Previous topic:
• Introduction to for-loop

Now:
• Review for-loop
• User-defined function

In the loop body, never change the value of the loop variable

\[
n = \_
\]
\[
\text{for } k = 1 : n
\]
% code to do
% that something
end

Drawing ASCII diagrams

Print these diagrams on the Command Window

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*******
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**
*

Printing is done left to right and top to bottom.

What is a simpler (sub)problem?
→ Print just one row of asterisks.

What is an even simpler (sub)problem?
→ Print just one single asterisk!

Functions that we have seen
• E.g., to evaluate the cosine of 2 radians you type \[ x = \cos(2) \]
i.e., you call the built-in function by its name and give it a value to work on. Here I store the result in a variable.
• To draw a colored disk, you may type \[ \text{DrawDisk}(1,9,5,\text{'y'}) \]

Functions that we have seen

What is the code to draw in one row some character \( n \) times?

\[
\begin{align*}
\text{\% } n \text{ needs a value} \\
\text{\% theChar needs a value (character)} \\
\text{\% } n \text{ is non-negative integer.} \\
\text{\% Add a linebreak.} \\
\text{\% Print to the Command Window the character in variable theChar } n \text{ times.}
\end{align*}
\]

Keyword to indicate this is a function file (not a script)

\[
\text{function printRepeatChar(theChar,n)}
\]
\[
\begin{align*}
\text{\% Print to the Command Window the character in variable theChar } n \text{ times.} \\
\text{\% n is non-negative integer.} \\
\text{\% Add a linebreak.}
\end{align*}
\]

```matlab
function printRepeatChar(theChar,n)
    % Print to the Command Window the character in variable theChar n times.
    % n is non-negative integer.
    % Add a linebreak.
    for k = 1 : n
        fprintf('\%c', theChar)
    end
    fprintf('\n')
end
```
function printRepeatChar(theChar,n) % Print to the Command Window the % character in variable theChar n times. % n is non-negative integer. % Add a linebreak.
for k= 1:n
    fprintf('%c', theChar)
end
fprintf('
')

Calling a function (invoking a function)
- I have a function with this header:
  function printRepeatChar(theChar,n)
- I will call function printRepeatChar like this:
  printRepeatChar('*',8)
- The function header tells you everything you need to know about how to call the function

Drawing ASCII diagrams
********
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% printRectangle
for r= 1:4
    % Print rth row
    printRepeatChar('*',7)
end
Given this function:

```matlab
function m = convertLength(ft,in)
% Convert length from feet (ft) and inches (in) to meters (m).
...
```

How many proper calls to `convertLength` are shown below?

```matlab
f = ...; n = ...;
d = convertLength(f,n);
d = convertLength(f*12+n);
d = convertLength(f+n/12);
x = min(convertLength(f,n), 1);
y = convertLength(pi*(f+n/12)^2);
```

1. A: 1
2. B: 2
3. C: 3
4. D: 4
5. E: 5 or 0

Implement this function

```matlab
function r = randReal(lo,hi)
% r is a random real number in the interval (lo,hi)
```

Implement this function

```matlab
function [x,y] = randPt(lo,hi)
% x and y are random real numbers in the interval (lo,hi)
```