



Gokaraju Rangaraju Institute of Engineering and Technology

FIRST YEAR BTECH

Computer Programming and Data Structures

UNIT-VII: Searching and Sorting

1. What do you mean by sorting? Mention the different types of sorting give some examples and explain any one in detail. [May/June 2008]
2. (a). Explain the algorithm for exchange sort with a suitable example.
(b). Compare selection sort and exchange sort [May/June 2006]
3. Discuss the bubble sort, write a C program and show its efficiency.
4. Write a program to explain bubble sort. Which type of technique does it belong? [May/June 2009]
5. Trace through the steps by hand to sort the following list in bubble sort.
74 39 35 97 84
6. (a) .Write a C program to sort the elements of an array using Quick sort with suitable example.
(b). What is the worst case and best case time complexity of the above program. [May/June 2007, Apr/May 2007]
7. (a). Explain Quick sort with algorithm.
(b). Analyze the worst case performance of Quick sort and compare with Selection sort. [May/June 2007, Nov/Dec 2005, Apr/May 2007]
8. Trace through the steps by hand to sort the following list in Quick sort.
74 39 32 35 97 84
9. Write a program to sort the elements whose worst and average cases are $O(n \log n)$. [May/June 2008]
10. Explain the sorting mechanism which uses the concept of pivot element selection with a program. [Aug/Sep 2008]
11. Trace through the steps by hand to sort the following list in Quick sort.
28 7 39 3 63 13 61 17 50 21
[Aug/Sep 2007, Aug/Sep 2006, May/June 2004]
12. Write a program to explain selection sort. Which type of technique does it belong. [May/June 2008]
13. Trace through the steps by hand to sort the following list in selection sort.
74 39 35 32 97 84
14. Explain the algorithm for selection sort and give a suitable example. [Nov/Dec 2004, Jan 2005]

15. Write a program to explain insertion sort. Which type of technique does it belong to?
[May/June 2009]
16. Show that the efficiency of Quick sort in its worst case is the same as that of simple insertion sort.
17. Write an algorithm for two-way merge sort. Analyze its time complexity.
[May/June 2006]
18. Trace through the steps by hand to sort the following list in merge sort.
A = {56, 78} B = {45, 67, 89}
19. Trace through the steps by hand to sort the following list in merge sort.
A = {5, 10, 14, 19, 30} B = {2, 23, 28, 44, 49, 60}
20. What are the advantages of external sorting? Write a program to perform merge sort with the following elements.
Set A {11, 16, 22, 25} Set B {15, 19, 22, 23} [Aug/Sep 2007]
21. Compare the advantages and disadvantages of bubble, insertion and selection sort.
[May/June 2008]
22. How the data is searched in sequential files. Mention the different techniques used with an example?
[May/June 2009]
23. (a). Write and explain linear search procedure with suitable example.
(b). Formulate recursive algorithm with binary search with its timing analysis.
[Aug/Sep 2006, Nov/Dec 2005, Jan 2005, Nov/Dec 2004]
24. (a). Write a C program to search for a given element in the integer array using binary search.
(b). Derive the time complexity of binary search. [May/June 2006, Jan 2005]
25. Write in detail about the following
(a). Exchange sort
(b). Binary Search [Aug/Sep 2007]
26. Write a C program to implement recursive algorithm for binary search.
[May/June 2009]
27. (a) Write and explain non-recursive algorithm for binary search with suitable example and discuss the various time complexities of binary search.
(b) Suppose that the list contains the integers 1, 2, 8 in this order. Trace through the steps of binary search to determine what comparisons of keys are done in searching.
(i) To locate 3
(ii) To locate 4.5 [Aug/Sep 2006]
28. What is the advantage of binary search? Write a program to search an element 30 in the given set of inputs {12, 15, 18, and 30}.
[Aug/Sep 2008]
29. Explain the tower-of-Hanoi problem.
[May/June 2009]

1. (a) What are the general characteristics of C language?

(b) Give and explain the structure of a C program?

(c) Write a program to print Pascal triangle?

2. (a) What are the constants and variables?

(b) Name the different data types that C supports and explain them in detail?

3. (a) What are the commonly used input/output functions in C? How are they accessed?

(b) What is the purpose of getchar(), putchar() functions? How is it used in C program?

How is it different from getc() and putc() functions?

4. (a) What is an expression? What kind of information is represented by an expression?

(b) What is an operator? Describe several different types of operators that are used in C and give an example for each?

5. Explain the following with general form flowchart and give example for each

a. Simple if statement

b. if....else statement

c. Nested if....else statement

d. switch statement

6. (a) What is meant by looping? Describe any two different forms of looping with examples?

(b) Write a program to print the following outputs using for loop.

(i)
$$\begin{array}{cccc} 1 & & & \\ 2 & 2 & & \\ 3 & 3 & 3 & \\ 4 & 4 & 4 & 4 \end{array}$$

(ii)
$$\begin{array}{cccc} & & & 1 \\ & & 2 & 2 \\ & 3 & 3 & 3 \\ 4 & 4 & 4 & 4 \end{array}$$

7. (a) What is the difference between break and continue statements? Explain with examples?

(b) What is the purpose of goto statement? How is the associated target statement identified?

(c) Write a C program to evaluate power series.

$$e^x = 1 + x + x^2 + x^3 + \dots + x^n, \quad 0 < x < n.$$

8. Write the various steps involved in executing a C program and illustrate it with a help of flowchart?

9. Explain the following with an example for each

(i) for loop

(ii) do-while loop

(iii) while loop

10. Write a program to find the roots of a quadratic expression using switch case?

1. (a) Define Algorithm?

(b) What is the use of Flowchart? Explain different symbols used in flowchart?

(c) What are the different steps followed in creating and running a program?

2. (a) What is assembly language? What are its main advantages?

(b) What is high-level language? What are the different types of high level languages?

3. What are input devices? Briefly explain some popular input devices?

4. What are output devices? Explain various types of output devices?

5. Explain the different types of computing environment?

6. Write a short note on the following?

(a) Assembler

(b) Compiler

(c) Interpreter

(d) Loader

(e) Linker

7. How can you represent sequence, selection and iteration statements in algorithms? Explain each with an example?

8. With a neat sketch explain the different phases in System Development Life Cycle (SDLC)?

9. (a) Write an algorithm and draw a flowchart for swapping two numbers without using third variable?

(b) Write algorithm and flowchart for finding greatest among three numbers?

10. What is a computer software? Explain the different categories in it?

UNIT V

1. What is a structure? How is it declared? How it is initialized? [2006S]
2. Explain with an example how a structure can be organized in the 'C' language? [2007R]
3. What is the use of a structure? Given an example for a structure with initialized values. [2006S,2007R]
4. Explain the advantages of structure type over the array type variable. [2007S]
5. How is structure different from an array? Explain. [2008S]
6. Define Structure and write the general format for declaring and accessing members. [2008S,2008R,2009R]
7. How are structure elements stored in memory? [2006R]
8. Write a C program to read the information from the keyboard in which the "Employee" structure consists of employee name, code, designation and salary. Display the same. [2006S]
9. Write a C program using structure to create a library catalogue with the following fields: Access number, Author's name, Title of the book, year of publication, publisher's name, and price. Display the output. [2006R]
10. Define a structure type struct ABS, that contains name, age, designation, and salary. Using this structure, write a C program to read this information for one person from the keyboard and print the same on the screen. [2007S]
11. Write a program using structures to display the following information for each customer name, account number, street, city, old balance, current payment, new balance, account status. [2008R]
12. Write a C program to illustrate the comparison of structure variables. [Aug/Sep-2006,2007R]
13. How to compare structure variables? Give an example. [2007S]
14. How to copy one structure to another structure of a same data type, give an example? [2008S]
15. Describe nested structures. Draw diagrams to explain nested structure. [2007R]
16. Define a structure to represent a data. Use your structures that accept two different dates in the format mmdd of the same year. And do the following: Write a C program to display the month names of both dates. [2006S]
17. Distinguish between an array of structures and an array within a structure. Give an example each. [2006R]

18. How an array is included as a member of a structure? [2008S]
19. Construct an array of structures that stores n employee's information and write a program to carry out operations like inserting a new entry, deleting entry. [2006S]
20. Write a program to read n records of students and find out how many of them have passed. The fields are student's roll no, name, mark and result. Evaluate the result as follows
If marks > 35 then
Result = "Pass" else "Fail" [2007S]
21. Write a C program to compute the monthly pay of 100 employees using each employee's name, basic-pay. The DA is computed as 52% of the basic pay. Gross-salary (Basic pay + DA). Print the employees name and gross salary. [2007R]
22. Write a C program to print maximum marks in each subject along with the name of the student by using structures. Take 3 subjects and 3 student's records. [2007R]
23. Write a program to create an array of student structure objects and to find the highest marks scorer. The fields in the student structure are: name, age and marks. [2006R]
24. Explain the different ways of passing structure as arguments in functions. [2006R]
25. Write a C program to illustrate the method of sending an entire structure as a parameter to a function. [2006R]
26. Consider a structure master includes the information like name, code, pay, experience. Write a program to delete and display the information contained in master variables for a give code. [2006S]
27. Define a structure that represent a complex number (contains two floating-point members, called real and imaginary). Write a C program to add, subtract, and multiply two complex numbers. [2007S]
28. Write a C program to illustrate the use of structure pointer. [2006S]
29. Write a program to declare pointer as members of structure and display the contents of the structure. Define a structure object, boy with three fields: name, age and height. [2007R]
30. How is self referential member created in structures? Where exactly is it used? [2009R]
31. Differentiate between a structure and union with respective allocation of memory by the compiler. Given an example of each. [2007S]
32. Compare arrays, structures and unions. [2008S]
33. What are Bit fields? What are its advantages? What is its syntax? [2007R]
34. Write a C program to store the information of vehicles. Use bit fields to store the status information. Assume the vehicle object consists of type, fuel and model member fields. Assume appropriate number of bits for each field. [2007R]
35. Write a C program to illustrate typedef data type.
36. Write a C program to illustrate enumerated (enum) data type.