KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/20010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

COURSE CODE: COMP 311

COURSE TITLE: DESIGN AND ANALYSIS OF ALGORITHMS

STREAM: Y3S1

DAY: MONDAY

TIME: 9.00 – 11.00 A.M.

DATE: 02/08/2010

INSTRUCTIONS:

- Attempt **Question ONE** and **Any other TWO**

PLEASE TURNOVER

QUESTION ONE 30 MARKS

a) Describe 0/1 knapsack problem using Dynamic programming [4 marks]

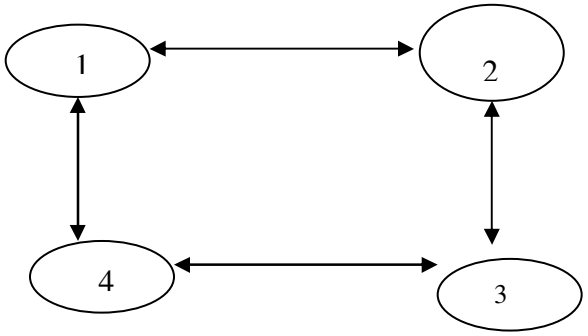
b) Write algorithm of divide and conquer technique [4 marks]

c) (i) What is algorithm ? [2 marks]
(ii) Describe elements of algorithm [4 marks]

d) Describe merge sort as used in divide and conquer technique [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,W1 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	10	15	20
2	5	0	9	10
3	6	13	0	12
4	8	8	9	0

QUESTION TWO (20 Marks)

a) Describe the algorithm for 4 queen back tracking problem [5 marks]

b) Write linear search algorithm as used in search and traversal technique [4 marks]

c) Differentiate between divide and conquer technique and Dynamic programming [5 marks]

d) Describe factors to consider when selecting a language to design algorithm [3marks]

e) Schedule the Two jobs that have to be scheduled on Two processor.

The matrix is T= (2 1)
(3 3)

[3 marks]

QUESTION THREE (20 Marks)

a) Write algorithm of finding maximum and minimum [5 marks]

b) Write algorithm for iterative back tracking [5 marks]

c) 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 using three tapes are T_0, T_1 and T_2 the programs are distributed to these tapes and total retrieval time [4 marks]

d) Describe the three types of file organization [6 marks]

QUESTION FOUR (20 Marks)

a) Write algorithm of Greedy method [5 marks]

b) Write DIJKSTRA's algorithm [5 marks]

c) Describe knapsack problem algorithm [5 marks]

d) Solve the 0/1 Knapsack problem using dynamic programming when
n = 4, m = 15 P = (10,10,12,18) W = (2,4,6,9) [5marks]