Computational Complexity

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1 NP and NP-completeness

1. Certificate definition of **NP**.

2. Nondeterministic computation and **NP**.

3. Reductions and completeness.

4. Transitivity of Reductions.

5. Karp and Turing reductions.

6. **NP-completeness**

2 Boolean circuits

1. Definition of boolean circuit.

2. Size and Depth of a circuit.

3. Acceptance of a string by a circuit.

4. Acceptance of a language by a circuit.

5. Family of circuits.

6. Size complexity and depth complexity of a family of circuits.

7. Uniform circuit family.

8. Connection between **P** and uniform circuit families.

3 The first NP-complete problem

1. CircuitSAT.

2. Witness Existence.

4 Satisfiability

1. SAT and 3SAT.

2. NAE3SAT.

3. MAXSAT and MAX2SAT.

4. 0/1 Integer Programming.