Part (b): Write output of the code segment below. If there is any error, clearly mention the error. (There is no syntax error in this code.)

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

int* SomeFunction()
{
        int abc = 50;
        return &abc;
}

void main()
{
        int* ptr1 = SomeFunction();
        cout<<"Data = ";
        cout<<*ptr1<<endl;
}
```

Output/Error:

Error
function type does not matches return type.

Memory leakage (no deallocation).

Part (c) Write the output of the code segment given below. (There is no syntax error in this code.)

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

void SomeFunction(int* arr, int size) {
    int* ptr1 = arr;
    int* ptr2 = arr + size - 1;
    while(ptr1 < ptr2) {
        *ptr1 = *ptr2;
        ptr1 = ptr1+2;
        ptr2--;
    }
}

int main() {
    int nums[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
    int* ptr = nums;
    SomeFunction(ptr, 10);
    for(int i = 0; i < 10; ++i) {
        cout << nums[i] << " ";
    }
    return 0;
}
```

deallocation missing

Output:

11, Garbage value, , , , , , , , ,

Part (d) For the code segment given below, write output/error. In case of crash, highlight the line where program will crash. (There is no syntax error in this code.)

[THIS QUESTION IS NOT FOR BCS-2C]

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

int* GetData(int xyz)
{
        int* ptr = 0;
        if(xyz%2 == 0)
        {
                ptr = new int[5];
                for(int i=0; i<5; i++)
                        ptr[i] = i+1;
        }
        return ptr;

}
```

```
int main() {
        int* array1[10];
        for(int i=0 ; i<10 ; i++)
        {
                array1[i] = GetData(i);
        }
        for(int i=0; i<10; i++)
        {
                for(int j=0; j<5 ; j++)
                {
                        array1[i][j] = array1[i][j] *2;
                        cout<<array1[i][j]<<" ";
                }
                cout<<endl;
        }
        //Assume we have Deallocation code here that
//successfully deallocates the memory.
}
```

Output/Error:

Part (d) ***[FOR BCS-2C ONLY]***

Consider the following program, **give C++ code for the class Point.** The distance formula is d = sqrt(dx*dx + dy*dy). The function sqrt is available in the C++ standard library.

```
int main() {
  Point p1(10,20);
  Point p2(30,50);
  cout << p1.distance(p2);
  return 0;
}
```

Solution:

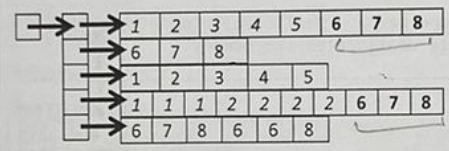
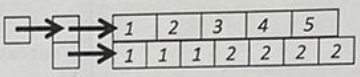
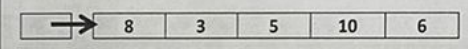
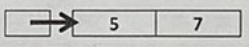
CLO # 3: Model an algorithmic solution for a given problem

Q2: [20 marks]

A program is getting multiple integer arrays (each array of variable size). It needs to keep only those arrays which end with a specific subArray. Your task is to write a function that takes a ListOfIntArrays (int**) and an ArrayToFind (int*) i.e. SubArray. The function should remove all the arrays (from ListOfIntArrays) that do not end with ArrayToFind. Prototype of the function is given below:

void FilterData(int& ListOfIntArrays, int*& LenghtsOfArrays, int*& ArrayToFind, int& SizeOfArrayToFind, int& TotalIntArrays)**

Sample run below shows the values of required variables and arrays' content before and after the function call for **ArrayToFind = {6,7,8}** and **SizeOfArrayToFind = 3**.

Before Function Call	After Function Call	Explanation
ListOfIntArrays:  	**ListOfIntArrays:**  	All the arrays that do not end with ArrayToFind = {6,7,8} have been removed. The array that ends with {6,7,8} but does not have any other data has also been removed.
TotalIntArrays: 5	**TotalIntArrays:** 2	Total no. of int arrays in ListOfIntArrays
LenghtsOfArrays:  	**LenghtsOfArrays:**  	Array Containing Lengths of all 1D int arrays in ListOfIntArrays.

Functionality Explanation:

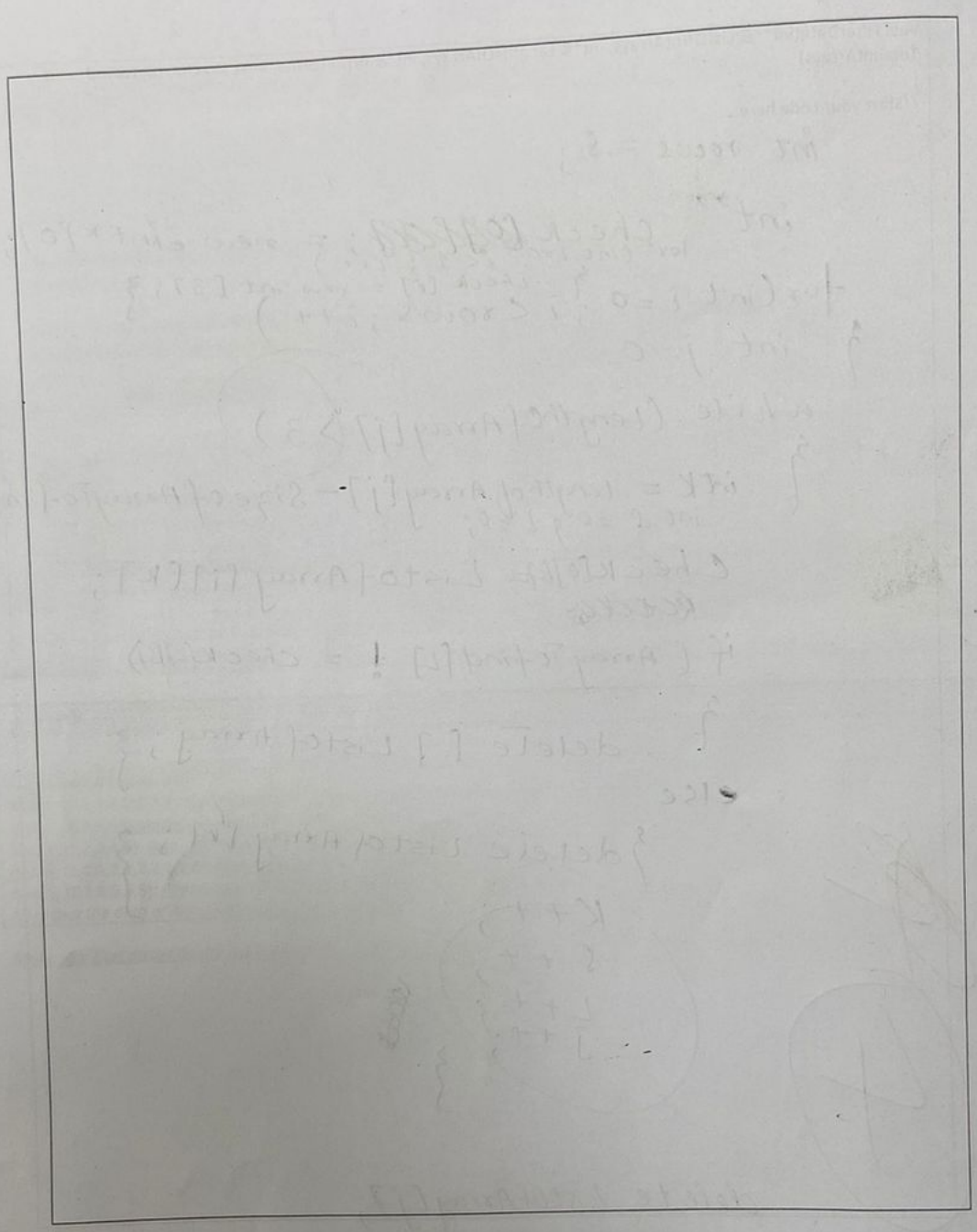
Row 1, {1,2,3,4,5,**6,7,8**}: *Not Removed*, as ArrayToFind {6,7,8} found at the end.
Row 2, {**6,7,8**}: *Removed*, as ArrayToFind {6,7,8} found at end but there wasn't any other data in this array.
Row 3, {1,2,3,4,5}: *Removed*, as ArrayToFind {6,7,8} NOT Found at the end.
Row 4, {1,1,1,2,2,2,2,**6,7,8**}: *Not Removed*, as ArrayToFind {6,7,8} found at the end.
Row 5, {6,7,8,6,6,8}: *Removed*, as ArrayToFind {6,7,8} NOT Found at the end.
Note that the data of ArrayToFind {6,7,8} has also been removed from original data arrays (ListOfIntArrays).

Make sure that arrays do not consume extra space. Also there should not be any memory leakage or dangling pointer.

6 7 8 3

```
void FilterData(int**& ListOfIntArrays, int*& LenghtsOfArrays, int*& ArrayToFind, int& SizeOfArrayToFind, int&
TotalIntArrays)
{
//Start your code here...
int rows = 5;
int** check = new int*[0];
for(int i=0; i<1; i++)
{ check[i] = new int[3]; }
for(int i=0; i<rows; i++)
{ int j=0
while(LengthOfArray[j] > 3)
{ int K = lengthofArray[j] - SizeofArrayTofind;
int S=0, L=0;
check[0][S] = ListofArray[i][K];
if(ArrayTofind[L] != check[0][S])
{ delete[] ListofArray; }
else
{ delete ListofArray[K]; }
K++;
S++;
L++;
j++;
}
delete ListofArray[j];
j++;
}
```

4



National University of Computer and Emerging Sciences 0080

Object Oriented Programming (CS1004)

Date: Feb 27, 2024

Course Instructor(s)

Mr. Aamir Rahim
Ms. Anosha Khan
Ms. Arooj Khalil
Ms. Samin Iftikhar
Mr. Uzair Naqvi
Mr. Waqas Manzoor

Sessional-I Exam

Total Time: 1 Hour
Total Marks: 40
Total Questions: 02

Semester: SP-2024
Campus: Lahore
Dept: FAST School of Computing

ESAR FATIMA | 23L0888 | 2B | Student Signature

Student Name | Roll No | Section

Vetted by | Vetter Signature

IMPORTANT INSTRUCTIONS: Answer in the space provided. **Answers written on rough sheet will not be marked.** Do not use pencil or red ink to answer the questions. In case of confusion or ambiguity make a reasonable assumption.

CLO # 4: Apply good programming practices

Q1: [4x5 = 20 marks] Short Questions

Part (a) Write output of the code segment below. (There is no syntax error in the code.)

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

void Swap(int*& a, int*& b)
{
        int* temp = a;
        a=b;
        b=temp;
}
```

```
void main()
{
        int a=5;
        int b=10;
        int* ptr1 = &a;
        int* ptr2 = &b;
        int** ptr3 = &ptr1;
        cout<<"Data = "<<**ptr3<<endl;
        int* temp1 = ptr1;
        int* temp2 = ptr2;
        Swap(temp1, temp2);
        cout<<"-------------"<<endl;
        cout<<"*ptr1 = "<<*ptr1<<endl;
        cout<<"*ptr2 = "<<*ptr2<<endl;
}
```

Error (int cannot point int*)

Output:

5 10