



CREATIVE EDUCATION FOUNDATION, KARKALA
SECOND PU ANNUAL EXAMINATION MARCH- 2023
COMPUTER SCIENCE DETAILED SOLUTION

PART - A

Answer ALL the questions. Each question carries 1 mark.

(20X1 = 20)

I. Select the correct answer from the choices given.

1) _____ are used to connect external devices like printers, keyboards. scanners to the computer.

- a) Slots b) Ports c) Bus d) Controllers

Ans: b) Ports

2) Involution law states that

- a) $\overline{\overline{X}} = X$ b) $X.X=X$ c) $X+X=X$ d) $\overline{\overline{X}} = 0$

Ans: a) $\overline{\overline{X}} = X$

3) _____ gate is also called an Inverter.

- a) OR b) AND c) NOT d) NAND

Ans: c) NOT

4) _____ is the process of accessing each data item at least once to perform some operation.

- a) Traversing b) Insertion c) Deletion d) Sorting

Ans: a) Traversing

5) _____ operator is used to define member function outside the class.

- a) :: b) ; c) . d) :

Ans: a) ::

6) Friend function is a _____

- a) Member function b) Non-member function
c) Main function d) Recursive function

Ans: b) Non-member function

7) _____ is a special function that is used to initialize the objects of a class automatically.

- a) Constructor b) Non-member function c) Inline function d) Friend function

Ans: a) Constructor

8) Derived class is called _____

- a) Sub class b) Super class c) Main class d) First class

Ans: a) Sub class

9) Which of the following is the correct way to declare a pointer?

- a) int *ptr b) int ptr c) int & ptr d) All of the above

Ans: a) int *ptr

10) Row in a table is called _____

- a) Relation b) Attribute c) Degree d) Tuple

Ans: d) Tuple

11) _____ command is used to delete entire table in SQL.

- a) Alter b) Create c) Drop d) Delete

Ans: c) Drop

12) URL stands for _____

- a) Uniform Resource Location b) Uniform Resource Locator
c) Uniform Reservation Location d) Uniform Road Location

Ans: b) Uniform Resource Locator

13) _____ is a device that connects dissimilar networks.

- a) Gateway b) Bridge c) Hub d) Switch

Ans: a) Gateway

14) _____ is a collection of computer networks all over the world.

- a) Intranet b) Internet c) Telnet d) Interspace

Ans: b) Internet

15) _____ is a collection of web pages.

- a) Package b) Domain c) Server d) Website

Ans: d) Website

II. Fill in the blanks choosing the appropriate word/words from those given in the brackets.

(Security, primary key, Diamond, Schema, Redundancy)

16) The structure of database is called as Schema.

17) Diamond is the symbol used to represent relationship in E-R diagram.

18) Primary key uniquely identifies each record in a table.

19) Protection of data is the Security.

20) Data duplication is called as Redundancy.

PART - B

III. Answer any four questions. Each question carries 2 marks.

(4x2=8)

21) Prove $X+XY=X$ algebraically.

$$LHS = X+XY$$

$$= X(1+Y)$$

$$= X.1$$

$$(\because 1+Y=1 \text{ \& } X.1=X)$$

$$= X=RHS$$

22) Define minterm and maxterm.

Minterm is a product of all the literals (with or without bar) within the logic system.

Maxterm is sum of all the literals (with or without bar) within the logic system.

23) Give any two applications of OOP.

- CAD/ CAM Software.
- Computer graphic applications.
- Object -Oriented Database.
- Real-time systems.
- Artificial intelligence and expert systems.
- User Interface design such as windows.

[Any two]

24) Mention the features of parameterized constructor.

- The parameterized constructors can be overloaded.
- For an object created with one argument, constructor with only one argument is invoked and executed.
- The parameterized constructor can have default arguments and default values.

[Any two]

25) Differentiate between read() and write() with respect to files.

read()	write()
1. It belongs to the class ifstream.	1.It belongs to the class ofstream.
2. It reads binary data from a file.	2. It writes binary data to a file.
3.Syntax: ifstream_object.read((char*)&variable, sizeof(variable));	3.Syntax: ofstream_object.write((char*)&variable, sizeof(variable));

[Any two]

26) Define a) data b) information

- Data is a collection of facts, figures, statistics which can be processed to produce meaningful information.
- Information is processed data, stored or transmitted by a computer.

27) Give the syntax and example of UPDATE command in SQL.

The update command used to modify or update already existing rows of a table.

Syntax: UPDATE table_name SET column=value where condition;

Example: UPDATE student SET percent=total/6;

28) Briefly explain circuit switching technique.

- In this technique, the complete physical connection between two computers is established and then data are transmitted from the source to the destination computer.
- It establishes an End to End connection between sender and receiver computer.

- When a computer places a telephone call the switching equipment within the telephone system seeks a physical copper path from sender telephone to the receiver's telephone.

PART -C

IV. Answer any four questions. Each question carries 3 marks.

(4X3=12)

29) Explain the cache memory.

- The cache memory is a very high-speed memory placed in between RAM and CPU.
- It is used to increase the speed of processing.
- It stores data that is used more often, temporarily and makes it available to CPU at a fast rate.
- Generally, computers have cache memory of sizes 256 KB to 2MB.
- There are two types of cache
L1 (Level 1) cache located in CPU.
L2 (Level 2) cache located on the motherboard.

30) What is principle of duality? Give an example.

This theorem states that a Boolean relation can be derived from another Boolean relation by,

- Changing each OR sign (+) to an AND sign (.) and by Changing each AND sign (.) to an OR sign(+)
- Changing each 0 by 1 and each 1 by 0.

Example: Dual of $X+1=1$ is $X.0=0$

31) What is stack? Write an algorithm for PUSH operation.

Stack is a ordered collection of data items where insertion and removal of items takes place at same end called "top".

Algorithm for PUSH operations:

Step 1: IF $TOP=N-1$ then

PRINT "STACK IS FULL"

EXIT

[end of if]

Step 2: $TOP=TOP+1$

Step 3: $STACK[TOP]=ITEM$

Step 4: RETURN

32) What is array of pointers? Give example.

Array of pointer is an array which stores collection of addresses.

Example:

```
int *p[3];
```

```
int a=6,b=8,c=4;
```

```
p[0]=&a; /*p[0]=6
p[1]=&b; /*p[1]=8
p[2]=&c; /*p[2]=4
```

33) What is file? Write the difference between text and binary file.

The information/data stored under a specific name on a storage device is called a file.

Difference between text and binary file.

Text File

- It is a file that stores information in ASCII characters.
- EOF and EOL characters are allowed.
- In this file translation is required to binary format.

Binary File

- Binary file contains information in the same format as it is held in the memory.
- EOF and EOL characters are not allowed.
- No translation is required.

[Any two]

34) Explain any three features of database management system.

- **Centralized data management:** Data are stored at central location and shared among multiple users.
- **Controlled data redundancy:** This eliminates replicating (duplication) of data and saves the storage space.
- **Data sharing:** The data stored in the database can be shared among multiple users or application programs.
- **Data security:** Since the data is stored centrally, providing security is much easier.
- **Multiple user interfaces:** DBMS provides different types of interfaces to fulfill the requirements of different users having different technical knowledge.
- **Backup and recovery:** It provide backup and recovery sub system that is responsible for recovery from hardware and software failures.

[Any three]

35. Mention any three technologies and services used in e- commerce.

- Electronic mail (e-mail).
- E-banking / Net banking.
- Electronic fund transfer (EFT).
- Electronic data interchange.
- Digital cash, smart cards, security services etc.

[Any three]

36) Write the features of DHTML.

- An object-oriented view of a web page and its elements.
- Cascading style sheets and the layering of content.

- Dynamic fonts.
- Programming that can address all or most page elements.

PART - D

V. Answer any six questions. Each question carries 5 marks.

(6 x 5 = 30)

37) Given the Boolean function $f(A,B,C,D) = \sum(0, 1, 2, 3, 4, 8, 12, 13)$ Reduce it by using K-map.

AB \ CD	CD			
	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	0	0
AB	1	1	0	0
$A\bar{B}$	1	0	0	0

Quad 1: $\bar{A}\bar{B}$ (cells 0, 1, 2, 3)
 Quad 2: $\bar{C}\bar{D}$ (cells 0, 4, 8, 12)
 Pair 1: $AB\bar{C}$ (cells 12, 13)

Reduced expression Quad 1 : $\bar{A}\bar{B}$

Reduced expression Quad 2 : $\bar{C}\bar{D}$

Reduced expression Pair 1 : $AB\bar{C}$

Final reduced SOP expression is $\bar{A}\bar{B} + \bar{C}\bar{D} + AB\bar{C}$

38) Write an algorithm to SORT elements of an array in ascending order using insertion sort method.

Step 1: FOR I=1 to N-1

Step 2: J = I

WHILE(J >= 1)

IF (A[J] < A[J-1]) THEN

TEMP = A[J]

A[J] = A[J-1]

A[J-1] = TEMP

[END IF]

J = J-1

[End of While loop]

[End of For loop]

Step 3: EXIT

39) Explain the operations on queue data structure.

- **Queue():** Creates an empty queue.
- **enqueue(item):** Adds a new item to the rear of the queue.

- **dequeue():** Removes the front item from the queue.
- **isEmpty():** It checks whether the queue is empty or not.
- **Size():** Returns the number of items in the queue.

40) Mention any five advantages of object-oriented programming.

- The programs are modularized based on the principle of classes and objects.
- Data abstraction separates object specification and object implementation.
- Data is encapsulated with functions, so non-member cannot access data, thus data is more secured.
- By sharing common code OOP reduces code duplication and code reusability.
- Easier to develop complex software, because complexity can be minimized through inheritance.
- Creation and implementation of OOP code is easy and reduces software development time.
- OOP can communicate through message passing which makes interface description with outside system very simple.

[Any five]

41) Explain member function outside class definition. Give an example.

Member functions declared within a class must be defined separately outside the class.

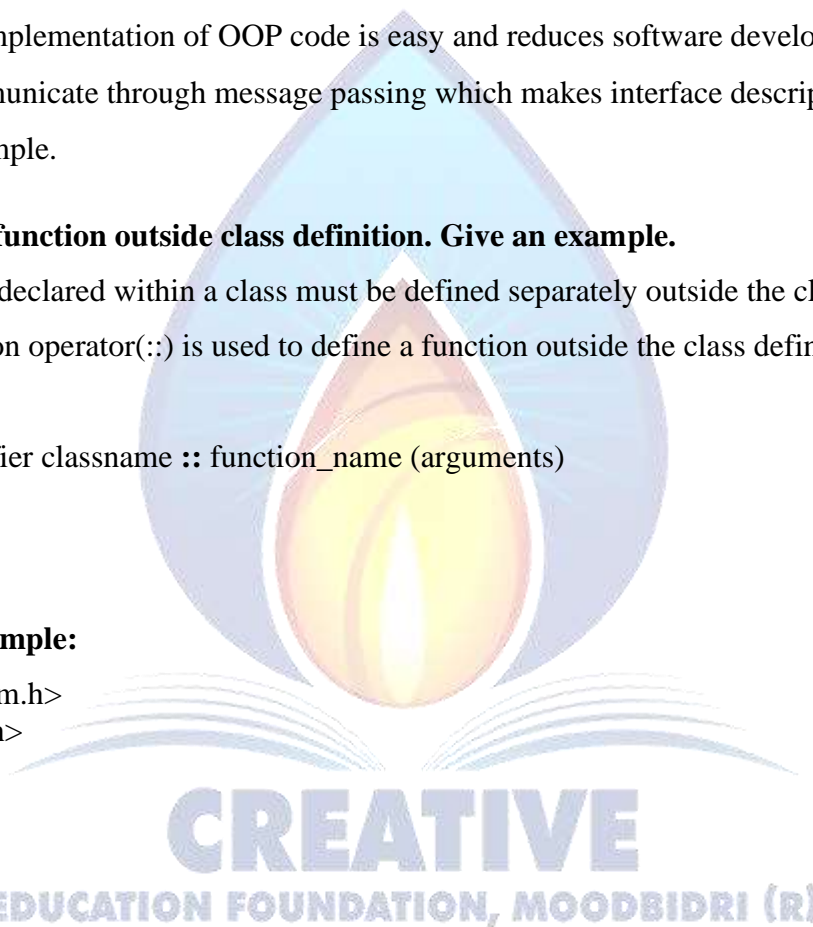
The scope resolution operator(::) is used to define a function outside the class definition.

Syntax:

```
return_type_specifier classname :: function_name (arguments)
{
    function body
}
```

Programming Example:

```
#include<iostream.h>
#include<conio.h>
class sum
{
    private:
        int a,b;
    public:
        void input( );
        void output( );
};
void sum::input( )
{
    cout<<"Enter two number";
    cin>>a>>b;
}
void sum::output( )
{
    cout<<" The sum is="<<a+b;
}
void main( )
{
    sum s;
```



```

s.input( );
s.output( );
getch( );
}

```

42) Mention the characteristics of friend function.

- A friend function is a non-member function which can access both private and protected members of a class.
- It can be declared anywhere in the class definition, because it is not affected by access specifiers.
- The function is declared with keyword friend.
- While defining friend function it does not use either keyword friend or :: operator.
- A friend function can be invoked like normal function without help of any objects.
- It cannot access the member variables directly and has to use an object name and dot operator(.) with each member name.

[Any five]

43) Define destructor. Explain with syntax and example.

Destructor is a special member function that destroys an object created by constructors.

Syntax	Example
<pre> class classname { public: classname() { body of the constructor } ~classname() { body of the destructor } }; </pre>	<pre> class sum { int a,b; public : sum() { a=0; b=0; } ~sum() { } }; </pre>

44) Mention the advantages of inheritance.

- Faster program development time.
- Code reusability.
- Easy to maintain the code.
- Easy to extend the existing code.
- Proper Memory utilization.

45) Explain data processing cycle

i) Data Input: The raw data is put into the computer using a keyboard, mouse or other devices such as the scanner, microphone and the digital camera.

ii) Data Processing It is a series of actions or operations on the input data to generate outputs.

Operations can be some condition, calculation, sorting etc.

iii) Data storage: Data should be stored in memory so that it can be accessed later

There are two types of storage:

a) Primary storage: It holds data temporarily in devices like RAM.

b) Secondary storage: It holds data permanently in devices like pendrive, hard disk.

iv) Output: Result obtained after processing the data must be presented to the user in user understandable form using devices like monitor, printer, speakers etc.

v) Communication: In communication, data is sent through wired or wireless connections.

Example: LAN, E-mail etc.

46) Explain the following with an example.

a) COUNT() b) MAX() c) MIN() d) AVG() e) SUM()

a) **COUNT():** This function returns the number of rows in the table.

Example: SELECT COUNT (*) from student;

b) **MAX():** This function is used to get the maximum value from a column.

Example: SELECT MAX (total) from student;

c) **MIN():** This function is used to get the minimum value from a column.

Example: SELECT MIN (total) from student;

d) **AVG():** This function is used to get the average value of a numeric column.

Example: SELECT AVG (total) from student;

e) **SUM():** This function is used to get the sum value of a numeric column.

Example: SELECT SUM (total) from student;

47) Explain Computer network security in detail.

Network security is to make sure that only legal or authorized user and programs gain access to information resources.

Different Protection Methods are:

Authorization:

- Authorization confirms the service requestor's credential.
- Authorization is performed by asking the user a legal login ID. If the user is able to provide a legal login ID, he/ she are considered an authorized user.

Authentication:

- Authentication involves accepting credentials from the entity and validating them against an authority.

- Authentication also termed as password protection as the authorized user is asked to provide a valid password.

Encrypted Smart Cards:

- An encrypted smart card is a card that can generate a token that a computer system can recognize.
- Every time a new and different token is generated, which even though cracked or hacked, cannot be used later.

Bio Metric Systems:

- They form the most secure level of authorization. The Biometric systems involve some unique aspects of a person's body such as finger prints, face, iris etc.

Firewall: A system designed to prevent unauthorized access to or from a private network.

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