FACULTY OF ENGINEERING

B.E. I – Year (Backlog) Examination, May / June 2018

Subject: Mathematics – I

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A & any five questions from Part B.

PART – A (25 Marks)

1 Examine the convergence of the series $\sum\limits_{n=1}^{\infty}\left(\dfrac{1}{2^n}+\dfrac{1}{n^2}\right)$. 3

2 Define absolute and conditionally convergent series. 2

3 Find the Taylor series expansion of the function $f(x) = e^x$ about $x = 1$. 3

4 Obtain the equation of the envelope of the family of lines $y = ax + a^2$, 'a' being parameter. 2

5 If $f(x,y) = \dfrac{x - y}{x + y}$, find $\dfrac{\partial f}{\partial x}$ at $(1,1)$. 3

6 Evaluate $\int\limits_{0}^{1}\int\limits_{0}^{3}\left(x^2 + y^2\right)dy\,dx$. 2

7 Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at $(2, -1, 2)$. 3

8 State Gauss's divergence theorem. 2

9 Find the rank of the matrix $A=\begin{pmatrix} 1 & 2 & 3 & 4 \\ 0 & 2 & 1 & 3 \\ -1 & 0 & 1 & 2 \end{pmatrix}$. 3

10 If $A = \begin{pmatrix} -1 & 2 \\ 0 & 1 \end{pmatrix}$, find the eigen values of $A^3 + 7A^2 + 2A$. 2

PART – B (5x10 = 50 Marks)

11 a) Discuss the convergence of the series $\dfrac{x}{2\sqrt{3}}+\dfrac{x^2}{3\sqrt{4}}+\dfrac{x^3}{4\sqrt{5}}+...$where $x > 0$. 5

b) Show that that the series $\sum\limits_{n=1}^{\infty}\dfrac{\cos\left(x^2 + n^2 x\right)}{n^3}$ is absolutely convergent. 5

..2

12 a) State and prove Rolle's theorem. 5

b) Find the equation of the circle of curvature on the curve $\sqrt{x} + \sqrt{y} = 2$ at the point (1,1). 5

13 a) If u = f(x-y, y-z, z-x), show that $\dfrac{\partial u}{\partial x} + \dfrac{\partial u}{\partial y} + \dfrac{\partial u}{\partial z} = 0$. 5

b) Find a point on the plane 2x + 3y − z = 5 which is nearest to the origin. 5

14 Verify Green's theorem in the plane for $\oint_c (x^2 - xy^3)\, dx + (y^2 - 2xy)\, dy$, where C is the square with vertices (0,0), (2,0), (2,2), (0,2). 10

15 a) Determine whether the vectors (1, 1, 1), (0, 1, -1), (1, 0, 1) are linearly dependent. 5

b) Using Cayley-Hamilton theorem, find the inverse of the matrix A=$\begin{pmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{pmatrix}$. 5

16 a) Apply Lagrange's mean value theorem to prove that $\dfrac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \dfrac{b-a}{1+a^2}$, $0 < a < b < c$. 5

b) Discuss the continuity of $f(x, y) = \begin{cases} \dfrac{(x-y)^2}{x^2 + y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$ at (0,0) 5

17 a) Prove that $\operatorname{div}\left(\dfrac{\vec{r}}{r^3}\right) = 0$ where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ and $r = |\vec{r}|$. 5

b) Find the canonical form, nature, index and signature of the quadratic form Q = 2x$_1$x$_2$ + 2x$_2$x$_3$ + 2x$_3$x$_1$. 5

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FACULTY OF ENGINEERING

B.E. / B. Tech (Bridge Course) I-semester (Backlog) Examination, May / June 2018

Subject: Programming in C

Time: 3 Hours   **Max. Marks: 75**

Note: Answer All Questions From Part-A, & any FIVE Questions From Part-B.

PART-A (25 Marks)

1. Discuss the Advantages of algorithm and flowchart   3
2. Explain size of ()?   2
3. Differentiate between get char () and put char ()?   2
4. Differentiate between while and do-while?   2
5. Briefly discuss advantages of recussion over loops?   3
6. Write a program in C to display multiplication table?   3
7. Differentiate between break and continue with an example?   2
8. Write the syntax for declaration of variable, array, pointer and structure 3
9. Discuss the need of file concepts in C Programming?   2
10. Write a program in C to find greatest among 3 number using ternary operation? 3

PART-B (50 Marks)

11. a) Explain in detail about block diagram of a computer.   5
    b) Write an algorithm for finding the given number is palindrome or Not. 3
    c) Define computer.   2

12. a) Explain in detail about pre processor on directives with a sample program. 5
    b) Briefly discuss about the structure of a 'C' program.   5

13. a) Write a program in 'C' to find whether the given number is Armstrong or not. 5
    b) Write a program in C to make a simple calculator.   5

14. a) Define function. Mention the advantages and disadvantages of it.   3
    b) Discuss about storage classes.   5
    c) Mention various string handling functions.   2

15. a) Write a program in C for multiplication of matrices using pointer with arrays. 6
    b) Differentiate between array and pointer with an example.   4

16. a) Write a program in C to display the student details such as name, id, marks in
       6 subjects and find the percentage of marks.   7
    b) Differentiate between structure and union.   3

17. a) Write a program in C to copy the data from one file to other file.   6
    b) Explain enum with a sample example.   4

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FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Supple.) Examination, May/June 2018

Subject: Engineering Geology

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from Part A and Part B & and Any FIVE questions from Part – B.

PART – A (2x10 = 20 Marks)

1) What is the vesicular structure in rock basalt?

2) Define the tension joints and compression joints in the rocks.

3) Write the Godrich classification of minerals with respect to susceptibility.

4) Differentiate the engineering properties of lateritic soils and red soil.

5) Write in brief the formation of Aeolian land farm.

6) What the types of aerial photographs?

7) Give the foundation geology of Nagarjunasagar dam.

8) What is over break in tunnel?

9) List out four mono mineralic rocks.

10) What is seismograph?

PART – B (5x10 =50 Marks)

11 a) Write distinguishing features following rocks.

    i) Dolerite   ii) Basalt   iii) Laterite   iv) Quartzite   10M

12 a) Describe the weathering of lime stone.   5M

    b) Give the occurrences of ground water in various lithological formation.   5M

13 a) What are the characteristic features of fluviatile land forms?   5M

    b) Give stress-strain behavior of quartz and dolerite.   5M

14 Write geological consideration in selection of following rocks.

    i) concrete aggregate ii) building stones   iii) decorative stones iv) road aggregates   10M

15 a) What is the water tightness in the reservoir?   5M

    b) Give a case history of dam failure that you know.   5M

16 a) Explain briefly the pay line in tunnel.   5M

    b) Write the forecasts and rehabilitations for disasters.   5M

17 Explain the geological consideration for selection of tunnel and add a note on tunnel supports.   10M

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FACULTY OF ENGINEERING

B.E (CBSC) (EE/Inst.) III-Semester (Suppl.) Examination, May / June 2018

Subject: Prime Movers & Pumps

Time: 3 hours   **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B

PART–A (20 Marks)

1. Define Laminar and Turbulent flow?   2
2. Define Specific volume and specific Gravity?   2
3. Why reciprocating pumps are not directly coupled to motors? Discuss the reason?   2
4. What is the difference between Inward and Outward Radial flow turbine?   2
5. What is priming why it is necessary?   2
6. How are the steam turbines classified?   2
7. What are the functions of Boiler?   2
8. Compare water tube and fire tube boiler?   2
9. What is cavitation? State its effects on performance of water turbine?   2
10. What is the difference between Dynamic viscosity & kinematic viscosity?   2

PART–B (50 Marks)

11. a) What is Euler's equation? Obtain Bernoulli's equation from it?   6
     b) Explain Momentum Equation and Energy Equation?   4

12. a) What is Draft Tube? Describe with neat sketches different types of draft tube?   6
     b) What do you understand by characteristic curves of turbine? Name the important types of Characteristic Curves?   4

13. a) Compare the Differences between Centrifugal & Reciprocating pumps?   5
     b) Write the Differences between Impulse and Reaction Turbine?   5

14. Explain Construction & Working of Babcock & Wilcox Boiler?   10

15. a) Explain Closed cycle Gas Turbine with neat sketch?   5
     b) Explain Working of Constant Volume Combustion Gas Turbine?   5

16. Explain the Principle and Working of Reciprocating Pump with neat sketch?   10

17. a) Define the terms Unit Power, Unit Speed and Unit Discharge with reference to hydraulic turbine. Also write the Expressions for these terms?   5
     b) Discuss the Advantages of Steam Engine over Steam Turbine?   5

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FACULTY OF ENGINEERING

B.E (ECE) (CBCS) III – Semester (Suppl.) Examination, May / June 2018
Subject :Electronic Devices

Time : 3 Hours   Max Marks : 70

Note: Answer all questions from Part – A & Any five questions from Part – B.

Part – A (20 MARKS)

1. The voltage across the Si diode is 0.65V at 300°K and 2mA current flows through it. If the voltage increases to 0.7 V calculate the diode current when volt equivalent temperature is V_T =26mV.   (2)

2. Distinguish between Zener breakdown and avalanche breakdown mechanism in reverse biased PN junctions.   (2)

3. Why a Bridge rectifier is preferred over Center-tap rectifier?   (2)

4. Compare half wave, full wave and bridge rectifiers   (2)

5. What is an early effect? What are the consequences of it?   (2)

6. Derive the general expression for stability factor S?   (2)

7. Define h-parameters and draw the small signal low frequency hybrid model of BJT. (2)

8. What is SCR? Draw the symbol, structure of SCR?   (2)

9. Compare JFET and BJT with various features.   (2)

10. What are the advantages of MOSFETs?   (2)

PART – B (50 Marks)

11. (a) Distinguish between drift and diffusion currents in semiconductors?   (5)

    (b) Derive the expression for transition capacitance C_T in PN junction diode. (5)

12. (a) Explain the operation of full wave center-tapped with neat circuit diagram & draw the input and output wave forms .   (5)

    (b) An a.c. supply of 230V is applied to a Full - wave rectifier circuit through transformer of turns ration 8:1.The load connected is a resistance of 1K .Find (i) DC output voltage (ii) PIV (iii) Maximum and (iv) Average values of power delivered to the load.   (5)

..2

13. (a) Obtain the output characteristics of a CB transistor configuration. Indicate and explain the various regions of operation on the output characteristics. (6)

   (b) Draw an equivalent circuit and explain the operation of UJT (4)

14. (a) Draw and explain fixed bias circuit , derive for stability factor S? (5)

   (b) Design a fixed bias circuit for a Si transistor having V_{BE} = 0.6V,   =99. Desired operating point is V_{CE} = 5V and I_C = 5mA. Assume Vcc = 15V and h_{fe} =100. (5)

15. (a) A junction transistor has the following h-parameters h_{ie} = 1000 , h_{re} = 1.6×10^{-4}, h_{fe} = 5 h_{oe} =50µmhos. Determine the A_I, A_V, Z_i, Zo of the CE amplifier. Assume load resistance R_L as 1K   and source resistance as 800 . (6)

   (b) Compare CE, CB and CC amplifiers for various parameters. (4)

16. (a) Explain the operation of depletion mode n – channel MOSFET, draw the drain and   transfer characteristics (7)

   (b) Define g_m,r_d and µ of a JFET and derive the relation between them. (3)

17. Write short notes on the following. (10)

   (a) Bias compensation using diodes

   (b) Zener Voltage regulator

   (c) Tunnel Diode

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FACULTY OF ENGINEERING

B.E. (M/P) III Semester (CBCS) (Suppl.) Examination, May / June 2018

Subject: Engineering Thermodynamics

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from Part A & any five from questions from Part B.

PART – A (20 Marks)

1. What is Thermodynamic Equilibrium.   [2]
2. Distinguish between intensive and extensive properties   [2]
3. Define Perpetual Motion Machine-I   [2]
4. Write Steady Flow Energy Equation for Nozzles   [2]
5. Define Heat Engine   [2]
6. What is Clausius theorem?   [2]
7. Explain the critical state of a substance.   [2]
8. Define triple point.   [2]
9. How do you define air standard cycle.   [2]
10. What is Amangat-Leduce law of partial volumes.   [2]

PART – B (5x10=50 Marks)

11. (a) Write about ideal gas temperature scale.   [5]
    (b) Explain Microscopic and Macroscopic approach of thermodynamics. [5]

12. (a) In a gas turbine unit, the gases flow through the turbine in 15kg/s and the power developed by the turbine in 12,000kW. The enthalpies of gases at the inlet and outlet are 1260kJ/kg respectively, and the velocity of gases at the inlet and outlet are 50m/s and 110 m/s respectively calculate: [10]

   (i) the rate at which the heat is rejected from the turbine and

   (ii) the area of the inlet pipe given that the specific volume of the gases at the inlet is 0.45 m^3

13. (a) State and Prove the equivalence of Kelvin Plank and Clausius statements. [5]

    (b) 0.04 m^3 of nitrogen contained in a cylinder behind a piston is initially at 1.05 bar and 15 ^{0}C. The gas is compressed isothermally and reversibly until the pressure is 4.8 bar.

    Calculate,   [5]

       (i) the change of entropy

       (ii) the heat flow and

       (iii) the work done

    Sketch the process on P-V and T-S diagram. Assume nitrogen to act as a perfect gas. Molecular weight of nitrogen = 28.

14. (a) Explain the behavior of water as a pure substance with the help of P-T diagram. [5]

(b) Derive the Clapeyron equation and give its applications [5]

15. (a) Differentiate between Volumetric and Gravimetric analysis [5]

(b) Compare air standard Otto cycle and Diesel cycle. [5]

16. (a) Give the significance of Zeroth law of thermodynamics [5]

(b) A heat engine receives 400 kJ heat reversibly from a source at 327^0C and rejects heat reversibly to the sink at 27^0C. There are no other heat transfers. Find out whether the engine is reversibly, irreversible or impossible for the following heat rejections. [5]

(i) 300kJ   (ii) 200kJ   (iii) 10kJ

17. (a) What are Maxwells relations? [5]

(b) What are Helmholtz and Gibbs functions? [5]

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FACULTY OF ENGINEERING

B.E. III(AE) Semester (CBCS) (Supple.) Examination, May / June 2018

Subject: Automotive Electrical & Electronic Engineering

Time: 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part A & any five questions from Part B.
PART – A (20Marks)

1. Why LED is better than the conventional lighting system?   2
2. HRD test in batteries is carried out by …….   2
3. Starter motors take…………..current due to ………….torque.   2
4. Starter motor pinion is made to rotate on over turning clutch type of arrangement. Because of …………requirement, and hence known as …….drive.   3
5. Alternator uses 3-unit regulator in its charging system(T/F)   2
6. Dynamo is comparatively less efficient than Alternator-why?   3
7. MPFI system is part of the modern electronic engine management system(T/F) 2
8. Electronic warning systems can be used for ……..,……….,…….etc.   2
9. Microprocessors are used for…….……..   2

PART – B (50 Marks)

10. Bring out the salient differential features in terms of construction and functioning between conventional Lead acid battery and maintenance free battery.   10

11. Compare the working principles of Alternator and Dynamo and then bring out the functional superiority of the alternator and why.   10

12. With a neat sketch, explain the working and functioning of a battery charging system. 10

13. Bring out in details the different sub-systems of an automotive electronic engine management system as well as overall automotive functioning systems.   10

14. (a)Describe the sources of electro-magnetic interference as well as its effects on other systems.   5

    (b)Describe modern day coolant system which has replaced the day to day replenishment of water.   5

15. (a) Explain the working principle of solenoid with a neat sketch.   5

    (b) How explain exhaust analyser functions?   5

16. Write short notes on the following: 10

    (a) On board diagnostic system.

    (b) Different security and warning system.

    (c) Microprocessor in automobiles.

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FACULTY OF ENGINEERING

B.E. (CSE) III - Semester (CBCS) (Suppl.) Examination, May / June 2018

Subject : Data structures

Time : 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part-A &answer any five questions from Part-B.

PART – A (20 Marks)

1   Write pseudo code for identifying if the given number is prime and calculate the time complexity using Step count.

2   If a 3D matrix has a size of 5*5*5, and if the base address of the matrix starts at 1000, calculate the Column Major Order for 2*3*4?

3   Convert the below expression into postfix? ((a*b)/(c+d*(e-f)/g)).

4   Given the list of elements {5, 10, 15, 20, 0, 23, 8} to be inserted into a hash table of size 10, how many collisions occur if linear probing is employed?

5   Write pseudo code for demonstrating inorder traversal of a binary tree using recursion

6   Which type of rotation is required for balancing the given AVL Tree.
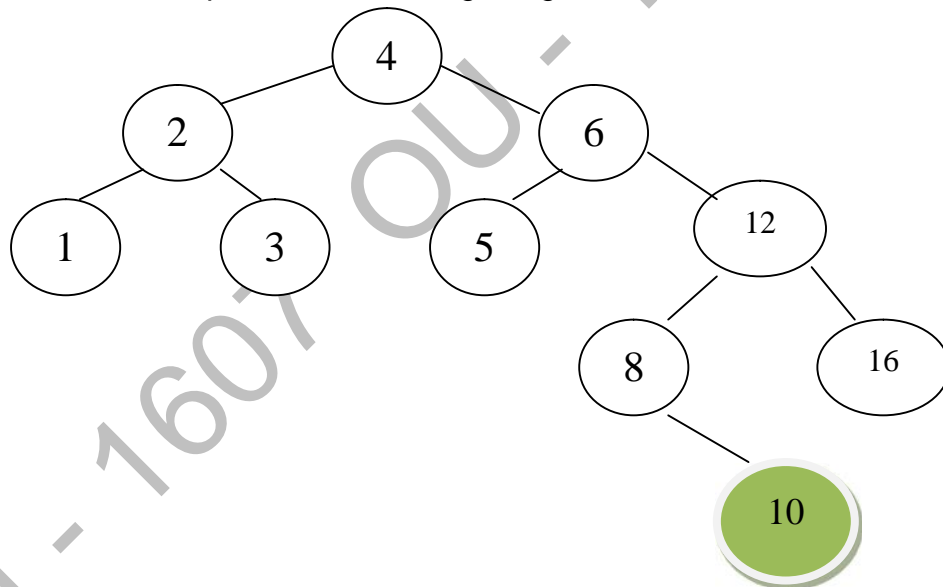
7   Specify the data structure used for computing the BFS for a graph.

8   Represent a graph from the given adjacency matrix.

	E1	E2	E3	E4	E5	E6	E7	E8
A	1	1	-1	0	0	0	0	0
B	-1	0	0	1	0	1	0	0
C	0	-1	0	0	1	0	0	0
D	0	0	1	-1	-1	0	1	1
E	0	0	0	0	0	-1	-1	0

9   Define a Max-Heap?

10 Demonstrate insertion sort with the following numbers {5, 8, 3, 6, 2, 1, 4, 7}

PART-B (5x10 = 50 Marks)

11 (a) Compare the various asymptotic notations used for analyzing the performance of any algorithm.
   (b) Write logic to use minimum iterations for inserting a new node at the end of a Circular linked list. Note: Linked List has only one pointer pointing to the head.

12 (a) Demonstrate the operations of a Stack implemented using a Linked List
   (b) Create a Skip list with the following numbers 20, 40, 80, 24, 60, 75, 30, 77

13 (a) Construct a binary search tree by taking the following elements a.
      10, 4, 9, 20, 30, 26, 29, 27, 15, 2 and delete the following nodes 27, 26, 20, 4, 10
   (b) Construct a AVL tree with the following numbers 14, 17, 11, 7, 53, 4, 13, 12, 8, 53, 1

14 (a) Demonstrate DFS starting from the vertex B using the graph below
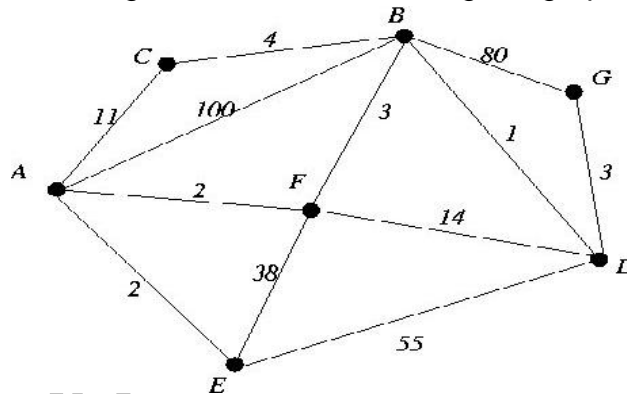
   (b) From the graph above, calculate the shortest path to reach D from E using Dijkstra's Algorithm.

15 (a) Explain which sorting algorithm better suits, when the data is randomly scattered, data is pre available, and always returns the sorted elements at the earliest
   (b) Write the algorithm for Heap Sort in ascending order

16 (a) Demonstrate a Double Ended Queue using a Doubly Linkedlist
   (b) Write a program to reverse the elements of a stack using Recursion

17 Write short notes on any **TWO** of the following
   (a) B-Tree
   (b) Kruskal's algorithm for computing Minimum spanning tree for the above graph
   (c) Closest pair of points

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FACULTY OF INFORMATICS

B.E (I.T) III-Semester (CBCS) (Supply) Examination, May/June 2018

Subject : Data Structures

Time : 3 Hours   **Max Marks : 70**

Note: Answer all questions from Part – A & Any five questions from Part – B.

Part - A (20 Marks)

1. What is sparse matrix? How sparse matrix is represented.
2. Define Abstract data type and Write ADT for Stack.
3. Transform the following expression to prefix and postfix form.
   (A / B * C * D+E)
4. Write a function to check whether circular queue is full or not.
5. Which is more efficient in terms of running time, the arrays or linked implementation of queue? Why?
6. What is hash function? List few hash functions.
7. Explain the array and linked representation of Binary Tree.
8. Compare and contrast DFS and BFS.
9. For insertion sort, what arrangement of the input data will cause the worst case performance? The best case performance?
10. Define splay tree.

Part-B (50 Marks)

11. a) Explain various asymptotic notations with examples.   5
    b) Write a C++ function to reverse a given string.   5

12. Write an algorithm for conversion of an infix expression to postfix expression and trace the algorithm for the expression ((((A/B)*C)*D) + E) and get the resultant postfix expression   10

13. Write C++ code to implement various operation on queue (use linked representation) 10

14. What is minimum cost spanning tree. Use Kruskal's algorithm to find minimum cost

    spanning tree for the following graph.   10
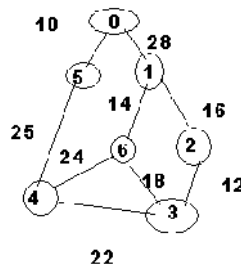
15. Write and explain heap sort algorithm. And Construct a min heap for the following elements 125, 145, 42, 55, 88, 72, 62, 95, 25, 100   10

16. a) Make a Binary Search Tree for the following sequence of numbers {30, 20, 25, 40, 35, 36, 32, 45, 42} Traverse the obtained BST in Pre-order

    Post-order and In-order.   5

    b) Write about different graph representations. Use Examples   5

17. Write short notes on any of two: 10

    a) Threaded binary tree

    b) Secure hash function

    c) AVL Trees.

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