

CS-1004: Object Oriented Programming (Z)

Serial No:

Sessional Exam-I

Total Time: 1 Hour

Total Marks: 50

Saturday, 27th February, 2023

Course Instructors

Dr. Syeda Javaria Imtiaz

Signature of Invigilator

Student Name

Roll No.

Course Section

Student Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. If you need more space write on the back side of the paper and clearly mark question and part number etc.
4. After asked to commence the exam, please verify that you have nine different printed pages including this title page. There are a total of 5 questions.
5. Calculator sharing is strictly prohibited.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.

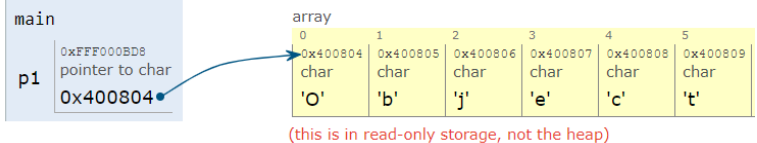
	Q-1	Q-2	Q-3	Q-4	Q-5	Total
Marks Obtained						
Total Marks	26	6	8	10	10	50

Question 1 [26 Marks]

Answer the following questions. In case of output/dry-run, only the code of main function is written without return statement, so please don't identify those errors.

Assumptions for output/dry-run:

- Uninitialized variable has value zero in beginning.
- An integer variable takes 4 bytes, float 4 bytes, double 8 bytes and char takes 1 byte.

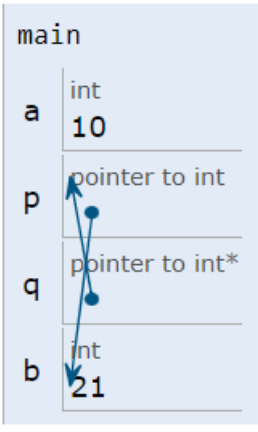
Q1: (2 marks) How much memory a character pointer variable takes?	Answer: Depends on OS
Q2: (2 marks) The void pointer can point to which type of variables?	Answer: The pointer to void can be used in generic functions in C because it is capable of pointing to any data type .
Q3: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804. <pre>#include <iostream> using namespace std; int main() { char * p1= "Object Oriented Programming"; int *p2; cout<<sizeof(p1)-sizeof(p2); return 0; }</pre>	Output: 0
Q4: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804. <pre>char * p1= "Object Oriented Programming"; cout<<&p1[5]-p1;</pre>	Output: 5 
Q5: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804.	Output: b bject Oriented Programming

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<pre>char *p1= "Object Oriented Programming"; int *p2; p1++; cout<<*p1; cout<<p1;</pre>	
<p>Q6: (2 marks) What is the output of following program segment? Identify errors if any?</p> <pre>int my_var=15; int my_var2=20; int* my_var_ptr=&my_var; int* my_ptr=my_var_ptr; my_var_ptr=my_var2; cout<<*my_var_ptr;</pre>	<p>Output: Variable value cannot be assigned to pointer</p>
<p>Q7: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804.</p> <ol style="list-style-type: none"> float data[]= {10.2, 20.2, 30.2, 40.2,50.2}; double *a= new double; *a =(data+2); a++; *a=(*a-(a-1)); cout<<*(data+3); 	<p>Output:</p> <p>Reference updated at line 4 resulted in dangling pointer line 5 resulted in error.</p> <p>Line 6 has output : 40.2</p>
<p>Q8: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804.</p> <pre>int a = 10; int *p = &a; int **q = &p; int b = 20; *q = &b; (*p)++; cout << a << " " << b << endl;</pre>	<p>Output:</p> 
<p>Q9: (2 marks) What is the output of following program segment? Identify errors if any? Assume starting address is 0x400804.</p>	<p>Output:</p> <p>OOP M MID smid-1</p>

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<pre>const char * c[]={"Oopsmid-1", "MID","OOP","EXAM"}; char const ** cp[] = {c+3, c+2, c+1,c}; char const ***cpp=cp; cout<<**(cpp+1)<<endl; cout<<*(* (cpp+2)+2)+3<<endl; cout<<*((*cpp)-2)<<endl; cout<<* (cpp+3)+0)+3<<endl;</pre>	
<p>Q10: (2 marks) What is the output of following program segment? Identify errors if any?</p> <pre>void swap (char *x, char *y) { char *t = x; x = y; y = t; } int main() { char *x = "OOPSessional"; char *y = "Spring2023"; char *t; swap(x, y); cout<<x << " "<<y; t = x; x = y; y = t; cout<<" "<<x<< " "<<y; return 0; }</pre>	<p>Output:</p> <p>OOPSessional Spring2023 Spring2023 OOPSessional</p>
<p>Q11: (2 marks) What is missing in the following code?</p> <pre>void printcards(int card) { int c=cards; printcards (card-1); }</pre>	<p>Output:</p> <p>Base condition</p>
<p>Q12: (2 marks) Can we define an alias to a pointer of integer? If yes write syntax to define.</p>	<p>Output:</p> <p>Yes</p> <ul style="list-style-type: none"> int i = 0; // int int& ir = i; // int reference (reference to int)

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	<ul style="list-style-type: none"> • <code>int* ip = &i; // int pointer (pointer to int)</code> • <code>int*& ipr = ip; // int pointer reference (reference to pointer to int)</code>
<p>Q13: (2 marks) What is the output of following program segment? Identify errors if any?</p> <pre> int main() { int A[2][3]= {{1,2,3},{4,5,6}}; int *p1, *p2; int B[3]= {7,9,0}; cout<< &B; p1=&B; p2=A; cout<<*p2; return 0; } </pre>	<p>Output:</p> <pre> int A[2][3]= {{1,2,3},{4,5,6}}; int *p1, (*p2)[3]; int B[3]= {7,9,0}; cout<< &B; p1=B; p2=A; cout<<*p2; </pre>

Question 2 [06 Marks]

Write the parameters of function ABC() for receiving 2D array in two different possible ways. Also write the output of the below code:

<pre> #include<iostream> using namespace std; void ABC (//Parameters to receive 2D array) { for (int i=0; i<5; i++) { for (int j=0;j<5; j++) { cout<<A[i][j]; } cout<<endl; } } </pre>
--

```
int main() {  
  
    int **A;  
    A= new int * [5];  
  
    for (int i=0; i<5; i++)  
    {  
        A[i]=new int [5];  
        for (int j=0;j<5; j++)  
        {  
            A[i][j]=i+j;  
        }  
    }  
    ABC(A);  
    return 0;  
}
```

Answer

Function Prototype 1 (2 marks)

Void ABC (int **A)

Function Prototype 2 (2 marks)

Void ABC (int *A[][5])

Output: (4 marks)

01234
12345
23456
34567
45678

Question 3 [08 Marks]

Write a recursive function called PowerOfFour. Given an integer n, return true if it is a power of four. Otherwise, return false.

An integer n is a power of four, if there exists an integer x such that $n == 4^x$

Example 1: Input: n =16

Output: true

Example 2: Input: n =12

Output: false

```
bool isPowerOfFour(int n)
{
    if(n == 0)
        return 0;
    while(n != 1)
    {
        if(n % 4 != 0)
            return 0;
        n = n / 4;
    }
    return 1;
};
```

Question 4 [10 Marks]

Given four single dimensional arrays of integer of same size. How can we use all of them by one name? Also use that for asking input from user. You can allocate single variable from stack memory and minimum required memory from heap. Don't copy the values. Use same arrays.

Hint: In your code we should use single nested loop to take input in all four arrays.

1. `int a[5];`

2. int b[5];
3. int c[5];
4. int d[5];

```
int ***p = new int [4]; | for (int i=0; i<4; i++) {
p[0] = a; | for (int j=0; j<5; j++) {
p[1] = b; | cin >> p[i][j];
p[2] = c; | }
p[3] = d; | }
```

Question 5 [10 Marks]

Write a recursive function in C++ which takes an integer array and two integer variables (start index and last index) of array as arguments and reverse the elements of that array.

If the array is {1,2,3,4,5,6}

ReverseArray(arr, 0,5) will make the array {6,5,4,3,2,1}

```
int reverse(int arr[],int start,int end){

    int temp;

    // if start is less than end

    if(start < end){

        /* Swap the position of an element. */

        temp      = arr[start];
        arr[start] = arr[end];
        arr[end]   = temp;

        /*calling itself
        *Incrementing start and decrementing end
        */
        reverse(arr, start+1, end-1);

    }
```


[The End]