Week 8 Tutorial 2

The purpose of this program is to demonstrate how a Bubble sort is used to sort a list into ascending order. Note that the bubble sort always makes one extra pass after the vector is sorted. This is because the only way that the function knows that the sort is complete is if it passes through the vector without having to switch any values.

```
clear
clc
close all % Close any currently open plot figure windows
```

Edit the code below and update the variable named **`name`** with your name for this tutorial in the code below.

```
name="";
fprintf("Output for Tutorial_08_2 run by %s.\n\n", name)
```

Vector 1

```
% Vector v1 with only one element out of order, largest element first
fprintf('Vector v1') % print the vector name
v1 = [5 1:4];  % define the vector
bubble(v1);     % send the vector to the bubble() function
```

Vector 2

```
% Vector v2 with only one element out of order, smallest element last
fprintf('\nVector v2')
v2 = [2:5 1];
bubble(v2);
```

Vector 3

```
% Vector v3 with elements in descending order
fprintf('\nVector v3')
v3 = 5:-1:1;
bubble(v3);
```

Vector 4

```
% Vector v4 with all elements in ascending order
fprintf('\nVector v4')
v4 = 1:5;
bubble(v4);
```

Vector 5

When sorting characters, the ASCII (numerical) value of the character is used to sort. In an ASCII chart, you can see that Capital letters come before lowercase letters. This is how computers (which can only deal with numbers) are able to sort text, humans created a pattern that places characters in the correct order when sorted by their numerical value. Older operating systems or Unix based systems (like Mac, Linux, etc) still sort files by first looking at the capital letters, which is why you'll often see the file README displayed in all caps, it will generally place this file at the top if other files are named using lowercase values.

```
% Vector v5 with character elements
fprintf('\nVector v5')
v5 = ['B' 'C' 'D' 'E' 'A' 'a'];
sorted = bubble(v5); % prints the order using the ASCII numerical values
                     % A = 65, B = 66, C = 67, D = 68, E = 69, a = 97
fprintf('\nSorted Character Vector\n')
% prints the sorted vector using a %c format that outputs the character
% values of the vector instead of their ASCII values
fprintf('%c\n',sorted);
```

Example Output:

Run this tutorial from the **Command Window** and ensure your output matches the following.

```
Output for Tutorial_08_2 run by Geoff Berl.

Vector v1
Vector order after 0 passes
5
1
2
3
4

Vector order after 1 passes
1
2
3
4
5

Vector order after 2 passes
1
2
3
4
5

Vector v2
Vector order after 0 passes
2
3
4
5
1

Vector order after 1 passes
2
3
4
1
5
```

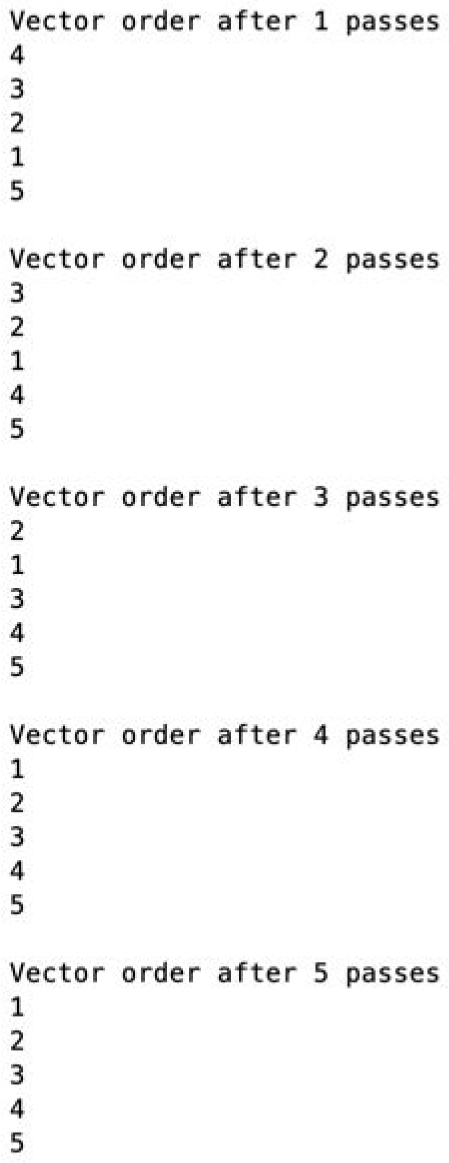
```
Vector order after 2 passes
2
3
1
4
5

Vector order after 3 passes
2
1
3
4
5

Vector order after 4 passes
1
2
3
4
5

Vector order after 5 passes
1
2
3
4
5

Vector v3
Vector order after 0 passes
5
4
3
2
1
```



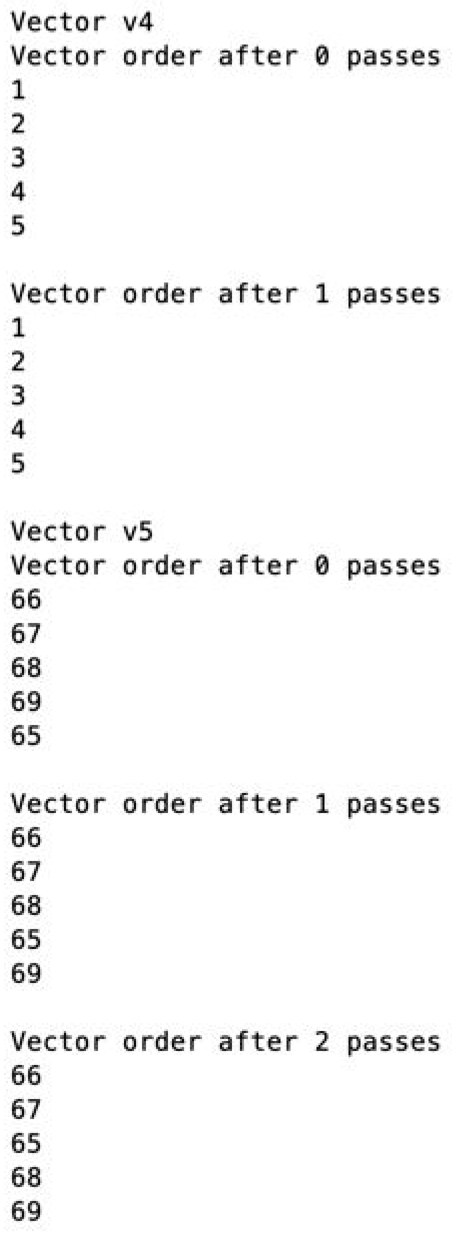
```
Vector order after 1 passes
4
3
2
1
5

Vector order after 2 passes
3
2
1
4
5

Vector order after 3 passes
2
1
3
4
5

Vector order after 4 passes
1
2
3
4
5

Vector order after 5 passes
1
2
3
4
5
```



```
Vector v4
Vector order after 0 passes
1
2
3
4
5

Vector order after 1 passes
1
2
3
4
5

Vector v5
Vector order after 0 passes
66
67
68
69
65

Vector order after 1 passes
66
67
68
65
69

Vector order after 2 passes
66
67
65
68
69
```

```
Vector order after 3 passes
66
65
67
68
69
97

Vector order after 4 passes
65
66
67
68
69
97

Vector order after 5 passes
65
66
67
68
69
97

Sorted Character Vector
A
B
C
D
E
a
```