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Sommario/riassunto	"India and the United States are the world's two largest democracies

	with distinguished scientific traditions and experts in a wide range of scientific-technical fields. Given these strengths and the ability to learn from one another, the U.S. National Academy of Sciences together with the National Institute for Advanced Studies in Bangalore, India, held a joint Indian-U.S. workshop to identify and examine potential areas for substantive scientific and technical cooperation that can support counterterrorism efforts through the Homeland Security Dialogue and through direct cooperation. India-United States Cooperation on Science and Technology for Countering Terrorism is the summary of that workshop. This report examines topics such as biological threats; protection of nuclear facilities; security (physical and cyber) for chemicals, chemical facilities and other critical infrastructure; and monitoring, surveillance, and emergency response. The report also identifies and examines promising areas for further Indian-U.S. cooperation."--Publisher's description.

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	Nota di contenuto	Intro -- Foreword -- Introduction -- Contents -- 1 Surface Preliminaries -- 1.1 Surfaces -- 1.2 Euclidean Space -- 1.3 Open Sets -- 1.4 Functions and Their Properties -- 1.5 Continuity -- 1.6 Problems -- 2 Surfaces -- 2.1 The Definition of a Surface -- 2.2

Examples of Surfaces -- 2.3 Spheres as Surfaces -- 2.4 Surfaces with Boundary -- 2.5 Closed, Bounded, and Compact Surfaces -- 2.6 Equivalence Relations and Topological Equivalence -- 2.7 Homeomorphic Spaces -- 2.8 Invariants -- 2.9 Problems -- 3 The Euler Characteristic and Identification Spaces -- 3.1 Triangulations and the Euler Characteristic -- 3.2 Invariance of the Euler Characteristic -- 3.3 Identification Spaces -- 3.4 ID Spaces as Surfaces -- 3.5 Abstract Topological Spaces -- 3.6 The Quotient Topology -- 3.7 Further Examples of ID Spaces -- 3.8 Triangulations of ID Spaces -- 3.9 The Connected Sum -- 3.10 The Euler Characteristic of a Compact Surface with Boundary -- 3.11 Problems -- 4 Classification Theorem of Compact Surfaces -- 4.1 The Geometry of the Projective Plane and the Klein Bottle -- 4.2 Orientable and Nonorientable Surfaces -- 4.3 The Classification Theorem for Compact Surfaces -- 4.4 Compact Surfaces Have Finite Triangulations -- 4.5 Proof of the Classification Theorem -- 4.6 Problems -- 5 Introduction to Group Theory -- 5.1 Why Use Groups? -- 5.2 A Motivating Example -- 5.3 Definition of a Group -- 5.4 Examples of Groups -- 5.5 Free Groups, Generators, and Relations -- 5.6 Free Products -- 5.7 Problems -- 6 Structure of Groups -- 6.1 Subgroups -- 6.2 Direct Products of Groups -- 6.3 Homomorphisms -- 6.4 Isomorphisms -- 6.5 Existence of Homomorphisms -- 6.6 Finitely Generated Abelian Groups -- 6.7 Problems -- 7 Cosets, Normal Subgroups, and Quotient Groups -- 7.1 Cosets -- 7.2 Lagrange's Theorem and Its Consequences -- 7.3 Coset Spaces and Quotient Groups.
7.4 Properties and Examples of Normal Subgroups -- 7.5 Coset Representatives -- 7.6 A Quotient of a Dihedral Group -- 7.7 Building up Finite Groups -- 7.8 An Isomorphism Theorem -- 7.9 Problems -- 8 The Fundamental Group -- 8.1 Paths and Loops on a Surface -- 8.2 Equivalence of Paths and Loops -- 8.3 Equivalence Classes of Paths and Loops -- 8.4 Multiplication of Path and Loop Classes -- 8.5 Definition of the Fundamental Group -- 8.6 Problems -- 9 Computing the Fundamental Group -- 9.1 Homotopies of Maps and Spaces -- 9.2 Computing the Fundamental Group of a Circle -- 9.3 Problems -- 10 Tools for Fundamental Groups -- 10.1 More Fundamental Groups -- 10.2 The Degree of a Loop -- 10.3 Fundamental Group of a Circle-Redux -- 10.4 The Induced Homomorphism on Fundamental Groups -- 10.5 Retracts -- 10.6 Problems -- 11 Applications of Fundamental Groups -- 11.1 The Fundamental Theorem of Algebra -- 11.2 Further Applications of the Fundamental Group -- 11.3 Problems -- 12 The Seifert-Van Kampen Theorem -- 12.1 Wedges of circles -- 12.2 The Seifert-Van Kampen Theorem: First Version -- 12.3 More Fundamental Groups -- 12.4 The Seifert-Van Kampen Theorem: Second Version -- 12.5 The Fundamental Group of a Compact Surface -- 12.6 Even More Fundamental Groups -- 12.7 Proof of the Second Version of the Seifert-Van Kampen Theorem -- 12.8 General Seifert-Van Kampen Theorem -- 12.9 Groups as Fundamental Groups -- 12.10 Problems -- 13 Introduction to Homology -- 13.1 The Idea of Homology -- 13.2 Chains -- 13.3 The Boundary Map -- 13.4 Homology -- 13.5 The Zeroth Homology Group -- 13.6 Homology of the Klein Bottle -- 13.7 Homology and Euler Characteristic -- 13.8 Homology and Orientability -- 13.9 Smith Normal Form -- 13.10 The Induced Map on Homology -- 13.11 Problems -- 14 The Mayer-Vietoris Sequence -- 14.1 Exact Sequences -- 14.2 The Mayer-Vietoris Sequence.
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70608-112 -- Appendix A Topological Notions -- A.1 Compactness Results -- A.2 Technical Conditions for Abstract Surfaces -- Appendix B A Brief Look at Singular Homology -- Appendix C Hints for Selected Problems -- Appendix References -- -- Index.

Sommario/riassunto

Algebraic Topology is an introductory textbook based on a class for advanced high-school students at the Stanford University Mathematics Camp (SUMaC) that the authors have taught for many years. Each chapter, or lecture, corresponds to one day of class at SUMaC. The book begins with the preliminaries needed for the formal definition of a surface. Other topics covered in the book include the classification of surfaces, group theory, the fundamental group, and homology. This book assumes no background in abstract algebra or real analysis, and the material from those subjects is presented as needed in the text. This makes the book readable to undergraduates or high-school students who do not have the background typically assumed in an algebraic topology book or class. The book contains many examples and exercises, allowing it to be used for both self-study and for an introductory undergraduate topology course.