PSY8219 : Week 4

Homework 3 Due Today

Homework 4 Due September 26

Readings for Today

  Attaway Chapter 1

Readings for Next Week

  Attaway Chapter 3
Note on Homework 4:

Write Matlab code that will create a stem-and-leaf plot ...

(First) Assume that you have a one-dimensional array called data. For testing purposes, assume it has the following values:

```
mydata = [68 47 63 76 44 64 81 66 106 68 72 72 46 75 49 84 88];
```

(Later) For full credit, it should also run with data sets such as:

```
mydata2 = [-23.678758, -12.45, -3.4, 4.43, 5.5, 5.678, 16.87, 24.7, 56.8];
```
Example

data = [420 500 130 540 800 120 930 100 340];

How could we extract only the RTs greater than 150ms and less than 750ms and put them in an array?

idx = 1
for i=1:length(data)
    if ((data(i) < 150) | (data(i) > 750))
        data(i) = [];
    end
end

Is this okay? Or no?
Example

data = [420 500 130 540 800 120 930 100 340];
There are always possible shortcuts, especially in a language with many toolboxes like Matlab.

idxs = find((data>150) & (data<750))
data2 = data(idxs)
- or -
data2 = data(find((data>150) & (data<750))))

What do the components of these commands do?
Example

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idxs = find((data>150) & (data<750))
data2 = data(idxs)
- or -
data2 = data(find((data>150) & (data<750))))

What do the components of these commands do?

Best Practices: Make sure you understand and test out a command before using it
Example

Imagine you want to “normalize” a set of data. That means that each data point is divided by the sum of all the data points.
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Imagine you want to “normalize” a set of data. That means that each data point is divided by the sum of all the data points.

Will this work? Why or why not?

```matlab
data = [ 1 2 2 1 1 3 ];
for i=1:length(data)
    data(i) = data(i) / sum(data);
end

... how to debug ...
Example

Imagine writing a program where an experimenter needs to type in a 1 to run a subject in condition 1 or a 2 to run a subject in condition 2.
Imagine writing a program where an experimenter needs to type in a 1 to run a subject in condition 1 or a 2 to run a subject in condition 2

```plaintext
session = 0;
while (session ~= 1) && (session ~= 2)
    session = input('Enter session [1 or 2] : ');
end
```
Example

What do you think this will do?

for i=1:10
  i
  i=20;
  i
end
Example

This?

i=1;
while (i<10)
    i
    i = i+1;
    i = 20;
end
Example

Sort data from smallest to largest.

data = [542 302 764 453 341 554 632 454 476];
Example

Sort data from smallest to largest.
\[
data = [542 \ 302 \ 764 \ 453 \ 341 \ 554 \ 632 \ 454 \ 476];
\]

Okay, so in Matlab there’s this ...
\[
\text{sort(data)}
\]
\[
\text{doc sort}
\]

How do we sort using our own algorithm?
Algorithm : method of procedure for getting a job done

Mohammed ibn-Musa al-Khwarizmi, who was part of the royal court in Baghdad and who lived from about 780 to 850. Al-Khwarizmi's work is the likely source for the word algebra as well.
Algorithm vs Formula

computing mathematics
there are often many algorithms (ways of getting things done) for the same problem - they may differ considerably in the amount of time or space (memory) they require

Example

Will this work?  

Don't look ahead at the Matlab code

data = [542 302 764 453 341 554 632 454 476];

for i=1:length(data)
    if data(i)>data(i+1)
        data(i) = data(i+1);
        data(i+1) = data(i);
    end
end

data
Example

Will this work?

```matlab
data = [542 302 764 453 341 554 632 454 476];
for i=1:length(data)
    if data(i)>data(i+1)
        data(i) = data(i+1);
        data(i+1) = data(i);
    end
end

data
```
Example

Will this work?

data = [542 302 764 453 341 554 632 454 476];
for i=1:length(data)-1
    if data(i)>data(i+1)
        data(i) = data(i+1);
        data(i+1) = data(i);
    end
end

data
Example

Will this work?
data = [542 302 764 453 341 554 632 454 476];
for i=1:length(data)-1
  if data(i)>data(i+1)
    data(i) = data(i+1);
    data(i+1) = data(i);
  end
end
data
Example

Will this work?

data = [542 302 764 453 341 554 632 454 476];
for i=1:length(data)-1
    if data(i)>data(i+1)
        tmp = data(i);
        data(i) = data(i+1);
        data(i+1) = tmp;
    end
end

data
Example

Will this work?
data = [542 302 764 453 341 554 632 454 476];for i=1:length(data)
    for j=1:length(data)
        if data(i)>data(j)
            tmp = data(i);
            data(i) = data(j);
            data(j) = tmp;
        end
    end
end
end
data
Example

Will this work?
data = [542 302 764 453 341 554 632 454 476];
for i=1:length(data)-1
    for j=i:length(data)
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data