Topics: Characters and strings

Reading (ML): Sec 6.2 (exclude 6.2.5, 6.2.8, and example 6.2)

String creation and manipulation

```matlab
str='Age 19'   % a 1-d array of characters
code= double(str) % convert chars to ASCII values
str1= char(code)  % convert ASCII values to chars

% 2-d array of characters
block= ['one row'; 'two rows']  % Error! Rows must have same length
block= [ 'one row'; 'two rows']
blk= char('one row', 'two rows')
line1= blk(1,:)                 % length 8
line1trim= deblank(blk(1,:))    % length 7, trailing blank removed

% string functions
str='Age 19'
ischar(str) % is the variable a char array? Returns ONE value
isletter(str)
ispace(str)
caps= upper(str)
small= lower(str)

% char arithmetic, relation
base= 'a'
nextcode= base + 1
nextletter= char(nextcode)
letter18= char(base+18-1)
ans1= 'a' > 'b'
ans2= base==''a''
ans3= base==letter18
blk= char('one row', 'two rows')
ans4= blk==''o''    % character-by-character comparison
ans5= blk(1,:)==blk(2,:)  % character-by-character comparison
```

Example 1

Write a function `caps` that capitalizes the first letter in each word of a string. Function `caps` accepts as input argument one string and returns two variables: the partially capitalized string and the number of capitalized letters in that string. Assume the string contains lower case letters and spaces only.

Example 3

Given a string `str`, write a program fragment to count how many times the alphabet `o` appears in `str`.

Example 2

Write a program to calculate the “day of year” from a user entered date in the string format mm/dd/yyyy. Note the user may omit any leading zero. The only MATLAB predefined functions you can use are length and find. Assume you have access to two user defined functions with the following headers:

```matlab
function days = daysInMonth(m)
    % daysInMonth returns the number of days in month m, m is numeric, 1<=m<=12
    % Assume non-leap year
    ...
end

function out = isLeapYear(y)
    % isLeapYear returns 1 if year y is a leap year and 0 otherwise
    ...
end
```

date= input('Enter date as mm/dd/yyyy: ', 's');

% separate into substrings for month, day, year
slash= find(date=='/');
m= date(1:slash(1)-1);
d= date(slash(1)+1:slash(2)-1);
y= date(slash(2)+1:length(date));

% convert strings to numbers
month= str2int(m);
day= str2int(d);
year= str2int(y);

days= day;
for k= 1:month-1
    days= days + daysInMonth(k);
end
if ( isLeapYear(year) && month>2 )
    days= days + 1;
end

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

function n = str2int(str)
% str2int converts string str into int n
% str is string representation of a
% non-negative integer
n= 0;
for k= length(str):-1:1
    n= n + ...
        (str(k) - '0')*10^(length(str)-k);
end

%%%% An alternate solution %%%%%%%
% n= str(1)-'0';
% for k= 2:length(str)
%     n= n*10 + (str(k)-'0');
% end