

**Second Semester M.Tech. Degree Examination, June / July 2014**  
**Advanced Algorithms**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Explain the different types of asymptotic notations. (10 Marks)  
 b. Solve the following recurrence relation by using recursion tree method:  

$$T(n) = T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + n$$
 (10 Marks)

- 2 a. Explain aggregate analysis with stack operations and incrementing a binary counter. (10 Marks)  
 b. Find the single source shortest path by using Bellman Ford algorithm for the given graph. (10 Marks)

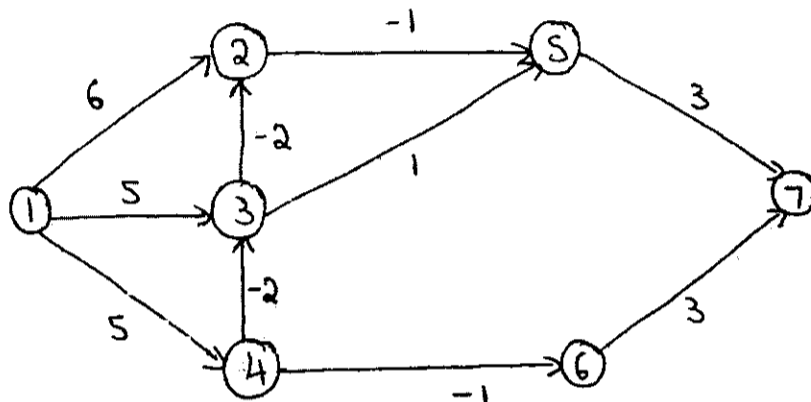


Fig. Q2 (b)

- 3 a. Write an algorithm for single source shortest path in DAG. Also apply the algorithm for the following graph and taking source vertex as 's'. (07 Marks)

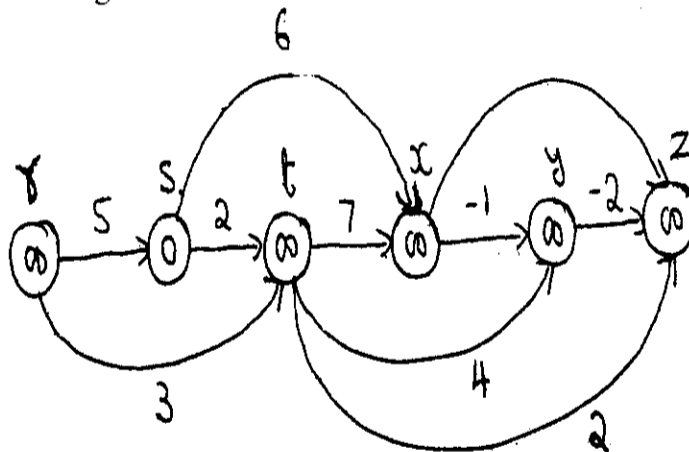


Fig. Q3 (a)

- b. What is maximum matching? Explain the procedure to find the maximum bipartite matching. (06 Marks)  
 c. Write the Johnson's algorithm to solve all pairs shortest path problem. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 4 a. Explain coefficient representation of a polynomial. (04 Marks)  
 b. State and prove Halving Lemma and Summation Lemma. (06 Marks)  
 c. Write and explain the algorithm for iterative FFT. Also draw a parallel FFT circuit for 8 input. (10 Marks)
- 5 a. Draw the table for the group operations of  $(Z_{15}^*, \cdot_{15})$ . Prove that the system  $(Z_n^*, \cdot_n)$  is a finite abelian group. (10 Marks)  
 b. Write and explain the Miller Rabin primality testing algorithm. (10 Marks)
- 6 a. What is finite automata? Explain with an example. Draw the state transition diagram for the pattern P = ababaca and illustrate its operation as the text string T = abababacaba. Also write the algorithm for finite automation – matcher. (10 Marks)  
 b. Explain Boyer-Moore algorithm for string matching and trace the algorithm for the following text and pattern.  
 Text : BESS – KNEW – ABOUT – BAOBABS  
 Pattern : BAOBAB (10 Marks)
- 7 a. Write and explain an algorithm for polynomial equality testing, using Monte Carlo method. (10 Marks)  
 b. How to implement the dart – throwing technique, using Monte Carlo integration algorithm? (10 Marks)
- 8 Write short notes on:  
 a. Chinese remainder theorem.  
 b. RSA public key cryptosystem.  
 c. Rabin Karp string matching.  
 d. Potential method of amortized analysis. (20 Marks)

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