CBSE Class 12 Computer Science 2004 - Set 91

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours **Maximum Marks: 70**

General Instructions

(i) This question paper contains 7 questions. All questions are compulsory.

(ii) Use C++ for the programming questions.

(iii) Marks are indicated with each question or subpart.

Questions

1(a). What is polymorphism? Give an example in C++ to show its implementation in C++.

1(b). Write the names of the header files to which the following belong:

(i) getst( )
(ii) strcmp( )
(iii) abs( )
(iv) isalnum( )

1(c). Rewrite the corrected code for the following program. Underline each correction (if any)

```
#include <iostream.h>
structure Supergym
{
   int member number;
   char membername[20];
   char membertype[] = "HIG";
};
void main()
{
   Supergym person1, person.2;
   cin<<"Member Number:";
   cin>>person1.membernumber;
   cout<<"Member Name :";
   cin>>person1.membername;
   person1.member type = "MIG";
   person2 = person1;
   cin<<"Member Number:"
<<person2.membernumber;
   cin<<"Member Name"<<person2.membername;
   cin<<"Member Number:"
<<person2.membertype;
}
```

1(d). What will be the output of the following program:

```
#include <iostream.h>
#include <ctype.h>
#include <conio.h>
#include <string.h>
void ChangeString(char Text[], int
&Counter)
{
   char *Ptr = Text;
   int Length = strlen (Text);
   for ( ;Counter<Length-2; Counter+=2,
Ptr++)
   {
      * (Ptr + Counter) = toupper( * (Ptr
+ Counter) );
   }
}
void main()
{
   clrscr();
   int Position = 0;
   char Message[] = "Pointers Fun";
   ChangeString (Message, Position);
   cout<<Message<<" @ "<<Position;
}
```

1(e). What will be the output of the following program:

```
#include <iostream.h>
void main( )
{
   int var1=5, var2=10;
   for (int i=1; i<=2; i++)
   {
      cout<<var1++<<'\t'<<--var2<<endl;
      cout<<var2--<<'\t'<<++var1<<endl;
   }
}
```

1(f). Write definition for a function SumSequence( ) in C++ with two arguments/parameters - double x and int n. The function should return a value of type double and it should perform sum of the following series:

$1/x - 3!/x^2 + 5!/x^3 - 7!/x^4 + 9!/x^5$ - ... up to n terms

(Note: The symbol ! represents Factorial of a number i.e. $5! = 5 \times 4 \times 3 \times 2 \times 1$)

2(a). Given the following C++ code, answer the questions (i) & (ii).

```
class TestMeOut
{
public:
   ~TestMeOut()            //Function 1
   {cout<<"Leaving the examination hall"
<<endl;}
   TestMeOut()             //Function 2
   {cout<<"Appearing for examination"
<<endl;}
   void MyWork()           //Function 3
   {cout<<"Attempting Questions"<<endl;}
};
```

(i) In Object Oriented Programming, what is Function 1 referred as and when does it get invoked / called?
(ii) In Object Oriented Programming, what is Function 2 referred as and when does it get invoked / called?

2(b). Declare a class myfolder with the following specifications:

private members of the class

Member	Description
Filenames	an array of strings of size [10][25] (to represent all the names of files inside myfolder)
Availspace	long (to represent total number of bytes available in myfolder)
Usedspace	long (to represent total number of bytes used in myfolder)

public members of the class

Member	Description
Newfileentry( )	A function to accept values of Filenames, Availspace and Usedspace from user
Retavailspace( )	a function that returns the value of total Kilobytes available (1 Kilobyte = 1024 bytes)
Showfiles( )	a function that displays the names of all the files in myfolder

2(c). Given the following class definitions answer the questions that follow:

```
class livingbeing
{
   char specification[20];
   int averageage;
public:
   void read();
   void show();
};
class ape : private livingbeing
{
   int no_of_organs, no_of_bones;
protected:
   int iq_level;
public:
   void readape();
   void showape();
};
class human : public ape
{
   char race[20];
   char habitation[30];
public:
   void readhuman();
   void showhuman();
};
```

(i) Name the members, which can be accessed from the member functions of class human.
(ii) Name the members, which can be accessed by an object of class ape.
(iii) Name the members, which can be accessed by an object of class human.
(iv) What will be the size of an object (in bytes) of class human?

3(a). Define a function SwapArray(int [ ], int), that would accept a one dimensional integer array NUMBERS and its size N. The function should rearrange the array in such a way that the values of alternate locations of the array are exchanged (Assume the size of the array to be even)

Example:
If the array initially contains
{2, 5, 9, 14, 17, 8, 19, 16},
then after rearrangement the array should contain
{5, 2, 14, 9, 8, 17, 16, 19}

3(b). An array ARR[5][5] is stored in the memory with each element occupying 2 bytes of space. Assuming the base address of ARR to be 1500, compute the address of ARR[2][4], when the array is stored:

(i) Row Wise
(ii) Column Wise

3(c). Write a function in C++ to find the sum of diagonal elements from a 2 dimensional array of type float. Use the array and its size as parameters with float as its return type.

3(d). Obtain the postfix notation for the following infix notation of expression showing the contents of the stack and postfix expression formed after each step of conversion:

A * B + (C - D/F)

3(e). Define member functions queins( ) to insert nodes and quedel( ) to delete nodes of the linked list implemented class queue, where each node has the following structure:

```
struct node
{
   char name[20];
   int age;
   node *Link;
};
class queue
{
   node * rear,* front;
public:
   queue(){rear=NULL;front=NULL;}
   void queins();
   void quedel();
};
```

4(a). Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords( ), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with a lowercase vowel (i.e. with 'a', 'e', 'i', 'o', 'u'). For example if the file FIRST.TXT contains

Carry umbrella and overcoat when it rains

Then the file SECOND.TXT shall contain

umbrella and overcoat it

4(b). Assuming the class Computer as follows:

```
class computer
{
   char chiptype[10];
   int speed;
public:
   void getdetails()
   {
      gets(chiptype);
      cin>>speed;
   }
   void showdetails()
   {
      cout<<"Chip"<<chiptype<<" Speed= "
<<speed;
   }
};
```

Write a function readfile( ) to read all the records present in an already existing binary file SHIP.DAT and display them on the screen, also count the number of records present in the file.

5(a). What do you understand by normalization? What is First Normal Form?

5(b). Given the following tables for a database LIBRARY

Table: Books

Book_Id	Book_Name	Author_Name	Publishers	Price	Type	Quantity
F0001	The Tears	William Hopkins	First Publ.	750	Fiction	10
F0002	Thunder bolts	Anna Roberts	First Publ.	700	Fiction	5
T0001	My First C++	Brian & Brooke	EPB	250	Text	10
T0002	C++ Brainworks	A.W. Rossaine	TDH	325	Text	5
C0001	Fast Cook	Lata Kapoor	EPB	350	Cookery	8

Table: Issued

Book_Id	Quantity_Issued
F0001	3
T0001	1
C0001	5

Write SQL queries for (b) to (g):

To show Book name, Author name and Price of books of EPB publishers

5(c). To list the names of books of Fiction Type

5(d). To display the names and price of the books in descending order of their price

5(e). To increase the price of all books of First Publ. by 50

5(f). To display the Book_Id, Book_Name and Quantity_Issued for all books which have been issued. (The query will require contents from both the tables)

5(g). To insert a new row in the table Issued having the following data:

"F0002", 4

5(h). Give the output of the following queries based on the above tables:

```
(i) SELECT COUNT(DISTINCT Publishers) FROM Books
(ii) SELECT SUM(Price) FROM Books WHERE Quantity >5
(iii) SELECT Book_Name, Author_Name FROM Books WHERE Price<500
(iv) SELECT COUNT (*) FROM Books
```

6(a). State and prove the absorption law algebraically.

6(b). Given the following truth table, derive a sum of product (SOP) and Product of Sum (POS) form of Boolean expression from it:

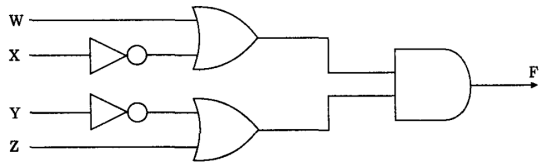
A	B	C	F(A,B,C)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

6(c). Obtain a simplified form for the following Boolean Expression using Karnaugh's Map:

$F(a, b, c, d) = \Sigma (0, 1, 2, 4, 5, 7, 8, 9, 10, 11, 14)$

6(d). Draw the logic circuit for a Half Adder using NAND gates only.

6(e). Interpret the following Logic Circuit as Boolean Expression:



7(a). Write two advantages and two disadvantages for STAR topology.

7(b). Write one difference between coaxial and optical cable.

7(c). Explain the following terms in short:

(i) FTP
(ii) URL

7(d). Define Packet Switching.

- End of Question Paper -