Subject Code: G0401/R13

M. Tech –I Semester Regular Examinations, March, 2014

INDUSTRIAL ROBOTICS

(Common to CAD/CAM and AMS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) With neat diagrams explain four basic types of robot configurations, also indicate the directions of rotation and linear movements. [8+4]
   b) Define work volume and load carrying capacity with reference to robot.

2. (a) Discuss the application of Lagrangian Newtonian techniques in writing the equation of motion for Robotics [6+6]
   (b) Apply a suitable technique for the two degree of freedom for both Rotational and linear system and derive the equation of motion

3. (a) Explain about proximity and range sensor with neat sketch [8+4]
   (b) List out some applications of Machine Vision

4. (a) what are the three functions used in operating Machine vision? Explain them with neat Sketch
   (b) What are future manufacturing applications of robot [8+4]

5. (a) what is preventive maintenance in brief?
   (b) what are work place design considerations for safety [6+6]

6. Explain about robot cell layouts with neat sketches [12M]

7. Explain about assembly operations with neat sketch [12M]

8. (a) Explain about robot anatomy [8+4]

   (b) what are the future applications of robot?

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Subject Code: G3801/R13

M. Tech – I Semester Regular Examinations, March, 2014

OPTICAL COMMUNICATIONS TECHNOLOGY

(Common to DE &CS, E&CE and CS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. (a) What is the basic principle of light propagation in optical fiber? Explain in detail. (8)
   (b) A typical sheet of paper is 0.003 inches thick. How many wavelengths of 820 nm light (which is widely used in optical fiber systems) will fit into this distance? How does this compare to a 50 µm diameter optical fiber? (4)

2. (a) What do you mean by dispersion in fiber? How it is related to bit rate of system? Compare intermodal dispersion in multimode step index fiber and graded index fiber.(8)
   (b) A step index fiber has a normalized frequency, v=26.6 at a 1300 nm wavelength. If the core radius is 25 µm, find the numerical aperture. (4)

3. (a) Explain the function & the principle of operation of an isolator with neat diagram.(6)
   (b) Explain the principle of operation of Fabry Perot (FP) filter? (6)

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4. (a) What are the types of optical switches? Explain in detail any two switches. (5)
   (b) Explain the principle of operation of a semiconductor optical amplifier (SOA)? (7)

5. (a) What are the three factors that decide the response time of photodiodes? Explain them in detail with necessary sketches. (8)
   (b) List out the advantages and disadvantages of laser diodes. (4)

6. (a) Explain the various network elements in an optical transmission system with a neat block diagram. (7)
   (b) Explain the Reed-Solomon Codes for Error Detection and Correction in optical communications. (5)

7. (a) What is WDM? Explain the principle with a neat block diagram. (6)
   (b) Describe the Wavelength Stabilization against Temperature Variations in an optical network. (6)

8. Write short notes on (6+6)
   (a) Bragg Gratings
   (b) Duo-binary optical modulation

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Subject Code: G4001/R13

M. Tech –I Semester Regular Examinations, March, 2014

ADVANCED DATA STRUCTURES/
DATA STRUCTURES/
ADVANCED DATA STRUCTURES ALGORITTHUM ANALYSIS
(Com to IT, CS&T, CS and CS&E)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks
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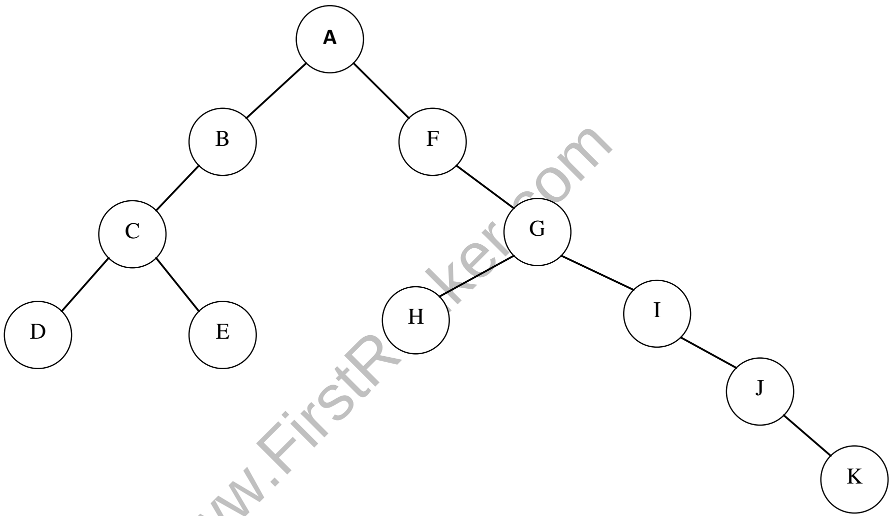
1. Create a stack by linked list implementation. Read a list of integers and print them in reverse order.

2. What are the common structures used to store graphs? Explain with examples.

3. a) Draw a complete tree to level 4. How many different nearly complete trees can exist at level 4?
   b) Show the breadth first traversal of the tree in the following figure.



4. Use linear probing , a hash table with b=13 buckets, and the hash function f(k)= k% b. Start with the empty hash table and insert pairs whose keys are 7, 42, 25, 70, 14, 38, 8, 21, 34, 11.

   i) Draw the hash table following each insert.

   ii) What is the maximum and average number of buckets examined in an unsuccessful search of your table?

   iii) What is the maximum and average number of buckets examined in a successful search of your table?

   iv) What is the loading factor of your table after the last insert?

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Subject Code: G4001/R13

5. Consider the array *theHeap*= { -, 10, 2, 7, 6, 5, 9, 12, 35, 22, 15, 1, 3, 4}
   - i) Draw the corresponding binary tree.
   - ii) Heapify the tree. Show the result in both tree and array format.
   - iii) Insert the elements 15, 20 and 45 using bubbling up process. Show the max heap following each insert.
6. Construct a binary search tree by inserting the keys 4, 12, 8, 16, 6, 18, 24, 2, 14, 3. Draw the tree following each insert. From the tree delete keys 6, 14, 16 and 4. Draw the search tree after each deletion.
7. a) Describe LL rotation, LR rotation in an AVL tree by considering an example.

   b) Describe Single rotation and double rotation in deleting an element in an AVL tree.
8. Start with an empty red black tree and insert the following keys in the given order: 20, 10, 5, 30, 40, 57, 3, 2, 4, 35, 25, 18, 22, 21. Draw the figures depicting your tree immediately after insertion and following the rebalancing rotation or color change. Label all nodes with their color and identify the rotation type.

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Subject Code: C5801/R09

M. Tech – I Semester Supply Examinations, March, 2014

DATASTRUCTURES AND ALGORITTHUM ANALYSIS

(Com to Neural Networks,CSE, CS and CST)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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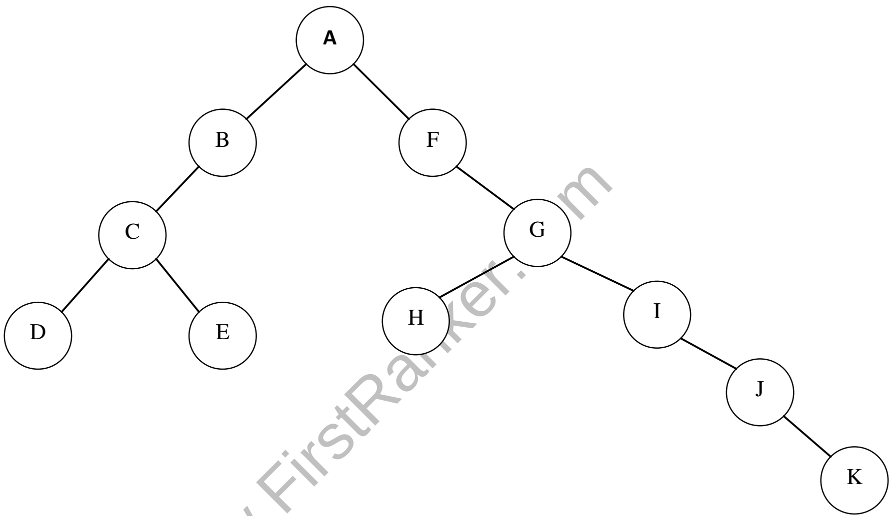
1. Create a stack by linked list implementation. Read a list of integers and print them in reverse order.

2. What are the common structures used to store graphs? Explain with examples.

3. a) Draw a complete tree to level 4. How many different nearly complete trees can exist at level 4?
   b) Show the breadth first traversal of the tree in the following figure.



4. Use linear probing , a hash table with b=13 buckets, and the hash function f(k)= k% b. Start with the empty hash table and insert pairs whose keys are 7, 42, 25, 70, 14, 38, 8, 21, 34, 11.

   i) Draw the hash table following each insert.

   ii) What is the maximum and average number of buckets examined in an unsuccessful search of your table?

   iii) What is the maximum and average number of buckets examined in a successful search of your table?

   iv) What is the loading factor of your table after the last insert?

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Subject Code: C5801/R09

5. Consider the array *theHeap*= { -, 10, 2, 7, 6, 5, 9, 12, 35, 22, 15, 1, 3, 4}

   i) Draw the corresponding binary tree.

   ii) Heapify the tree. Show the result in both tree and array format.

   iii) Insert the elements 15, 20 and 45 using bubbling up process. Show the max heap following each insert.

6. Construct a binary search tree by inserting the keys 4, 12, 8, 16, 6, 18, 24, 2, 14, 3. Draw the tree following each insert. From the tree delete keys 6, 14, 16 and 4. Draw the search tree after each deletion.

7. a) Describe LL rotation, LR rotation in an AVL tree by considering an example.

   b) Describe Single rotation and double rotation in deleting an element in an AVL tree.

8. Start with an empty red black tree and insert the following keys in the given order: 20, 10, 5, 30, 40, 57, 3, 2, 4, 35, 25, 18, 22, 21. Draw the figures depicting your tree immediately after insertion and following the rebalancing rotation or color change. Label all nodes with their color and identify the rotation type.

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