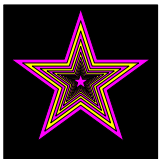
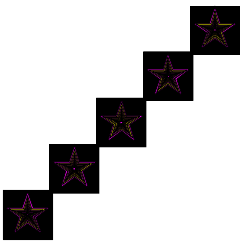
- Previous class:
  - User-definted function
- Now:
  - Nested loops
  - Developing algorithms

Suppose you know how to draw



How difficult is it to draw





## Pattern for doing something *n* times

```
n= _____
for k= 1:n
    % code to do
    % that something
end
```



## Example: Times Table

Write a script to print a times table for a specified range.

Row headings

Column headings

| | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|
| 3 | 9 | 12 | 15 | 18 | 21 |
| 4 | 12 | 16 | 20 | 24 | 28 |
| 5 | 15 | 20 | 25 | 30 | 35 |
| 6 | 18 | 24 | 30 | 36 | 42 |
| 7 | 21 | 28 | 35 | 42 | 49 |



## Developing the algorithm for the times table

| | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|
| 3 | 9 | 12 | 15 | 18 | 21 |
| 4 | 12 | 16 | 20 | 24 | 28 |
| 5 | 15 | 20 | 25 | 30 | 35 |
| 6 | 18 | 24 | 30 | 36 | 42 |
| 7 | 21 | 28 | 35 | 42 | 49 |

- Look for patterns
  - Each entry is row# × col#
  - Row#, col# increase regularly
- ⇒ Loop!!!
- How to loop?
  - For each row#, get the products with all the col#s.
  - ⇒ For each row#, need a loop to work through all the col#s
  - ⇒ Nested loops!
- Details: what will be the print format? Don't forget to start new lines. Also need initial input to specify the range.



```
disp('Show the times table for specified range')
lo= input('What is the lower bound? ');
hi= input('What is the upper bound? ');
```

## Drawing ASCII diagrams

```
*******
*******
*******
*******
```

Write a function **`asciiRectangle`** to draw this diagram on the Command Window. The number of rows and the number of asterisks on each row are the parameters.

No user-defined function
(so that you can practice nested loops)

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## Drawing ASCII diagrams

Example for **n**=6

```
*
**
***
****
*****
******
```

Write a function **`asciiTriangle`** to draw this diagram on the Command Window. The number of asterisks on each side, **n**, is the parameter.

No user-defined function
(so that you can practice nested loops)

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