Programming Fundamentals

Lab 13

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Question 1:

Run the given below code and check the functionality of it step by step in detail.

```
#include "stdafx.h"

#include <iostream>

using namespace std;

void inputArray(int alpha[]) {

	for (int i = 0; i < 12; i++) {

		cout << "Enter " << i + 1 << " Element for Alpha:\t";
		cin >> alpha[i];
	}
}

void doubleArray(const int a[], int beta[]) {

	for (int i = 0; i < 12; i++) {

		beta[i] = a[i] * 2;
		//a[i] = 5;
	}
}

void copyAlphaBeta(int matrix[][4], const int alpha[], const int beta[]) {

	int rowSize = 6, columSize = 4;
	int index = 0;
	int i = 0;

	for (; i < 3; i++) {

		for (int j = 0; j < columSize; j++) {

			matrix[i][j] = alpha[index++];
		}
	}
```

```
	index = 0;

	for (; i < rowSize; i++) {

		for (int j = 0; j < columSize; j++) {

			matrix[i][j] = beta[index++];
		}
	}
}

/*int main()
{

	return 0;
}*/

int _tmain(int argc, _TCHAR* argv[])
{
	cout << "Hello Class of PF B9!\n";

	const int cint = 13;

	int counter = 0, i, j;
	int alpha[12];
	int beta[12];
	int matrix[6][4];

	inputArray(alpha);
	doubleArray(alpha, beta);
	copyAlphaBeta(matrix, alpha, beta);

	for (i = 0; i < 6; i++) {

		for (j = 0; j < 4; j++) {

			cout << matrix[i][j] << "\t";

			if (++counter >= 10) {
				counter = 0;
```

```
                cout << endl;
            }
        }
    }

    system("pause");

    return 0;
}
```

Question 2:

Run the given below code and check the functionality of it step by step in detail.

```
#include "stdafx.h"
#include <iostream>

using namespace std;

void printingChars() {

    char strs[3][20] = {

        { 'S', 't', 'r', 'i', 'n', 'g', '\0' },
        "Programing Class",
        "Do Work"
    };

    cout << strs << endl;
    cout << strs + 1 << endl;
    //cout << **strs << endl;

    char* temp = (char*)strs;

    for (int i = 0; i < 3; i++) {

        //for (int j = 0; *((*(strs + i)) + j) != '\0'; j++) {
        for (int j = 0; j < 20; j++) {
```

```
                cout << *(*(strs + i) + j) << endl;
            }

            cout << *(temp + i) << "\t";
            cout << *(strs + i) << endl;
        }

        return;
}

void printingInts() {

        int arr[4][5] = {

            { 1, 2, 3, 4, 5 },
            { 6, 7, 8, 9, 10 },
            { 11, 12, 13, 14, 15 },
            { 16, 17, 18, 19, 20 }
        };

        for (int i = 0; i < 4; i++) {

            for (int j = 0; j < 5; j++) {
                cout << &arr[i][j] << "\t"
                    << arr[i][j] << "\t"
                    << *(*(arr + i) + j) << endl;
            }
        }

        cout << "After Type Casting\n";
        int* dptr = (int*)arr;
        for (int i = 0, k = 0; i < 4; i++) {

            cout << dptr + k << endl;
            cout << arr[i] << endl;

            int *ptr = arr[i];
            for (int j = 0; j < 5; j++) {
                cout << dptr[k++] << "\t";
```

```
                cout << *(ptr + j) << endl;
            }
        }

        return;
}

int _tmain(int argc, _TCHAR* argv[])
{
        cout << "Hello Class of PF B9" << endl;

        //printingChars();
        printingInts();

        system("pause");

        return 0;
}
```

Question 3:

Write a program in C++ that reads a matrix from a file, and displays the matrix in reverse order. Each row ends with -99.

Example:

Data.txt

```
1 2 3 -99

4 5 6 -99
```

$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

Output on console: $\begin{bmatrix} 6 & 5 & 4 \\ 3 & 2 & 1 \end{bmatrix}$

Question 4:

Write a program in C++, that reads a matrix from a file, and displays the data column wise.

Example:

Data.txt

```
1 2 3 -99
4 5 6 -99
```

$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

Output on console:

$$\begin{matrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{matrix}$$

Question 5:

Write a program in C++ that reads two matrices from two files and calculates the sum of two matrices.

Example:

Matrix1.txt

```
1 2 3 -99
4 5 6 -99
```

Matrix2.txt

```
9 7 4 -99
1 2 8 -99
```

Apply Operations of Matrix1+Matrix2 and store it into third text file.

Question 6:

Write a program in C++ that reads a matrix from a file, and displays the diagonal of a matrix.

Example:

Data.txt

```
1 2 3 -99

4 5 6 -99

7 8 9 -99
```

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

Output on console: 1 5 9