357/338

C. 120

Air University
Final Semester Examination Fall 2023
Department of Cyber Security

Subject:-	Programming Fundamental
Course Code: -	CS111
Class:-	BS CYB
Semester:-	I
Section(s):-	A, B

Total Marks:- 100
Date:- 6th January 2024
Time:- 9:30-12:30
Max Time Allowed: 3 Hrs.

FM(s) Name:- Dr. Kashif Kifayat
FM Signature:

Special Instructions:

- Calculators are allowed.
- All questions are to be solved on answer sheets.
- Closed notes and books.
- Minor syntax mistakes could be ignored.
- Opening and closing brackets should be strictly followed.

Section A: [CLO-4] [20 Marks]

1. What is the output of the following program.

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

using namespace System;
using namespace std;

struct Length {

     int meter;
     float cm;
     long arr[5];
};

Length sub(struct Length);
```

```
int main(array<System::String ^> ^args)
{

	int a=10, b=20;
	int c[]={50,100,150,200,250};

	Length st,st1;
	st.meter = a;
	st.cm = b;
	for(int i=0;i<5;i++)
	st.arr[i] = c[i];

	st1 = sub(st);

	cout<<"Meter Value is:"<<st1.meter<<endl;
	cout<<"Meter Value is:"<<st1.cm<<endl;

	for(int i=0;i<5;i++)
		cout<<"Arr:["<<i<<"]="<<st1.arr[i]<<endl;

	getch();
	return 0;
}

Length sub(Length a)
{
	a.meter++;
	a.cm++;
	a.arr[2]+=2;
	a.arr[3]=a.meter;
	a.arr[0]=a.cm;

	return(a);
}
```

2. What is the output of the following program.

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

using namespace System;
```

```
using namespace std;

struct Length {

	int* meter;
	float* cm;
	long* arr;
};

void Test(struct Length*);

int main(array<System::String ^> ^args)
{
	Length* PL;
	Length L;


	int x=100;
	float y=200;
	long z[]={5,10,15,20,25};

	PL = & L;

	PL->meter = &x;
	PL->cm = &y;
	PL-> arr = z;

	Test(PL);

	cout<<*L.meter<<endl;
	cout<<*L.cm<<endl;
	for(int i=0;i<5;i++)
		cout<<L.arr[i]<<endl;

	getch();
	return 0;
}


void Test(Length* pt)
{
	*pt->meter += 100;
	*pt->cm -= 50;

	int i=1;
	while(i<3)
```

```
        {
        pt->arr[i]+=5;
        i++;
        }
}
```

[5]

3. **Please select the output of the following program from below answers.**

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

using namespace System;
using namespace std;

namespace ns
{
      class geek
      {
      public:
            int a,b,c;
      public:
            geek()
            {
                  a=30;
                  b=20;
            }
            int add ()
            {
                  return(a-b);
            }
            int sub()
            {
                  return(a+b);
            }
            int divide(int x, int y)
            {
                  return(x/y);
            }
      };
}
```

```
int main(array<System::String ^> ^args)
{
      ns::geek g;

      cout<<"The Sum is="<<g.add()<<endl;
      cout<<"The Sub is="<<g.sub()<<endl;
      cout<<"The Division is="<<g.divide(g.sub(),g.add());

      getch();
      return 0;

}
```

[5]

4. What is the output of the following program.

```
Void add(void);
int sub();
int mul(int, int);
int divd(int, int);
int cub(int);
int sqr(int);
int _tmain(int argc, _TCHAR* argv[])
{

      cout<<cub(divd(mul(sub(),5),sub()))<<"-";
      cout<<divd(sqr(mul(10,5)),cub(5));

_getch();


}

void add()
{
      int a=100, b=200,c;
      c=a+b;
      cout<<c<<endl;
}
int sub()
{
      int a=300, b=100,c;
      c=a-b;
      return©;
}
int mul(int a, int b)
```

```
{
      int c;
      c=a*b;
      return©;
}
int divd(int a, int b)
{
      int c;
      c=a/b;
      return©;
}
int cub(int a)
{
      return(a*a*a);
}

int sqr(int a)
{
      return(a*a);
}
```

[5]

Section B: Attempt all of the followings:

[CLO1]
[30 Marks]

1. **The pointer in C++ language is a variable, it is also known as locator or indicator that points to an address of a value. Please explain the following:**

   a) **How pointer to pointer works. Please explain with an example.** [5]
   b) **Please describe a pointer for a structure with an example.** [5]
   c) **Please describe a pointer for an array with an example.** [5]
   d) **Please describe a pointer for a function with an example.** [5]
   e) **Please describe a pointer for a class with an example.** [5]

[25]

2. **Please describe what is function overloading with an example. Furthermore, how it is different from constructor overloading.**

[5]

Section C:

[CLO2]
[50 Marks]

3. Write a C++ code for to define 5x5 matrix, take user input then calculate:

[10]

(a) Left diagonal factorial sum
(b) Right diagonal factorial sum

2	1	1	1	3
1	4	1	3	1
1	1	6	1	1
1	9	1	8	1
9	1	1	1	10

4. Define 5x5 matrix and write a C++ code to take both diagonal inputs using only two loops and fill rest of matrix with zeros. Where X represents user input.

[10]

X	0	0	0	X
0	X	0	X	0
0	0	X	0	0
0	X	0	X	0
X	0	0	0	X

5. Define 5x5 matrix and write a C++ code to take both diagonal inputs using only two loops and fill rest of matrix with zeros. Where X represents user input.

[10]

0	0	X	0	0
0	0	X	0	0
X	X	X	X	X
0	0	X	0	0
0	0	X	0	0

6.Assume you are a software developer. You need to write a code for a tax calculation. You need to take user input that how many Jobs he/she is doing then take all his/her salaries follow by their total. This software only works for four jobs. Then ask user for his/he expenses which will be except from the taxes. Below are taxes bands.

0	39,999	No Tax
40,000	50,000	5%
50,000	70,000	10%
70,000	100,000	15%
100,000	150,000	20%
150,000	200,000	25%
200,000	300,000	30%
Above		40%

If the user's total salary is above than 300,000 then he/she will be charged 30% for 300,000 and all above salary will be charged at 40% rate.

[20]