Exercise – Nested Loop

Write a program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values (not counting zeros). Your program ends with the input 0. Display the average as a floating-point number. Here is a sample run:

Enter an integer, the input ends if it is 0: 1 2 -1 3 0
The number of positives is 3
The number of negatives is 1
The total is 5.0
The average is 1.25

Write a program that prints the characters in the ASCII character table from! To ~. Display ten characters per line. Characters are separated by exactly one space.

Use nested loops that display the following patterns in four separate programs:

```
    Pattern A        Pattern B         Pattern C         Pattern D
    1                1 2 3 4 5 6                1         1 2 3 4 5 6
    1 2              1 2 3 4 5               2 1           1 2 3 4 5
    1 2 3            1 2 3 4              3 2 1             1 2 3 4
    1 2 3 4          1 2 3             4 3 2 1               1 2 3
    1 2 3 4 5        1 2           5 4 3 2 1                   1 2
    1 2 3 4 5 6      1           6 5 4 3 2 1                     1
```

Write a program that display a multiplication table as shown

```
            Multiplication Table
        1   2   3   4   5   6   7   8   9
    -------------------------------------
1 |     1   2   3   4   5   6   7   8   9
2 |     2   4   6   8  10  12  14  16  18
3 |     3   6   9  12  15  18  21  24  27
4 |     4   8  12  16  20  24  28  32  36
5 |     5  10  15  20  25  30  35  40  45
6 |     6  12  18  24  30  36  42  48  54
7 |     7  14  21  28  35  42  49  56  63
8 |     8  16  24  32  40  48  56  64  72
9 |     9  18  27  36  45  54  63  72  81
```

Exercise – String

Write a program that checks whether a string is a palindrome. A string is a palindrome if it reads the same forward and backward. The words "mom," "dad," and "noon," for instance, are all palindromes. Sample run:
Enter a string: noon
noon is a palindrome
Enter a string: moon
moon is not a palindrome

Given a string consisting of exactly two words separated by a space. Print a new string with the first and second word positions swapped (the second word is printed first).
This task should not use loops and if.
Sample Run:

```
Input: Hello, world!

Correct Answer: world! Hello,
```

Given a string that may or may not contain a letter of interest. Print the index location of the first and last appearance of **f**. If the letter **f** occurs only once, then output its index. If the letter **f** does not occur, then do not print anything.

```
Input: office

Correct Answer: 1 2
```

Given a string in which the letter **h** occurs at least twice. Remove from that string the first and the last occurrence of the letter **h**, as well as all the characters between them.
Sample Run:

```
Input: In the hole in the ground there lived a hobbit

Correct Answer: In tobbit
```

Given a string. Replace every occurrence of the letter `h` by the letter `H`, except for the first and the last ones.

```
Input: In the hole in the ground there lived a hobbit

Correct Answer: In the Hole in tHe ground tHere lived a hobbit
```

You are given a string.
In the first line, print the third character of this string.
In the second line, print the second to last character of this string.
In the third line, print the first five characters of this string.
In the fourth line, print all but the last two characters of this string.
In the fifth line, print all the characters of this string with even indices (remember indexing starts at 0, so the characters are displayed starting with the first).
In the sixth line, print all the characters of this string with odd indices (i.e. starting with the second character in the string).
In the seventh line, print all the characters of the string in reverse order.
In the eighth line, print every second character of the string in reverse order, starting from the last one.
In the ninth line, print the length of the given string.
Sample Run:

```
Input: Hello
l
l
Hello
Hel
Hlo
el
olleH
olH
5
```