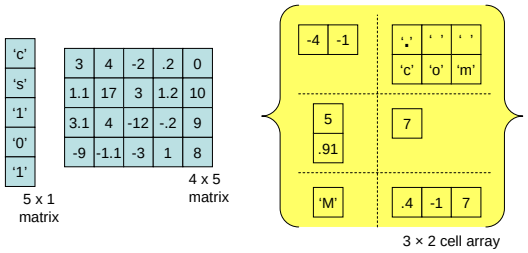
Strings in Cell Arrays

Matrix vs. Cell Array

Vectors and matrices store values of the same type in all components

A cell array is a special array whose individual components may contain different types of data



Use braces { } for creating/addressing cell arrays

Matrix	Cell Array
• Create/append m= [5, 4 ; … 1, 2 ; … 0, 8]	• Create/append C= { ones(2,2), 4 ; … 'abc' , ones(3,1) ; … 9 , 'a cell' }
• Addressing m(2,1)= pi	• Addressing C{2,1}= 'ABC' C{3,2}= pi disp(C{3,2})

Cell Arrays of Strings

```
C= { 'Alabama','New York','Utah'}
```

C | 'Alabama' | 'New York' | 'Utah'

```
C= { 'Alabama';'New York';'Utah'}
```

C
'Alabama'
'New York'
'Utah'

```
M= {'Alabama '; ...
    'New York'; ...
    'Utah    '}
```

M

'A'	'l'	'a'	'b'	'a'	'm'	'a'	' '
'N'	'e'	'w'	' '	'Y'	'o'	'r'	'k'
'U'	't'	'a'	'h'	' '	' '	' '	' '

Build a cell array of Roman numerals for 1 to 3999

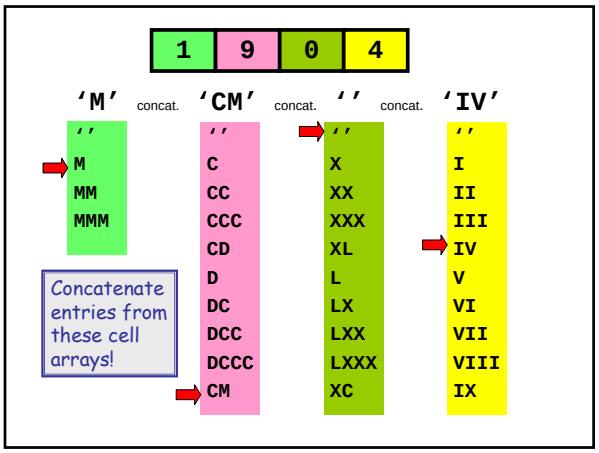
```
C{1} = 'I'
C{2} = 'II'
C{3} = 'III'
   :
C{2007} = 'MMVII'
   :
C{3999} = 'MMMXMXCIX'
```

Example

1904 = 1*1000 + 9*100 + 0*10 + 4*1

= M CM IV

= MCMIV



Ones-Place Conversion

```
function r = Ones2R(x)
% x is an integer that satisfies
%      0 <= x <= 9
% r is the Roman numeral with value x.

Ones = {'I', 'II', 'III', 'IV', ...
        'V', 'VI','VII', 'VIII', 'IX'};

if x==0
     r = '';
else
     r = Ones{x};
end
```

Similarly, we can implement these functions:

```
function r = Tens2R(x)
% x is an integer that satisfies
%      0 <= x <= 9
% r is the Roman numeral with value 10*x.
```

```
function r = Hund2R(x)
% d is an integer that satisfies
%      0 <= x <= 9
% r is the Roman numeral with value 100*x
```

```
function r = Thou2R(x)
% d is an integer that satisfies
%      0 <= x <=3
% r is the Roman numeral with value 1000*x
```

Now we can build the Roman numeral cell array for 1,…,3999

```
for a = 0:3
  for b = 0:9
    for c = 0:9
      for d = 0:9
        n = a*1000 + b*100 + c*10 + d;
        if n>0
          C{n} = [Thou(a) Hund(b)...
                  Tens(c) Ones(d)];
        end
      end
    end
  end
end
```

Four strings concatenated together

The n^{th} component of cell array C