1.5.2 A Copy Routine (copy)

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Week 1 due Oct 5, 2023 03:12 IST

1.5.2 A Copy Routine (copy)

In our videos, we discuss how column and row vectors are special cases of matrices and stored in MATLAB as two dimensional arrays. This means we talk about matrices before we have introduced matrices...

Here is the idea: In high school, you were probably exposed to matrices as two dimensional arrays in an algebra class. For example

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}.$$

In M-script (MATLAB), this can be entered as

```
A = [
1 2 3
4 5 6
7 8 9
]
```

Now, a (column) vector can be entered as

```
x = [
1
4
7
]
```

and is hence stored just like a matrix with only one column. Similarly, a row vector can be entered as

```
x = [ 4 5 6 ]
```

and is hence stored just like a matrix with only one row.

As we talk about this, we may interchangeably use the term "two dimensional array" and "matrix" (which is strictly speaking abuse of the term "matrix", since a matrix represents a linear transformation as we will see in Week 2).

Considering the two dimensional array

```
A = [
1 2 3
4 5 6
7 8 9
]
```

the (i, j) entry in that array can be accessed as `A( i,j )`, where indexing starts at 1. Thus the $(1, 2)$ entry in M-script array `A` is where the number `2` is stored.

(Notice that in our notes we index into matrix A with $\alpha_{i,j}$ where indexing starts at 0... As a result, if $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$, then $\alpha_{0,1} = 2$... Yes, this is a bit confusing but you will get used to it. Computer scientists tend to start indexing at zero. Mathematicians tend to start indexing at one.)

Vector

Calculator

```
x = [
1
4
7
]
```

can be viewed as a one-dimensional array, in which case `x( 2 )` stores 4. Or it can be viewed as a two-dimensional array, in which case `x(2,1)` stores 4.

Similarly, row vector

```
x = [ 4 5 6 ]
```

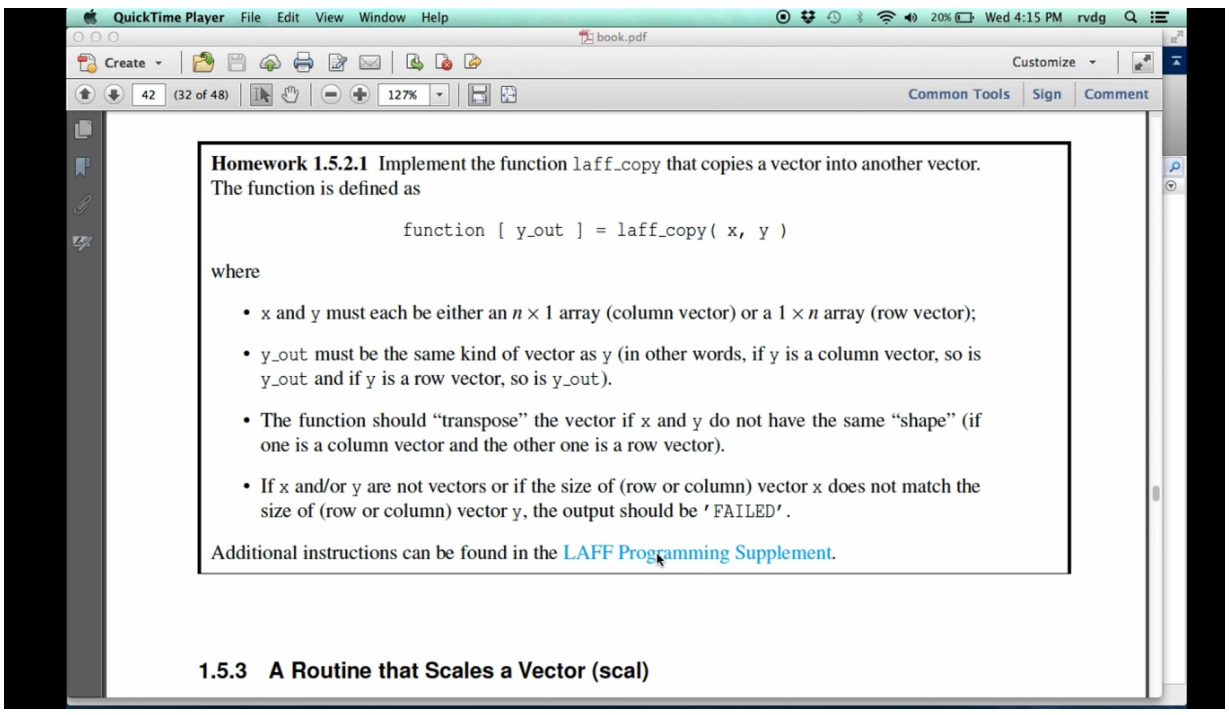
can be viewed as a one-dimensional array, in which case `x( 2 )` stores 5. Or it can be viewed as a two-dimensional array, in which case `x(1,2)` stores 5.

In the below video a "Programming Supplement" is mentioned. This has been changed to a PDF document to which the link "Detailed additional instructions" points in Homework 1.5.2.1.

We also changed the directory structure somewhat from what it says in the video. Hopefully you will figure it out. If not, ask questions on the discussion board!

Finally, notice the link in Homework 1.5.2.1 regarding **Detailed additional instructions.** (These have been updated for MATLAB Onlilne and if you place this PDF in the same directory as the file "Week1.pdf", the link in problem 1.5.2.1 in that file will work.)

1.5.2.1 Part 1



0:45 / 11:14 2.0x

slightly

different from what I'm showing.

But you'll get the gist of it.

So let's get started on the first programming assignment, which

is to create a function in M-script that copies one vector to another.

We have rather detailed instructions for this.

So if you go to the notes and you find this homework,

and you click on LAFF programming supplement, you will get there.

And it'll look something like this.

Now, what I want you to do is to start up MATLAB.

And what you'll see is something like this.

And you may have to navigate to the particular sub-directory that

Video

Download video file

Transcripts

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Reading Assignment

0 points possible (ungraded)

Read Unit 1.5.2 of the notes. [LINK]

Calculator

Done

Submit

Answers are displayed within the problem

1.5.2 Discussion

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Topic: Week 1 / 1.5.2

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? "Not enough input arguments." error when creating function 3
I'm getting stuck on the coding supplement, since MATLAB is throwing me errors at the laff_copy.m function that we are supposed to build: >> l...

? y_out, y, and whether y gets updated by the function 3

? Is n_x = size(x) a scalar or vector? 4

? Can't find the LAFF-2.0xM.zip directory 2
How do I download the LAFF-2.0xM.zip? I'm so lost

? Typing multi line in matlab online 11
I'm not able to enter multi line matrix. After entering a line, it is jumping to prompt immediately. I can copy paste without any problems though

? Unrecognized function or variable 'laff_copy'. 3
I'm following the video 1.5.2.1 Part 1 to create a laff_copy function in Matlab. However, when I run the function under Command Window, I'm alwa...

'FAILED' vs. "FAILED" 7
I've noticed that in MATLAB, single-quoted and double-quoted strings are different: >> size('FAILED') ans = 1 6 >> size("FAILED") ans = 1 1 Whic...

In 1521Instructions.pdf - From notice the ";"s to notice the ";" ? 4
I only see one ; in the example, so change notice the ";"s to notice the ";" ?

Homework 1.5.2.1

1/1 point (graded)

Implement the function `laff_copy` that copies a vector into another vector. The function is defined as

```
function [ y_out ] = laff_copy( x, y )
```

where

- `x` and `y` must each be either an $n \times 1$ array (column vector) or a $1 \times n$ array (row vector);
- `y_out` must be the same kind of vector as `y` (in other words, if `y` is a column vector, so is `y_out` and if `y` is a row vector, so is `y_out`).
- The function should "transpose" the vector if `x` and `y` do not have the same "shape" (if one is a column vector and the other one is a row vector).
- If `x` and/or `y` are not vectors or if the size of (row or column) vector `x` does not match the size of (row or column) vector `y`, the output should be `'FAILED'`.

Check your implementation with the script in `LAFF-2.0xM/Programming/Week01/test_copy.m`.

Detailed additional instructions. (if you place this PDF in the same directory as the file "Week1.pdf", the link in problem 1.5.2.1 in that file will work.)

Depending on when you downloaded `LAFF-2.0xM.zip` there may already be a file `laff_copy.m` in directory `Week00` . If [illegible] it before you get started.

Calculator

☑ Done / Skip

✔

See the video below and the routine in the file Programming → laff → vecvec → laff_copy.m

Submit

ℹ Answers are displayed within the problem

1.5.2.1 Part 2 (Answer)

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Start of transcript. Skip to the end.

Dr. Robert van de Geijn: So let's have a look.

Let's have a close look at the copy routine that I created.

And what I'll do is I'll use it to explain

a few things about MatLab or M-script.

And then we'll also talk about a few of the design decisions that I made.

Now, let's have a look.

Video

‹ Previous Next ›

Calculator