

UNIT I

C PROGRAMMING BASICS

2 MARKS

1. What are the different data types available in 'C'? (APR/MAY 2014)

There are four basic data types available in 'C'.

1. int
2. float
3. char
4. double

2. What are Keywords? (APR/MAY 2012,NOV/DEC 2017)

Keywords are certain reserved words that have standard and pre-defined meaning in 'C'. These keywords can be used only for their intended purpose.

3. What is an Operator and Operand? (MAY 2015/NOV/DEC2014)

An operator is a symbol that specifies an operation to be performed on operands.

Example: *, +, -, / are called arithmetic operators.

The data items that operators act upon are called operands.

Example: a+b; In this statement a and b are called operands.

4. What is Ternary operators or Conditional operators? (APR/MAY2014)

Ternary operators is a conditional operator with symbols ? and :

Syntax: variable = exp1 ? exp2 : exp3

If the exp1 is true variable takes value of exp2. If the exp2 is false, variable takes the value of exp3.

5. What are the Bitwise operators available in 'C'?

& -Bitwise AND
| - Bitwise OR
~ - One's Complement
>> - Right shift
<< - Left shift
^ -Bitwise XOR are called bit field operators

Example: k=~j; where ~ take one's complement of j and the result is stored in k.

6. What are the logical operators available in 'C'? (NOV/DEC2014)

The logical operators available in 'C' are

&& - Logical AND
|| - Logical OR
! - Logical NOT

AND (&): Only used in Bitwise manipulation. It is a unary operator.

7. What is the difference between if and while statement (APR/MAY 2013/2015 NOV2016)

If	while
(i) It is a conditional statement	(i) It is a loop control statement
(ii) If the condition is true, it executes some statements.	(ii) Executes the statements within the while block if the condition is true.
(iii) If the condition is false then it stops the execution the statements.	(iii) If the condition is false the control is transferred to the next statement of the loop.

8. What is the difference between while loop and do...while loop? (APR/MAY 2013/2015)

In the while loop the condition is first executed. If the condition is true then it executes the body of the loop. When the condition is false it comes of the loop. In the do...while loop first the statement is executed and then the condition is checked. The do...while loop will execute at least one time even though the condition is false at the very first time.

9. What is a Modulo Operator?

'%' is modulo operator. It gives the remainder of an integer division

Example:

a=17, b=6. Then c=%b gives 5.

10. What are the types of I/O statements available in 'C'? (NOV/DEC 2018)

There are two types of I/O statements available in 'C'.

Formatted I/O Statements

Unformatted I/O Statements

11. What is the difference between ++a and a++?(NOV/DEC2015)

++a means do the increment before the operation (pre increment)

a++ means do the increment after the operation (post increment)

Example:

```
a=5;
x=a++;
y=a;
x=++a;
```

12. What is a String? (NOV/DEC 2018)

String is an array of characters.

13. What is a global variable?(APR/MAY2016)(NOV/DEC2015)

The global variable is a variable that is declared outside of all the functions. The global variable is stored in memory, the default value is zero. Scope of this variable is available in all the functions. Life as long as the program's execution doesn't come to an end.

14. What is the difference between scanf() and gets() function?

In scanf() when there is a blank was typed, the scanf() assumes that it is an end. gets() assumes the enter key as end. That is gets() gets a new line (\n) terminated string of characters from the keyboard and replaces the '\n' with '\0'.

15. List the types of operators. (APR/MAY 2016)

S No	Operators Types	Symbolic Representation
1	Arithmetic operators	=, -, *, / and %
2	Relational operators	>, <, ==, >=, <= and !=
3	Logical operators	&&, and !
4	Increment and Decrement operators	++ and --
5	Assignment operators	=, +=, -=, *=, /=, ^=, ;=, &=
6	Bitwise operators	&, , ^, >>, <<, and ~
7	Comma operator	,
8	Conditional operator	?:

16. Distinguish between while..do and do..while statement in C. (JAN 2009)

While..DO

DO..while

(i) Executes the statements within the while block if only the condition is true.	(i) Executes the statements within the while block at least once.
(ii) The condition is checked at the starting of the loop	(ii) The condition is checked at the end of the loop

17. Compare switch() and nestedif statement.(APR

S No	switch() case	nested if
1	Test for equality ie., only constant values are applicable.	It can equate relational (or) logical expressions.
2	No two case statements in same switch.	Same conditions may be repeated for a number of times.
3	Character constants are automatically converted to integers.	Character constants are automatically converted to integers.
4	In switch() case statement nested if can be used.	In nested if statement switch case can be used.

18. Give the syntax for the ‘for’ loop statement ((JAN 2009 APR/MAY2012 NOV/DEC2018))

```
for (Initialize counter; Test condition; Increment / Decrement)
{
    statements;
}
```

19. What is a loop control statement?(NOV/DEC2016)

Many tasks done with the help of a computer are repetitive in nature. Such tasks can be done with loop control statements.

20. What are global variables in 'C'? (APR/MAY 2016)

- This section declares some variables that are used in more than one function. Such variables are called as global variables.
- It should be declared outside all functions.

13 MARKS

1. Explain in detail about 'C' declarations and variables. (APR/MAY 2015)
2. Explain in detail about the constants, expressions and statements in 'C'. (NOV/DEC 2016)
3. Discuss about the various data types in 'C'. (APR/MAY 2009)
4. Describe the various types of operators in 'C' language along with its priority. (APR/MAY 2015)(NOV/DEC 2017)
5. Explain about the various decision making statements in 'C' language. (MAY 2009/NOV 2010)
6. Write short notes on the following: (APR/MAY 2015)(NOV/DEC 2017)

'for' loop
'while' loop
'dowhile' loop
'Switch case'

7. Explain briefly about the input and output function in 'C'. (MAY 2009/NOV 2014)

UNIT II

2 MARKS

1. **What is meant by Recursive function? (NOV 2018)**
If a function calls itself again and again, then that function is called Recursive function.
2. **What is an array? (APR/MAY 2014)(NOV/DEC 2016)**
An array is a group of similar data types stored under a common name.
`int a[10];`
Here a[10] is an array with 10 values.
3. **What is a Pointer? How a variable is declared to the pointer? (MAY 2016)**
Pointer is a variable which holds the address of another variable.
Pointer Declaration:
`datatype *variable-name;`
Example:
`int *x, c=5;`
`x=&a;`
4. **What are the uses of Pointers? (NOV/DEC 2018)**

- Pointers are used to return more than one value to the function
 - Pointers are more efficient in handling the data in arrays
 - Pointers reduce the length and complexity of the program
 - They increase the execution speed
- The pointers saves data storage space in memory

5.What are * and & operators means?(NC2014NOV/DEC)

- ‘*’ operator means ‘value at the address’
- ‘&’ operator means ‘address of’

8.How can you return more than one value from a function?

A Function returns only one value. By using pointer we can return more than one value.

9. What are the types of errors occurred in C program?(APR2014,NOV2016,APR2017)

- Syntax errors
- Runtime errors
- Logical errors
- Latent errors

10.What are the pre-processor directives?(APR/MAY 2018)(NOV2016)

- Macro Inclusion
- Conditional Inclusion
- File Inclusion

11. Why is it necessary to give the size of an array in an array declaration?

When an array is declared, the compiler allocates a base address and reserves enough space in the memory for all the elements of the array. The size is required to allocate the required space. Thus, the size must be mentioned.

12.What is the difference between an array and pointer?(APR2015,NOV2016)

Difference between arrays and pointers are as follows.

Array	Pointer
1.Array allocates space automatically. 2.It cannot be resized. 3.It cannot be reassigned. 4.Size of(array name) gives the number of bytes occupied by the array.	1.Pointer is explicitly assigned to point to an allocated space. 2.It can be resized using realloc (). 3.Pointers can be reassigned. 4.Sez eof(pointer name) returns the number of bytes used to store the pointer variable.

13. What is the purpose of the function main()?(MAY 2009)

The function main () invokes other functions within it. It is the first function to be called when the program starts execution.

Some salient points about main() are as follows:

1. It is the starting function .
2. It returns an int value to the environment that called the program.
3. Recursive call is allowed for main() also.
4. It is a user-defined function.
5. Program exection ends when the closing brace of the function main() is reached.

6. It has two arguments (a) argument count and (b) argument vector (represents strings passed.)
7. Any user-defined name can also be used as parameters for main() instead of argc and argv

14. Compare array and structure? (APR/MAY 2018)

Arrays	Structures
An array is a collection of data items of same data type. Arrays can only be declared. There is no keyword for arrays. An array name represents the address of the starting element. An array cannot have bit fields.	A structure is a collection of data items of different data types. Structures can be declared and defined. The keyword for structures is struct. A structure name is known as tag. It is a shorthand notation of the declaration. A structure may contain bit fields.

15. Compare structures and unions.(NOV/DEC2016)

Structure	Union
Every member has its own memory. The keyword used is struct. All members occupy separate memory location, hence different interpretations of the same memory location are not possible. Consumes more space compared to union.	All members use the same memory. The keyword used is union. Different interpretations for the same memory location are possible. Conservation of memory is possible.

16. What are the types of Arrays?(APR/MAY2014)

1. One-Dimensional Array
2. Two-Dimensional Array
3. Multi-Dimensional Array

17. Define Strings.(APR/MAY2015) (NOV/DEC2016)

The group of characters, digit and symbols enclosed within quotes is called as String (or) character Arrays. Strings are always terminated with '\0' (NULL) character. The compiler automatically adds '\0' at the end of the strings.

Example:

```
char name[]={ 'C', 'O', 'L', 'L', 'E', 'G', 'E', '\0' };
```

The character of a string are stored in contiguous memory locations as follows:

C	O	L	L	E	G	E	\0
1000	1001	1002	1003	1004	1005	1006	1007

18. Differentiate library functions and User-defined functions.(APR/MAY2016)

Library Functions	User-defined Functions
a) Library functions are pre-defined set of functions that are defined in C libraries. b) User can only use the function but cannot change (or) modify this function.	a) The User-defined functions are the functions defined by the user according to his/her requirement. b) User can use this type of function. User can also modify this function.

19.What are the steps in writing a function in a program.(N/DEC2016OV)

- a) Function Declaration (Prototype declaration):
- b) Function Callings:
The user-defined functions can be called inside any functions like main(), user-defined function, etc.
- c) Function Definition:

20.Distinguish between Call by value Call by reference. (APR2016/DEC2018)

Call by value	Call by reference.
<ul style="list-style-type: none">a) In call by value, the value of actual arguments is passed to the formal arguments and the operation is done on formal arguments.b) Formal arguments values are photocopies of actual arguments values.c) Changes made in formal arguments valued do not affect the actual arguments values.	<ul style="list-style-type: none">a) In call by reference, the address of actual argument values is passed to formal argument values.b) Formal arguments values are pointers to the actual argument values.c) Since Address is passed, the changes made in the both arguments values are permanent.

13MARKS

- 1. What are functions? Explain the types of functions in detail with an example program for each type. **(APR/MAY 2016)**
- 2. Define arrays. Explain the array types with an example program for each type.**(NOV2018)**
- 3. Explain the standard string functions with example to support each type. . **(APR/MAY 2016)**
- 4. What are pointers? When and why they are used? Explain in detail with sample**(NOV2016)** programs.**(JAN 2009/MAY 2009)**
- 5. Describe in detail about the Preprocessors in C. **(MAY 2009)**
- 6. Brief call by value and call by reference in detail. **(MAY 2009)**
- 7. Define Structures. Explain structures in detail. **(JAN 2009/MAY2009)**
- 8. Define Union. Explain Union in detail. **(MAY2010)**

UNIT III

2MARKS

1. Explain the term data structure. (APR /MAY 2016)

The data structure can be defined as the collection of elements and all the possible operations which are required for those set of elements. Formally data structure can be defined as a data structure is a set of domains D, a set of domains F and a set of axioms A. this triple (D,F,A) denotes the data structure

2. What do you mean by non-linear data structure? Give example.(NOV/DEC2017)

The non-linear data structure is the kind of data structure in which the data may be arranged in hierarchical fashion. For example- Trees and graphs.

3. What do you linear data structure? Give example.(NOV/DEC 2016 APR/MAY 2018)

The linear data structure is the kind of data structure in which the data is linearly arranged. For example- stacks, queues, linked list.

4. Enlist the various operations that can be performed on data structure.

Various operations that can be performed on the data structure are

- Create
- Insertion of element
- Deletion of element
- Searching for the desired element
- Sorting the elements in the data structure
- Reversing the list of elements.

5. What is abstract data type? What are all not concerned in an ADT?(NOV/DEC2018)

The abstract data type is a triple of D i.e. set of axioms, F-set of functions and A-Axioms in which only what is to be done is mentioned but how is to be done is not mentioned. Thus ADT is not concerned with implementation details.

6. What is a linked list?(NOV/DEC 2016)

A linked list is a set of nodes where each node has two fields 'data' and 'link'. The data field is used to store actual piece of information and link field is used to store address of next node.

7. Define doubly linked list.

Doubly linked list is a kind of linked list in which each node has two link fields. One link field stores the address of previous node and the other link field stores the address of the next node.

8. Write down the steps to modify a node in linked lists.(NOV/DEC2016)

- 1 Enter the position of the node which is to be modified.
- 2 Enter the new value for the node to be modified.
- 3 Search the corresponding node in the linked list.
- 4 Replace the original value of that node by a new value.
- 5 Display the messages as " the node is modified".

9. Difference between arrays and lists. (APR/MAY 2015)

In arrays any element can be accessed randomly with the help of index of array, whereas in lists any element can be accessed by sequential access only.

Insertion and deletion of data is difficult in arrays on the other hand insertion and deletion of data is easy in lists.

10. State the properties of LIST abstract data type with suitable example. (APR/MAY 2016)

Various properties of LIST abstract data type are

- 1 It is linear data structure in which the elements are arranged adjacent to each other.
- 2 It allows to store single variable polynomial.
- 3 If the LIST is implemented using dynamic memory then it is called linked list. Example of LIST are- stacks, queues, linked list.

11. State the advantages of circular lists over doubly linked list.

In circular list the next pointer of last node points to head node, whereas in doubly linked list each node has two pointers: one previous pointer and another is next pointer. The main advantage of circular list over doubly linked list is that with the help of single pointer field we can access head node quickly. Hence some amount of memory get saved because in circular list only one pointer is reserved.

12. What is the circular linked list? (NOV/DEC 2014)

The circular linked list is a kind of linked list in which the last node is connected to the first node or head node of the linked list.

13. Define Stack (APR/MAY 2013)

A Stack is an ordered list in which all insertions (Push operation) and deletion (Pop operation) are made at one end, called the top. The topmost element is pointed by top. The top is initialized to -1 when the stack is created that is when the stack is empty. In a stack $S = (a_1, a_n)$, a_1 is the bottom most element and element a_i is on top of element a_{i-1} . Stack is also referred as Last In First Out (LIFO) list.

14. What are the various Operations performed on the Stack? (APR/MAY 2016)

The various operations that are performed on the stack are

CREATE(S) – Creates S as an empty stack.

PUSH(S,X) – Adds the element X to the top of the stack.

POP(S) – Deletes the top most elements from the stack.

TOP(S) – returns the value of top element from the stack.

ISEMPTY(S) – returns true if Stack is empty else false.

ISFULL(S) - returns true if Stack is full else false.

15. How do you test for an empty stack?

The condition for testing an empty stack is $top = -1$, where top is the pointer pointing to the topmost element of the stack, in the array implementation of stack. In linked list implementation of stack the condition for an empty stack is the header node link field is NULL.

16. Write the postfix form for the expression -A+B-C+D? (NOV/DEC2018)

$$A-B+C-D+$$

17. What are the postfix and prefix forms of the expression?

$$A+B*(C-D)/(P-R)$$

Postfix form: ABCD-*PR-/+

Prefix form: +A/*B-CD-PR

18. Explain the usage of stack in recursive algorithm implementation?(NOV/DEC2017)

In recursive algorithms, stack data structures is used to store the return address when a recursive call is encountered and also to store the values of all the parameters essential to the current state of the function.

19. Define Queues.(NOV/DEC2016)

A Queue is an ordered list in which all insertions take place at one end called the rear, while all deletions take place at the other end called the front. Rear is initialized to -1 and front is initialized to 0. Queue is also referred as First In First Out (FIFO) list.

20. Define Dequeue.(APR/MAY2015)

Dequeue stands for Double ended queue. It is a linear list in which insertions and deletion are made from either end of the queue structure.

13Marks

1. Write an algorithm for Push and Pop operations on Stack using Linked list. (APR/MAY2014)
2. Explain the linked list implementation of stack ADT in detail?(NOV/DEC2014)
3. Explain the array implementation of queue ADT in detail? (NOV/DEC2016)
4. Explain the linked list implementation of queue ADT in detail? (APR/MAY2016)
5. Explain the array implementation of stack ADT in detail? (APR/MAY2018)
6. Explain the insertion operation in linked list. How nodes are inserted after a specified node.
7. Write an algorithm to insert a node at the beginning of list? (NOV/DEC2017)
8. Explain the deletion operation from a linked list.

UNIT IV
13MARKS

1. Define tree?(nov/dec2017)

Trees are non-linear data structure, which is used to store data items in a sorted sequence.

It represents any hierarchical relationship between any data item. It is a collection of nodes, which has a distinguished node called the root and zero or more non-empty subtrees T_1, T_2, \dots, T_k , each of which are connected by a directed edge from the root.

2. Define Height of tree?

The height of n is the length of the longest path from root to a leaf. Thus all leaves have height zero. The height of a tree is equal to a height of a root.

3. Define Depth of tree?(APR/MAY2014)

For any node n , the depth of n is the length of the unique path from the root to node n . Thus for a root the depth is always zero.

4. What is the length of the path in a tree?

The length of the path is the number of edges on the path. In a tree there is exactly one path from the root to each node.

5. Define sibling?(NOV/DEC2014)

Nodes with the same parent are called siblings. The nodes with common parents are called siblings.

6. Define binary tree?(NOV/DEC2017)

A Binary tree is a finite set of data items which is either empty or consists of a single item called root and two disjoint binary trees called left sub tree max degree of any node is two.

7. What are the two methods of binary tree implementation?(APR/MAY2017)

Two methods to implement a binary tree are,

- a. Linear representation.
- b. Linked representation

8. What are the applications of binary tree?(APR/MAY2015)

Binary tree is used in data processing.

- a. File index schemes
- b. Hierarchical database management system

9. List out few of the Application of tree data-structure?(NOV/DEC2014)

- (1) The manipulation of Arithmetic expression
- (2) Used for Searching Operation
- (3) Used to implement the file system of several popular operating systems
- (4) Symbol Table construction
- (5) Syntax analysis

10. Define expression tree?

Expression tree is also a binary tree in which the leafs terminal nodes or operands and non-terminal intermediate nodes are operators used for traversal.

11. Define tree traversal and mention the type of traversals?(NOV/DEC2017)

Visiting of each and every node in the tree exactly is called as tree traversal.

Three types of tree traversal

- 1 Inorder traversal
- 2 Preoder traversal
- 3 Postorder traversal.

12. Define in -order traversal?

In-order traversal entails the following steps;

- a. Traverse the left subtree
- b. Visit the root node
- c. Traverse the right subtree

13. Define Binary Search Tree.(NOV/DEC2018)

Binary search tree is a binary tree in which for every node X in the tree, the values of all the keys in its left subtree are smaller than the key value in X and the values of all the keys in its right subtree are larger than the key value in X.

14. List out the steps involved in deleting a node from a binary search tree.(APR/MAY2015)

- Deleting a node is a leaf node (ie) No children
- Deleting a node with one child.
- Deleting a node with two Childs

15. Define complete binary tree.(NOV/DEC2015)

If all its levels, possible except the last, have maximum number of nodes and if all the nodes in the last level appear as far left as possible.

16. Define Graph?(NOV/DEC2018)

A graph G consist of a nonempty set V which is a set of nodes of the graph, a set E which is the set of edges of the graph, and a mapping from the set of edges E to set of pairs of elements of V. It can also be represented as $G=(V, E)$.

17. Name the different ways of representing a graph? Give examples (Nov 10)

- a. Adjacency matrix
- b. Adjacency list

18. What is an undirected acyclic graph?(/DEC /NOV2014)

When every edge in an acyclic graph is undirected, it is called an undirected acyclic graph. It is also called as undirected forest.

19. What is meant by depth?

The depth of a list is the maximum level attributed to any element with in the list or with in any sub list in the list.

20. What is a cycle or a circuit?(APR/MAY2016)

A path which originates and ends in the same node is called a cycle or circuit.

13 Marks

1. Explain the tree traversal techniques with an example. (NOV/DEC2016)
2. Construct an expression tree for the expression $(a+b*c) + ((d*e+f)*g)$. Give the outputs when you apply inorder, preorder and postorder traversals.(APR/MAY2014)
3. How to insert and delete an element into a binary search tree and write down the code for the insertion routine with an example. (NOV/DEC2017)
4. Create a binary search tree for the following numbers start from an empty binary search tree. 45,26,10,60,70,30,40 Delete keys 10,60 and 45 one after the other and show the trees at each stage. .(APR/MAY2016)
5. Explain the various representation of graph with example in detail? .(APR/MAY2014) (NOV/DEC2016)

UNIT – V

2 MARKS

1. What is meant by Sorting?(NOV/DEC2017)

Sorting is ordering of data in an increasing or decreasing fashion according to some linear relationship among the data items.

2. List the different sorting algorithms.(APR/MAY2016)

- 1 Bubble sort
- 2 Selection sort
- 3 Insertion sort
- 4 Shell sort
- 5 Quick sort
- 6 Radix sort
- 7 Heap sort
- 8 Merge sort

3. Why bubble sort is called so?(NOV/DEC2016)

The bubble sort gets its name because as array elements are sorted they gradually **“bubble” to their proper positions, like bubbles rising** in a glass of soda.

4. State the logic of bubble sort algorithm.

The bubble sort repeatedly compares adjacent elements of an array. The first and second elements are compared and swapped if out of order. Then the second and third elements are compared and swapped if out of order. This sorting process continues until the last two elements of the array are compared and swapped if out of order.

5. What number is always sorted to the top of the list by each pass of the Bubble sort algorithm?

Each pass through the list places the next largest value in its proper place. In essence, each item **“bubbles” up to the location where it belongs.**

6. When does the Bubble Sort Algorithm stop?(APR/MAY2015)

The bubble sort stops when it examines the entire array and finds that no "swaps" are needed. The bubble sort keeps track of the occurring swaps by the use of a flag.

7. State the logic of selection sort algorithm.

It finds the lowest value from the collection and moves it to the left. This is repeated until the complete collection is sorted.

9.How does insertion sort algorithm work?(NOV/DEC2017)

In every iteration an element is compared with all the elements before it. While comparing if it is found that the element can be inserted at a suitable position, then space is created for it by shifting the other elements one position up and inserts the desired element at the suitable position. This procedure is repeated for all the elements in the list until we get the sorted elements.

10. Which sorting algorithm is best if the list is already sorted? Why?(NOV/DEC2010)

Insertion sort as there is no movement of data if the list is already sorted and complexity is of the order $O(N)$.

11.Mention the different ways to select a pivot element.(NOV/DEC2010)

The different ways to select a pivot element are

1. Pick the first element as pivot
2. Pick the last element as pivot
3. Pick the Middle element as pivot
4. Median-of-three elements
5. Pick three elements, and find the median x of these elements
6. Use that median as the pivot.
7. Randomly pick an element as pivot.

12.What is divide-and-conquer strategy?(APR/MAY2017)

Divide a problem into two or more sub problems

Solve the sub problems recursively

Obtain solution to original problem by combining these solutions

13.Compare quick sort and merge sort.(/NOV2017)

Quicksort has a best-case linear performance when the input is sorted, or nearly sorted. It has a worst-case quadratic performance when the input is sorted in reverse, or nearly sorted in reverse.

Merge sort performance is much more constrained and predictable than the performance of quicksort. The price for that reliability is that the average case of merge sort is slower than the average case of quicksort because the constant factor of merge sort is larger.

14.Define Searching.(NOV2018)

Searching for data is one of the fundamental fields of computing. Often, the difference between a fast program and a slow one is the use of a good algorithm for the data set. Naturally, the use of a hash table or binary search tree will result in more efficient searching, but more often than not an array or linked list will be used. It is necessary to understand good ways of searching data structures not designed to support efficient search.

15. What is linear search?(NOV2012)

In Linear Search the list is searched sequentially and the position is returned if the key element to be searched is available in the list, otherwise -1 is returned. The search in Linear Search starts at the beginning of an array and move to the end, testing for a match at each item.

16. What is Binary search?(APR2010)

A binary search, also called a dichotomizing search, is a digital scheme for locating a specific object in a large set. Each object in the set is given a key. The number of keys is always a power of 2. If there are 32 items in a list, for example, they might be numbered 0 through 31 (binary 00000 through 11111). If there are, say, only 29 items, they can be numbered 0 through 28 (binary 00000 through 11100), with the numbers 29 through 31 (binary 11101, 11110, and 11111) as dummy keys.

17. Define hash function?

Hash function takes an identifier and computes the address of that identifier in the hash table using some function.

18. Why do we need a Hash function as a data structure as compared to any other data structure? (may 10)

Hashing is a technique used for performing insertions, deletions, and finds in constant average time.

19. What are the important factors to be considered in designing the hash function? (Nov 10)

- To avoid lot of collision the table size should be prime
- For string data if keys are very long, the hash function will take long to compute.

20. What do you mean by hash table?(NOV/DEC2018)

The hash table data structure is merely an array of some fixed size, containing the keys. A key is a string with an associated value. Each key is mapped into some number in the range 0 to tablesize-1 and placed in the appropriate cell.

21. What do you mean by hash function?(NOV/DE2012)

A hash function is a key to address transformation which acts upon a given key to compute the relative position of the key in an array. The choice of hash function should be simple and it must distribute the data evenly. A simple hash function is $\text{hash_key} = \text{key} \bmod \text{tablesize}$.

13Marks

1. Write an algorithm to implement Bubble sort with suitable example. **.(NOV/DEC2016)**
.(APR/MAY2015)
- 2.Explain any two techniques to overcome hash collision.
- 3.Write an algorithm to implement insertion sort with suitable example.**(APR/MAY2018)**
.(NOV/DEC2017)
- 4.Write an algorithm to implement selection sort with suitable example.
5. Write an algorithm for binary search with suitable example. **.(NOV/DEC2018)**
- 6.Explain about quick sort in detail.**(NOV/DEC2018)**
- 7.Write an algorithm for merge sort.**(APR/MAY2016)** **.(NOV/DEC2016)**