Assignment 1: Nov.15.2018 **Due Date: Nov.29.2018**

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1) Given **Array.h** and **type** the corresponding implementation file **Array.cpp**

```
// Array Class Header file : Array.h
class Array
{
public:
    Array();
    Array(const int SIZE, const int value);
    Array(const int SIZE, const int* arr);
    Array(const Array& array);

    void add(const Array& array);
    void float(const Array& array);
    int multiply(const Array& array);
    void copy(const Array& array);
    int getSize();
    int* getData();
    void fill(const int value);
    void print();
private:
    int* data;
    int size;
};
```

```
Hint:
Array::Array()
{
   size=1;
   data=new int[size];
   for (int i=0; i<size; i++)
        data[i]=0;
}
```

```
-------------------------------------------------------------
       Array a1;            // a1 ← {0}
       Array a2(5, 0);      // a2 ← {0, 0, 0, 0, 0}
       int arr[]={3,3,3,3,3};
       Array a3(5, arr);    // a3 ← {3, 3, 3, 3, 3}
       Array a4(a3);        // a4 ← {3, 3, 3, 3, 3}

       a2.add(a3);          // a2 ← {3, 3, 3, 3, 3}
       a2.subtract(a3);     // a2 ← {0, 0, 0, 0, 0}
       cout << a3.multiply(a4)<<endl;    // 45

       cout << a3.getSize()<<endl;       //5
       cout << a3.getData()[2]<<endl;    //3

       a2.copy(a3);         // a2 ← {3, 3, 3, 3, 3}
       a2.fill(1);          // a2 ← {1, 1, 1, 1, 1}
       a2.print();          // [1 1 1 1 1]
```

2) Given **Pi.h** and **type** the corresponding implementation file **Pi.cpp**

```
// Array Class Header file : Pi.h
class Pi
{
public:
    Pi (const int nTerms);
    double apprErr();
    //uses value() function's return and value of actual PI, returns approximation error.
    void print(); // //uses value() function's return displays it
private:
    int n;
    double value(); // return value of pi with assigned number of terms
};
```

```
Pi pi2(2);
pi1.print();
cout << pi1.apprErr()

Pi with 2 terms: 2.66667
0.47619
```

3) Submit your assignment

submit the print outs of these two files.

Dr Muharrem Mercimek

a) Complete and submit your assignment yourself.
b) The due date is firm and assignment can be submitted by the **end of this date.** "NO OTHER EXCEPTION"
c) Print out your document and hand it in

```cpp
#include <iostream>
#include "Array.h"
using namespace std;
Array::Array()
{
    size = 1;
    data = new int[1];
    *data = 0;
}
Array::Array(const int SIZE, const int value)
{
    size = SIZE;
    data = new int[size];
    for (int i = 0; i < size; i++)
        data[i] = value;
}
Array::Array(const int SIZE, const int *arr)
{
    size = SIZE;
    data = new int[size];
    for (int i = 0; i < size; i++)
        data[i] = arr[i];
}
Array::Array(const Array &array)
{
    size = array.size;
    data = array.data;
}
int* Array::getData()
{
    return data;
}
int Array::getSize()
{
    return size;
}
void Array::add(const Array &array)
{
    for (int i = 0; i < size; i++)
        data[i] += array.data[i];
}
void Array::subtract(const Array &array)
{
    for (int i = 0; i < size; i++)
        data[i] -= array.data[i];
}
int Array::multiply(const Array &array)
{
    int sum = 0;
    for (int i = 0; i < size; i++)
        sum += data[i] * array.data[i];
    return sum;
}
void Array::copy(const Array &array)
{
    for (int i = 0; i < size; i++)
```

```
57          data[i] = array.data[i];
58  }
59  void Array::fill(const int value)
60  {
61      for (int i = 0; i < size; i++)
62          data[i] = value;
63  }
64  void Array::print()
65  {
66      for (int i = 0; i < size; i++)
67          cout << data[i] << ' ';
68      cout << endl;
69  }
```



```
 1  #define _USE_MATH_DEFINES
 2  #include <iostream>
 3  #include <cmath>
 4  #include "Pi.h"
 5  using namespace std;
 6  Pi::Pi(const int nTerms)
 7  {
 8      n = nTerms;
 9  }
10  void Pi::print()
11  {
12      cout << "Pi with " << n << " terms: " << value() << endl;
13  }
14  double Pi::apprErr()
15  {
16      return M_PI - value();
17  }
18  double Pi::value()
19  {
20      double value = 0;
21      for (int i = 0; i < n; i++)
22          value += 4 * pow(-1, i) / (2 * i + 1);
23      return value;
24  }
```