Department of Higher Education

University of Computer Studies, Yangon

Second Year (B.C.Sc. / B.C.Tech.)

Final Examination

Advanced Data Structure (CST-203)

September, 2018

Answer **ALL** questions. Time allowed : **3** hours.

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1. (a) Write a Bubble Sort algorithm that sorts a list of integers in descending order.
   (b) How do you understand the invariants? What is the invariant in the bubble sort?
   (c) Show the contents of the array after the **fourth** iteration of selection sort.

43	7	10	23	18	4	19	5	66	14
[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]

(20 marks)

2. (a) What is recursion? Describe the characteristics of recursive methods.
   (b) Write an algorithm recFind( ) which find a given number in a ordered array using recursive binary search method.

(15 marks)

3. (a) Write a code segment to traverse a binary search tree in preorder traversal.
   (b) Draw the binary search tree whose elements are inserted in the following order:
   17, 26, 12, 11, 91, 22, 10, 25, 51, 95
   (c) Construct **a binary tree** whose nodes in inorder and preorder traversal are given as follows:
   Inorder : 10, 15, 17, 18, 20, 25, 30, 35, 38, 40, 50
   Preorder : 20, 15, 10, 18, 17, 30, 25, 40, 35, 38, 50

(15 marks)

4. (a) Discuss the disadvantages of hash tables.
   (b) Draw a hash table with size 23 to store a list of key {25, 29, 20, 0, 26, 22, 38, 49,81, 18, 23, 56, 79, 81, 34, 60} using double hashing method. Use hash function " key%23 " and step size runs from 1 to 5. Also state the values of key, hash value, step size and cells in probe sequences at each key insertion into table.
   (c) What are the advantages of separate chaining method over open addressing methods?

(20 marks)

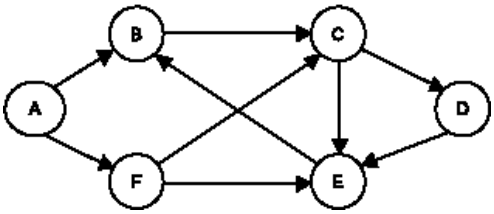
5. (a) Describe the steps for removing the maximum node from heap. What is different between binary tree and heap?
   (b) Show the heap after inserting each of the following keys in this order.
   6, 9, 20, 10, 8, 7, 15, 12, 40, 12, 30, 25
   (c) Redraw the heap (i) after inserting 30 and then (ii) after removing of two times.

(15 marks)

6. (a) Difference between the depth-first search and breath-first search algorithm.

(b) Find the adjacency matrix and adjacency list of the following graph. Search the graph using both depth-first search method and breath-first search method starting at vertex A. Also show the memory contents and various stages of each process during vertex are visited.

(15 marks)



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