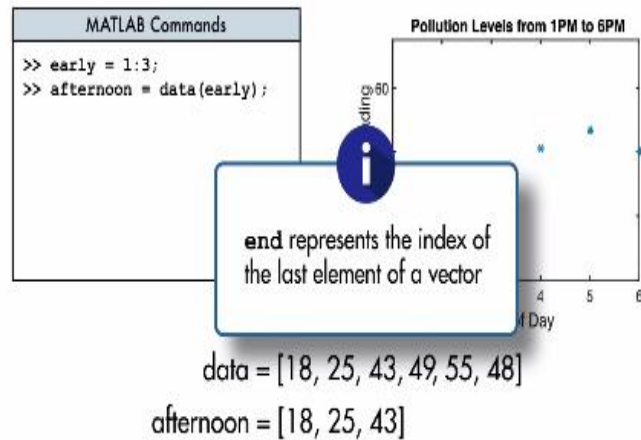
`data = [18, 25, 43, 49, 55, 48]`

We access a specific element by typing the variable name and enclosing the desired index inside parentheses. Let us approximate the value of the 4th reading with the average of neighboring elements which have indices 3 and 5 rather than access each element one at a time how can we access both indices at once.

This command returns the third and fifth elements of our data. Instead of using a single scalar index we use a vector of indices to extract multiple values. The result is a two element vector with the values at the corresponding indices which we save as a variable X. Now we take the mean of X and assign that value to the 4th element.

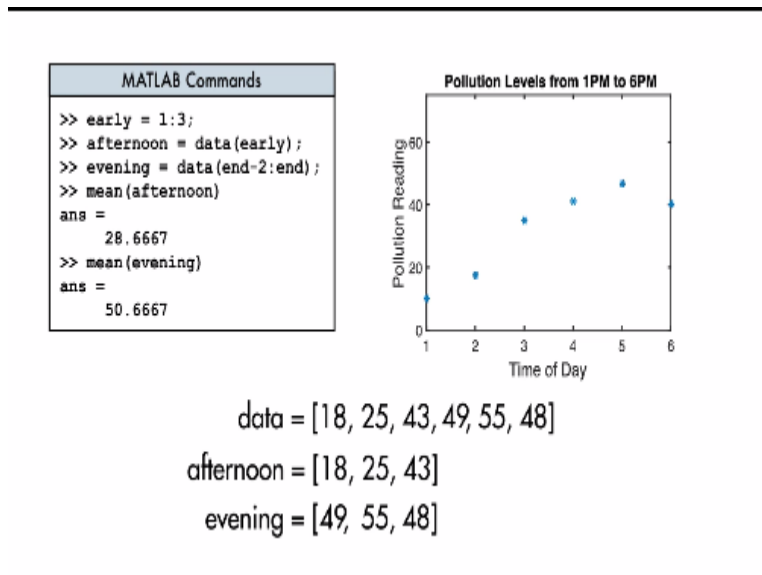
Notice that the index we want to change is enclosed in parentheses and the assignment operator is used to change the value from 0 to the mean that is better. Now we are ready to look at the data before and during rush hour.

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Let us look at the readings from 1pm to 3pm using the colon operator we make a vector of integers 1 to 3 and use that vector to extract the first three elements of our data. Now let us get the last three hours of data this data set is pretty small but in many applications we do not know the exact size of our dataset only that we want to look at the last elements of it no problem. We use the end key word to reference the last index of a vector.

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We can even do arithmetic with the end keyword to access elements close to the end of a vector and end -1 and end -2 are the indices of the last three elements. This command using end extracts the last three readings of data and there you go. It looks like our average pollution reading does go up a bit during rush hour.

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