

Characters and Strings

Characters & strings

- We have used strings already :
 - `n= input('Next number:')`
 - `fprintf('Answer is %d', ans)`
 - 'Next number:' and 'Answer is %d' are strings
- Use **single quotes** to enclose characters:
 - '100' is a (character) vector of length 3
 - 100 is a numeric value
- A string is made up of individual characters, so a string is a **1-d array of characters**

Strings as vectors

<p>Vectors</p> <ul style="list-style-type: none"> Indexing <pre>v= [7 0 5]; x= v(3); % x is 5 v(1)= 1; % v is [1 0 5]</pre> colon notation <pre>v= 2:5; % v is [2 3 4 5]</pre> Appending <pre>v= [7 0 5]; v(4)= 2; % v is [7 0 5 2]</pre> Concatenation <pre>v= [v [4 6]]; % v is [7 0 5 2 4 6]</pre> 	<p>Strings</p> <ul style="list-style-type: none"> Indexing <pre>s= 'hello'; c= s(2); % c is 'e' s(1)= 'J'; % s is 'Jello'</pre> colon notation <pre>s= 'a':'g'; % s is 'abcdefg'</pre> Appending <pre>s= 'duck'; s(5)= 's'; % s is 'ducks'</pre> Concatenation <pre>s= [s ' quack']; % s is 'ducks quack'</pre>
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Some useful string functions

```
str= 'Cs 101';


isletter(str) % [1 1 0 0 0 0]
isspace(str)  % [0 0 1 0 0 0]

lower(str)    % 'cs 101'
upper(str)    % 'CS 101'

ischar(str)   % is str a char array?
               % Yes, so returns 1
```

Example: capitalize 1st letter

Write a function to capitalize the 1st letter of each word in a string. Assume that the string has lower case letters and blanks only.

look for the spaces

Look For The Spaces

ASCII characters

(American Standard Code for Information Interchange)

ascii code	Character	ascii code	Character
:	:	:	:
:	:	:	:
48	'0'	65	'A'
49	'1'	66	'B'
50	'2'	67	'C'
:	:	:	:
57	'9'	90	'Z'
:	:	:	:

Character vs ASCII code

```
str= 'cs101M'  
%a 1-d array of characters  
code= double(str)  
%convert chars to ascii values  
str1= char(code)  
%convert ascii values to chars
```

Arithmetic and relational operations on characters

- `'c'-'a'` gives 2
- `'c'>'a'` gives true
- `'6'-'5'` gives 1
- `letter1='e'; letter2='f';`
- `letter1-letter2` gives -1
- `letter1==letter2` gives false

- `'A' + 2` gives 67
- `char('A'+2)` gives 'C'

Example: toUpper

Write a function `toUpper(cha)` to convert character `cha` to upper case if `cha` is a lower case letter. Return the converted letter. If `cha` is not a lower case letter, simply return the character `cha`.

Hint: Think about the **distance** between a letter and the base letter 'a' (or 'A'). E.g.,

```
a b c d e f g h ...  
|-----| distance = 'g'-'a' = 6 = 'G'-'A'  
A B C D E F G H ...
```

Of course, do not use Matlab's function `upper`!