# CBSE Class 12 Computer Science 2009 - Set 91/1

## Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

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

### General Instructions

(i) All questions are compulsory.

(ii) Programming language: C++.

## Questions

**1(a).** What is the difference between call by value and call by reference? Give an example in C++ to illustrate both.

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

(i) puts( )

(ii) sin( )

**1(c).** Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include [iostream.h]
#include [stdio.h]
class Employee
{
int EmpId = 901;
char EName [20] ;
public
Employee ( ) { }
void Joining () {cin>>EmpId; gets
(EName);}
void List ( ) {cout<<EmpId<<" : "
<<EName<<endl;}
} ;
void main ( )
{
Employee E ;
Joining.E ( ) ;
E. List ( )
}
```

**1(d).** Find the output of the following program:

```
#include<iostream.h>
void main ( )
{
int X[ ] = {10, 25, 30, 55, 100};
int *p = X ;
while ( *p < 110)
{
if (*p%3 ! = 0)
*p = *p + 1 ;
else
*p = *p + 2 ;
p++;
}
for(int I = 4 ; 1>= 1 ; I - -)
{
cout << X[I] << "*" ;
if ( I%3 = = 0) cout<<endl ;
}
cout<<X[0]*3<<endl ;
}
```

**1(e).** Find the output of the following program:

```
#include<iostream.h>
#include<ctype.h>
void Encode (char Info [ ], int N) ;
void main ( )
{
char Memo [ ] = "Justnow" ;
Encode(Memo, 2) ;
cout<<Memo<<endl ;
}
void Encode(char Info[ ], int N)
{
for (int I = 0 ; Info[I] != '\0' ; 1++)
if (1%2= =0)
Info[I] = Info[I] –N ;
else if (islower(Info[I]))
Info[I] = toupper(Info[I]) ;
else
Info[I] = Info[I] +N ;
}
```

**1(f).** Study the following program and select the possible output from it :

```
#include <iostream.h>
#include <stdlib.h>
const int LIMIT = 4 ;
void main ( )
{
randomize ( ) ;
int Points;
Points = 100 + random(LIMIT) ;
for (int P=Points ; P>=100 ; P– –)
cout<<P<<"#" ;
cout<<endl;
}
```

(A) 103#102#101#100#

(B) 100#101#102#103#

(C) 100#101#102#103#104#

(D) 104#103#102#101#100#

**2(a).** What is copy constructor? Give an example in C++ to illustrate copy constructor.

**2(b).** Answer the questions (i) and (ii) after going through the following class:

```
class WORK
{
int WorkId;char WorkType ;
public:
~WORK ( )          //Function 1
{ cout<<"Un–Allocated"<<endl ;}
void status ( )    //Function 2
{ cout<<WorkId<<": "<<WorkType<<endl ;}
WORK ( )           //Function 3
{ WorkId = 10; WorkType='T' ; }
WORK(WORK &W)      //Function 4
{
WorkId=W. WorkId+12;WorkType=W. WorkType+l
}
} ;
```

(i) Which member function out of Function 1, Function 2, Function 3 and Function 4 shown in the above definition of class WORK is called automatically, when the scope of an object gets over? Is it known as Constructor OR Destructor OR Overloaded Function OR Copy Constructor?

(ii)

```
WORK W ;       //Statement 1
WORK Y (W) ;   //Statement 2
```

Which member function out of Function 1, Function 2, Function 3 and Function 4 shown in the above definition of class WORK will be called on execution of statement written as statement 2 ? What is this function specifically known as out of Destructor or Copy Constructor or Default Constructor?

**2(c).** Define a class RESORT in C++ with following description:

Private Members: Rno //Data member to store Room No; Name //Data member to store customer name; Charges //Data member to store per day charges; Days //Data member to store number of days of stay; COMPUTE( ) //A function to calculate and return Amount as Days*Charges and if the value of Days*Charges is more than 11000 then as 1.02*Days*Charges

Public Members: Getinfo ( ) //A function to enter the content Rno, Name, Charges and Days; Dispinfo ( ) //A function to display Rno, Name, Charges, Days and Amount (Amount to be displayed by calling function COMPUTE ( ) )

**2(d).** Answer the questions (i) to (iv) based on the following:

```
class FaceToFace
{
char CenterCode [10] ;
public:
void Input ( ) ;
void Output ( ) ;
} ;
class Online
{
char website [50] ;
public:
void SiteIn ( ) ;
void SiteOut ( ) ;
} ;
class Training: public FaceToFace, private
Online
{
long Tcode ;
float charge;
int period;
public:
void Register ( ) ;
void Show ( ) ;
} ;
```

(i) Which type of Inheritance is shown in the above example?

(ii) Write names of all the member functions accessible from Show( ) function of class Training.

(iii) Write name of all the members accessible through an object of class Training.

(iv) Is the function Output( ) accessible inside the function SiteOut( ) ? Justify your answer.

**3(a).** Write a function SORTPOINTS( ) in C++ to sort an array of structure Game in descending order of Points using Bubble Sort.

Note: Assume the following definition of structure Game

```
struct Game
{
long PNo; //Player Number
char PName [20] ;
long Points;
} ;
```

Sample content of the array (before sorting)

| PNo | PName | Points |
|---|---|---|
| 103 | Ritika Kapur | 3001 |
| 104 | John Philip | 2819 |
| 101 | Razia Abbas | 3451 |
| 105 | Tarun Kumar | 2971 |

Sample content of the array (after sorting)

| PNo | PName | Points |
|---|---|---|
| 101 | Razia Abbas | 3451 |
| 103 | Ritika Kapur | 3001 |
| 105 | Tarun Kumar | 2971 |
| 104 | John Philip | 2819 |

**3(b).** An array S[40][30] is stored in the memory along the column with each of the element occupying 4 bytes, find out the base address and address of element S[20][15], if an element S[15][10] is stored at the memory location 7200.

**3(c).** Write a function QUEINS( ) in C++ to insert an element in a dynamically allocated Queue containing nodes of the following given structure:

```
struct Node
{
int PId ;
//Product Id
char Pname [20] ;
NODE *Next ;
} ;
```

**3(d).** Define a function SWAPCOL ( ) in C++ to swap (interchange) the first column elements with the last column elements, for a two dimensional integer array passed as the argument of the function.

Example: If the two dimensional array contains

| 2 | 1 | 4 | 9 |
|---|---|---|---|
| 1 | 3 | 7 | 7 |
| 5 | 8 | 6 | 3 |
| 7 | 2 | 1 | 2 |

After swapping of the content of 1st column and last column, it should be :

| 9 | 1 | 4 | 2 |
|---|---|---|---|
| 7 | 3 | 7 | 1 |
| 3 | 8 | 6 | 5 |
| 2 | 2 | 1 | 7 |

**3(e).** Convert the following infix expression to its equivalent postfix expression showing stack contents for the conversion:

X-Y /(Z + U) * V

**4(a).** Observe the program segment given below carefully and fill in the blanks marked as Line 1 and Line 2 using fstream functions for performing the required task.

```
#include <fstream.h>
class Stock
{
long Ino ;
//Item Number
char Item [20] ;//Item Name
int Qty ;
//Quantity
public:
void Get(int) ;//Function to enter the
content
void show ( ) ;//Function to display the
content
void Purchase (int Tqty)
{
Qty + = Tqty ;
}
//Function to increment in Qty
long KnowIno ( ) {return Ino ;}
} ;
void Purchaseitem (long PINo, int PQty)
//PINo -> Ino of the item purchased
//PQty -> Number of item purchased
{
fstream File;
File.open("ITEMS.DAT", ios :: binarylios
::
inlios :: out);
int Pos = -1 ;
Stock S ;
while (Pos = = -1 && File.read((char*) &S,
sizeof (S)))
if (S. KnowIno( ) = =PINo)
{
S. Purchase (PQty); //To update the number
of Items
Pos = File.tellg ( ) -sizeof (S) ;
//Line 1: To place the file pointer to the
required
position ;
//Line 2: To write the object S on to the
binary
file ;
}
if (Pos = = -1)
cout<<"No updation done as required Ino
not found.." ;
File.close ( ) ;
}
```

**4(b).** Write a function COUNT_DO( ) in C++ to count the presence of a word 'do' in a text file "MEMO.TXT"

Example: If the content of the file "MEMO.TXT" is as follows:

```
I will do it, if you
request me to do it.
It would have been done much earlier.
```

The function COUNT_DO( ) will display the following message:

```
Count of –do– in file : 2
```

Note: In the above example, 'do' occurring as a part of word done is not considered.

**4(c).** Write a function in C++ to read and display the detail of all the users whose status is 'A' (i.e. Active) from a binary file "USER.DAT". Assuming the binary file "USER.DAT" is containing objects of class USER, which is defined as follows:

```
class USER
{
int Uid ;
//User Id
char Uname [20];//User Name
char Status; //User Type: A Active I
Inactive
Public:
void Register ( ) ;//Function to enter the
content
void show ( ) ;    //Function to display
all data
      members
char Getstatus ( ) {return Status;}.
} ;
```

**5(a).** What are candidate keys in a table? Give a suitable example of candidate keys in a table.

**5(b).** Consider the following tables GARMENT and FABRIC. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii)

Table: GARMENT

| GCODE | DESCRIPTION | PRICE |
|---|---|---|
| 10023 | PENCIL SKIRT | 1150 |
| 10001 | FORMAL SHIRT | 1250 |
| 10012 | INFORMAL SHIRT | 1550 |
| 10024 | BABY TOP | 750 |
| 10090 | TULIP SKIRT | 850 |
| 10019 | EVENING GOWN | 850 |
| 10009 | INFORMAL PANT | 1500 |
| 10007 | FORMAL PANT | 1350 |
| 10020 | FROCK | 850 |
| 10089 | SLACKS | 750 |

**5(b).** (continued)

| GCODE | FCODE | READYDATE |
|---|---|---|
| 10023 | F03 | 19-DEC-08 |
| 10001 | F01 | 12-JAN-08 |
| 10012 | F02 | 06-JUN-08 |
| 10024 | F03 | 07-APR-07 |
| 10090 | F02 | 31-MAR-07 |
| 10019 | F03 | 06-JUN-08 |
| 10009 | F02 | 20-OCT-08 |
| 10007 | F01 | 09-MAR-08 |
| 10020 | F04 | 09-SEP-07 |
| 10089 | F03 | 20-OCT-08 |

Table: FABRIC

| FCODE | TYPE |
|---|---|
| F04 | POLYSTER |
| F02 | COTTON |
| F03 | SILK |
| F01 | TERELENE |

(i) To display GCODE and DESCRIPTION of each GARMENT in descending order of GCODE

(ii) To display the details of all the GARMENTs, which have READYDATE in between 08-DEC-07 and 16-JUN-08 (inclusive of both the dates).

(iii) To display the average PRICE of all the GARMENTs, which are made up of FABRIC with FCODE as F03.

**5(b).** (continued)

(iv) To display FABRIC wise highest and lowest price of GARMENTs from GARMENT table. (Display FCODE of each GARMENT along with highest and lowest price)

(v) SELECT SUM (PRICE) FROM GARMENT WHERE FCODE = 'F01' ;

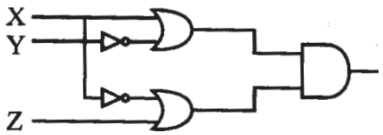
(vi) SELECT DESCRIPTION, TYPE FROM GARMENT, FABRIC WHERE GARMENT.FCODE = FABRIC.FCODE AND GARMENT. PRICE > = 1260 ;

(vii) SELECT MAX (FCODE) FROM FABRIC;

(viii) SELECT COUNT (DISTINCT PRICE) FROM GARMENT ;

**6(a).** Verify X'Y + X.Y' + X'Y' = (X' + Y') using truth table.

**6(b).** Write the equivalent Boolean Expression for the following Logic Circuit:




**6(c).** Write the POS form of a Boolean function H, which is represented in a truth table as follows:

| A | B | C | H |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

**6(d).** Reduce the following Boolean Expression using K-Map :

F(P, Q, R, S) = Σ(1, 2, 3, 5, 6, 7, 9, 11, 12, 13, 15)

**7(a).** What is difference between Star Topology and Bus Topology of network?

**7(b).** Expand the following abbreviations:

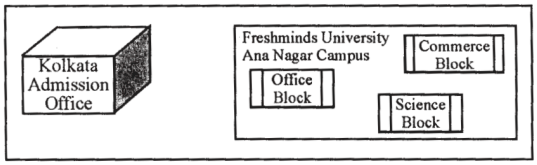
(i) GSM

(ii) CDMA

**7(c).** What is protocol? Which protocol is used to search information from internet using an internet browser?

**7(d).** Name two switching techniques used to transfer data between two terminals (computers ).

**7(e).** Freshminds University of India is starting its first campus in Ana Nagar of South India with its center admission office in Kolkata. The university has 3 major blocks comprising of Office Block, Science Block and Commerce Block in the 5 KM area Campus.




As a network expert, you need to suggest the network plan as per (E1) to (E4) to the authorities keeping in mind the distance and other given parameters.

Expected Wire distances between various locations:

| From | To | Distance |
|---|---|---|
| Office Block | Science Block | 90 m |
| Office Block | Commerce Block | 80 m |
| Science Block | Commerce Block | 15 m |
| Kolkata Admission office | Ana Nagar Campus | 2450 km |

Expected number of Computers to be installed at various locations in the University are as follows:

| Location | Computers |
|---|---|
| Office Block | 10 |
| Science Block | 140 |
| Commerce Block | 30 |
| Kolkata Admission office | 8 |

**7(e)(E1).** Suggest the authorities, the cable layout amongst various blocks inside university campus for connecting the blocks.

**7(e)(E2).** Suggest the most suitable place (i.e. block) to house the server of this university with a suitable reason.

**7(e)(E3).** Suggest an efficient device from the following to be installed in each of the blocks to connect all the computers:

(A) MODEM (B) SWITCH

(C) GATEWAY

**7(e)(E4).** Suggest the most suitable. (very high speed) service to provide data connectivity between Admission Office located in Kolkata and the campus located in Ana Nagar from the following options:

Telephone line; Fixed-Line Dial-up connection; Co-axial Cable Network; GSM; Leased line; Satellite Connection

**- End of Question Paper -**