This assignment is worth 25% of the total unit. Marks are given for clarity, presentatic accuracy, and concise and efficient programs. This is an individual assignment. ***If y found guilty of plagiarism, a failure grade will be awarded.***

The due date of this assignment is ***Wednesday 29th April 2015*** **at 10:00am**. *Plea submit your answers in* ***one pdf file containing the C programming codes a the screenshots of the program outputs*** *using Learnline (in the "Submit Here" ta Late submissions incur a 10% penalty per day. Make sure your programs can run Microsoft Visual Studio if you are using another c compiler. The link below shows y how to take a screenshot: http://www.wikihow.com/Take-a-Screenshot-in-Microso Windows*

Problem 1: (Marks: 5)

Write a program that inputs three different integers from the keyboard, and t prints the sum, the average, the product, the smallest and the largest of th numbers. The output screen should appear as follows:

```
Input three different integers: 13 27 14
Sum is 54
Average is 18
Product is 4914
Smallest is 13
Largest is 27
```

For this problem you should use different functions for:

- Sum
- Average
- Product
- Maximum
- Minimum

Include a screenshot of the above program output in the submission.

Problem 2: (Marks: 3)

Write a program that prints the following pattern containing asterisk. You should use **Loop** for this program.

[Hint: You can use inner and outer loop. The inner loop will print the asterisk, and the outer loop will run:
1 time for the printing 1 asterisk,
2 times for printing 2 asterisks,
3 times for printing 3 asterisks and so on till 10 times.]

The output screen should appear as follows:

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

Note: Marks will be deducted if the students don't use the outer and the inner loop for this problem. Effective problem solving is to write a minimum code and get the desired output.

Include a screenshot of the above program output in the submission.

Problem 3: (Marks: 5)

Part 1

A palindrome is a number or text phrase that reads the same backward as forward. For example, each of the following five-digit integers is a palindrome: 12321, 55555, 34543 and 11611. Write a program that reads in a five-digit integer and determines whether or not it is a palindrome.

Hint: Use integer division method to solve the problem.

Include two screenshots of the above program output; one for the input 12321 and one for the input 12345, in the submission.

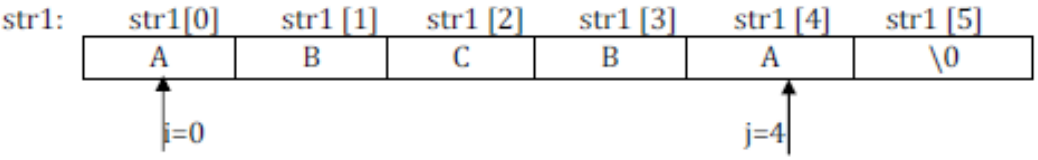
Part 2

Write a program that checks whether the string given by the user is Palindrome or not. A string can be said as a Palindrome if the reversed string is the same as the original string. For example

Original String: ABCCBA
Reversed String: ABCCBA

Both the original and the reversed strings match each other and hence the string is a Palindrome. In this problem, I will give one word and you need to check whether the word is palindrome or not. You should not use any built-in functions; rather use the technique I defined below.

How to check whether the string is palindrome or not:



Solving steps:

- Compare the character of str[i] and str[j]
- Increment i++ (by 1) and Decrement j-- (by1)
- Stops when i and j are equal or j<i

Include two screenshots of the above program output; one for the input ABCBA and one for the input ABCDEF, in the submission.

Problem 4: (Marks: 6)
One Dimensional Array Operation

Write a program that takes multiple values and store the numbers in an array. Your array size should not be more than 10.

Sort the array in ascending order based on the following ways:

- Find the maximum number from the array of size n.
- Swap the number with the last position (n) of the array.
- Reduce your array size by 1 and then find the maximum again from (0 to n-1).
- Swap the number with the n-1 position of the array
- Continue until you have sorted the whole array.

Input:

x:

x[0]	x[1]	x[2]	x[3]	x[4]
10	21	5	1	7

Output:

x:

x[0]	x[1]	x[2]	x[3]	x[4]
1	5	7	10	21

Once the array is sorted the next job is to get user command:

User command: I for Insertion
Q for Quit.

Under Insertion:

- Get the input from the user and insert the number in the correct position of the array.
- Print the array.

For example: User input is 15

The new output of the array x will be:

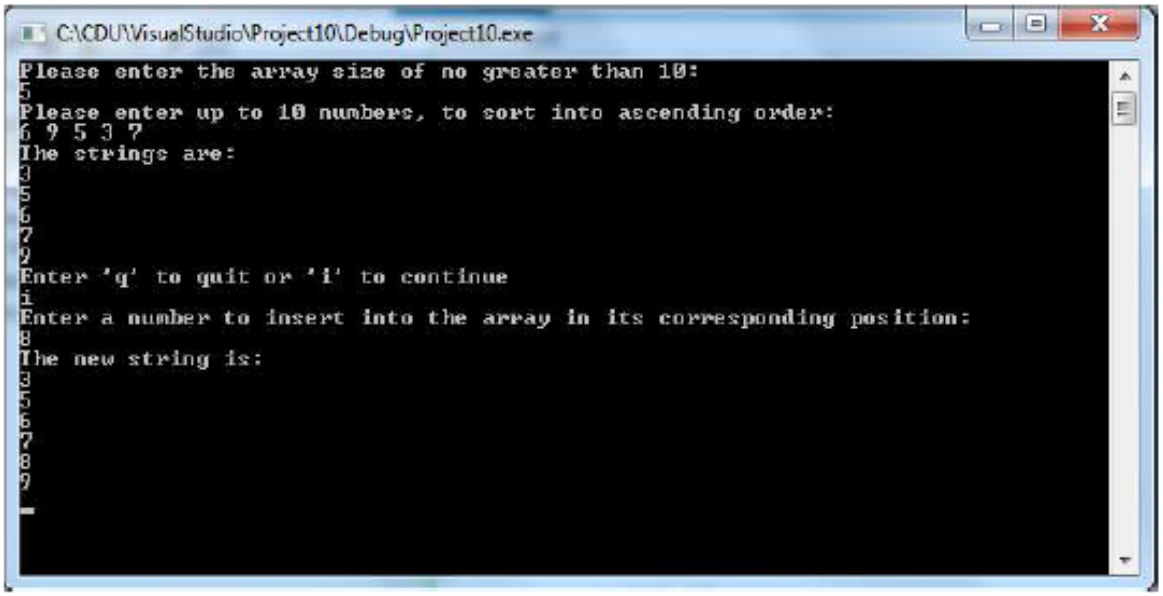
Output:

x:

x[0]	x[1]	x[2]	x[3]	x[4]	x[5]
1	5	7	10	15	21

Under Quit: Terminate the whole program.

Below is an example of the program output screenshot.



Include a screenshot for six input numbers: 6 9 5 3 7 4, and insert 2 in the correct location into the sorted array, in the submission.

Problem 5: (Marks: 6)
Two Dimensional Array Operations

int x[3][3]

	0	1	2
0	**1**	**2**	**3**
1	**4**	**5**	**6**
2	**7**	**8**	**9**

x[3][3]

Figure 1

x[0][0]=1 x[0][1]=2 x[0][2]=3
x[1][0]=4 x[1][1]=5 x[1][2]=6
x[2][0]=7 x[2][1]=8 x[2][2]=9

In order to populate the 3x3 matrix with numbers start from 1 and finish at 9 we can simply use two loops:

Code for storing numbers:

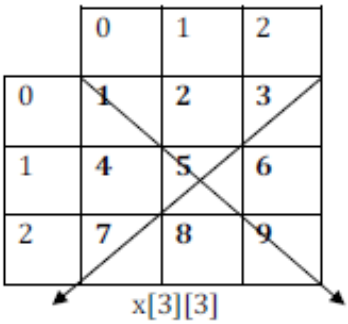
```
int num=1;

for(i=0;i<3;i++)
{
  for(j=0;j<3;j++){
  x[i][j]=num;
  num=num+1
  }
}
```

Write a program that stores the numbers (1 to 9) in two dimensional array. Your array declaration should be int x[3][3], same as Figure 1.

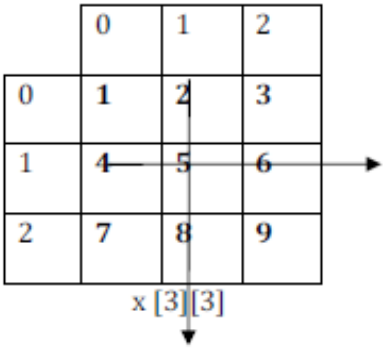
Once you have stored the numbers:

Print the summation of the diagonal numbers.



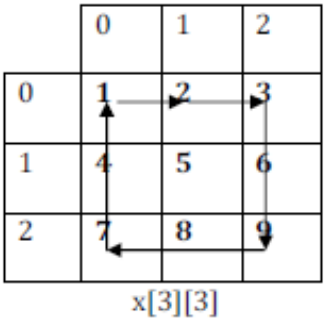
Left Diagonal = 1+5+9 = 15
Right Diagonal =3+5+7 = 15

Print the Summation of the middle column numbers and middle row numbers.



Middle Column = 2+5+8 = 15
Middle Row = 4+5+6 = 15

Print the values of the outer border of the array in clockwise circular manner starting from x[0][0] and finishes at x[0][0].



Values: 1 2 3 6 9 8 7 4 1

Include a screenshot of the above program output in the submission.