WINTER - 2016

SENEGAL-II (CBCS 2015) :
SUBJECT : HIGH PERFORMANCE COMPUTING

Day : Saturday
Date : 26-11-2016

Time : 11.00 A.M. To 2.00 P.M.
Max. Marks : 60.

N.B.;

1) All questions are **COMPULSORY.**
2) Both the section should be written in **SEPARATE** answer books.
3) Figures to the **RIGHT** indicate full marks.
4) Draw neat labeled diagrams **WHEREVER** necessary.

SECTION-I

Q.1 What are data and control hazards in pipeline architecture? **(10)**

OR

How process management is performed by the operating system in a HPC environment. **(10)**

Q.2 What are the levels of parallel processing? **(10)**

OR

With respect to compilers explain **(10)**

a) Function call and return mechanism
b) Loop optimization

Q.3 Explain how a divide and conquer algorithm strategy can be parallelised. **(10)**

OR

What is parallel algorithm? Explain the design process of Parallel Algorithms. **(10)**

SECTION-II

Q.4 Discuss General Model Of Shared Memory Programming **(10)**

OR

What is MPI? Describe Principles of MPP. **(10)**

Q.5 What is multiprocessor cache coherence problem? **(10)**

OR

Explain the shared memory architecture for symmetric multiprocessing **(10)**

Q.6 What tools are used to measure the performance of software related to use of memory hierarchy **(10)**

OR

Explain how the performance of a parallel program is measured in multi-core environment **(10)**

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SENEGAL – II (C.B.C.S 2015 Course): WINTER - 2016
SUBJECT: ADVANCED COMPUTER ALGORITHMS

Day: Monday
Date: 28-11-2016

Time: 11:00 A.M. To 2:00 P.M.
Max Marks: 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
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4) Assume suitable data if necessary.

SECTION- I

Q.1 Prove that the running time of Insertion Sort(A) is Quadratic function of 'n' where n = length [A]. **(10)**

OR

Q.1 Prove by induction that Fibonacci numbers grow exponentially and satisfies the equality

$$Fi = \frac{\phi^i - \hat{\phi}^i}{\sqrt{5}}$$ **(10)**

Q.2 Describe Time and Space Complexity of Algorithms.
If $f(n) = a_m n^m + \ldots\ldots + a_1 n + a_0$
Then prove that $f(n) = O(n^m)$ **(10)**

OR

Q.2 How is Divide and Conquer strategy applied to computer product of two n x n matrices? **(10)**

Q.3 Explain the algorithm of RADIX Sort. **(10)**

OR

Q.3 Write a Pseudocode to delete a given node z from a BST. Three cases should be clearly shown.

i) if z has no children
ii) If z has only one child and
iii) If z has two childrens

(10)

SECTION- II

Q.4 Give the pseudocode for Naïve string Matching Approach. **(10)**

OR

Q.4 Define Minimum Spanning Trees and Explain Prim's Algorithm with example. **(10)**

P.T.O

Q. 5	Draw a state space tree for Travelling Salseperson problem with n= 4 and $i_0 = i_4 = 1$	**(10)**
	OR	
Q. 5	With the help of neat diagram explain the Eight Queens Problem.	**(10)**
Q. 6	Define NP hard. Draw the Venn Diagram for Commonly Believed relationship among P, NP-Complete and NP-Hard Problems.	**(10)**
	OR	
Q. 6	Let m = 2, n=6, $(t_1,t_2,t_3,t_4,t_5,t_6)$= (8,6,5,4,4,1) and k = 4. Show the complete schedule and indicate overall optimal schedule for all the tasks.	**(10)**

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