1. Write a program to find the maximum and minimum numbers in a list of N integers. The program should be able to find the location of the maximum and the minimum. Test your program on a list of 10 numbers of your choice.

2. Write a program that reads the values of an array called score of size N and then reverses the order of the array (i.e. score[0] goes into score[N-1], score[1] goes into score[N-2], and so on). You must do the operation without an external array (i.e. the change of order happens in the same array). Discuss the case of even and odd values of N.

3. Write a program to get the input data of n students in m different courses. The program is required to use a function to read the data of all students and another function to get the total score and the average score of any student. Use the functions to get the total and average score of all students and display the output.

4. What is the output of the following program? The data for the program is given below it.

```
 #include <iostream.h>
main()
{int a[100], b[100]; int c[10][10], ct[10][10],cd;
int j,i, m, sumA, sumB, sumDiff;
sumA=0; sumB=0; sumDiff = 0;
cin >> m;
for(j=0; j < m; j++)
{ cin >> a[j] >> b[j];
 sumA= sumA + a[j]; sumB = sumB + b[j];
 sumDiff = sumDiff + (a[j] - b[j]);}
  cout<<" the two arrays and their difference  "<<endl;
for (j= m-1; j >=0; j--)
cout << a[j] << ' ' << b[j] << ' ' << a[j]-b[j]<< '\n';
   cout<<" the sum of the two arrays   "<<endl;
   cout << "  sumA "<<sumA<< ' ' <<" sumB   "<<sumB<< '\n';*/
   cd=0;
  for(i=0;i<3;i++)
  for(j=0;j<3;j++) cin>>c[i][j];
   for(i=0;i<3;i++)cd=cd+c[i][i];
    cout<<" sum of diagonal  "<<cd<<endl<<endl;
    cout<<"  the transpose of c  "<<endl<<endl;
    for(i=0;i<3;i++)
    for(j=0;j<3;j++)
    ct[i][j]=c[j][i];
      for(i=0;i<3;i++)
    {for(j=0;j<3;j++) cout<< ct[i][j]<<"    ";cout<<endl;}}
```

m -> size
a -> accumilate sum of array a
b -> accumilate sum of array b
sum diff -> accumilate sum of array diff

Data:

```
4
11  15
19  14
4   2
6   3
1 2 3 4 5 6 7 8 9
```

5. Write a program that reads a single character from 'A' to 'Z' and produces a pyramid of letters. For example, if the input is 'E', the output is :

ABA
ABCBA
ABCDCBA
ABCDEDCBA

6. Write the code for the following string manipulation functions:

a. void StrToUpper(char str[ ]) that converts a given string to uppercase. Use the function char toupper(char ch) that return the uppercase of the argument ch.
b. int strcmp(char s1[ ], char s2[ ]) as described in lecture
c. void strcat(char s1[], char s2[]) as described in lecture
d. int strlen(char s1[])as described in lecture

7. Show the output of the following programs:

a) int main()

```
{char m[20], n[20];
 for(int j=0;j<3;j++)
 {   gets(m); gets(n);
     cout<<" first string  "<<m<<endl<<" second string  "<<n <<endl;
    int i=-1;int k=0;int x,y;
   do{i++; x=m[i]; y=n[i];
cout<<m[i]<<"   "<<x<<"    "<<n[i]<<"    "<<y<<endl;
    if(m[i]!=n[i]) {k=m[i]-n[i];break;}
  }while(m[i]||n[i]);
   if(k==0) cout<<"  equal , output= "<<k<<endl;
    else{
     cout<<"   not equal  " <<endl;
if(k>0)cout<<"   first string is greater by "<<k;
 else cout<<"  first string is less by  "<<k;}}
return 0;  }
```

Let the inputs of the program as follows:

m	n
Ahmed	Ahmed
Omar	Kareem
Abdelrahman	Abdelwahab

b) void main ( )

```
{char ch, s[100], word[50];
  int i, k, j;
  strcpy (s," computer& logic& design & circuits#");
   cout<<s<<endl; ch='&';
 i=0; k=0; j=0;
 while(s[i]!='#')
 { if(s[i] = = ch) k++;
  else  { word[j]=s[i];j++;}   i++;}
  cout<<" number of deleted characters  "<<k<<
   " the new string  "<<word<<endl;   }
```

8. Write a C++ program that reads the names of 100 students as an array of strings then search for certain name in the array.

9. Write a C++ program that reads any string and a certain character, then count the number of occurrence of the character in the string.

10. 10.Write the function reverse ( ) : to reverse a string, the string should passed to the function as an argument. (strings are declared as array of characters):

11. Write a C++ function "wcount" that returns the number of words in an input **string s, use the find( ) function of the class string.** For example, if the input string S is "C++ programming is interesting", the function should return the string contains 4 words.

Use minimum required code to achieve the function purpose and use the class string functions.