CBSE Class 12 Computer Science 2017 - 91 (Set-4) C++ - Compartment

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

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

General Instructions

(i) This C++ version contains 7 main questions: the C++ programming option and the common section.

(ii) The official paper offers Section A (C++) or Section B (Python). This version includes Section A and the compulsory Section C.

(iii) Attempt all questions in the selected programming section and in Section C.

(iv) State the selected programming section on the first page of the answer-book.

(v) Follow any internal choices printed with individual questions.

Section A — C++

1(a). Write the type of C++ tokens (keywords and user defined identifiers) from the following:

1. case
2. _delete
3. WHILE
4. 21stName

1(b). Jayneel has just started learning C++. He typed the following C++ code and during the compilation of the code, he got some errors. When Jayneel asked his teacher, the teacher told him to include necessary header files in the code.

Write the names of those header files, which Jayneel needs to include, for successful compilation and execution of the following code.

```
void main()
{
    cout <<"We win !"<<endl;
    cout <<strlen("The World")<<endl ;
}
```

1(c). Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.

Note: Assume all header files required in the code are already being included.

```
#define 10*Number MAX(Number)
void main()
{
    int Num,NewNum;
    cout<<"Number:";
    cin<<Num;
    if Num<10
        NewNum=MAX(Num);
    else
        NewNum=Num-2;
    cout<<"New Number:"<<NewNum<<end;
}
```

1(d). Find and write the output of the following C++ program code:

Note: Assume all required header files are already included in the program.

```
void Decider(int &K,int L=70)
{
    if (K>L)
        K-=L;
    else
        K+=L;
}
void main()
{
    int M=100,N=40;
    Decider(M,N);
    cout<<M<<"#"<<N<<endl;
    Decider(M);
    cout<<N<<"#"<<M<<endl;
}
```

1(e). Find and write the output of the following C++ program code:

Note: Assume all required header files are already being included in the program.

```
void DispScore(int S[],int N)
{
    for(int Count = 0;Count<N;Count++)
        cout<<S[Count]<<"#";
    cout<<endl;
}
void main()
{
    int *Point,Score[]={10,5,20,15};
    Point=Score;
    DispScore(Score,2);
    for(int Count=0; Count<4; Count++)
    {
        cout<<*Point<<":";
        if(Count%2==0)
           Point++;
        else
        {
           *Point +=10;
           Point++;
        }
    }
    cout<<endl;
    DispScore(Score,4);
}
```

1(f). Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables Low and High.

Note: Assume all the required header files are already being included in the code. The function random(n) generates an integer between 0 and n-1.

```
void main()
{
    randomize();
    int Low=2+random(3),High=5+random(3);
    int C[] = "ABCDEFGHIJ";
    for(int I=Low;I<=High;I++)
        cout<<C[I];
    cout<<endl;
}
```

(A) BCDE (B) CDEF

(C) CDE (D) DCEFG

2(a). Differentiate between Data Hiding and Data Encapsulation in context of Object Oriented Programming. Also give a suitable example illustrating the same in C++.

2(b). Observe the following C++ code and answer the questions (i) and (ii).

Note: Assume all necessary files are included.

```
class GAME
{
    int Pcode,Round,Score;
public:
    GAME()                  //Member
Function 1
    {
        Pcode=1;Round=0;Score=0;
    }
    GAME(GAME &G)           //Member
Function 2
    {
        Pcode=G.Pcode+1;
        Round=G.Round+2;
        Score=G.Score+10;
    }
};
void main()
{
    _____________           //Statement 1
    _____________           //Statement 2
}
```

2(b)(i). Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class GAME?

2(b)(ii). Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively.

2(c). Write the definition of a class FRAME in C++ with following description:

Private Members

```
- FID      // data member of integer type
- Height   // data member of float type
- Width    // data member of float type
- Amount   // data member of float type
- GetAmount() // Member function to
calculate and assign
              // Amount as 10*Height*Width
```

Public Members

```
- GetDetail() // A function to allow user
to enter values of
               // FID, Height, Width.
This Function should
               // also call GetAmount()
function to calculate
               // Amount
- DispDetail()  // A function to display
the
               // values of all data
members
```

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

```
class DIGITAL
{
    int ID;
protected:
    float Amount;
    int Seconds;
public:
    DIGITAL();
    void Register(); void Disp();
};
class PRINT
{
    int PID;
protected:
    float Amount;
    int SQinch;
public:
    PRINT();
    void Get();
    void Print();
};
class MEDIA : Public PRINT, private
DIGITAL
{
    int MID;
public:
    MEDIA();
    void Enter();
    void Print();
};
void main()
{
    MEDIA M;      //Statement 1
    __________;   //Statement 2
}
```

1. Which type of Inheritance out of the following is illustrated in the above example? – Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
2. Write the names of all the member functions, which are directly accessible by the object M of class MEDIA as declared in main( ) function.
3. What will be the order of execution of the constructors, when the object M of class MEDIA is declared inside main( )?
4. Write Statement 2 to call function Print( ) of class PRINT from the object M of class MEDIA.

3(a). Write the definition of a function **MIXER(int A[], int N)** in C++, which should multiply 2 to the odd values present in the array and multiply 3 to the even values present in the array. The entire content of the array A having N elements should change without using any other array.

Example: if the array Arr contains

23	20	5	11	10

Then the array should become

46	60	10	22	30

Note: The function should not display the content of the array.

3(b). Write definition for a function **TOPBOTTOM(int M[][5],int N,int M)** in C++, which finds and displays sum of the values in topmost row and sum of the values in bottommost row of a matrix M (Assuming the parameter N represents number of Row and the parameter M represents number of Columns).

For example, if the content of array M having N as 4 and M as 5 is as follows:

10	20	30	40	50
12	15	32	4	15
38	4	11	24	15
5	10	15	20	25

The function should find the sum and display the same as:

```
Sum of Top Row : 150
Sum of Bottom Row : 75
```

3(c). G[15][20] is a two dimensional array, which is stored in the memory along the column with each of its element occupying 4 bytes, find the address of the element G[5][10], if the element G[2][4] is stored at the memory location 52000.

3(d). Write the definition of a member function **PUSHBOOK( )** in C++ to add information of BOOL in a static stack implemented using an array of structure BOOK (definition of struct BOOK is defined below for reference).

```
struct BOOK
{
    int BNO;
    char TITLE[20];
};
```

3(e). Evaluate the following Postfix expression showing the stack contents for each step of conversion.

```
50,40,-,4,5,*,+
```

4(a). Write a function definition **ARTICLES()** in C++ to count all the articles “the”, “a” and “an” present in a text file “BOOK.TXT”.

Note: Ensure that “the”, “a” and “an” are counted as independent words and not as a part of any other word.

Example:

If the following is content in the file BOOK.TXT:

```
We should choose a low fat diet. The chef
is really good
in the hotel. An article came in the
newspaper about him.
```

The function ARTICLE( ) should display the following output:

```
5
```

4(b). Write definition of a function **CALSAL( )** in C++ to find the total salary paid to all the workers in a company. The worker's detail of this company is stored in a binary file WORKERS.DAT.

Assume that the file WORKERS.DAT is created with the help of objects of class WORKER, which is defined below:

```
class WORKER
{
    int WID; char Name[20];
    float Salary;
public:
    void INPUT()
    {
        cin>>WID;gets(Name);cin>>Salary;
    }
    void OUTPUT()
    {
        cout<<WID<<":"<<Name<<end1;
        cout<<Salary<<endl;
    }
    float *GetSal(){return Salary;}
};
```

4(c). Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 350 products.

```
class PRODUCT
{
    int PCode;char PName[20];
public:
    void Entry();void Disp();
};
void main()
{
    fstream In;

In.open("PRODUCT.DAT",ios::binary|ios::in)
;
    PRODUCT P;
    In.seekg(0,ios::end);
    cout<<"Total Count: "
<<In.tellg()/sizeof(P)<<endl;
    In.seekg(70*sizeof(P));
    In.read((char*)&P, sizeof(P));
    In.read((char*)&P, sizeof(P));
    cout<<"At Product:"
<<In.tellg()/sizeof(P) + 1;
    In.close();
}
```

Section C — Common Questions

5(a). Observe the following table CANDIDATE carefully and write the name of the RDBMS operation, which has been used to produce the output as shown in OUTPUT? Also, find the Degree and Cardinality of the OUTPUT.

TABLE _ A

NO	ALPHA
C1	X
C2	Y
C3	Z

TABLE _ B

CODE	VALUE
101	3000
102	4000

OUTPUT

NO	ALPHA	CODE	VALUE
C1	X	101	3000
C1	X	102	4000
C2	Y	101	3000
C2	Y	102	4000
C3	Z	101	3000
C3	Z	102	4000

(A) SELECTION
(B) PROJECTION
(C) UNION
(D) CARTESIAN PRODUCT

5(b). Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables:

TABLE : SALESPERSON

Code	NAME	SALARY	ITCODE
1001	TANDEEP JHA	60000	I2
1002	YOGRAJ SINHA	70000	I5
1003	TENZIN JACK	45000	I2
1005	ANOKHI RAJ	50000	I7
1004	TARANA SEN	55000	I7

TABLE : ITEM

ITCODE	ITEMTYPE	TURNOVER
I5	STATIONARY	3400000
I7	HOSIERY	6500000
I2	BAKERY	10090000

1. To display the CODE and NAME of all SALESPERSON having “I7” Item Type Code from the table SALESPERSON.
2. To display all details from table SALESPERSON in descending order of SALARY.
3. To display the number of SALESPERSON dealing in each TYPE of ITEM. (Use ITCODE for the same)
4. To display NAME of all the salespersons from the SALESPERSON table along with their corresponding ITEMTYPE from the ITEM table.
5. SELECT MAX(SALARY) FROM SALESPERSON;
6. SELECT DISTINCT ITCODE FROM SALESPERSON;
7. SELECT CODE,NAME, I.ITCODE FROM SALESPERSON S, ITEM I WHERE S.ITCODE=I.ITCODE AND TURNOVER>=700000;
8. SELECT SUM(SALARY) FROM SALESPERSON WHERE ITCODE=”I2”;

6(a). State Absorption Laws of Boolean Algebra and verify them using truth table.

6(b). Draw the Logic Circuit of the following Boolean Expression using only NOR Gates:

A. B' + C

6(c). Derive a Canonical POS expression for a Boolean function F, represented by the following truth table:

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

6(d). Reduce the following Boolean Expression to its simplest form using K-Map:

$F(P,Q,R,S) = \Sigma(0,1,2,3,4,5,6,9,13)$

7(a). Write one name of wireless and one wired communication medium.

7(b). Name any two private Internet Service Providers (company) in India.

7(c). Pratibha is an IT expert and a freelancer. She is undertakes those jobs, which are related to setting up security software/tools and managing networks in various companies. If we name her role in these companies, what it will be out of the following: (justify the reason for you chosen option)

(A) Cracker (B) Network Admin

(C) Hacker (D) Operator

7(d). Go-Fast corporation is a Hyderabad based company, which is planning to set up training campuses in various cities in next 3 years. Their first campus is coming up in Pune. At Pune campus, they are planning to have 4 different blocks for HR, Web Design Training, Programming Training and Hardware Training. Each block has number of computers, which are required to be connected in a network for communication, data and resource sharing.

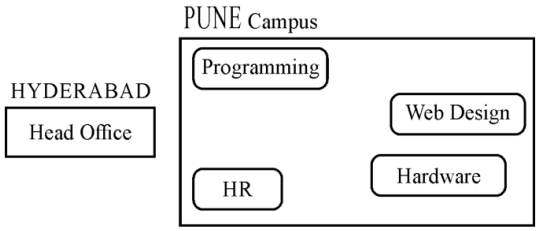
As a network consultant of this company, you have to suggest the best network related solutions for them for issues/problems raised in (i) to (iv), keeping in mind the distances between various blocks/locations and other given parameters.

Shortest distances between various blocks/locations:

Programming Block to HR Block	60 metres
Programming Block to Web Design Block	50 metres
Programming Block to Hardware Block	70 metres
HR Block to Web Design Block	120 metres
HR Block to Hardware Block	85 metres
HYDERABAD Head Office to PUNE Campus	504 Km

Number of Computers installed at various blocks are as follows:

HR Block	10
Programming Block	100
Web Design Block	60
Hardware	40



7(d)(i). Suggest the most appropriate block/location to house the SERVER in the PUNE Campus (out of the 4 blocks) to get the best and effective connectivity. Justify your answer.

7(d)(ii). Suggest a device/software to be installed in the PUNE Campus to take care of data security.

7(d)(iii). Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various Blocks within the PUNE campus.

7(d)(iv). Suggest a device and the protocol that shall be needed to provide Video Conferencing solution between PUNE Campus and Hyderabad Head Office.

- End of Question Paper -