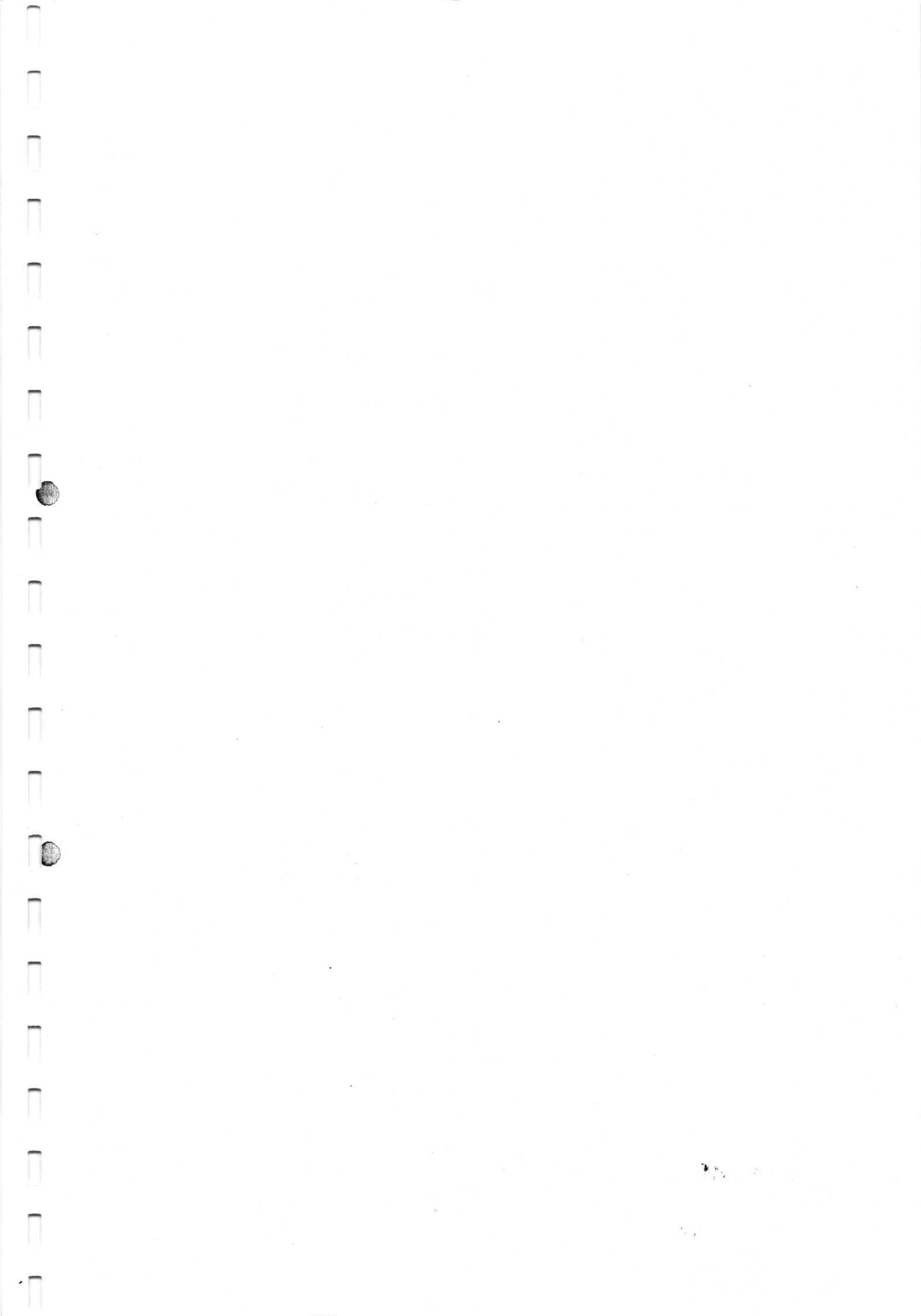


9. Which of the following best describe sorting?
 accessing and processing each record exactly one
 finding the location of the record with a given key
 arranging the data in some given order
 adding a new record to the data structure
10. What is the infix version of the following postfix expression?
 $x \ 12 + z \ 17 \ y + 42 \ * / +$
 $(x + 12 + z) / (17 + y * 42)$ $x + 12 + z / 17 + y * 42$
 $x + 12 + z / (17 + y) * 42$ $x + 12 + z / ((17 + y) * 42)$
11. Given two sort lists of size m and n respectively. Number of comparisons needed in the worst case by the merge sort algorithm will be
 mn $\max(m, n)$ $\min(m, n)$ $m+n-1$
12. Quick sort is run on two inputs shown to sorting ascending order: i) $1, 2, 3, \dots, n$ ii) $n, n-1, n-2, \dots, 2, 1$. Let C_1 and C_2 be the number of comparisons made for the input i) and ii) respectively
 $C_1 < C_2$ $C_1 > C_2$
 $C_1 = C_2$ can't say anything for arbitrary n
13. Consider a sorted binary insertion tree. What must be done to produce a sorted array of numbers (for printing) from the sorted binary insertion tree?
 preorder traversal postorder traversal
 inorder traversal top down traversal
14. The goal of hashing is to produce a search that takes
 $O(1)$ time $O(n^2)$ time $O(\log n)$ time $O(n \log n)$ time
15. Which of the following statement is false?
 Arrays are dense lists and static data structure
 data elements in linked list need not be stored in adjacent space in memory
 pointers store the next data element of a list
 linked lists are collection of the nodes that contain information part and next pointer
16. A variable P is called pointer if
 P contains the address of an element in DATA
 P points to the address of first element in DATA
 P can store only memory addresses
 P contain the DATA and the address of DATA
17. A balance factor in AVL tree is used to check
 what rotation to make if all child nodes are at same level
 when the last rotation occur if the tree is unbalanced

18. Each array declaration need not give implicitly or explicitly, the information about
- P contains the address of an element in DATA
 - P points to the address of first element in DATA
 - P can store only memory addresses
 - P contain the DATA and the address of DATA
19. What is the running time of the following code fragment?

```
for(int i=0; i<10; i++)
  for(int j=0; j<N; j++)
    for(int k=N-2; k<N+2; k++)
      cout << i << " " << j << endl;
```

- (log N) $O(N \log N)$ $O(N)$ $O(N^2)$
20. Suppose we're debugging a quicksort implementation that is supposed to sort an array in ascending order. After the first partition step has been completed, the contents of the array are in the following order:
- 9 1 14 17 24 22 20
- The pivot could have been either 14 or 17
 - The pivot could have been 14, but could not have been 17
 - The pivot could have been 17, but could not have been 14 3.
 - Neither 14 nor 17 could have been the pivot



KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

JUN 10 2018

Level : B.E./B.Sc.
Year : II
Time : 2 hrs. 30 mins.

Course : COMP 202
Semester: I
F.M. : 40

SECTION "B"
[6 Q.×4=24 marks]

Attempt any *SIX* questions.

1. Define tree with its components. Briefly explain preorder, inorder and postorder traversal. [1 + 3]

2. Here is an array which has just been partitioned by the first step of quicksort:
3, 0, 2, 4, 5, 8, 7, 6, 9
Which of these elements could be the pivot? [4]

3. What is Kruskal's Algorithms? Explain with the help of an example. [1 + 3]

4. Given below is an array of ten integers:
5 3 8 9 1 7 0 2 6 4
Draw this array after the TWO recursive calls of merge sort are completed, and before the final merge step has occurred. [4]

5. Explain the following with diagram and also write algorithm: [4]
 - (a) Insert a node at the beginning, at the end and at the specified position of singly link list.
 - (b) Deleting the first node, last node and a node from a specified position in case of doubly linked list.
 - (c) Deleting the first node, last node and a node from a specified position in case of circular linked list.

6. In an AVL tree, at what condition the balancing is to be done? There are 7, 19, 12, and 11 nodes in 4 different trees. Which one of them can form a full binary tree? [1+3]

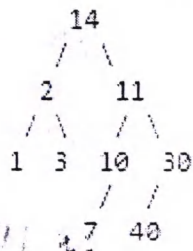
7. What is stack? Convert $7*2/(3-2)+2*(8-1)$ into prefix expression. [1+3]

SECTION "C"
[2 Q. × 8 = 16 marks]

Attempt any *TWO* questions.

8.
 - i. Draw a complete binary tree with exactly six nodes. Put a different value in each node. Then draw an array with six components and show where each of the six node values would be placed in the array (using the usual array representation of a complete binary tree).

ii. Here is a binary tree



Write the order of the nodes visited in:

- A. An in-order traversal:
- B. A pre-order traversal:
- C. A post-order traversal:

[4+4]

9. What are the various steps while performing Binary Search? Here is an array of ten integers:
5 3 8 9 1 7 0 2 6 4

Draw this array after the FIRST iteration of the large loop in a selection sort (sorting from smallest to largest).

[4+4]

10. Sort the following lists in ascending order using selection sort:

[4+4]

i) 42, 52, 92, 39, 44, 92, 61, 75

ii) D, A, T, A, S, T, R, U, C, T, U, R, E



KATHMANDU UNIVERSITY

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RE-SCHEDULED

May 30, 2018

NOTICE

End-Semester Compartmental Examinations of B.E.\B.Sc.\B.Pharm.\B.Tech.\B.Arch. students will be held according to the following schedule.

Date	Day	Courses
June 10, 2018	Sunday	MATH 101, MATH 111, EEG 207, COMP 202, BIOT 302, COMP 342, PHAR 301, PHAR 402, COMP 407, ARCH 111, CHEG 311, MEEG 301, GEOM 303, COMP 314, MEPP 403
June 11, 2018	Monday	EEEG 213, MEEG 213, MCSC 201, MATH 205, PHYS 405, PHAR 216, MGTS 403, GEOM 402, PHAR 408, COMP 409, CIEG 204, MATH 322
June 12, 2018	Tuesday	PHYS 101, CIEG 203, BIOT 204, MGTS 301, PHYS 302, BIOT 406, BIOT 409, BIOT 410, ARCH 101, CHEG 302, COMP 316
June 13, 2018	Wednesday	MATH 207, PHAR 203, PHAR 404, BIOT 401, COMP 472, PHYS 401, ENVS 404, CIEG 304
June 14, 2018	Thursday	COMP 103, COMP 101, CHEM 201, COEG 304, INAN 301, PHYS 303, EPEG 422, GEOM 411, CHEG 303, COMP 323 <i>ENVS-207</i>
June 15, 2018	Friday	EEEG 202, EEG 204, CIEG 201, BIOT 202, GEOM 202, EPEG 302, COMP 317, MEPP 412, PHAR 406, MATH 303, ENVE 204, MGTS 402, COMP 301 <i>CHEM-207, ENVS-212</i>
June 17, 2018	Sunday	ENGG 111, BIOL 101, COMP 231, PHAR 204, GEOM 316, MATH 208, PHAR 304, CIEG 305, COMP 478, COMP 484, PHYS 402, STAT 201
June 18, 2018	Monday	EEEG 211, EEG 313, MEEG 216, BIOT 205, MEEG 315, COMP 315, CIEG 401, MATH 206, COEG 401, MATH 201, PHYS 201, <i>ENVS-415</i>
June 19, 2018	Tuesday	CHEM 101, MEEG 219, EEG 314, MEEG 306, CIEG 301, PHAR 303, PHYS 404, ENVE 433, COMP 307, CIEG 402, CIEG 403, MCSC 202, PHYS 203 <i>PHYS-206, ENVS-435</i>

Examination Time : 11.00 A.M. to 2.00 P.M.

Venue : Kathmandu University, Dhulikhel.

Prof. Panna Thapa, Ph. D.
Controller of Examinations

