

Object Oriented Programming (CS1004)

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Sessional-I Exam

Total Time: 1 Hour

Total Marks: 40

Total Questions: 02

Semester: SP-2024

Campus: Lahore

Dept: FAST School of
Computing

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Student Name

Roll No

Section

[Signature]

Student Signature

Vetted by

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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;
}
```

Output:

Data = 5

*ptr1 = 5
*ptr2 = 10

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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.)

<pre>#include <iostream> using namespace std; int* SomeFunction() { int abc = 50; return &abc; } void main() { int* ptr1 = SomeFunction(); cout<<"Data = "; cout<<*ptr1<<endl; }</pre>	<p>Output/Error:</p> <p>Logical error is found. There is error in the function return. It cannot return the reference (&) of variable. Therefore, program will not execute.</p> <p>4</p>
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Part (c) Write the output of the code segment given below. (There is no syntax error in this code.)

<pre>#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--; } }</pre>	<pre>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; }</pre>
<p>Output:</p> <p>1 2 3 4 5 6 7 8 9 10</p> <p>20</p>	

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:

The program will crash at line 10 where nested for loops are used. We are dealing with single pointers therefore we cannot use rows and columns form. We cannot store a two-D array in array [10] as it is of single pointer.

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

Consider the following program, give C++ code for the class Point. The distance formula is $d = \sqrt{dx^2 + dy^2}$. 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:


```
void FilterData(int**& ListOfIntArray, int*& LengthsOfArrays, int*& ArrayToFind, int& SizeOfArrayToFind, int& TotalIntArray)
{
```

```
//Start your code here...
```

```
Array To Find = {6, 7, 8}
```

```
int arr 1[] = {1, 2, 3, 4, 5, 6, 7, 8};
```

```
int arr 2[] = {6, 7, 8};
```

```
int arr 3[] = {1, 2, 3, 4, 5};
```

```
int arr 4[] = {1, 1, 1, 2, 2, 2, 2, 6, 7, 8};
```

```
int arr 5[] = {6, 7, 8, 6, 6, 8};
```

```
int rows = 0, cols = 0;
```

```
List of int Arrays = new int* [rows];
```

```
for (int i = 0; i < rows; i++)
```

```
{
    List of Int Arrays [i] = new int [cols];
}
```

```
Total Int Arrays = arr 1[];
```

```
Total Int Arrays = arr 2[];
```

```
Total Int Arrays = arr 3[];
```

```
Total Int Arrays = arr 4[];
```

```
Total Int Arrays = arr 5[];
```

```
cout << "Total Int Arrays =" << Total Int Arrays;
```

```
for (int i = 0; i < 5; i++)
```

```
{
    if (Array To Find = {6, 7, 8})
```

```
{
```

```
    List of Int Array = arr 1 + arr 4;
```

```
}
```


Size of arr1[] = size of (arr1) / size of arr1[0];

Size of arr4[] = size of (arr4) / size of arr4[0];

Size of Array To Find = Size of arr1[] + Size of arr4[]

cout << "Size of Array To Find = " << Size of array To Find;

cout << "length of arr1 = " << Size of arr1;

cout << "length of arr4 = " << size of arr4;

delete[] list of Int Arrays;

}