COMPUTER SCIENCE AND APPLICATIONS

Name & Signature of the Invigilator

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PAPER-III
SEPT-16/19

OMR Answer Sheet No. : | | | | | | |

Roll No. : | | | | | | |

(in figures as in Hall Ticket)

Roll Number in words : .....

.....

Time : 2.30 Hours] **No. of Printed Pages : 28** **[Maximum Marks : 150**

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of **Seventy Fifty (75)** multiple choice type of questions. **All** questions are compulsory.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (*i*) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker seal and do not accept an open booklet.
   (*ii*) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given
   (*iii*) After this verification is over, the Test Booklet Number should be entered on the OMR Answer Sheet and the OMR Answer Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.

   Example : (A) ● (C) (D) where (B) is the correct response
5. Your responses to the items are to be indicated on the OMR Answer Sheet under Paper – III only. If you mark your response at any place other than in the oval in the OMR Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the original OMR Answer Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet and duplicate copy of OMR Answer Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table etc., is prohibited.
12. There shall be no negative marking.
13. In case of any discrepancy in the English and Gujarati versions of questions, English version will be taken as final.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

1. આ પાનાની ટોચ પર દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.
2. આ પ્રશ્નપત્રમાં બહુવૈકલ્પિક ઉત્તરો ધરાવતા **પંચોતેર (૭૫)** પ્રશ્નો આપેલા છે. **બધાજ** પ્રશ્નો ફરજિયાત છે.
3. પરીક્ષાની શરૂઆતમાં આપને પ્રશ્નપુસ્તિકા આપવામાં આવશે. પ્રથમ પાંચ (૫) મિનિટ દરમ્યાન તમારે પ્રશ્નપુસ્તિકા ખોલી અને ફરજિયાતપણે નીચે મુજબ પરીક્ષણ કરવું :
   (*i*) પ્રશ્નપુસ્તિકાનાં વપરાશ કરવા માટે આ કવર પૃષ્ઠની ધાર પર આપેલ સીલ સ્ટીકર કાઢો નાખો. કોઈપણ સંજોગોમાં સીલ સ્ટીકર વગરની કે ખુલ્લી પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં.
   (*ii*) કવર પૃષ્ઠ પર છપાયેલ નિર્દેશાનુસાર પ્રશ્નપુસ્તિકાના પ્રશ્નો, પૃષ્ઠો અને સંખ્યાને બરાબર ચકાસી લો. ખામીયુક્ત પ્રશ્નપુસ્તિકા કે જેમાં પ્રશ્નો પૃષ્ઠો ઓછા હોય, બે વાર છપાયા હોય, અનુક્રમમાં અથવા અન્ય કોઈ ક્ષતિ હોય અર્થાત કોઈપણ સંજોગોમાં ખામીયુક્ત પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં. અને જો ખામીયુક્ત પ્રશ્નપુસ્તિકા મળી હોય તો નિરીક્ષક પાસેથી તુરંત જ બીજી સારી પ્રશ્નપુસ્તિકા મેળવી લેવી. આ માટે ઉમેદવારને પાંચ (૫) મિનિટનો સમયગાળો આપવામાં આવશે. પાછી થી, પ્રશ્નપુસ્તિકા બદલવામાં આવશે નહીં કે કોઈ વધારાનો સમયગાળો આપવામાં આવશે નહીં.
   (*iii*) આ ચકાસણી સમાપ્ત થાય પછી, પ્રશ્નપુસ્તિકાનો નંબર OMR જવાબ પત્રક પર લખવો અને OMR જવાબ પત્રકનો નંબર પ્રશ્નપુસ્તિકા પર લખવો.
4. પ્રત્યેક પ્રશ્ન માટે ચાર જવાબ વિકલ્પ (A), (B), (C) અને (D) આપવામાં ઓવલ છે. તમારે સાચા જવાબના ઓવલ (oval) ને નીચે આપેલ ઉદાહરણ મુજબ પેનથી ભરીને સંપૂર્ણ કાળું કરવાનું રહેશે.

   ઉદાહરણ : (A) ● (C) (D) કે જ્યાં (B) સાચો જવાબ છે.
5. આ પ્રશ્નપુસ્તિકાના પ્રશ્નોના જવાબ અલગથી આપવામાં આવેલ OMR જવાબ પત્રકમાં પેપર–III લખેલ વિભાગમાં જ અંકિત કરવા. જો આપ OMR જવાબ પત્રકમાં આપેલ ઓવલ (oval) સિવાય અન્ય સ્થાને જવાબ અંકિત કરશો તો તે જવાબનું મૂલ્યાંકન કરવામાં આવશે નહીં
6. અંદર આપેલ સૂચનાઓ ધ્યાનપૂર્વક વાંચો.
7. કાચું કામ (Rough Work) પ્રશ્નપુસ્તિકાના અન્તિમ પૃષ્ઠ પર કરવું.
8. જો આપ OMR જવાબ પત્રક નિયત જગ્યા સિવાય અન્ય કોઈપણ સ્થાને, આપનું નામ, રોલ નંબર, ફોન નંબર અથવા એવું કોઈ ચિન્હકે જેનાથી તમારી ઓળખ થઈ શકે, અંકિત કરશો અથવા અભદ્ર ભાષાનો પ્રયોગ કરો, અથવા અન્ય કોઈ અનુચિત સાધનોનો ઉપયોગ કરો, જેમ કે અંકિત કરી દીધેલ જવાબ ભૂંસી નાખવો કે સફેદ શાહીનો ઉપયોગ કરી બદલશો તો આપને પરીક્ષા માટે અયોગ્ય જાહેર થઈ શકો છો.
9. પરીક્ષા સમય પુરો થઈ ગયા બાદ ઓરીજીનલ OMR જવાબ પત્રક જે તે નિરીક્ષકને ફરજીયાત સોંપી દેવું અને કોઈ પણ સંજોગોમાં તે પરીક્ષાખંડની બહાર લઈ જવું નહીં. પરીક્ષા પૂર્ણ થયા બાદ ઉમેદવાર ઓરીજીનલ પ્રશ્નપુસ્તિકા અને OMR જવાબ પત્રકની ડુપ્લિકેટ કોપી પોતાની સાથે લઈ જઈ શકે છે.
10. માત્ર કાળી/ભૂરી બોલ પોઈન્ટ પેન વાપરવી.
11. કેલ્કયુલેટર અને અન્ય ઈલેક્ટ્રોનિક યંત્રોનો ઉપયોગ કરવાની મનાઈ છે.
12. ખોટા જવાબ માટે નકારાત્મક ગુણાંકન પ્રથા નથી.
13. પ્રશ્નપુસ્તિકાના કોઈ પ્રશ્નમાં અનુવાદ અંગે કોઈ વિવાદ/મતભેદ જણાય તો અંગ્રેજી વર્ઝન પ્રાધ્ય ગણાશે.

SEAL

COMPUTER SCIENCE AND APPLICATIONS
PAPER - III

Note : This paper contains **Seventy Five (75)** multiple-choice/assertion and reasoning/ matching questions, each question carrying **TWO (2)** marks. Attempt **All** the questions.

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1. In microprogrammed processor design, a word in the control ROM contains :

   (A) A microinstruction (B) An address in address ROM

   (C) An address in RAM (D) An address in BIOS

2. Which of the following Boolean functions represents the NAND operator ?

   (A) $\bar{A}.B + A.\bar{B}$ (B) $\bar{A} + B$

   (C) $A + \bar{B}$ (D) $\bar{A} + \bar{B}$

3. The CPU register that points to the address of next instruction to be executed is :

   (A) Memory Address Register (B) Instruction Register

   (C) Program Counter (D) Accumulator

4. The phase of the instruction execution during which the instruction is brought from memory into the CPU is called :

   (A) Execution cycle (B) Fetch cycle

   (C) Instruction cycle (D) Clock cycle

5. 8085 microprocessor is called an 8-bit microprocessor because it has :

(A) An address bus of 8 bits

(B) CPU registers of 8 bits

(C) I/O interfaces of 8 bits

(D) All instruction cycles of 8 clock cycles

6. Which one of the following properties does *not* belong to the set of five main properties of transactions ?

(A) Concurrency

(B) Durability

(C) Consistency

(D) Isolation

7. Which one of the following statements related to two-phase locking and its protocol is invalid ?

(A) Two transactions can not have conflicting locks

(B) Two phase locking prevents deadlock

(C) No data are affected until all locks are obtained (i.e. until the transaction is in its locked point)

(D) No unlock operation can precede a lock operation in the same transaction

8. Which one of the following statements is *false* ?

(A) Query optimization is one of the central activities during the parsing phase in query processing.

(B) Query optimizer can operate in one of two modes (*i*) rule based optimizer, and (*ii*) cost based optimizer.

(C) To achieve performance tuning, it is recommended to assign various data files in the same storage volume for the indexes system and high usage tables.

(D) One of the performance improving techniques involves taking a table from a higher normal to a lower normal form.

9. Which one of the following statements is *false* ?

(A) An object represents only one individual occurrence of an entity.

(B) Object oriented data model is a complex navigation system.

(C) One object in Object oriented model may correspond to more than one entities and their relationships, but one entity will not correspond to more than one object in Object oriented model.

(D) Object oriented data model has low system overhead.

10. Which one of the following statements is *false* ?

(A) Write-ahead-log protocol ensures that transaction logs are always written before any database data are actually updated.

(B) If the recovery procedure uses deferred-write and if the transaction aborts before it reaches its commit point, no ROLLBACK or Undo needs to be made to the database.

(C) If the recovery procedure uses write-through, the database is not immediately updated by transaction operations. Only the transaction log is updated. The database is physically updated only after the transaction reaches its commit point.

(D) Check point results in physical database and the transaction log to be in sync.

11. The phenomenon of having a continuous glow of beam on the screen even after it is removed is called :

(A) Fluorescence (B) Persistence

(C) Phosphorescence (D) Incandescence

12. In Bresenham's circle algorithm, we do not require :

(A) floating-point arithmetic

(B) calculation along the line to a pixel centre

(C) multiplication or division

(D) addition or subtraction

13. Which of the following clipping algorithm follows the Divide and Conquer strategy ?

(A) 4-bit algorithm

(B) Midpoint Subdivision algorithm

(C) Cyrus break algorithm

(D) Cohen-Sutherland algorithm

14. The point at which a set of projected parallel lines appear to converge is called a :

(A) convergence point (B) vanishing point

(C) point of illusion (D) point of delusion

15. The ISO standard for Computer Graphics is :

(A) Graphics Kernel System

(B) Graphics Standard System

(C) Computer Graphics Standard

(D) Computer Graphics Kernel

16. A particular parallel program computation requires 100 seconds when executed on a single processor. If 40 percent of this computation is inherently "sequential" (i.e., will not benefit from additional processors), then the theoretically best possible elapsed times for this program running with 2 and 4 processors, respectively, are :

(A) 30 and 15 seconds (B) 50 and 25 seconds

(C) 70 and 55 seconds (D) 80 and 70 seconds

17. Let L be the language that consists of all strings that contain an equal number of a's and b's. Let M be the regular language a^*b^*. Which of the following is (are) *true* ?

(I) L $\cap$ M is a context-free language

(II) L $\cap$ M is a regular language

(III) L $\cup$ M is not context-free language

(A) (I) only (B) (I) and (II)

(C) (I) and (III) (D) (II) and (III)

18. A grammar has the following productions :

$$S \rightarrow aSSb \mid a \mid bSa$$

Which of the following string is in the language that is generated by this grammar ?

(A) *aaaaabb* (B) *aabbaabb*

(C) *bbbaabbaa* (D) *babbbabba*

19. The concept of Finite State Automata is commonly used in this part of the compiler :

(A) lexical analysis (B) parser

(C) code generation (D) code optimization

20. The invariant to prove that the following program computes the product of x and y (assuming y is not negative) is :

$\{y \geq 0\}$

z : = 0 ;

n : = y ;

while n > 0 do

z : = z + x ;

n : = n − 1 ;

$\{z = x * y\}$

(A) $z = x * (y - n) \wedge n \geq 0$ (B) $z = z + y \wedge n \geq 0$

(C) $z = z + y \wedge n \leq 0$ (D) $z = x * (y - n) \wedge n \leq 0$

21. How many parse trees does the grammar :

$$E \rightarrow E + E | E * E | (E) | \text{elem}$$

have for the expression elem * elem + elem ?

(A) 0 (B) 1

(C) 2 (D) 3

22. Which device is used to connect two networks that work on different network protocols ?

(A) Router (B) Bridge

(C) Gateway (D) Repeater

23. What is the minimum and maximum size of IP datagram header ?

(A) 16 bytes, 40 bytes (B) 20 bytes, 60 bytes

(C) 40 bytes, 512 bytes (D) 512 bytes, 65535 bytes

24. Which one is a good example of a packet screener ?

(A) Router (B) Gateway

(C) Firewall (D) Hub

25. Error detection at the Data link layer is achieved by :

(A) Bit stuffing

(B) Cyclic redundancy code (CRC)

(C) Hamming code

(D) Equalization

26. Which topology has highest reliability ?

(A) Bus (B) Star

(C) Ring (D) Mesh

27. The alpha-mem, a new data structure, supports two operations. The insert operation allows "words" to be stored in the alpha-mem. The remove operation causes the "word" in the alpha-mem which is first alphabetically to be printed and removed from the alpha-mem. Which of the following is true of an alpha-mem ?

(A) If words are inserted in alphabetical order and all words are inserted before any are removed, then it works like a stack.

(B) If words are inserted in alphabetical order, then it works like a stack whether or not all inserts precede any removes.

(C) If words are inserted in reverse alphabetical order, then it works like a queue whether or not all inserts precede any removes.

(D) If words are inserted in alphabetical order, then it works like a queue whether or not all inserts precede any removes.

28. Assume a breadth-first search and depth-first search were done on a large data structure. Interestingly, the nodes were visited in exactly the same order for both BFS and DFS. Each visit occurred when a node was entered the first time. What data structure was searched ?

(A) Singly-linked list (B) Complete tree

(C) Strictly Binary tree (D) Circular doubly linked list

29. Of the following sorting algorithms, which has a running time that is at least dependent on the initial ordering of the input ?

(A) Insertion sort (B) Quick sort

(C) Merge sort (D) Tree sort

30. The Quick sort algorithm is based on the ..... strategy.

(A) Greedy (B) Dynamic programming

(C) Divide and Conquer (D) Backtracking

31. Consider the following statements :

(*i*) a^n is $O(b^n)$, if $1 < a \leq b$.

(*ii*) $f(n) + g(n)$ is $O(max(f(n), g(n)))$.

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false. (B) Both (*i*) and (*ii*) are true.

(C) (*i*) is true, but (*ii*) is false. (D) (*i*) is false, but (*ii*) is true.

32. If a class C is derived from class B, which is derived from class A, all through public inheritance, then a class C member function can access :

(A) protected and public data only in C and B.

(B) protected and public data only in C.

(C) private data in A and B.

(D) protected data in A and B.

33. RunTime Polymorphism in C++ is achieved by :

(A) friend function (B) virtual function

(C) operator overloading (D) function overloading

34. Which one is *not* a main feature of object oriented programming ?

(A) Classes and Objects (B) Exception handling

(C) Inheritance (D) Polymorphism

35. Why does an applet have no main( ) method ?

(A) The browser acts as the main( ). The applet provides methods for the browser.

(B) The paint( ) method is like the main( ) method for an applet.

(C) Programs that do graphics don't need a main( ) method.

(D) Only simple programs need a main( ) method.

36. Where in an HTML document is the correct place to refer to an external style sheet ?

(A) At the top of the document

(B) At the end of the document

(C) In the <body> section

(D) In the <head> section

37. The ..... keyword tells the C++ compiler to substitute the code within the function definition for every instance of a function call.

(A) virtual (B) inline

(C) instance (D) abstract

38. Which activity is associated with question "Are we building the right product" ?

(A) Testing (B) Verification

(C) Debugging (D) Validation

39. Alpha and Beta testing are forms of :

(A) Integration testing (B) Unit testing

(C) System testing (D) Acceptance testing

40. Reliability in software engineering is measured as :

(A) the frequency of failures

(B) the number of defects

(C) the frequency of successfully execution of a module

(D) the number of error free operations

41. In Project scheduling, probability technique (i.e. probabilistic nature) is used in :

(A) CPM (B) PERT

(C) Gantt Charts (D) Both (A) and (B)

42. Which testing method is normally used to identify an error of data type during parameter passing in a function calling ?

(A) Regression testing (B) Integration testing

(C) Unit testing (D) Functional testing

43. Which scheduling policy is most suitable for a time-shared operating system ?

(A) Shortest-job First (B) Elevator

(C) Round-Robin (D) First-Come-First-Serve

44. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlocks will ever arise is :

(A) 4 (B) 3

(C) 5 (D) 6

45. In which of the following page replacement policies Belady's anomaly occurs ?

(A) FIFO (B) LRU

(C) LFU (D) NRU

46. If a process is executing in its critical section, then no other processes can be executing in their critical section. This condition is called :

(A) mutual exclusion (B) critical exclusion

(C) synchronous exclusion (D) asynchronous exclusion

47. Virtual memory is usually implemented using :

(A) swapping (B) fragmentation

(C) segmentation (D) demand paging

48. Which one of the following is *not* a rule of inference in propositional logic ?

(A) $(P \rightarrow Q) \wedge \neg Q \Rightarrow \neg P$ (B) $(P \vee Q) \wedge \neg P \Rightarrow Q$

(C) $(P \rightarrow Q) \wedge Q \Rightarrow P$ (D) $P \rightarrow Q \Rightarrow P \rightarrow (P \wedge Q)$

49. Consider the following statements :

(*i*) A* is based on heuristics.

(*ii*) A* is exponential in the worst case.

(*iii*) A* always finds a solution if one exists.

Which of the following is *correct* ?

(A) All statements are true

(B) None of the statements is true

(C) Only (*i*) and (*iii*) are true

(D) Only (*ii*) is true

50. What is the output of the following PROLOG program :

```
bachelor(P) : - male(P), not(married(P)).

    male(henry).

    male(tom).

    married(tom).
```

on the query : ? - bachelor(henry).

(A) yes (B) no

(C) henry (D) Who = henry ;

51. Which one of the following statements is invalid ?

(A) Decision Support System (DSS) uses semi-structured and unstructured information in addition to the structured information.

(B) DSS helps top-level management in taking strategic decision.

(C) In a financial accounting system, Management Information System (MIS) reports include day books (e.g. cash book, bank books, ...)

(D) Analysis (e.g. sales analysis) reports form a part of MIS reports.

52. Which of the following conversion is *not* possible (algorithmically) ?

(A) regular grammar to context-free grammar

(B) nondeterministic FSA to deterministic FSA

(C) nondeterministic PDA to deterministic PDA

(D) nondeterministic TM to deterministic TM

53. Using a suitable Pumping Lemma, one can :

(A) Prove that a language is regular

(B) Prove that a language is context-free

(C) Prove that a language is context-free but not regular

(D) Disprove that a language is context-free

54. Consider a language L for which there exists a Turing machine (TM), T, that accepts every word in L and either rejects or loops for every word that is not in L. The language L is :

(A) NP hard

(B) NP complete

(C) recursive

(D) recursively enumerable

55. Consider the following language :

$$L = \{a^n b^n c^n d^n \mid n \geq 1\}$$

L is :

(A) CFL but not regular

(B) CSL but not CFL

(C) regular

(D) type 0 language but not type 1

56. Consider the following language :

$$L = \{a^n b^n \mid n \geq 1\}$$

L is :

(A) CFL but not regular

(B) CSL but not CFL

(C) regular

(D) type 0 language but not type 1

57. Which of the following regular expressions denotes a language comprising of all possible strings over $\Sigma = \{a, b\}$ of length n, where n is a multiple of 3.

(A) $(a + b + aa + bb + aba + bba)^*$

(B) $(aaa + bbb)^*$

(C) $((a + b)\ (a + b)\ (a + b))^*$

(D) $(aaa + ab + a) + (bbb + bb + a)$

58. A data file of 100,000 characters contains only the characters a to f with the frequencies written within parentheses : a(45,000), b(13,000), c(12,000), d(16,000), e(9,000) and f(5,000). What will be Huffman code for letters b, d and e ?

(A) 001, 011, 100

(B) 10, 110, 1110

(C) 10, 100, 1100

(D) 101, 111, 1101

59. To detect one bit error in a given binary string, which one of the following actions is to be taken ?

(A) '1' is appended at the end of the given string if the number of 1s in the given string is odd and odd parity is used.

(B) '1' is appended at the end of the given string if the number of 1s in the given string is odd and even parity is used.

(C) '1' is appended at the end of the given string if the number of 0s in the given string is odd and odd parity is used.

(D) '1' is appended at the end of the given string if the number of 0s in the given string is odd and even parity is used.

60. A series of n fair coin tosses has an entropy of :

(A) $2n - 1$ (B) $2n$

(C) n (D) $\log_2 n$

61. A 12 bit codeword is generated using Hamming code to detect 2 bit errors and correct 1 bit error in 8 bit data. The 12 bit codeword (generated) is corrupted to give 1010 0000 1010. Select from the following options the originally generated codeword.

(A) 1010 0000 0010 (B) 1010 0100 1010

(C) 1010 0000 1011 (D) 1000 0000 1010

62. Which one of the following statements is *true* ?

(A) Degeneracy may occur in Vogel's Approximation Method (VAM) or in Least Cost Method (LCM), but it will never occur if North-West Corner Method is used to find initial solution of a Transportation problem.

(B) Existence of multiple optimal solutions in a Transportation problem is determined by the presence of zero opportunity cost in one or more than one unoccupied cells.

(C) Multiple solutions do not exist in Assignment problem because the minimum number of horizontal and vertical lines covering all zeros is equal to the number of jobs.

(D) Both dummy rows and dummy columns may be required to be added in some special case of unbalanced Assignment problem

63. What will be the characteristic of the solution of the following LP problem ?

Maximize $Z = 3x_1 + 4x_2$

Subject to constraints

$x_1 - x_2 = -1$

$-x_1 + x_2 \leq 0$

$x_1, x_2 \geq 0$

(A) Unique solution

(B) Unbounded solution

(C) Infeasible solution

(D) Multiple solution

64. Dual LP problem approach attempts to optimize resource allocation by ensuring that :

(A) Marginal opportunity cost of a resource equals the marginal return

(B) Marginal opportunity cost of a resource is less than the marginal return

(C) Marginal opportunity cost of a resource is more than the marginal return

(D) Marginal opportunity cost is made independent of the marginal return

65. Which of the following statements is *false* ?

(A) Network flow algorithms can be used to solve the bipartite matching problem in graphs.

(B) The worst-case time complexity of the Ford-Fulkerson algorithm is exponential.

(C) The maximum weighted matching problem on bipartite graphs is NP-hard.

(D) The maximum flow algorithm can be used to identify the minimum cut in the graph.

66. Dijkstra's algorithm for single-source shortest path :

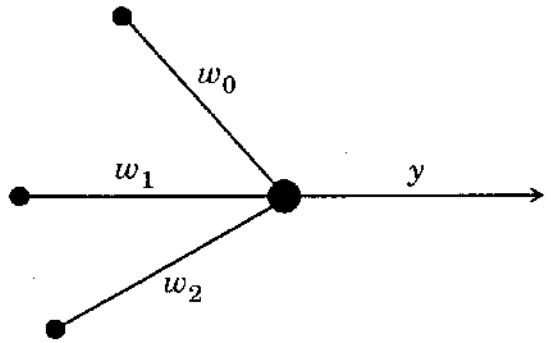
(A) can be used to find the minimum spanning tree of a weighted graph.

(B) supports negative weights on the edges of the graph.

(C) is an example of the greedy method.

(D) runs in $O(n \log n)$ time.

67. The following thresholding neuron with binary inputs finds the weighted sum $net = w_1x_1 + w_2x_2 - w_0$ and outputs $y = 1$ if $net > 0$ and $y = 0$ otherwise.



Which of the following values of (w_0, w_1, w_2) will make the neuron to represent the AND Boolean operator ?

(A) (1, 1, 0) (B) (1, 0, 1)

(C) (1, 1, 1) (D) (0, 1, 1)

68. The logistic function $f(x) = \frac{1}{1 + e^{-x}}$ is used as a convenient transfer function for neurons in a neural network. The derivative of $f(x)$ has the following simple relationship with $f(x)$:

(A) $f'(x) = f(x)\ (1 + f(x))$ (B) $f'(x) = f(x)\ (f(x) - 1)$

(C) $f'(x) = f(x)\ (1 - f(x))$ (D) $f'(x) = 1 + f(x)^2$

69. The XOR Boolean function can be represented by a two-layer Feed Forward Neural Network. What is the minimum number of computing neurons in such a network ?

(A) 2 (B) 4

(C) 5 (D) 3

70. Consider a set P = {P1, P2, P3, P4} of four varieties of paddy plants, set D = {D1, D2, D3, D4} of the various diseases affecting the plants and S = {S1, S2, S3, S4} be the set of common symptoms of the diseases. The fuzzy relation R between plants diseases and fuzzy relation S between diseases symptoms respectively, defined by following Matrices.

R	D1	D2	D3	D4
P1	0.6	0.6	0.9	0.8
P2	0.1	0.2	0.9	0.8
P3	0.9	0.3	0.4	0.8
P4	0.9	0.8	0.1	0.2

S	S1	S2	S3	S4
D1	0.1	0.2	0.7	0.9
D2	1	1	0.4	0.6
D3	0	0	0.5	0.9
D4	0.9	1	0.8	0.2

If we associate plants with different symptoms using Max-Min composition of R and S, then which one of the following fuzzy sets would represent association of P1 with symptoms S1, S2, S3, S4 ?

(A) $0.8|S1 + 0.8|S2 + 0.8|S3 + 0.9|S4$

(B) $0.6|S1 + 0.6|S2 + 0.9|S3 + 0.8|S4$

(C) $0.6|S1 + 0.6|S2 + 0.6|S3 + 0.6|S4$

(D) $0.1|S1 + 0.2|S2 + 0.7|S3 + 0.9|S4$

71. Let u and v be two variables defined on sets X = $\{x_1, x_2, x_3\}$ and Y = $\{y_1, y_2\}$ respectively. Assume that a proposition "If u is A then v is B" is given, where A = $0.5|x_1 + 1|x_2 + 0.6|x_3$ and B = $1|y_1 + 0.4|y_2$. Also, given a Fact "u is A'" where A' = $0.6|x_1 + 0.9|x_2 + 0.7|x_3$. If we use fuzzy implication J : [0, 1] × [0, 1] [0, 1] as $J(a, b) = \min(1, 1\ a + b)$ to interpret the proposition and draw a conclusion in the form "v is B'" then the fuzzy set B' is given by :

(A) $B' = 0.7|y_1 + 0.9|y_2$ (B) $B' = 0.9|y_1 + 0.7|y_2$

(C) $B' = 1|y_1 + 0.4|y_2$ (D) $B' = 0|y_1 + 0.6|y_2$

72. Given the following input file "unix-input" :

RamavatarbSinghbSehr192326Volleyballbb

KrishnasuribIyerbbbb102977Footballbbbb

where b denotes an empty space. The command sed 's/[0–9][0–9]*//' unix-input will output :

(A) RamavatarbSinghbSehrVolleyballbb

KrishnasuribIyerbbbbFootballbbbb

(B) RamavatarbSinghbSehrb12326Volleyballbb

KrishnasuribIyerbbbb1277Footballbbbb

(C) 192326

102977

(D) 12326

1277

73. Given the following input file "unix-input" :

RamavatarbSinghbSehr192326Volleyballbb

KrishnasuribIyerbbbb102977Footballbbbb

where b denotes an empty space. The command grep –v Football unix-input | sed 's/[0–9].*//' will output :

(A) KrishnasuribIyer

(B) RamavatarbSinghbSehr

(C) Krishnasuri

(D) Ramavatar

74. The following lex program :

```
%{
#include <strings.h>
int m = 0;
char word[60];
%}
%%
[a – zA – Z]+     { if   (yyleng > m)  {
                         m = yyleng;
                         strcpy (word, yytext);
                         }
                  }
.           |
\n          ;
%%
int main (void)   {
        yylex ( );
        printf ("%s\n", word);
        return 0;
        }
```

when compiled and run outputs :

(A) Each word that contains alphabetic characters

(B) Each word that contains alphanumeric characters

(C) The shortest string which contains alphanumeric characters

(D) The longest string which contains alphabetic characters

75. Windows API to create a process is :

(A) fork( ) (B) CreateProcess( )

(C) exec( ) (D) CreateThread( )

ROUGH WORK

SEAL