Question 1:

Function f is defined as : $f(x)=3+6x+5x^2+3x^3+4x^4$. It has a minimum on the interval [-1 , 0]. Apply the bisection search to determine the location of the minimum of f(x).

Answer:

```
#include <iostream>
#include <cmath>
#include <stdlib.h>
using namespace std;
float f(float a){
   return (3 + (6*a) + (5 * pow(a,2)) + (3 * pow(a,3)) + (4 * pow(a,4)));
}

int main()
{
   float min = -1, max = 0, mid;

   do{
      mid = (min + max)/2;
      if(f(mid - 0.01)> f(mid + 0.01)){
         min = mid;
      }else{
         max = mid;

      }

   }while(abs(max - min) > 0.0001);

   cout<< mid <<" "<<f(mid);
}
```

Question 2:

In this problem, you are requested to define an array A of integers and of size n (with 5 <= n <= 20). The value n and the elements of the array A will be obtained from the user.

Instead of you entering 20 values (in case n = 20), you may use the arguments of the main function as presented in class:

```
include <stdlib.h>
int main (int argc, char ** argv){
  // assuming that the list of parameters used to execute the program is : 1.5 4
  float x = atof (argv[1]); // x is assigned the value 1.5
  int n = atoi (argv[2]);  // n is assigned the value 4
}
```

If you do use the arguments of the function main, copy the following 20 values in the list of parameters (from Menu Execute in Dev-C++) or in the "Command line arguments" in onlinegdb.com :

67 97 77 52 81 19 57 65 88 61 58 51 45 97 43 26 63 95 72 24

Do not forget to add the value of n BEFORE 20 values !

Define the array A as:

int A[20]; // even if the actual size of the array is n, use the maximum value of n (ie 20) to define the array A.

Write a C++ program which gets the value n. And only when n is [5 , 20], have the program get the n values to store in the array A. When n does not have a valid value, output the message : "n must be >=5 and <= 20".

Define a second array B of size 5 whose content is :

- the 1st element of B is the last element of A

- the 2nd element of B is the 2nd from the last element of A

- the 3rd element of B is the 3rd from the last element of A

...

Have your program output the content of B.

Example : A[] = { 19, 57, 65, 88, 61, 58, 51, 45}

then B[] = {45, 51, 58, 61, 88}

Answer:

```
#include <iostream>
#include <math.h>
#include <stdlib.h>
using namespace std;

int main()
{
   int n, m, i;
   do{
   cout << "Please enter array size [5, 20]: " << endl;
   cin >> n;} while (n < 5 || n > 20);
   int array[n];
   for(m = 0; m <= n-1; m++){
      cout << "Please input array value: " << endl;
      cin >> array[m];
   }
   for(m = 0; m <= n - 1; m++){cout << "A[" << m << "]=" << array[m] << ",";}
   cout << endl;
   int B[5];
   for (i = 0; i <= 4; i++){
      B[i] = array[n - (i + 1)];
      cout << "B[" << i << "]=" << B[i] << ",";

   }
   return 0;
}
```