

SSESA's, Science College, Congress Nagar, Nagpur

Department of Computer Science

M.Sc. Semester – I (Computer Science)

Paper – I (Discrete Mathematical Structure)

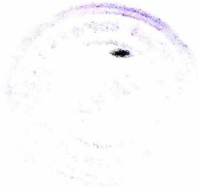
Assignment List (2021-22)

1. Define set and subset. What are the different operations on set?
2. Explain the principle of mathematical induction? Solve  $1^2 + 2^2 + 3^2 + \dots + n^2 = n(n+1)(2n+1)/6$ .
3. If A and B are finite set, then  $|A \cup B| = |A| + |B| - |A \cap B|$ . Solve with the help of Addition Principle.
4. Obtain the Principle disjunctive form of (a)  $P \rightarrow ((P \rightarrow Q) \wedge (\neg Q \vee P))$   
(b)  $\neg P \vee Q$
5. State and explain pigeonhole principle.
6. What is Backtracking? Using Backtrack to find an explicit formula for the sequence defined by the recurrence relation  $b_n = 2b_{n-1} + 1$  with the initial condition  $b_1 = 7$ .
7. What is permutation Function? Explain
  - (a) Cyclic Permutation
  - (b) Even odd permutation
8. Explain Partial order relation with the help of examples.
9. Explain the terms:
  - (a) Euler paths and circuits.
  - (b) Hamiltonian paths and circuits.
10. Explain the terms:
  - (a) Partially ordered set.
  - (b) Hasse diagrams.
11. What is lattice? Explain with example.
12. What is minimal spanning trees? Explain.
  - (a) Krushal's algorithm.
  - (b) Prim's algorithm.
13. Define Monoid and semigroup with example.

14. Let  $G$  be the set of all non-zero real numbers and  $a * b = ab \forall a, b \in G$ . show that  $(G, *)$  is an Abelian group.

15. Explain Isomorphism and Homomorphism.

16. What is Finite State machine. Explain with example.



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**SSESAT'S, Science College, Congress Nagar, Nagpur**  
**Department of Computer Science**  
**Assignment List**  
**Session 2021-22**  
**M.Sc.-Final (Semester-III) Practical - I**  
**Paper-II (Software Engineering)**

1. What is software? Give different characteristics of software and explain changing nature of software in detail.
2. Explain role of software engineering and software myths in detail.
3. Explain a) waterfall model b) spiral model.
4. What is process? Explain process framework activities.
5. What is requirement engineering? Explain functions used in requirement engineering.
6. What is system modeling? How graphical model can be used to present software system.
7. Write note on a) context model b) behavioral model
8. What is design? Explain characteristics of good design.
9. What is software testing? Explain fundamental testing goals.
10. Explain a) white box testing b) black box testing.
11. What is software quality? Explain its quality factors.
12. Write note on design evolution and interface analysis.
13. Explain a) software quality assurance b) formal technical review
14. What is risk management? Explain strategies of risk management
15. What is software Quality management? Explain 9000 quality standards.
16. What is software risk? Explain RMMI plan.

  
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**SSESA's Science College, Congress Nagar, Nagpur**  
**M.Sc. (Computer Science) -Semester III**  
**Assignment List (Session 2021-22)**  
**Paper IV: Mobile Computing**

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1. What is mobile communication? Explain mobile computing architecture.
2. What are handheld devices? Explain the limitations of mobile devices.
3. Explain the automotive system architecture.
4. Explain the types of medium access control.
5. Write down the coding methods in CDMA.
6. Explain mobile IP network layer.
7. Explain Database Hoarding and caching techniques.
8. Explain in detail unicast mode broadcasting architecture for communication asymmetry.
9. Explain MANET (Mobile Ad-hoc Network).
10. Explain wireless application environment.



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TOC & CC  
Assignment List  
M.Sc. Semester - II  
Session 2021-22

1. Explain Deterministic and Non-Deterministic finite automata with example.
2. State and Prove the pumping lemma for Regular Expression.
3. What do you mean by Context Free Grammar? Explain.
4. Explain Useless Symbol with the help of example.
5. Explain Chomsky Normal form and Greibach normal form with example.
6. Design a PDA for the language  $L = \{WcW^R/W \text{ is in } (0^+)^*\}$ .
7. Design Turing machine for the language  $L = \{WW^R/W \text{ is in } (0^+)^*\}$ .
8. Define compiler. Discuss the structure of compiler.
9. What is parser? Explain representation of parse tree.
10. What are register and address descriptor.
11. Explain three address code, Quadruples and Triples.
12. Explain Shift reduce parsing with example.
13. Explain the construction of SLR parsing table.
14. Explain the contents and data structures used for symbol tables.
15. Explain the process of code generation from DAG's.



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**SSESA's, Science College, Congress Nagar, Nagpur**  
**Computer Architecture and Organization**  
**Assignment List**  
**M.Sc. Semester – II**  
**Session 2021-22**

1. Explain in detail the different layers used in Computer architecture.
2. What is hardware and software? What are their roles in computer design? Explain how they interact with each other.
3. What is instruction ? What are its types ? Explain each one with its formats.
4. What are addressing modes ? Explain different types of addressing modes with suitable example.
5. Explain the concept of pipelining in CPU design in detail.
6. Discuss control path design in detail.
7. What is RISC and CISC ? Difference between RISC and CISC and give their advantages and disadvantages.
8. Explain superscalar processors in detail.
9. What is storage device ? Explain the different storage technologies with an example .
10. Design a memory unit for 8 KB RAM with available chip of 2 KB RAM. Also design a decoder using address table method.
11. Design a memory unit of 16 KB RAM using suitable number of available 2 KB RAM. Give the suitable decoder design also.
12. What is virtual memory? Explain the concept of paging and segmentation.
13. Describe the daizy-chain priority interrupt system in detail.
14. What is PCI bus? Discuss the role of PCI bus in computer system organization.
15. Discuss the Transaction processing benchmark in detail .
16. What is DMA ? What are its advantages ? Explain the cycle-stealing mode of operation of DMA in brief.



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M. Sc. Semester - IV

Parallel Computing (Paper – IV)

Assignment List

1. Discuss the dichotomy of parallel computing platforms.
2. Describe the communication costs in parallel machines.
3. What are the limitations of memory system performance?
4. Explain the network topologies in parallel computing.
5. Write notes on principles of parallel algorithm design and explain its preliminaries.
6. How to perform decomposition techniques? Explain.
7. What are the characteristics of task and interactions?
8. Explain One-to-All Broadcast and All-to-One reduction.
9. What is the performance metrics for parallel systems?
10. Explain the building blocks send and receive operations.
11. Write the principles of message passing programming.
12. What are the collective communication and computation operations?
13. Explain matrix-matrix multiplication.
14. Explain the binary exchange algorithm in FFT.
15. Describe parallel depth-first search.
16. Describe the transpose algorithm in details.



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