

MATH.2720 Introduction to Programming with MATLAB

Character Strings

A. Character Strings

A character string is a one-dimensional array consisting of characters. For example,

```
s = 'Today is Monday.'
```

produces a 1×16 array of characters. $s(1) = T$, $s(2) = o$, etc. Character arrays are indexed like any other array. Try

```
s(length(s):-1:1)
```

A character is represented internally in MATLAB by an integer in the range 0 to 65,535. To see MATLAB's internal code number corresponding to a character, you can use the command `double`. For example, try

```
double('abc')
```

Code numbers up to 127 correspond to ASCII code; the rest are Unicode characters. The command `char` will convert a code number into a character. Try

```
char(100)
```

B. Concatenating Character Strings

You can join character strings together to produce a longer string. There are two ways to do this. Try

```
s2 = 'Hello.'
```

```
strcat(s, s2)
```

```
[s, s2]
```

```
strvcat(s, s2) %Notice that strvcat concatenates vertically
```

C. Working with Character Strings

The command `strcmp` compares 2 strings and returns the value 1 if the strings are identical, 0 otherwise. Try

```
strcmp('MATLAB', 'mATLAB')
```

The command `strcmpi` compares 2 strings, ignoring case, and returns the value 1 if the strings are identical, 0 otherwise. Try

```
strcmpi('MATLAB', 'mATLAB')
```

The command `lower` converts all letters in a string to lower case, while the command `upper` converts all letters to upper case. Try

```
lower('mATLAB')
```

The command `strfind(s, t)` will return an array of indices in array `s` at which the string `t` is found. Try

```
strfind('aababcabcdabcde', 'abc')
```

You can convert a number to a character string using the command `num2str`. This can be useful in creating a title or legend in a figure. Try this:

```
function charex(a)
%This function produces a graph of y=sin(ax) on the interval [0, 2 pi]
x = linspace(0,2*pi);
y = sin(a*x);
plot(x,y)
title(['Graph of y = sin(',num2str(a),'x')'])
end
```

D. References

1. Knoesen, Amirtharajah, Vahid, and Lysecky, *Programming in MATLAB*, zybooks.com, 2015.
2. Attaway, *MATLAB: A Practical Introduction to Programming and Problem Solving*, 2nd ed., Elsevier, 2012.
3. Higham and Higham, *MATLAB Guide*, 3rd ed., SIAM, 2017.

E. Practice Problems (from Attaway, *MATLAB: A Practical Introduction to Programming and Problem Solving*)

1. Write a function file that will take two strings as input and produce as output a string containing the first two letters of input 1 and the first two letters of input 2. The output should be in all capital letters. For example, if you call your function file `problem1` the result of issuing the command `problem1('Captain','Kirk')` should be the string 'CAKI'
2. Write a script file that will prompt the user separately to enter a filename and extension and will create a string in the form 'filename.ext'
3. Write a function file that will take two strings as input and produce as output a character matrix with the two input strings in separate rows.