Facultatea de Matematică și Informatică
Departamentul de Informatică
Conferențiar universitar, poziția 16

Tematica probelor de concurs

Teoria grafurilor și combinatorică

1. Tehnici de numarare
2. Tehnici de generare si enumerare
3. Principiul porumbelului si principiul incluziunii si excluziunii. Aplicatii
4. Tehnici avansate de numarare. Relatii de recurenta
5. Teoria de enumerare a lui Polya
6. Grafuri. Conectivitate. Traversarea grafurilor. Aplicatii
7. Drumuri de cost minim in grafuri ponderate: algoritmul lui Dijkstra si algoritmul lui Warshall. Arbori de acoperire: algoritmul lui Kruskal si algoritmul lui Prim.
8. Retele de transport. Cuplaje
9. Colorarea grafurilor. Grafuri planare

Programare logica și funcționala

10. Recursivitate în Racket
11. Iterativitate în Racket
12. Argumente opționale. Liste de asociere. Abstractizare
13. Închideri lexicale
14. Macro-uri
15. Probleme in scrierea macrourilor
16. Liste. Recursivitate în Prolog. Acumulatori
17. Backtracking şi predicatul de tăiere. Exemple de utilizare. Negaţia ca insucces.
18. Prolog eficient. Consideraţii asupra stilului de programare. Clauze Horn. Principiul rezoluţiei. Rezoluţie SLD corectitudine şi completitudine.
19. Logica predicatelor de ordinul I. Forma clauzală. Unificare
20. Programare logică cu constrângeri.

Tematica în limba engleză

Graph Theory and Combinatorics

1. Counting principles.
2. Generation and enumeration principles.
3. The Pigeonhole principle and the inclusion and exclusion principle. Applications
4. Advanced counting techniques. Recurrence relations

5. Polya's enumeration theory
6. Graph Theory. Connectivity. Graphs traversal. Applications
7. Lightest paths in weighted graphs: Dijkstra's algorithms and Warshall algorithm. Spanning trees: Kruskal's algorithm and Prim's algorithm.
8. Flow networks. Flows
9. Graph colourings. Planar graphs

Logic and Functional Programming

10. Recursion in Racket
11. Iterativity in Racket
12. Optional arguments. Association lists. Abstraction
13. Lexical closures
14. Macros
15. Problems in writing macros
16. Lists. Recursion in Prolog. Accummulators
17. Backtracking and the cut predicate. Common uses of the cut. Negation as failure.
18. Efficient Prolog. Considerations on programming style. Horn clauses. The resolution principle. The SLD resolution correctness and completeness.
19. First order predicate logic. Clausal form of formulae. Unification
20. Constraint logic programming.

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