(1)

```
#include <iostream>
using namespace std;

int Cal2DArrSize(int size);
void Fill2DArray(int ** arr2D, int arr2DSize, int * arr1D, int
arr1DSize);
void main()
{
    char choice;
    do
    {
        int arrSize;
        cout << "Enter 1D array size :";
        cin >> arrSize;

        int *arr1D = new int[arrSize];

        cout << "Enter array's data :";
        for (int i = 0; i < arrSize; i++)
            cin >> arr1D[i];

        int arr2DSize = Cal2DArrSize(arrSize);

        int* *arr2D = new int*[arr2DSize];
        for (int i = 0; i < arr2DSize; i++)
            arr2D[i] = new int[arr2DSize];
        Fill2DArray(arr2D, arr2DSize, arr1D, arrSize);
        for (int i = 0; i < arr2DSize; i++)
        {
            for (int j = 0; j < arr2DSize; j++)
                cout << arr2D[i][j] << " ";
            cout << endl;
        }

        for (int i = 0; i < arr2DSize; i++)
            delete[] arr2D[i];
        delete []arr2D;
        delete []arr1D;
        cout << "Do you want to continue (y/n)?"<<endl;
        cin >> choice;
    } while (choice == 'y' || choice == 'Y');

}
```

```
int Cal2DArrSize(int size)
{
	int sizeSquareRoot = sqrt(size);
	if (sizeSquareRoot*sizeSquareRoot < size)
		sizeSquareRoot++;
	return sizeSquareRoot;
}
void Fill2DArray(int* * arr2D, int arr2DSize, int* arr1D, int
arr1DSize)
{
	int row = -1;
	for (int i = 0; i < arr2DSize; i++)
		for (int j = 0; j < arr2DSize; j++)
			arr2D[i][j] = 0;
	for (int i = 0; i < arr1DSize; i++)
	{
		if (i%arr2DSize == 0)
			row++;
		arr2D[row][i%arr2DSize] = arr1D[i];
	}
}
```

(2)

```
void Swap_Diagonals(int ** Array2D , int Size)
{
        for(int i=0;i<Size;i++)
        {
                int temp = Array2D[i][i];
                Array2D[i][i] = Array2D[i][Size-1-i];
                Array2D[i][Size-1-i] = temp;
        }
        for(int i=0;i<Size;i++)
        {
                for (int j = 0; j < Size; j++)
                {
                        cout << Array2D[i][j] << " ";
                }
                cout <<endl;
        }
}

void input(int ** Arr, int Size)
{
        for (int i = 0; i < Size; i++)
        {
                for (int j = 0; j < Size; j++)
                {
                        cin >> Arr[i][j];
                }


        }
}

void main()
{

        int ArraySize;
        cout << "Enter Size of Array" << endl;
        cin >> ArraySize;
        int ** Array_2D = new int *[ArraySize];
        for(int i=0;i<ArraySize;i++)
        {
                Array_2D[i] = new int [ArraySize];
        }
        cout << "Enter 2D Array Values : "<<endl;

        input(Array_2D,ArraySize);
        Swap_Diagonals(Array_2D,ArraySize);
        for(int i=0;i<ArraySize;i++)
        {
                delete [] Array_2D[i];
        }
        delete [] Array_2D;
}
```

```
(3)
#include<iostream>
using namespace std;

/*
Sample Run
Enter how many numbers you will enter: 10
Enter Array: 1   2    3    4    5     6   7   8    9   10
The new array: 2   3   5   7
Do you want to continue (y/n) ? : y
Enter how many numbers you will enter: 10
Enter Array: 11    12      13   14       15      16    17   18    19
20
The new array: 11      13         17    19
Do you want to continue (y/n) ? : n
*/

bool IsPrime(int num);
void FillPrimeArr(int* OldArr, int Size, int* NewArr, int& NewSize);

void main()
{
    char choice;
    int arrSize;
    int newsize;
    do
    {

        cout << "Enter how many numbers you will enter:";
        cin >> arrSize;

        int *arr1D = new int[arrSize];
        int *prime = new int[arrSize];

        cout << "Enter Array :";
        for (int i = 0; i < arrSize; i++)
            cin >> arr1D[i];

        FillPrimeArr(arr1D, arrSize, prime, newsize);
        cout << "The new array: ";
        for (int j = 0; j < newsize; j++)
                cout << prime[j] << " ";

        cout << endl;
        cout << "Do you want to continue (y/n)?" << endl;
        cin >> choice;
    } while (choice == 'y' || choice == 'Y');

}

bool IsPrime(int num)
{
    if (num == 0 || num == 1)
        return false;
    for (int i = 2; i < num; i++)
        if (num%i == 0)
            return false;
    return true;
}
void FillPrimeArr(int* OldArr, int Size, int* NewArr, int& NewSize)
{
    NewSize = 0;
    for (int i = 0; i < Size; i++)
    {
        if (IsPrime(OldArr[i]))
        {
            NewArr[NewSize] = OldArr[i];
            NewSize++;
        }
    }
}
```

(4)

```
#include<iostream>
using namespace std;

/*
Sample Run
Enter how many numbers you will enter: 10
Enter Array: 1   2    3    4    5     6   7   8    9   10
The new array: 2   3   5   7
Do you want to continue (y/n) ? : y
Enter how many numbers you will enter: 10
Enter Array: 11    12      13   14       15      16    17   18    19
20
The new array: 11      13        17   19
Do you want to continue (y/n) ? : n
*/

bool IsPerfect(int num);
void FillPrefectArr(int* OldArr, int Size, int* NewArr, int& NewSize);

void main()
{
    char choice;
    int arrSize;
    int newsize;
    do
    {

        cout << "Enter how many numbers you will enter:";
        cin >> arrSize;

        int *arr1D = new int[arrSize];
        int *perfect = new int[arrSize];

        cout << "Enter Array :";
        for (int i = 0; i < arrSize; i++)
            cin >> arr1D[i];
        FillPrefectArr(arr1D, arrSize, perfect, newsize);

        cout << "The new array: ";
        for (int j = 0; j < newsize; j++)
                cout << perfect[j] << " ";
        cout << endl;

        cout << "Do you want to continue (y/n)?" << endl;
        cin >> choice;
    } while (choice == 'y' || choice == 'Y');

}
bool IsPerfect(int num)
{
    int sum = 0;
    for (int i = 1; i < num; i++)
    {
        if (num%i == 0)
            sum += i;

    }
    if (sum == num)
        return true;


    return false;
}
void FillPrefectArr(int* OldArr, int Size, int* NewArr, int& NewSize)
{
    NewSize = 0;
    for (int i = 0; i < Size; i++)
    {
        if (IsPerfect(OldArr[i]))
        {
            NewArr[NewSize] = OldArr[i];
            NewSize++;
        }
    }
}
```

(5)