

KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

2010/2011 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

COURSE CODE: COMP 311

**COURSE TITLE: DESIGN AND ANALYSIS OF
ALGORITHMS**

STREAM: Y3S1

DAY: TUESDAY

TIME: 9.00 – 11.00 A.M.

DATE: 15/03/2011

INSTRUCTIONS:

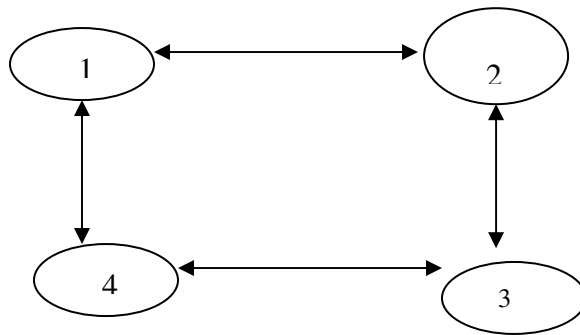
- Answer question ONE in section A and any other TWO question in section B

PLEASE TURN OVER

SECTION A 30 MARKS

QUESTION ONE

- a) Describe 0/1 knapsack problem using Dynamic programming [3 marks]
- b) Describes following the sorting techniques
a) Merge sort [3 marks]
b) Bubble sort [3 marks]
- c) (i) What is algorithm? [1 marks]
(ii) Describe elements of algorithm [4 marks]
- d) Describe maximum and minimum algorithm [5 marks]
- e) Using Greedy method find the optimum solution for knapsack instances $N=7, M=15$
P1,P2, P3.....P7 (10,5,15,7,6,18,3)
W1,W2,W3.....W7 (2,3,5,7,1,4,1)
show your workings [5 marks]
- f) Solve the following traveling sales man problem using Dynamic programming (*show your workings*) [6 marks]



	1	2	3	4
1	0	15	24	29
2	15	0	16	23
3	6	13	0	56
4	12	7	4	0

QUESTION TWO

- a) Describe the algorithm for 4 queen back tracking problem [3 marks]
- b) Given the following array determine whether x is present and if it is present determine the position of x where $x = 143$ (*show your workings*)

a[1] a[2] a[3] a[4] a[5] a[6] a[7] a[8] a[9] a[10] a[11] a[12] a[13] a[14]
-15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151

[4 marks]

- c) How do we analyze the performance of an algorithm [4 marks]
- d) Describe factors to consider when selecting a language to design algorithm [4 marks]
- e) Schedule the Two jobs that have to be scheduled on Two processor.

The matrix is $T = \begin{pmatrix} 2 & 1 \\ 3 & 3 \end{pmatrix}$

[3 marks]

QUESTION THREE

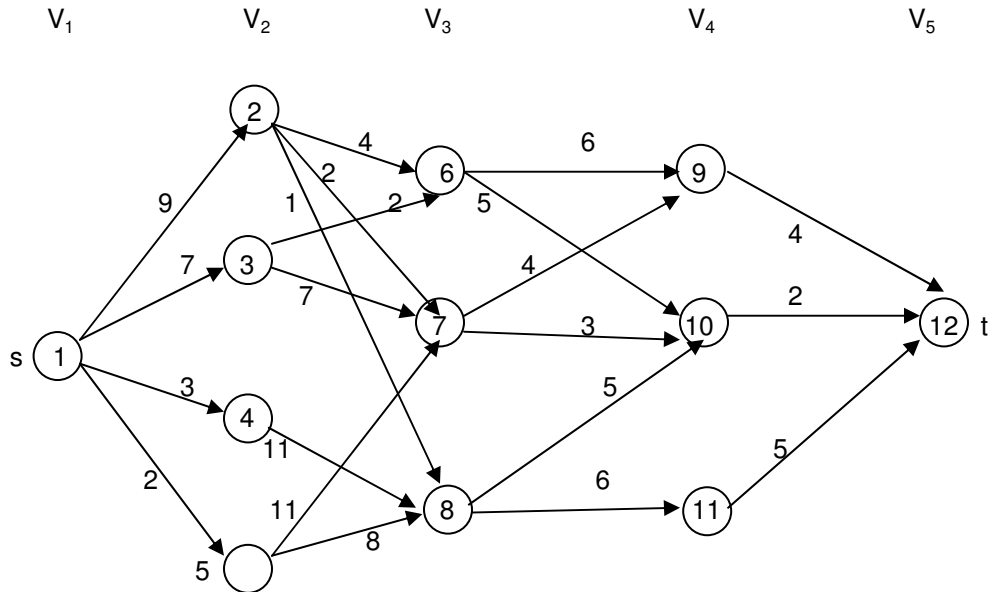
- a) Find the optimal placement for 13 programs on three tape where the programs are of lengths 12, 5, 8, 32, 7, 5, 18, 26, 4, 3, 11, 10 and 6. [5 marks]
- b) Write algorithm for iterative back tracking [5 marks]
- c) Describe binary search algorithm as used in searching and traversal [4 marks]
- d) Describe principles of optimality [4 marks]
- e) How do you consider whether the selected option in greedy method is feasible [2 mark]

QUESTION FOUR

a) Write algorithm of Greedy method

[5 marks]

b) Consider the five-stage graph given below.



Find the minimum cost from node S to node T and indicate the path clearly

[2 marks]

c) Describe knapsack problem algorithm

[5 marks]

d) Explain the flow shop scheduling using a suitable example

[4 marks]

e) Using back tracking fill the following graph

[4 marks]

1			Q				
2					Q		
3							Q
4		Q					
						Q	
6	Q						
7			Q				
8				Q			