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I Semester M.C.A. Degree Examination, July - 2022

COMPUTER SCIENCE

The Art of Programming

(CBCS Scheme)

Paper : IMCA1

Time : 3 Hours

Maximum Marks : 70

PART - A

Answer any FIVE. Each carries SIX marks.

(5×6=30)

1. Write an algorithm to find $1^2+3^2+5^2+\dots+n^2$ Find the complexity of the algorithm.
2. Write an algorithm to reverse the digit reverse 786 using your algorithm.
3. Write an efficient algorithm to find GCD of two numbers. Find GCD of 512 and 36 using your algorithm.
4. Write an algorithm to search for an element in the list using binary search. Find 7 in the list {1, 4, 5, 6, 9, 13, 15} using your algorithm.
5. What is the difference between while-do and repeat control structures.
6. Give an example for pass by value and pass by address. Discuss the differences.
7. Write an algorithm to find Pseudo random number.
8. Write an algorithm to multiply two matrices of the order $m \times n$ and $n \times p$.

PART - B

Answer FOUR. Each carries TEN marks.

(4×10=40)

9. What is complexity of an algorithm, and rate of growth? Define Big oh notation. Write an algorithm to find an element using Linear search, and find its best case, worst case complexity.
10. Write an algorithm to sort the numbers using insertion sort. Sort the following list. {4, 1, 3, 9, 0, 2, 6, 5, 7}. Trace your algorithm. Suppose the elements given for sorting were to be {1, 2, 3, 4, 6, 7} how many comparisons you make.

[P.T.O.]



11. Write an algorithm to remove the identical numbers in a list. Trace your algorithm for removing the identical numbers for the following list {1, 3, 3, 5, 6, 7, 7, 8, 10, 10}
 12. What is structured programming? Write a C program to find factorial of a number using functions. Call the function to find factorial of 3 & factorial of zero.
 13. Write an efficient algorithm to raise the power of a number by a large number.
 14. Write algorithm to merge two sorted arrays. Trace your algorithm to merge the following two list.
{1, 4, 6, 9, 13, 18}
{2, 3, 5, 7, 8, 15, 19, 21}
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